

What Does Investment-Cash Flow Sensitivity Really Measure?

* An Investigation Using Worldwide Data

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Abstract

The answer to the above question appears to be ‘the firm’s cash flow situation.’ Using firm-level data from thirty-five countries over the period 1998 through 2004, we attempt to uncover the nature of investment-cash flow sensitivity. Prior studies on U.S. firms report that investment-cash flow sensitivity is not a measure of financial constraint and is higher for firms of good financial status than for firms of poor financial status. We examine whether this observation can be generalized to the firms outside the U.S. Our empirical results suggest that investment-cash flow sensitivity is unlikely to be related to financial constraint, which confirms the results of prior studies on U.S. firms. However, unlike prior studies on U.S. firms, our results do not suggest that good financial status firms display relatively high investment-cash flow sensitivity. Our most important finding is that almost invariably across countries, investment-cash flow sensitivity is weak for firms with low cash flows while it is strong for firms with high cash flows. We propose that investment-cash flow sensitivity is a measure of the availability of the firm’s internal funds.

JEL classification: G31, G32

Key words: investment-cash flow sensitivity; financial status, pecking order

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1. Introduction

A controversial issue in the corporate finance literature is whether investment-cash flow sensitivity is related to financial constraint. This issue has been raised first in the seminal study of Fazzari, Hubbard and Petersen (1988, FHP hence-after). They argue that the pecking order theory predicts that firms facing financial constraint—i.e. firms for which external funds are particularly more expensive—will rely more on internal funds and thus will display high investment sensitivity to cash flows.

However, subsequent studies on U.S. firms do not support the claim of FHP. For example, the evidence from Kaplan and Zingales (1997, KZ hence-after) and Cleary (1999) suggests that investment-cash flow sensitivity may not be related to financial constraint. Alti (2003) also argues that investment-cash flow sensitivity is not a proper measure of financial constraint. The empirical results of KZ and Cleary are particularly controversial because they indicate that firms of good financial status actually display higher investment sensitivity to cash flows than firms of poor financial status. This positive relation between investment sensitivity and financial status is the opposite of what is predicted by FHP.

Prior studies, however, while making some conjectures, do not offer convincing explanations as to why there may exist a positive relation between financial status and investment-cash flow sensitivity. For example, Cleary briefly mentions that this positive relation is consistent with the free cash flow hypothesis of Jensen. KZ proposes that “managerial risk aversion” may contribute to this positive relation.¹

In this study, we use worldwide firm-level data to re-examine the question of whether investment-cash flow sensitivity is related to financial constraint. In addition, we examine whether the prior finding on the U.S. firms—namely, the positive relation between investment-cash flow sensitivity and financial status—can be extended to firms in other countries outside the U.S. We believe that before searching for reasons for the positive relation between investment-cash flow sensitivity and financial status, one must

¹ One can point out, however, that managerial risk aversion is a legitimate explanation only if managers of firms of good financial status are more risk averse than those of firms of poor financing status.

first need to establish whether this empirical relation is truly robust and can apply to firms outside the U.S. that operate in different institutional environments. In examining these questions, our ultimate aim is to uncover the nature of investment-cash flow sensitivity—what the variable really measures.

The primary motivation for this multi-country study comes from the possibility that firms in countries in different stages of financial development may display disparate the relationships between financial status and investment-cash flow sensitivity. For example, firms in a country without well-developed financial markets may have to rely more on internal funds. Especially, it is conceivable that in countries without well-developed financial markets, firms of poor financial status face much limited access to external funds in comparison to firms of good financial status. If so, we can posit that in countries without well-developed financial markets, firms of poor financial status will display substantial investment sensitivity to cash flows because they need to rely mainly on internal funds for investment. This means that the results of KZ and Cleary on U.S. firms—the positive relation between financial status and investment-cash flow sensitivity—may not apply to firms in countries without well-developed financial markets.

Our analysis begins by applying the approach of Cleary to each of the thirty-five countries in the sample. We use a creditworthiness score as a proxy for firms' financial status as Cleary does. In each country, we divide firms into three groups according to their creditworthiness scores estimated using a linear discriminant function. Firms with low creditworthiness scores are taken to be financially constrained. We then estimate a regression model for each of the three groups so that we can obtain investment-cash flow sensitivity. If investment-cash flow sensitivity is truly a measure of financial constraint (as posited by FHP), we expect the sensitivity to be the highest for firms of low creditworthiness, followed by firms of medium creditworthiness and then firms of high creditworthiness. On the other hand, it is also possible that firms outside the U.S. may display the same pattern displayed by the U.S. firms—that is, investment-cash flow sensitivity in each country is the highest for firms of high creditworthiness, followed by firms of medium creditworthiness and then firms of low creditworthiness.

As an alternative to using the creditworthiness score, we use firm size—measured by total assets—in classifying firms into three groups. Firm-size-based classification can make sense because firm size may reflect the firm’s ability to access external financial markets. For example, as argued by Beck, Demirguc-Kunt and Maksimovic (2004), in countries without well-developed financial markets, small firms face more limited access to external financing than large firms. In essence, this means that small firms are more likely to face financial constraint than large firms. Therefore if investment-cash flow sensitivity is a measure of financial constraint, the sensitivity will be higher for small firms. We examine this question by dividing firms in each country into three groups according to their total asset values. We then estimate and compare investment-cash flow sensitivity for each of the three groups of firms.

The results of this analysis can be summarized as follows:

- In the majority of countries, firms of poor financial status (i.e., firms with low creditworthiness scores) do not display high investment-cash flow sensitivity.
- Contrary to the results of KZ and Cleary on U.S. firms, the relation between financial status and investment-cash flow sensitivity is not positive in the majority of countries.
- In more than half the countries in the sample, large firms display high investment-cash flow sensitivity relative to small firms.

To interpret the above results, it seems that investment-cash flow sensitivity is unlikely to be related to financial constraint. Firms of low creditworthiness or of small size do not display high investment-cash flow sensitivity in the majority of countries. Thus our results using worldwide data confirm to the finding of KZ and Cleary on U.S. firms—investment-cash flow is not related to financial constraint. However, it is also important to note that our results deviate from those of KZ and Cleary in that the relation between investment-cash flow sensitivity and financial status is not positive in

the majority of countries. Thus the positive relation between investment-cash flow sensitivity and financial status—found on U.S. firms—is not quite common around the world.

Given that investment-cash flow sensitivity is unlikely to be a measure of financial constraint and is not positively related to financial status, our next task is to uncover the nature of investment-cash flow sensitivity. That is, we feel compelled to ask the following question: what does this sensitivity really measure? In search of an answer to this question, we pay attention to the possibility that firms with poor (or negative) cash flows will be unable to finance their investment projects with cash flows. If so, it is likely that investment of poor-cash-flow firms will display small sensitivity to cash flows. On the other hand, firms with good cash flows will be able to finance their investment projects with cash flows, and thus will display large sensitivity to cash flows. This reasoning calls for analyzing the relation between investment-cash flow sensitivity and the level of cash flows. To examine this relation, we divide sample firms in each country into three groups based on their level of cash flows: high-, medium-, and low-cash-flow firms. Then for each group of firms, we estimate investment-cash flow sensitivity.

Remarkably, our results strongly suggest that investment-cash flow sensitivity is related positively to the level of cash flows. That is, in all countries—with no single exception in our thirty-five countries—investment-cash flow sensitivity is the lowest for low-cash-flow firms. And in almost all countries—in thirty-two countries out of our thirty five countries—investment-cash flow sensitivity is the highest for high-cash flow firms. Hence, evidence is remarkably strong that investment-cash flow sensitivity is a variable that reflects the firm's cash flow situation.

We argue that this intriguing observation can be explained by the pecking order theory. The pecking order theory predicts that internal funds are less expensive than external funds and thus firms will use internal funds first, if available, before tapping external sources of funds. However, if the cash flow stream is poor or negative, the firm cannot afford to use internal funds to finance investments. The firm will rely mainly on external

funds to finance investments. Hence, investment of low-cash-flow firms will not necessarily be sensitive to the availability of internal funds. On the other hand, firms with healthy cash flows will rely on internal funds for their investment as the pecking order theory predicts. Thus investment of such firms will display high sensitivity to the availability of internal funds. This line of reasoning is strongly supported by our results, given that the relation between investment-cash flow sensitivity and the level of cash flows is strongly positive in almost all countries in the sample.

The contribution of our empirical investigation to the literature on investment-cash flow sensitivity can be described as follows. First, we confirm the conclusion of prior studies that investment-cash flow sensitivity is not related to financial constraint. Especially, our results provide robustness to this conclusion because our results are derived from a study of firms in multiple countries with different institutional environments. Second, we reveal that the position relation observed in U.S. firms between financial status and investment-cash flow is not quite universal around the world. Third and the most important, we uncover the nature of investment-cash flow sensitivity by showing what the sensitivity really measures. That is, we show that investment-cash flow sensitivity is a variable that reflects the firm's cash flow situation. The evidence for this is remarkably strong across countries despite the fact that firms in different countries operate in different institutional environments. We argue that the positive relation between investment-cash flow sensitivity and cash flows is consistent with the pecking order theory.

This paper is organized as follows. The next section reviews prior studies on investment-cash flow sensitivity. Section 3 presents methodology and data. Section 4 conducts empirical analysis and summarizes empirical results. Section 5 discusses and concludes the paper.

2. Prior U.S. Studies

FHP offer a seminal study on investment-cash flow sensitivity. The premise of FHP is that there is a financing hierarchy given that internal funds are a less costly source of funds than external funds. Under this premise it is possible to argue that the amount of

capital investments will be sensitive to the availability of internal funds. FHP then predict that this sensitivity of capital investments to internal funds will be higher for firms facing financial constraint. To assess this prediction, FHP partition sample firms into three groups according to the level of dividend payouts that is presumed to be associated negatively with the level of financial constraint faced by firms. Their results indicate that investment decisions of financially-constrained firms are more sensitive to internal funds than firms that are not financially constrained.

KZ, however, challenge the validity of the claim of FHP. KZ classify firms according to their degree of financial constraint, based on quantitative and qualitative information obtained from company annual reports. Contrary to FHP, they find that investment decisions of the least financially constrained firms are the most sensitive to the availability of internal funds.

Cleary examines this issue by employing a sophisticated quantitative scheme that measures a firm's financial constraint. He classifies firms according to their creditworthiness scores derived from a multiple discriminant analysis, similar to Altman's Z factor used to predict bankruptcy. Firms with low creditworthiness scores are regarded as facing high levels of financial constraint. He then compares investment-cash flow sensitivity across three groups of firms—high-, medium-, and low-creditworthiness firms. He finds that investment-cash flow sensitivity is the highest among high-creditworthiness firms, followed by medium-creditworthiness firms and then low-creditworthiness firms. This observation—a positive relation between investment-cash flow sensitivity and the firm's creditworthiness—is the opposite of the prediction of FHP but supports KZ's result that investment-cash flow sensitivity is not related to financial constraint.

As explained in Introduction, we depart from prior studies on U.S. firms by extending analysis to firms from a number of countries around the world. It is our belief that benefits of looking at firms operating in different institutional environments will be substantial. This multi-country study, we hope, will help us to uncover the nature of the forces behind the (or lack of) relation between investment-cash flow sensitivity and

financial constraint.

3. Research Design

3.1 Methodology

In analyzing the relation between investment-cash flow sensitivity and financial constraint, we follow the approach used by Cleary. The primary reason for our following Cleary's approach is to facilitate the comparison of the results of our international study with the results of a key U.S. study. Cleary uses the regression model below to estimate investment-cash flow sensitivity. This regression model, a variation of the regression model used in FHP, is estimated using fixed firm and year effects. In this regression model, investment-cash flow sensitivity is represented by $\beta_{CF/K}$.

$$(I / K)_{it} = \beta_{M/B} (M / B)_{it} + \beta_{CF/K} (CF / K)_{it} + u_{it} \quad (1)$$

In the above regression equation, I represents investment in plant and equipment for the firm during period t ; K is the beginning-of-period book value for net property, plant and equipment; CF represents current-period cash flow to the firm as measured by net income plus depreciation plus the change in deferred taxes; M/B represents the firm's common equity market-to-book ratio based on the previous year's actual market value at year-end; and u_{it} is an error term.

We estimate the above regression model for each of the three groups of firms: firms of good financial status, firms of medium-level financial status, and firms of poor financial status. These three groups of firms are created by classifying our entire sample firms based on their financial status.

Specifically, in determining firms' financial status, we use creditworthiness scores developed by Cleary. This means that firms receiving low (high) creditworthiness scores are treated as poor (good) financial status and thus are likely to face high (low) levels of financial constraint. The creditworthiness scores are derived from a linear discriminant function estimated using a multiple discriminant analysis. Prior to estimating the linear

discriminant function, we first divide the entire sample firms into three equal-sized groups, depending on whether the firm during the year increases, decreases, or leave unchanged dividend payments per share. We then focus on two groups, (i) dividend-increasing firms and (ii) dividend-decreasing firms, for the discriminant analysis. The discriminant analysis looks at the differences between these two groups of firms in terms of various financial characteristics that represent firms' financial status. The rationale for looking at the differences between dividend-increasing and dividend-decreasing firms is that dividend-decreasing firms may face higher levels of financial constraint than dividend-decreasing firms.²

Specifically, the discriminant analysis allows us to construct the creditworthiness index (Z_C) using proxy variables for four key characteristics related to financial status: liquidity, leverage, profitability, and growth. This index is obtained using the following linear classification function which is estimated with the dividend-increasing and dividend-decreasing firm.

$$Z_C = \beta_1 \cdot Current + \beta_2 \cdot FCCov + \beta_3 \cdot SLACK / K + \beta_4 \cdot NI\% + \beta_5 \cdot SGR + \beta_6 \cdot Debt$$

(2)

where *Current* is current ratio; *FCCov* is fixed charge coverage; *SLACK/K* is the ratio of slack to net fixed assets; *NI%* is net income margin; and *SGrow* is one-year sales growth rate; and *Debt* is debt ratio. *Current* and *SLACK/K* are proxy variables for liquidity; *FCCov* and *Debt* is a proxy variable for leverage; *NI%* is a proxy variable for profitability; and *SGR* is a proxy variable for growth.

At the beginning-of-each year, each firm is classified into one of the three groups—low, medium, and high creditworthiness firms—according to their Z_C score. Firms with high Z_C scores are taken to have good financial status and thus face low levels of financial constraint. On the other hand, firms with a low Z_C score are taken to have poor financial status and face high levels of financial constraint.

² The view that non-dividend-paying firms are likely to be financially constrained is first adopted in the study of FHP. The studies of KZ and Cleary adopt the same view as well.

In addition to the creditworthiness score, we use an alternative proxy variable, namely, firm size, for financial constraint.³ We take small firms to be likely to face financial constraint. Viewing firm size as a proxy for financial constraint is plausible because firm size may be related to the firm's ability to access external financial markets. Some prior study argues that in countries without well-developed financial markets, small firms face more limited access to external financing than do large firms. [Beck, Demircuc-Kunt and Maksimovic (2004)]. We choose total assets as a measure of firm size. Using total assets instead of other firm size measures such as market capitalization and net sales can be justified that total assets can be put up as collateral and thus a better indicator of the firm's ability to raise capital.

In examining whether investment-cash flow sensitivity is related to firm size, we follow the same procedure as above. That is, we first divide firms into three equal-size groups based on firm size and then estimate investment-cash flow sensitivity for each of the three groups. If investment-cash flow sensitivity is related to financial constraint, we expect the sensitivity to be the highest for small firms.

3.2 Data and Variables

In constructing our sample of firms from countries around the world, we use the *Worldscope* database. We choose a seven-year period 1998 through 2004. We begin with all available firms in the database, but remove firms in financial services industry as well as foreign firms and ADRs.

Our study requires a number of firm-level variables in order to estimate the regression model (eq. (1)) and the linear discriminant function (eq. (2)). Appendix A lists and

³ It is important to note that the creditworthiness score may not necessarily be a very good measure of the firm's ability to access external financial markets. Our creditworthiness score is obtained using the linear discriminant equation that focuses on the differences in firm characteristics between dividend-increasing and non-dividend-decreasing firms. However, we do not have complete knowledge about forces behind corporate decision to change dividend payouts. Specifically, we do not have concrete evidence as to whether the behavior of increasing or decreasing dividend payouts is related to changes in the firm's ability to access external financial markets.

describes these firm-level variables. These firm-level variables are collected from *Worldscope*. When a firm-year observation has a missing value in any of these variables, the observation is discarded from our sample construction procedure. While we desire to look at as many firms as possible in our analysis, some countries do not have sufficient amounts of usable firm-year observations for analysis.⁴ In the end, we end up with thirty-five countries with sufficient amounts of usable firm-year observations. Table 1 reports key financial ratio means for sample firms (firm years, to be exact) in each country.

In order to deal with extreme observations, we winsorize our data according to the rules followed by Cleary⁵: (i) assign a value of 100 percent (–100 percent) if growth in sales is greater (less) than 100 percent (–100 percent); (ii) assign a value of 2 (–2) if investment/net fixed assets is greater (less) than 2 (–2); (iii) assign a value of 5 (–5) if cash/net fixed assets is greater (less) than 5 (–5); (iv) assign a value of 10 (–10) if market-to-book is greater (less) than 10 (–10); (v) assign a value of 10 if current ratio is greater than 10; (vi) assign a value of +100 percent (–100 percent) if net income margin is greater (less) than 100 percent (–100 percent); and (vii) assign a value of 100 (–0.1) if fixed charge coverage is greater (less) than 100 (0).

4. Empirical Results

4-1 Investment-cash flow sensitivity and creditworthiness

In this subsection, we use the creditworthiness score as a proxy for financial constraint status—meaning that firms with low creditworthiness scores are taken to be financial constrained—and examine whether investment-cash flow sensitivity is related to financial constraint. Specifically, we divide firms of each country into three equal-size groups of firms—low-, medium- and high-creditworthiness-score firms according to the

⁴ For example, Mexico has less than thirty usable firm-year observations. Mexico is not included in our analysis.

⁵ In addition to the rules used by Cleary, we use one more winsorization rule: we assign a value of –10 if market-to-book is less than –10. We think that doing so makes sense because there are many negative market-to-book firms in our international data. However, we find that our results do not change in the qualitative sense by adding this additional winsorization.

creditworthiness score estimated using the linear discriminant function (eq. (2)). Then we estimate the regression model (eq. (1)) for each of the three groups in each country.

Table 1 reports the results of the regression analysis. For each of the thirty-five countries, the table reports the results of the regression analysis for the three groups of firms as well as for the whole sample. Our focus here is on the magnitude and significance of the coefficient on cash flow (CF/K)—which represents investment-cash flow sensitivity.

First, we find that almost invariably, investment-cash flow sensitivity is significantly positive when we look at all sample firms in each country with only two exceptions of Indonesia and Philippines. As pointed out by Cleary, this is consistent with the pecking order theory—firms tend to rely on internal funds for investment.

Second and more important, we find that investment-cash flow sensitivity is not related to financial constraint in many countries. Out of thirty-five countries in the sample, investment-cash flow sensitivity is the highest (in terms of the magnitude of t-statistic) for low creditworthiness firms in only twelve countries—Austria, Switzerland, Germany, Finland, Greece, Norway, New Zealand, Singapore, Thailand, Turkey, and South Africa. This suggests that investment-cash flow sensitivity may not be viewed as a measure of financial constraint in the majority of countries.

Third, contrary to the results of KZ and Cleary on U.S. firms, we find that investment-cash flow sensitivity is not the highest for high-creditworthiness-firms (i.e., firms of good financial status) in the majority of countries. The number of countries where investment-cash flow sensitivity is the highest for good-creditworthiness firms is only eleven: Brazil, Canada, Chile, the U.K., Ireland, India, Japan, Korea, Malaysia, Portugal and the U.S. Further, the number of countries for which the relation between creditworthiness and investment-cash flow sensitivity is monotonically positive is only six: Great Britain, Canada, Chile, India, Ireland and the U.S. Thus, the positive relation observed on U.S. firms between financial status and investment-cash flow sensitivity is unlikely to be a norm in the majority of countries.

In summary, evidence is rather weak that investment-cash flow sensitivity is related to financial constraint. In the majority of countries, the sensitivity is not the highest for low creditworthiness firms. At the same time, evidence is also weak in many countries that the sensitivity is positively related to financial status, implying that KZ and Cleary's results on U.S. firms do not apply to firms in many countries outside the U.S.

4-2 Investment-cash flow sensitivity and firm size

Now we examine whether investment-cash flow sensitivity is related to firm size, assuming that small firms are likely to face financial constraint. If investment-cash flow is a measure of financial constraint, we expect small firms to display higher investment-cash flow sensitivity than large firms. In carrying out the analysis, we partition sample firms in each country into three equal-size groups—small, medium-sized, and large firms—based on their total assets. Then we estimate investment-cash flow sensitivity for each of the three groups in each country.

The results in Table 3 suggest that investment-cash flow sensitivity is unlike to be a measure of financial constraint, if firm size represents financial constraint. For example, we find in Table 3 that in only five countries—Denmark, Greece, Portugal, Sweden and Singapore—small firms display the highest investment-cash flow sensitivity. In fact, we find that large firms display the highest investment-cash flow sensitivity in the majority of countries. The number of countries where large firms display the highest investment-cash flow sensitivity is as many as twenty-one: Austria, Australia, Brazil, Canada, Chile, China, Germany, Spain, Finland, the U.K., Hong Kong, Indonesia, India, Italy, Korea, Malaysia, Netherlands, New Zealand, Turkey, U.S. and South Africa. Hence in many countries, our results are in fact the opposite of what we would expect if investment-cash flow sensitivity is related to financial constraint and small firms face high levels of financial constraint.

Summing up, even when using an alternative proxy for financial constraint, namely, firm size, we find little evidence that investment-cash flow sensitivity is related to

financial constraint.

4-3 What does investment-cash flow really measure?

So far our evidence strongly suggests that investment-cash flow sensitivity is unlikely to be related to financial constraint. Our evidence also suggests that the positive relation between the sensitivity and financial status (or creditworthiness)—which is observed for U.S. firms—is not observed for firms in many countries outside the U.S. Now our evidence prompts us to ask a question: what does investment-sensitivity really measure?

In trying to answer this question, we pay attention to the firm's cash flow situation. We focus on the possibility that firms with poor (or negative) cash flows will be unable to finance their investment projects with internal funds and thus will display small sensitivity to cash flows. This possibility leads us predict that investment-cash flow sensitivity is related to the level of the firm's cash flows. In order to examine this possibility, we classify firms into three groups—low-, medium-, and high-cash-flow firms—based on their cash flow situation (i.e., cash flow/total assets). We then estimate and compare investment-cash flow sensitivity for the three groups of firms in each country.

Table 4 reports the results of the regression analysis for the three groups of firms for each of the thirty-five countries. A key observation from the table is that invariably across countries—meaning, in all thirty-five countries—low-cash-flow firms exhibit the lowest investment-cash flow sensitivity. It is astonishing that there is no exception to this observation. Moreover, in all but only three countries—Brazil, Spain and Sweden—high-cash-flow firms exhibit the highest investment-cash flow sensitivity. And we find that in all but these three countries, the significance of investment-cash flow sensitivity tends to be stronger as we move from low-cash-flow firms to high-cash-flow firms.

The evidence of weak (strong) investment-cash flow sensitivity for low-cash-flow firms (high-cash-flow firms) is remarkably strong across countries. Thus our evidence strongly indicates that investment-cash flow sensitivity is a measure of the availability

of the firm's internal funds. We argue that this remarkable observation may not come as a surprise in the context of the pecking order theory. If internal funds are given a priority over external funds as the pecking order suggests, then firms with large internal funds will rely more on internal funds and thus will display high investment-cash flow sensitivity. On the other hand, firms with small (or negative) internal funds are unable to use internal funds to finance investment projects and thus will display low investment-cash flow sensitivity.

5. Discussion and Closing Remarks

In this empirical investigation using worldwide data, we have demonstrated that investment-cash flow sensitivity is unlikely to be a measure of financial constraint but is a variable that reflects the availability of internal funds. Especially, we have argued that the strong positive relation between investment-cash flow sensitivity and the availability of internal funds is consistent with the pecking order theory.

Now it is worthwhile to look back on how the research stream on investment-cash flow sensitivity began. It began with the seminal study of FHP in which they reason that the pecking order theory predicts that firms facing financial constraint—i.e. firms for which external funds are especially more expensive—will rely more on internal funds and thus will display higher investment sensitivity to cash flows. However, the evidence from KZ and Cleary suggests that investment-cash flow sensitivity is not high for firms of low creditworthiness that are likely to face financial constraint. Our results using worldwide data also concur with KZ and Cleary.

Then do our results (as well as those of KZ and Cleary) suggest that FHP's reasoning is flawed? The answer seems 'not necessarily.' This is because it is uncertain whether firms classified as financially constrained (in terms of dividend payouts, creditworthiness scores, firm size, etc.) are truly financial constrained. For example, firms of low creditworthiness may not necessarily be financially constrained. It is possible that such firms are still capable of raising funds in external capital markets without incurring too much cost. In fact, most firms included in our dataset (as well as KZ's and Cleary's) are firms listed on major stock exchanges in the world. Hence, it

may be rather unreasonable to expect external financing to be prohibitively expensive for firms in our dataset (as well as KZ's and Cleary's). In sum, to the extent that our dataset does not contain firms that are truly financially constrained, we are unable to test the validity of FHP's reasoning.

In closing, we suggest a direction of future research that can help strengthen the results of our study. The central argument in our study is that firms of low (high) cash flows will rely less (more) on cash flows such that their investment will be less (more) sensitive to cash flows. The flip side of this argument is that firms of low (high) cash flows will rely more (less) on external financing such that their investment will be more (less) sensitive to external financing. Hence it will be interesting to look at the investment sensitivity to the availability of external funds (i.e., investment-external funds sensitivity) for groups of firms classified by the level of cash flows. A negative relation between investment-external funds sensitivity and the cash flow situation will provide further support for the central argument of our study. We hope that the future draft of this study can incorporate the results of this investigation.

Appendix A: Description of Variables

Current ratio (Current)

current assets / current liabilities

Debt ratio (Debt)

(current portion of long-term debt + long-term debt) / total assets

Fixed charge coverage ratio (FCCov)

earnings before interest and taxes / (interest expense + preferred dividend payments × (1 / (1 – tax rate)))

Net income

net income before extraordinary operations ± extraordinary items and discontinued operations

Net income margin (NI%)

net income / net sales * 100

Cash flow (CF)

net income + depreciation and/or amortization expense + change in deferred taxes

Investment (I)

net capital expenditures

Net sales growth (SGR)

(net sales_t – net sales_{t-1}) / net sales_{t-1}

Dividend payout

total dividends paid / net income

Slack (SLACK)

Cash + short-term investments + (0.50 × inventory) + (0.70 × account receivable) – short term loans

Net fixed assets (K)

net property, plant and equipment

Market-to-book (M/B)

market value of common equity / book value of common equity

US Dollar Total Assets (USDTA)

Total assets expressed in U.S. dollar values using the end-of-the-year exchange rate

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Table 1 Selected Financial Ratio Means for Sample Firms

The table reports the means of selected financial ratios for our sample of firm year observations in each country over 1998-2004. US dollar total assets (USDTA) is presented in millions of U.S. dollars.

Nation	nobs	USDTA	CURRENT	DEBT	FCCOV	NIM	M/B	SGR	SLACK/K	CF/K	I/K
Argentina	201	1,054	1.798	0.200	6.545	-4.589	1.061	17.204	1.601	0.297	0.136
Austria	258	955	1.635	0.141	8.876	2.181	1.292	9.054	1.972	0.230	0.271
Australia	1,931	600	1.892	0.184	13.284	-6.764	2.185	15.302	4.559	0.326	0.306
Brazil	653	1,816	1.469	0.169	2.699	0.505	0.917	16.658	7.452	0.260	0.181
Canada	2,323	1,126	2.018	0.224	10.520	-6.120	2.171	16.048	2.624	0.156	0.285
Switzerland	885	2,253	2.263	0.174	12.514	2.148	2.343	5.897	2.576	0.337	0.202
Chile	551	567	1.985	0.147	12.806	6.931	1.166	9.112	1.909	0.227	0.132
China	2,786	302	1.324	0.081	9.709	0.741	3.171	19.202	2.747	0.266	0.231
Germany	2,655	2,605	2.283	0.120	11.501	-5.412	2.277	7.374	6.436	0.332	0.354
Denmark	597	474	1.887	0.174	9.457	-0.176	1.957	7.918	5.653	0.262	0.255
Spain	481	1,901	1.489	0.149	11.012	5.594	2.391	11.808	2.089	0.471	0.198
Finland	639	1,307	1.994	0.182	14.059	1.585	2.193	10.644	5.084	0.370	0.370
France	2,585	2,858	1.585	0.160	12.943	0.019	2.541	11.300	8.846	0.708	0.447
UK	5,326	1,301	1.634	0.149	14.011	-6.651	2.530	13.530	10.197	0.269	0.305
GR	197	560	1.628	0.138	20.139	4.904	3.212	15.576	2.293	0.618	0.282
HongKong	2,610	679	2.106	0.164	16.025	-5.832	1.384	5.711	5.421	0.149	0.201
Indonesia	989	278	1.657	0.308	9.707	-1.799	1.096	17.057	2.885	0.226	0.166
Ireland	208	1,088	1.727	0.232	15.017	1.724	2.588	14.163	2.554	0.515	0.235
India	1,616	505	1.579	0.219	15.592	5.132	1.862	12.135	1.212	0.373	0.201
Italy	829	3,636	1.667	0.154	9.882	-0.032	2.168	9.160	5.943	0.453	0.266
Japan	14,768	1,641	1.628	0.133	20.851	0.393	1.351	2.331	3.634	0.215	0.133
Korea	1,768	441	1.711	0.202	7.178	-2.907	0.672	6.505	3.764	0.183	0.146
Malaysia	2,741	280	1.899	0.149	15.066	-2.604	1.248	7.050	2.675	0.181	0.127
Netherlands	669	3,201	1.504	0.166	11.876	1.522	3.207	6.909	3.695	0.607	0.309
Norway	609	941	2.063	0.229	10.654	-4.227	2.261	14.225	9.226	0.350	0.443
NewZealand	270	232	1.969	0.223	15.185	4.569	2.169	9.552	2.332	0.381	0.237

Philippines	405	350	1.496	0.187	4.748	-9.660	0.833	8.894	11.571	0.196	0.132
Portugal	194	1,100	0.993	0.185	3.871	0.303	1.892	10.600	1.185	0.099	0.165
Sweden	1,150	999	2.393	0.137	14.089	-8.853	2.904	13.104	20.310	0.052	0.359
Singapore	1,700	395	1.820	0.156	16.486	-2.011	1.492	8.026	2.913	0.200	0.190
Thailand	1,420	228	1.801	0.226	19.265	1.772	1.157	9.868	1.625	0.298	0.143
Turkey	601	658	1.809	0.143	12.732	3.346	2.734	44.944	6.391	0.709	0.418
Taiwan	2,634	551	1.851	0.131	17.421	1.025	1.609	14.963	2.581	0.358	0.196
US	19,659	2,145	2.357	0.272	12.170	-10.759	2.386	12.379	7.391	0.118	0.319
SouthAfrica	1,085	481	1.729	0.107	14.481	1.883	1.882	15.009	5.632	0.776	0.363

Table 2 Regression Results For Firms Classified By Creditworthiness Status Score

The table reports the results of the regression analysis on equation for three groups of firms as well as total sample firms over the period 1998 thru 2004. In each country, firm years are divided into three groups according to their creditworthiness scores estimated using a linear discriminant function. 'Low,' 'Medium' and 'High' indicate firms with low, medium and high creditworthiness scores, respectively. The dependent variable is investments (I/K) and the regression model is estimated using fixed firm and year effects. The number of observations is different across groups because firms having only one yearly observation are deleted from the regression. The numbers in the parenthesis are t values. *, ** and *** indicate two-tailed significance of t-test at 90%, 95% and 99% levels, respectively.

Nation	Group	M/B			CF/K			R ²	nobs
Argentina	All	-0.021	(-1.988)	**	0.048	(2.926)	***	0.568	201
	Low	0.007	(0.377)		0.029	(0.565)		0.727	53
	Medium	0.022	(0.704)		0.105	(1.621)		0.716	57
	High	0.023	(1.194)		-0.067	(-1.900)	*	0.853	45
Austria	All	0.012	(1.020)		0.118	(5.251)	***	0.757	258
	Low	0.010	(0.635)		0.082	(3.137)	***	0.857	80
	Medium	0.023	(0.883)		0.498	(2.954)	***	0.913	81
	High	0.063	(1.155)		0.278	(1.415)		0.799	79
Australia	All	0.022	(4.360)	***	0.051	(7.076)	***	0.675	1931
	Low	0.039	(4.100)	***	0.072	(3.439)	***	0.815	563
	Medium	0.023	(3.020)	***	0.185	(8.877)	***	0.757	558
	High	0.008	(0.828)		0.020	(1.642)		0.667	575
Brazil	All	0.014	(2.460)	**	0.021	(2.092)	**	0.663	653
	Low	0.026	(2.439)	**	-0.002	(-0.170)		0.795	196
	Medium	0.017	(0.846)		0.121	(2.555)	**	0.857	192
	High	0.011	(0.791)		0.157	(3.773)	***	0.689	196
Canada	All	0.035	(8.868)	***	0.029	(3.360)	***	0.678	2323
	Low	0.037	(5.199)	***	-0.054	(-3.516)	***	0.663	703
	Medium	0.022	(4.515)	***	0.116	(6.101)	***	0.826	655
	High	0.010	(0.899)		0.239	(10.824)	***	0.820	656
Switzerland	All	0.007	(1.784)	*	0.079	(10.626)	***	0.780	885
	Low	0.018	(1.970)	*	0.103	(7.660)	***	0.852	265
	Medium	0.008	(1.604)		0.180	(3.923)	***	0.851	263
	High	0.003	(0.348)		0.056	(3.907)	***	0.815	263
Chile	All	0.028	(1.810)	*	0.114	(6.023)	***	0.529	551
	Low	0.018	(0.597)		-0.019	(-0.179)		0.529	172
	Medium	0.022	(1.064)		0.425	(2.573)	**	0.679	164
	High	0.025	(0.416)		0.350	(4.352)	***	0.656	170
China	All	0.007	(2.207)	**	0.120	(11.034)	***	0.752	2786
	Low	0.001	(0.236)		0.138	(5.873)	***	0.772	643
	Medium	0.005	(0.544)		0.383	(8.444)	***	0.818	536
	High	0.010	(1.475)		0.093	(4.982)	***	0.766	670
Germany	All	0.036	(9.746)	***	0.025	(4.301)	***	0.684	2655
	Low	0.038	(4.426)	***	0.091	(4.596)	***	0.770	773
	Medium	0.009	(1.326)		-0.021	(-0.931)		0.795	759
	High	0.032	(4.441)	***	-0.011	(-1.092)		0.734	788
Denmark	All	0.027	(3.054)	***	0.037	(3.064)	***	0.658	597
	Low	0.025	(1.271)		0.029	(1.815)	*	0.682	183
	Medium	0.014	(0.751)		-0.178	(-2.771)	***	0.780	182

	High	0.019	(1.010)		0.063	(2.504)	**	0.715	189
Spain	All	0.020	(3.601)	***	0.095	(5.986)	***	0.686	481
	Low	0.037	(3.256)	***	0.277	(3.530)	***	0.809	156
	Medium	0.048	(3.728)	***	0.333	(10.546)	***	0.851	146
	High	0.014	(1.600)		0.069	(2.212)	**	0.652	153
Finland	All	0.054	(5.341)	***	0.039	(2.750)	***	0.714	639
	Low	0.055	(2.761)	***	0.135	(3.469)	***	0.798	184
	Medium	0.053	(2.271)	**	0.056	(1.194)		0.785	186
	High	0.024	(1.280)		0.046	(1.612)		0.783	189
France	All	0.028	(7.076)	***	0.084	(13.052)	***	0.767	2585
	Low	0.026	(2.738)	***	0.098	(5.756)	***	0.816	752
	Medium	0.032	(3.208)	***	0.133	(7.554)	***	0.839	749
	High	0.019	(2.929)	***	0.053	(4.075)	***	0.792	782
UK	All	0.010	(6.105)	***	0.013	(3.229)	***	0.666	5326
	Low	0.006	(1.993)	**	-0.100	(-10.658)	***	0.681	1610
	Medium	0.008	(3.184)	***	0.029	(2.033)	**	0.770	1574
	High	0.010	(2.762)	***	0.090	(7.770)	***	0.791	1577
Greece	All	0.001	(0.088)		0.202	(5.664)	***	0.705	197
	Low	0.005	(0.168)		0.160	(4.046)	***	0.838	52
	Medium	0.002	(0.107)		0.129	(1.850)	*	0.901	51
	High	-0.006	(-0.231)		0.109	(0.460)		0.698	59
HongKong	All	0.008	(2.357)	**	0.062	(8.809)	***	0.584	2610
	Low	-0.005	(-0.895)		0.064	(3.743)	***	0.636	761
	Medium	0.024	(2.872)	***	0.132	(8.053)	***	0.719	730
	High	-0.004	(-0.393)		0.075	(5.925)	***	0.655	747
Indonesia	All	0.004	(1.007)		0.008	(0.693)		0.553	989
	Low	-0.002	(-0.256)		0.019	(1.166)		0.717	295
	Medium	0.001	(0.105)		0.097	(4.063)	***	0.783	290
	High	0.008	(0.811)		-0.009	(-0.343)		0.618	282
Ireland	All	0.011	(1.471)		0.118	(4.454)	***	0.824	208
	Low	0.015	(1.187)		0.091	(1.691)	*	0.785	64
	Medium	0.000	(-0.035)		0.266	(2.260)	**	0.904	62
	High	-0.010	(-0.701)		0.285	(5.208)	***	0.925	68
India	All	0.015	(3.770)	***	0.084	(6.294)	***	0.682	1616
	Low	0.016	(1.473)		-0.084	(-3.337)	***	0.637	499
	Medium	0.009	(0.724)		0.261	(5.549)	***	0.699	461
	High	0.014	(2.192)	**	0.154	(7.289)	***	0.813	471
Italy	All	-0.006	(-0.788)		0.040	(3.453)	***	0.664	829
	Low	-0.024	(-1.907)	*	0.034	(1.881)	*	0.640	251
	Medium	0.002	(0.116)		0.285	(4.585)	***	0.834	240
	High	0.001	(0.040)		0.186	(2.846)	***	0.734	259
Japan	All	0.012	(11.207)	***	0.011	(4.098)	***	0.697	14768
	Low	0.005	(3.398)	***	0.007	(1.243)		0.695	4407
	Medium	0.012	(7.065)	***	-0.017	(-2.371)	**	0.816	4381
	High	0.015	(5.242)	***	0.033	(5.161)	***	0.738	4436
Korea	All	0.012	(2.671)	***	0.104	(10.364)	***	0.566	1769
	Low	0.024	(2.585)	**	0.037	(2.277)	**	0.559	522
	Medium	0.008	(0.875)		0.044	(1.102)		0.655	487
	High	-0.008	(-0.894)		0.288	(8.057)	***	0.774	486
Malaysia	All	0.002	(0.807)		0.097	(11.480)	***	0.571	2741
	Low	-0.001	(-0.259)		0.034	(2.346)	**	0.555	828

	Medium	-0.013	(-1.458)		0.033	(1.417)		0.619	779
	High	0.016	(1.673)	*	0.152	(8.339)	***	0.664	806
Netherlands	All	0.021	(3.757)	***	0.069	(6.876)	***	0.733	669
	Low	0.020	(2.105)	**	0.031	(1.688)	*	0.736	201
	Medium	0.015	(1.164)		0.234	(7.982)	***	0.838	197
	High	0.018	(1.634)		0.077	(1.786)	*	0.827	208
Norway	All	0.027	(2.488)	**	0.051	(3.461)	***	0.690	609
	Low	0.016	(0.514)		0.109	(2.666)	***	0.804	173
	Medium	0.041	(1.573)		-0.048	(-1.542)		0.788	178
	High	0.015	(0.771)		-0.019	(-0.642)		0.686	174
NewZealand	All	0.048	(3.777)	***	0.129	(7.761)	***	0.801	270
	Low	-0.046	(-2.086)	**	0.215	(5.395)	***	0.891	78
	Medium	0.016	(0.932)		0.207	(1.973)	*	0.848	81
	High	0.085	(3.068)	***	0.049	(1.918)	*	0.875	82
Philippines	All	0.026	(2.916)	***	0.007	(0.335)		0.532	405
	Low	0.013	(1.944)	*	-0.001	(-0.077)		0.679	124
	Medium	-0.004	(-0.202)		0.170	(2.039)	**	0.782	115
	High	0.033	(1.116)		-0.010	(-0.141)		0.689	124
Portugal	All	-0.012	(-0.880)		0.100	(2.183)	**	0.668	194
	Low	-0.031	(-1.104)		0.166	(1.942)	*	0.832	60
	Medium	-0.023	(-0.480)		0.174	(0.538)		0.710	61
	High	-0.047	(-1.994)	*	0.115	(2.133)	**	0.820	57
Sweden	All	0.059	(9.187)	***	0.048	(6.425)	***	0.699	1150
	Low	0.024	(1.974)	**	0.105	(4.032)	***	0.843	340
	Medium	0.028	(2.102)	**	0.091	(4.044)	***	0.785	348
	High	0.076	(6.039)	***	0.009	(0.500)		0.667	350
Singapore	All	0.013	(2.731)	***	0.065	(5.699)	***	0.633	1700
	Low	-0.015	(-1.919)	*	0.447	(10.202)	***	0.804	509
	Medium	0.018	(1.663)	*	0.159	(3.177)	***	0.696	491
	High	0.017	(2.083)	**	0.019	(1.112)		0.678	512
Thailand	All	0.011	(3.333)	***	0.056	(4.612)	***	0.621	1420
	Low	-0.005	(-0.428)		0.195	(4.576)	***	0.770	434
	Medium	0.008	(1.240)		-0.028	(-1.256)		0.742	430
	High	0.016	(3.636)	***	0.031	(1.478)		0.602	447
Turkey	All	-0.002	(-0.183)		0.065	(3.354)	***	0.678	601
	Low	0.016	(0.674)		0.122	(2.583)	**	0.826	164
	Medium	0.011	(0.550)		0.085	(1.681)	*	0.784	157
	High	-0.008	(-0.428)		-0.051	(-1.090)		0.636	156
Taiwan	All	0.029	(5.493)	***	0.116	(9.940)	***	0.692	2634
	Low	0.035	(3.638)	***	0.040	(2.055)	**	0.731	724
	Medium	0.010	(1.095)		0.206	(6.725)	***	0.796	696
	High	0.040	(2.795)	***	0.166	(5.486)	***	0.749	715
US	All	0.014	(15.610)	***	0.025	(11.475)	***	0.659	19659
	Low	0.010	(6.507)	***	-0.066	(-12.690)	***	0.635	5965
	Medium	0.009	(5.894)	***	0.036	(7.429)	***	0.767	5841
	High	0.013	(6.301)	***	0.087	(17.663)	***	0.793	5837
SouthAfrica	All	0.020	(3.596)	***	0.085	(9.541)	***	0.740	1085
	Low	0.007	(0.844)		0.123	(6.124)	***	0.786	316
	Medium	0.005	(0.304)		0.058	(1.876)	*	0.834	325
	High	0.031	(2.228)	**	0.073	(4.518)	***	0.780	310

Table 3 Regression Results For Firms Classified By Firm Size

The table reports the results of the regression analysis on equation for three groups of firms as well as total sample firms over the period 1998 thru 2004. In each country, firm years are divided into three groups according to their total asset size. 'Small' 'Medium' and 'Large' indicate small, medium-size and large firms, respectively. The dependent variable is investments (I/K) and the regression model is estimated using fixed firm and year effects. The number of observations is different across groups because firms having only one yearly observation are deleted from the regression. The numbers in the parenthesis are t values. *, ** and *** indicate two-tailed significance of t-test at 90%, 95% and 99% levels, respectively.

Nation	Group	M/B			CF/K		R ²	nobs	
Argentina	All	-0.021	(-1.988)	**	0.048	(2.926)	***	0.568	201
	Low	-0.004	(-0.229)		0.004	(0.220)		0.674	64
	Medium	-0.073	(-2.651)	**	0.095	(2.403)	**	0.649	63
	High	0.004	(0.248)		0.168	(1.941)	*	0.678	67
Austria	All	0.012	(1.020)		0.118	(5.251)	***	0.757	258
	Low	0.005	(0.197)		0.118	(3.023)	***	0.739	86
	Medium	0.053	(3.517)	***	0.088	(1.045)		0.893	83
	High	0.027	(1.105)		0.351	(3.105)	***	0.876	86
Australia	All	0.022	(4.360)	***	0.051	(7.076)	***	0.675	1931
	Low	0.009	(0.993)		0.031	(2.636)	***	0.657	612
	Medium	0.043	(3.572)	***	0.093	(5.430)	***	0.734	601
	High	0.027	(4.686)	***	0.238	(13.214)	***	0.809	628
Brazil	All	0.014	(2.460)	**	0.021	(2.092)	**	0.663	653
	Low	-0.002	(-0.223)		-0.008	(-1.051)		0.809	212
	Medium	0.011	(1.058)		0.015	(0.887)		0.766	209
	High	0.012	(1.187)		0.335	(6.344)	***	0.668	213
Canada	All	0.035	(8.868)	***	0.029	(3.360)	***	0.678	2323
	Low	0.032	(4.255)	***	-0.013	(-0.892)		0.644	744
	Medium	0.024	(2.854)	***	0.190	(8.549)	***	0.773	737
	High	0.025	(6.646)	***	0.125	(9.980)	***	0.846	749
Switzerland	All	0.007	(1.784)	*	0.079	(10.626)	***	0.780	885
	Low	0.006	(0.675)		0.087	(6.931)	***	0.751	292
	Medium	0.004	(0.906)		0.139	(7.151)	***	0.862	290
	High	0.021	(3.257)	***	0.183	(5.508)	***	0.868	289
Chile	All	0.028	(1.810)	*	0.114	(6.023)	***	0.529	551
	Low	-0.003	(-0.234)		0.148	(2.625)	***	0.640	178
	Medium	0.032	(1.193)		-0.010	(-0.521)		0.615	182
	High	0.155	(3.699)	***	0.485	(12.039)	***	0.732	180
China	All	0.007	(2.207)	**	0.120	(11.034)	***	0.752	2786
	Low	0.002	(0.513)		0.090	(4.891)	***	0.726	849
	Medium	0.009	(0.875)		0.187	(6.458)	***	0.788	791
	High	0.014	(1.417)		0.154	(7.655)	***	0.775	864
Germany	All	0.036	(9.746)	***	0.025	(4.301)	***	0.684	2655
	Low	0.030	(4.244)	***	0.018	(1.987)	**	0.668	863
	Medium	0.050	(7.178)	***	0.037	(2.732)	***	0.745	854
	High	0.002	(0.353)		0.124	(7.964)	***	0.790	872
Denmark	All	0.027	(3.054)	***	0.037	(3.064)	***	0.658	597
	Low	0.009	(0.526)		0.113	(4.215)	***	0.588	194
	Medium	0.063	(3.396)	***	0.000	(0.011)		0.782	195
	High	0.012	(1.239)		-0.007	(-0.861)		0.852	198

Spain	All	0.020	(3.601)	***	0.095	(5.986)	***	0.686	481
	Low	0.013	(1.940)	*	0.320	(6.203)	***	0.783	157
	Medium	0.019	(1.675)	*	0.022	(1.113)		0.762	158
	High	0.009	(0.802)		0.276	(9.198)	***	0.769	156
Finland	All	0.054	(5.341)	***	0.039	(2.750)	***	0.714	639
	Low	0.050	(2.237)	**	-0.035	(-1.223)		0.707	204
	Medium	0.076	(4.350)	***	0.082	(4.243)	***	0.789	202
	High	0.020	(1.664)	*	0.411	(5.041)	***	0.786	212
France	All	0.028	(7.076)	***	0.084	(13.052)	***	0.767	2585
	Low	0.036	(4.939)	***	0.058	(5.609)	***	0.753	845
	Medium	0.013	(1.809)	*	0.126	(9.716)	***	0.828	834
	High	0.028	(4.774)	***	0.093	(6.751)	***	0.830	848
UK	All	0.010	(6.105)	***	0.013	(3.229)	***	0.666	5326
	Low	0.005	(1.395)		0.007	(1.031)		0.620	1731
	Medium	0.015	(4.655)	***	-0.005	(-0.547)		0.726	1713
	High	0.006	(3.517)	***	0.089	(10.354)	***	0.810	1736
Greece	All	0.001	(0.088)		0.202	(5.664)	***	0.705	197
	Low	0.045	(1.969)	*	0.148	(4.745)	***	0.899	60
	Medium	-0.013	(-0.408)		0.330	(2.621)	**	0.725	53
	High	-0.003	(-0.092)		0.242	(1.842)	*	0.754	61
HongKong	All	0.008	(2.357)	**	0.062	(8.809)	***	0.584	2610
	Low	0.000	(0.022)		0.028	(2.135)	**	0.564	842
	Medium	0.009	(0.944)		0.092	(5.646)	***	0.611	812
	High	0.018	(3.005)	***	0.091	(8.771)	***	0.729	842
Indonesia	All	0.004	(1.007)		0.008	(0.693)		0.553	989
	Low	0.000	(-0.046)		0.067	(3.380)	***	0.616	325
	Medium	-0.005	(-0.463)		-0.042	(-1.766)	*	0.580	317
	High	0.007	(1.586)		0.111	(5.584)	***	0.685	323
Ireland	All	0.011	(1.471)		0.118	(4.454)	***	0.824	208
	Low	0.015	(1.062)		0.085	(1.323)		0.731	67
	Medium	0.010	(0.571)		0.303	(5.290)	***	0.926	66
	High	0.013	(1.493)		0.052	(1.883)	*	0.889	68
India	All	0.015	(3.770)	***	0.084	(6.294)	***	0.682	1616
	Low	0.018	(2.132)	**	0.027	(1.384)		0.635	517
	Medium	0.010	(1.520)		0.190	(4.729)	***	0.713	516
	High	0.015	(1.968)	**	0.167	(5.394)	***	0.773	522
Italy	All	-0.006	(-0.788)		0.040	(3.453)	***	0.664	829
	Low	-0.016	(-1.266)		0.034	(2.024)	**	0.642	271
	Medium	-0.006	(-0.414)		0.032	(1.287)		0.770	263
	High	0.020	(1.298)		0.120	(3.241)	***	0.682	274
Japan	All	0.012	(11.207)	***	0.011	(4.098)	***	0.697	14768
	Low	0.014	(6.264)	***	0.001	(0.149)		0.647	4841
	Medium	0.015	(7.476)	***	0.017	(2.851)	***	0.729	4773
	High	0.007	(6.581)	***	0.002	(0.373)		0.821	4840
Korea	All	0.012	(2.671)	***	0.104	(10.364)	***	0.566	1769
	Low	0.019	(2.515)	**	0.047	(2.865)	***	0.573	573
	Medium	0.015	(1.543)		0.178	(7.917)	***	0.620	560
	High	0.001	(0.072)		0.161	(9.544)	***	0.658	576
Malaysia	All	0.002	(0.807)		0.097	(11.480)	***	0.571	2741
	Low	0.002	(0.627)		0.028	(1.137)		0.600	880
	Medium	-0.008	(-1.237)		0.081	(3.880)	***	0.591	868

	High	0.013	(2.044)	**	0.090	(8.230)	***	0.585	896
Netherlands	All	0.021	(3.757)	***	0.069	(6.876)	***	0.733	669
	Low	0.038	(3.412)	***	0.041	(2.725)	***	0.714	220
	Medium	0.004	(0.384)		0.137	(3.680)	***	0.795	219
	High	-0.002	(-0.253)		0.194	(7.665)	***	0.815	221
Norway	All	0.027	(2.488)	**	0.051	(3.461)	***	0.690	609
	Low	0.027	(1.449)		-0.003	(-0.135)		0.702	195
	Medium	0.020	(0.986)		0.160	(5.535)	***	0.732	195
	High	0.025	(1.341)		0.097	(3.381)	***	0.787	196
NewZealand	All	0.048	(3.777)	***	0.129	(7.761)	***	0.801	270
	Low	0.087	(3.016)	***	0.109	(3.757)	***	0.834	85
	Medium	0.002	(0.121)		0.393	(5.410)	***	0.906	85
	High	0.005	(0.521)		0.363	(5.521)	***	0.929	86
Philippines	All	0.026	(2.916)	***	0.007	(0.335)		0.532	405
	Low	0.017	(0.931)		-0.020	(-0.431)		0.453	131
	Medium	0.069	(3.250)	***	0.044	(0.600)		0.766	124
	High	0.068	(4.246)	***	0.043	(0.466)		0.750	134
Portugal	All	-0.012	(-0.880)		0.100	(2.183)	**	0.668	194
	Low	-0.012	(-0.780)		0.084	(1.999)	*	0.752	63
	Medium	-0.058	(-1.442)		0.087	(1.231)		0.851	63
	High	0.023	(0.670)		0.020	(0.117)		0.635	64
Sweden	All	0.059	(9.187)	***	0.048	(6.425)	***	0.699	1150
	Low	0.050	(3.690)	***	0.058	(4.502)	***	0.691	374
	Medium	0.058	(6.272)	***	0.036	(2.733)	***	0.778	372
	High	0.052	(4.646)	***	0.084	(4.242)	***	0.730	376
Singapore	All	0.013	(2.731)	***	0.065	(5.699)	***	0.633	1700
	Low	0.007	(0.745)		0.075	(4.098)	***	0.656	538
	Medium	0.008	(1.011)		0.060	(2.766)	***	0.698	536
	High	0.023	(3.295)	***	0.061	(3.000)	***	0.723	550
Thailand	All	0.011	(3.333)	***	0.056	(4.612)	***	0.621	1420
	Low	-0.003	(-0.612)		0.058	(2.155)	**	0.697	456
	Medium	0.009	(1.328)		0.144	(4.214)	***	0.694	450
	High	0.015	(2.374)	**	-0.031	(-1.534)		0.604	460
Turkey	All	-0.002	(-0.183)		0.065	(3.354)	***	0.678	601
	Low	-0.022	(-0.942)		0.003	(0.109)		0.695	192
	Medium	-0.029	(-1.794)	*	0.085	(2.142)	**	0.701	182
	High	0.016	(0.922)		0.121	(2.538)	**	0.749	183
Taiwan	All	0.029	(5.493)	***	0.116	(9.940)	***	0.692	2634
	Low	0.037	(4.204)	***	0.083	(3.835)	***	0.732	838
	Medium	0.028	(2.750)	***	0.215	(8.610)	***	0.728	823
	High	0.011	(1.106)		0.091	(4.575)	***	0.684	856
US	All	0.014	(15.610)	***	0.025	(11.475)	***	0.659	19659
	Low	0.006	(3.532)	***	0.007	(1.837)	*	0.590	6471
	Medium	0.026	(13.934)	***	0.040	(9.142)	***	0.740	6328
	High	0.014	(12.822)	***	0.138	(29.467)	***	0.816	6477
SouthAfrica	All	0.020	(3.596)	***	0.085	(9.541)	***	0.740	1085
	Low	0.025	(2.094)	**	0.047	(3.482)	***	0.715	353
	Medium	-0.007	(-0.637)		0.178	(7.078)	***	0.778	345
	High	0.017	(2.688)	***	0.208	(11.752)	***	0.857	351

Table 4 Regression Results For Firms Classified By Cash Flow Level

The table reports the results of the regression analysis on equation for three groups of firms as well as total sample firms over the period 1998 thru 2004. In each country, firm years are divided into three groups according to their level of cash flows. 'Low,' 'Medium' and 'High' indicate firms with low, medium and high cash flow levels, respectively. The dependent variable is investments (I/K) and the regression model is estimated using fixed firm and year effects. The number of observations is different across groups because firms having only one yearly observation are deleted from the regression. The numbers in the parenthesis are t values. *, ** and *** indicate two-tailed significance of t-test at 90%, 95% and 99% levels, respectively.

Nation	Group	M/B			CF/K		R ²	nobs	
Argentina	All	-0.021	-(2.795)	***	0.115	(6.571)	***	0.585	219
	Low	-0.004	-(0.811)		0.023	(0.853)		0.696	58
	Medium	-0.062	-(6.364)	***	0.239	(0.743)		0.882	62
	High	-0.019	-(0.902)		0.163	(1.879)	*	0.612	65
Austria	All	0.003	(0.477)		0.087	(4.614)	***	0.771	274
	Low	0.015	(1.269)		-0.660	-(4.372)	***	0.896	85
	Medium	0.014	(1.441)		1.010	(1.982)	*	0.872	82
	High	0.010	(0.988)		0.236	(2.674)	***	0.848	83
Australia	All	0.003	(0.797)		0.051	(7.307)	***	0.665	2011
	Low	0.005	(0.768)		-0.128	-(5.839)	***	0.671	591
	Medium	0.003	(0.853)		0.362	(4.270)	***	0.782	595
	High	0.006	(0.970)		0.164	(7.480)	***	0.804	605
Brazil	All	0.006	(1.532)		0.023	(2.299)	**	0.683	674
	Low	0.001	(0.296)		0.006	(0.277)		0.680	201
	Medium	-0.002	-(0.541)		0.448	(3.229)	***	0.856	200
	High	0.015	(1.429)		0.100	(2.618)	***	0.770	206
Canada	All	0.003	(1.214)		0.022	(2.728)	***	0.676	2567
	Low	0.002	(0.556)		-0.171	-(10.043)	***	0.692	784
	Medium	0.012	(3.970)	***	0.422	(3.745)	***	0.826	762
	High	-0.002	-(0.450)		0.197	(9.887)	***	0.815	762
Switzerland	All	-0.004	-(2.003)	**	0.067	(8.437)	***	0.750	925
	Low	-0.016	-(3.003)	***	-0.011	-(0.536)		0.715	288
	Medium	0.000	(0.163)		0.313	(3.229)	***	0.931	285
	High	-0.003	-(0.950)		0.208	(10.347)	***	0.861	284
Chile	All	0.010	(1.558)		0.142	(7.960)	***	0.529	573
	Low	0.000	-(0.003)		-0.173	-(2.495)	**	0.545	179
	Medium	0.002	(0.248)		0.311	(0.868)		0.736	173
	High	0.005	(0.638)		0.151	(1.443)		0.656	172
China	All	-0.001	-(0.896)		0.157	(16.581)	***	0.654	5553
	Low	-0.002	-(1.882)	*	-0.040	-(3.261)	***	0.654	1671
	Medium	0.000	(0.073)		0.954	(5.914)	***	0.762	1569
	High	0.000	-(0.052)		0.233	(10.294)	***	0.754	1642
Germany	All	-0.017	-(8.346)	***	0.023	(4.175)	***	0.710	3038
	Low	-0.025	-(6.373)	***	-0.124	-(8.424)	***	0.758	936
	Medium	-0.005	-(1.974)	**	0.536	(6.278)	***	0.774	932
	High	-0.008	-(2.087)	**	0.160	(8.218)	***	0.805	932
Denmark	All	-0.013	-(2.780)	***	0.045	(3.525)	***	0.651	622
	Low	-0.009	-(0.803)		-0.111	-(2.330)	**	0.581	188
	Medium	-0.034	-(4.033)	***	0.399	(1.491)		0.807	195

	High	-0.010	-(1.509)		0.147	(3.695)	***	0.784	195
Spain	All	-0.002	-(0.647)		0.109	(6.471)	***	0.664	504
	Low	0.003	(0.618)		-0.008	-(0.259)		0.685	158
	Medium	-0.001	-(0.175)		0.854	(3.434)	***	0.790	158
	High	0.011	(1.370)		0.111	(2.543)	**	0.789	156
Finland	All	-0.002	-(0.371)		0.059	(4.524)	***	0.714	679
	Low	0.014	(1.353)		-0.052	-(1.655)		0.688	210
	Medium	0.004	(0.497)		0.280	(1.168)		0.749	211
	High	0.003	(0.385)		0.148	(3.712)	***	0.819	210
France	All	0.002	(0.833)		0.090	(14.561)	***	0.761	2837
	Low	0.004	(0.980)		0.009	(0.559)		0.694	877
	Medium	-0.004	-(1.204)		0.324	(4.080)	***	0.813	863
	High	0.001	(0.161)		0.171	(9.398)	***	0.846	889
UK	All	-0.002	-(1.788)	*	0.012	(2.876)	***	0.669	5654
	Low	-0.009	-(3.337)	***	-0.152	-(13.974)	***	0.701	1739
	Medium	0.003	(1.906)	*	0.297	(6.358)	***	0.788	1733
	High	0.000	(0.046)		0.163	(15.224)	***	0.792	1765
Greece	All	0.012	(1.227)		0.203	(5.722)	***	0.703	199
	Low	0.014	(0.688)		0.146	(2.033)	*	0.816	46
	Medium	0.020	(1.984)	*	-0.420	-(0.983)		0.903	44
	High	0.019	(0.767)		0.368	(3.061)	***	0.708	49
HongKong	All	-0.006	-(2.913)	***	0.054	(8.194)	***	0.626	2850
	Low	-0.014	-(3.670)	***	-0.165	-(11.684)	***	0.618	867
	Medium	-0.006	-(1.387)		0.363	(2.768)	***	0.533	844
	High	0.001	(0.401)		0.200	(11.363)	***	0.803	842
Indonesia	All	0.002	(0.600)		0.009	(0.741)		0.556	1011
	Low	0.004	(0.688)		-0.284	-(10.681)	***	0.694	300
	Medium	0.003	(0.913)		0.299	(1.860)	*	0.726	290
	High	-0.006	-(0.935)		0.121	(4.681)	***	0.758	303
Ireland	All	-0.006	-(1.661)	*	0.151	(5.480)	***	0.808	225
	Low	0.009	(1.435)		0.150	(1.424)		0.726	70
	Medium	0.001	(0.148)		1.132	(3.074)	***	0.901	68
	High	-0.022	-(3.343)	***	0.261	(3.907)	***	0.899	69
India	All	0.000	(0.085)		0.105	(8.036)	***	0.699	1697
	Low	0.007	(1.303)		-0.049	-(1.857)	*	0.624	521
	Medium	0.004	(0.910)		0.664	(4.053)	***	0.719	513
	High	-0.009	-(2.079)	**	0.176	(7.440)	***	0.797	520
Italy	All	-0.014	-(4.283)	***	0.050	(4.250)	***	0.652	931
	Low	-0.026	-(4.177)	***	-0.079	-(2.997)	***	0.604	293
	Medium	-0.007	-(1.655)	*	0.278	(1.956)	*	0.821	282
	High	-0.001	-(0.203)		0.181	(5.873)	***	0.795	293
Japan	All	-0.001	-(1.285)		0.016	(6.328)	***	0.710	15418
	Low	-0.003	-(1.960)	*	-0.065	-(9.755)	***	0.667	4496
	Medium	0.003	(3.272)	***	0.197	(4.297)	***	0.819	4533
	High	-0.001	-(0.898)		0.133	(15.269)	***	0.771	4676
Korea	All	0.003	(1.133)		0.120	(12.276)	***	0.603	1856
	Low	0.002	(0.429)		-0.076	-(4.305)	***	0.597	556
	Medium	-0.001	-(0.238)		0.121	(0.668)		0.682	534
	High	0.001	(0.177)		0.262	(10.218)	***	0.752	548
Malaysia	All	0.001	(0.815)		0.107	(12.752)	***	0.590	2859
	Low	-0.001	-(0.290)		-0.023	-(1.328)		0.573	873

	Medium	-0.002	-(0.584)		0.111	(0.676)		0.592	829
	High	0.004	(0.895)		0.199	(8.790)	***	0.681	850
Netherlands	All	-0.004	-(0.952)		0.080	(7.714)	***	0.741	694
	Low	0.005	(0.669)		-0.058	-(1.437)		0.712	216
	Medium	0.002	(0.428)		0.110	(0.880)		0.911	211
	High	-0.013	-(1.682)	*	0.091	(2.990)	***	0.790	215
Norway	All	-0.006	-(1.066)		0.032	(2.300)	**	0.686	669
	Low	-0.009	-(0.845)		-0.189	-(4.551)	***	0.733	210
	Medium	0.005	(0.481)		0.802	(2.120)	**	0.614	199
	High	0.007	(0.587)		0.091	(2.341)	**	0.810	200
NewZealand	All	0.012	(2.405)	**	0.128	(7.816)	***	0.790	284
	Low	0.036	(3.193)	***	-0.037	-(0.381)		0.755	84
	Medium	-0.004	-(0.624)		0.488	(2.092)	**	0.853	87
	High	0.009	(0.917)		0.216	(6.016)	***	0.898	84
Philippines	All	0.008	(1.547)		0.010	(0.456)		0.518	425
	Low	0.007	(0.797)		-0.043	-(1.156)		0.460	131
	Medium	0.003	(0.466)		0.095	(0.318)		0.748	118
	High	0.026	(1.777)	*	0.156	(2.380)	**	0.679	130
Portugal	All	-0.005	-(0.837)		0.082	(2.275)	**	0.681	208
	Low	-0.009	-(1.363)		0.064	(2.582)	**	0.880	63
	Medium	0.013	(0.211)		1.272	(1.468)		0.720	63
	High	-0.013	-(2.346)	**	0.330	(3.963)	***	0.930	60
Sweden	All	-0.011	-(3.573)	***	0.050	(6.441)	***	0.684	1255
	Low	-0.017	-(2.690)	***	-0.115	-(4.805)	***	0.673	393
	Medium	0.004	(0.923)		0.532	(4.982)	***	0.799	389
	High	-0.003	-(0.511)		0.110	(4.820)	***	0.805	380
Singapore	All	-0.002	-(0.680)		0.079	(7.681)	***	0.656	1857
	Low	-0.003	-(0.688)		-0.169	-(7.373)	***	0.621	579
	Medium	0.003	(1.077)		0.436	(3.669)	***	0.747	534
	High	0.003	(0.704)		0.187	(7.539)	***	0.782	563
Thailand	All	0.001	(0.512)		0.117	(11.231)	***	0.683	1565
	Low	0.006	(2.168)	**	-0.138	-(6.726)	***	0.518	482
	Medium	0.001	(0.173)		0.355	(2.435)	**	0.714	471
	High	0.003	(0.621)		0.140	(7.336)	***	0.824	475
Turkey	All	-0.004	-(0.583)		0.067	(3.485)	***	0.681	610
	Low	-0.011	-(1.009)		0.013	(0.302)		0.670	174
	Medium	0.015	(0.949)		0.334	(1.462)		0.762	175
	High	-0.008	-(0.397)		0.145	(2.539)	**	0.815	181
Taiwan	All	0.000	(0.269)		0.147	(14.545)	***	0.698	3026
	Low	-0.016	-(3.253)	***	-0.033	-(2.256)	**	0.629	917
	Medium	-0.001	-(0.456)		0.547	(5.026)	***	0.764	872
	High	0.000	(0.135)		0.216	(10.624)	***	0.775	905
US	All	0.000	(0.649)		0.016	(7.404)	***	0.655	21091
	Low	-0.001	-(0.783)		-0.158	-(27.870)	***	0.681	6554
	Medium	0.000	(0.573)		0.373	(16.471)	***	0.826	6474
	High	0.000	-(0.070)		0.176	(33.878)	***	0.809	6510
SouthAfrica	All	-0.001	-(0.143)		0.106	(12.135)	***	0.742	1115
	Low	0.013	(1.895)	*	-0.049	-(2.392)	**	0.648	329
	Medium	0.010	(1.543)		0.355	(3.563)	***	0.870	329
	High	-0.006	-(0.858)		0.161	(7.308)	***	0.818	338