"Corporate investment, cash flow level and market imperfections"

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CORPORATE INVESTMENT, CASH FLOW LEVEL AND MARKET IMPERFECTIONS

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Abstract

We analyze firms' investment behavior, differentiating firms according to the cash flow levels they experience during their lifecycles. We consequently consider the firm as the basic unit and not firm-year observations. Firms with persistent positive cash flow show higher investment-cash flow sensitivity than firms with persistent negative cash flow. Independent of the industry they belong to, older firms with positive cash flow show a weaker sensitivity than younger firms with positive cash flow. Firms with persistent negative cash flow are neither younger nor smaller than their counterparts, and their cash flow coefficient can be positive, negative or statistically insignificant. Thus, classifying firms by age or size may not yield a group of firms with similar financial structures.

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1. Introduction

By considering firms rather than firm-year observations, this paper introduces a new approach to confront the well-known challenges of analyzing empirically the interaction between investment and liquidity conditions. Our methodology consists of classifying *the firms, and not firm-year observations,* according to their *level of cash flow*. One of the motives to do so is that most theoretical predictions drawn from the corporate finance literature are based on treating the firm as a unit rather than on firm-year observations. This study helps bridge this gap between theory and empirical analysis by investigating the investment behavior of firms that have negative cash flow for consecutive years, versus firms that have positive cash flow for consecutive years, treating the firm as the basic unit. We also recognize that the optimal implementation of an economic policy requires that one is able to identify the firm as the basic unit when it is intended, for example, to alleviate liquidity problems of specific firms with certain characteristics and structure. It should here be unnecessary to emphasize the importance that cash flow conditions have on firms' performance and their access to capital markets in general, especially during a financial crisis like the one we are still experiencing (August 2009).

Let us to remark at the outset, and as documented below, that we find significant differences in the estimated investment behavior of firms, when the firm treated as a unit, versus when firm-year observations are the basic unit.

The main objectives of this paper are the following: i) to analyze the investment behavior of firms that in their lifecycle have rarely or never experienced negative cash flow, and compare it with that of firms that have persistently experienced periods of negative cash

flow;[1] ii) to study firms' investment behavior sorting out the effects of financial conditions (i.e. cash flow status) from those of financial frictions (i.e. firm age is used as predictor of financial constrains or information problems)[2], and iii) to determine what proportion of additional long-run and short-run debt is allocated to new investment for firms of different age experiencing different levels of cash flow.

Few empirical studies in the related literature have treated the firm as the basic unit. Brown, Fazzari and Peterson (2008) study the effect of financial variables on R&D after excluding firms whose sum of cash flow-to-assets ratio over the sample period is negative. They argue that these firms are very small startup companies and that their number is trivial in relation to their whole sample of firms.[3] [4] In our sample, firms that experience negative cash flow in their life cycle are typically neither young nor small. We here emphasize the investment decisions of firms that face liquidity problems for at least a certain *consecutive* number of years during their life cycles, and compare these with investments of firms with ample liquidity during their life cycles. In the approach of Brown et al. (2008), we cannot

[1] We have not opted for analyzing the basic regression specification for investment augmented by dummies representing size, industry, and sign (or size) of cash flow because that implies analyzing *investment behavior by firm-year observations,* as is usually done in the literature.

[2] We look into the age of the firm after taking into account its cash flow position over their life cycle in order to sort out financial factors from investment opportunities. Hadlock and Pierce (2008) have shown that age is a particularly useful predictor of constraints.

[3] They do not comprehensible report the regression results for their negative-cash-flow firms.

[4] Fazzari et al. (1988) have treated the firm as a unit after considering three categories of dividend-income ratios, while Erickson and Whited (2000) have classified firms according to whether or not a firm, in the whole sample, falls in the lower third of each year's distribution of total assets size and each year's distribution of the capital stock.

know whether firms have been exposed to sporadic or continuous periods of distress with scarce liquidity. In our view, it is important for the conduct of economic policy to take into account the liquidity shortage pattern that firms face. If authorities find the need to intervene, they should be more concerned about firms that have persistent liquidity problems than about firms that only occasionally experience negative cash flow. There are the former firms that are likely more prompt to be affected during recessions.

Other empirical work on corporate finance eliminates the *observations of firm-years* (see Allayannis and Mozumdar (2004)), or observations are classified into firm-years with negative cash flow and firm-years with positive cash flow (see Cleary et al., 2007) when analyzing investment-cash flow sensitivity. In our view, this is an important weakness of the literature. One of the problems is that a firm may end up belonging to both groups over time, and the capital structure of each firm is not preserved across samples. Moreover, if within a specific industry one constructs a sample that either excludes all negative cash flow firm-year observations, and another that contains only such firm-year observations, one may respectively upward- or downward-bias respectively the internal financial strength of the average firm in the corresponding sample. These procedures materially influence the estimation results and consequently the conclusions drawn. The relevant literature nevertheless argues that within any industry, a sample of firm-year observations with solely negative (positive) cash flow must represent firms that experience liquidity shortage (slackness) early (late) in their lifecycle, and therefore have similar financial structures.

The empirical work in this paper uses comprehensive firm-level panel data from Norway. This data set contains the annual financial statements[5] of limited liability enterprises registered with the Norwegian register for business enterprises over the years 1988-2003. It consists of more than 1.7 million observations for around 117,000 enterprises in different industries. The empirical analysis is based on an unbalanced panel data set. We study firms in each of the following *industries*: Manufacturing, Construction, Transportation, Computer and Data Technology, and Hotels and Restaurants.[6]

The general empirical characteristics of our data when considering the firm as a unit, independent of the industry, are: i) size and age are not correlated (there is no systematic tendency for old firms to be large); ii) firms experiencing persistent negative cash flow over several years do not tend to be growing, profitable, young, nor small; iii) only young firms with positive cash flows are characterized by high rates of investment, growth rates, and being far more profitable than other young firms with negative cash flow, and in general when compared to older firms. Many of these observations contradict many of the claims made by the related empirical literature using other datasets. Besides, many of the above issues have not been carefully analyzed in the related literature as far we know, with any type of data and for any country. We here provide such an analysis. A main point, that again needs

[5] We have used unconsolidated accounts for each company.

[6] See ECB (2007) for a description of the empirical studies on financing constraints for different countries. Notice that most studies consider only manufacturing, or an aggregate of industries. We do not include other industries because they are either too small or too large relatively to the average firm size we consider here (for example, fishing companies are too small, and telecommunication companies are too large). We also think that firms in the financial sector should be studied separately and differently.

stressing, is that classifying firm-year observations or firms by age or by size alone does not necessarily yield a group of firms with similar financial structures.

We also find, independent of industry and age, that cash flow, profits, sales growth and investment are larger (smaller) in the sample that considers firm-year observations with positive (negative) cash flows than in the sample that considers the firm as a unit. Moreover, the median age of the old and young firms in the sample considering firm-year observations, with positive and negative cash flow, appears to be much lower than the median age of the respectively older and young firm treated as a unit experiencing persistently positive and negative cash flow.

Regarding investment behavior we first find that, when considering firm-year observations with positive cash flows (*financially stronger*), relatively *older* firms have significant larger investment sensitivity to cash flow than younger firms; an exception to this pattern is found only for the Transportation sector. The well-known results of Kaplan and Zingales (1997) and Cleary (1999) are therefore confirmed: firms financially strong and little likely to face asymmetric informational problems (e.g. old firms) show significantly stronger investment-cash flow sensitivity. The results of Fazzari, Hubbard and Peterson (1988) are only confirmed for Transportation. Second, when we consider firm-year observations with negative cash flow, the cash flow coefficient is always negative independent of firm age. Such a result is in accordance with Cleary et al. (2007) who classify firm-year observations according to cash-flow level.

Note however that when we consider the firm as a unit and focus on those that are *financially strong*, we cannot confirm Kaplan and Zingales' prediction. That is, *older* firms have significantly *weaker or null* investment sensitivity to cash flow than firms that are

younger. *These results apply to all industries*. This only confirms the results of Fazzari-Hubbard-Peterson (1988), while the predictions of Dasgupta and Sengupta (2008) only apply to firms that are old and with relatively stronger liquidity position. Dasgupta and Sengupta (2008) document that firms' investments can decline even when firms are in a strong liquidity position because they may decide to transfer liquidity into the future to avoid financial constraints. Note that the work of Dasgupta and Sengupta does not tell us whether decisions to transfer liquidity to the future depend on the age of the firm. Our young firms here might not be transferring high levels of liquidity into the future and be less worried to become credit constrained.

It is interesting to remark that while treating the firm as a unit, we can confirm the predictions of Kaplan and Zingales (1997) only if firm age is disregarded for all our industries except Hotel and Restaurants: financially strong firms (e.g. persistent positive cash flows) show significantly stronger investment-cash flow sensitivity than financially weak firms (e.g. persistent negative cash flow. Our *financially weak* and especially *young firms* have the coefficient measuring the *investment sensitivity to cash flow* either numerically small negative (statistically and numerically significant), or positive (statistically and numerically significant). This *depends on the industry involved.* These results also contrast those of Cleary et al. (2007). Only for Computer and Data Technology in which this coefficient is negative independent of the age of the firm. These are new results from which one should conclude that the cash flow position of a firm over its life cycle, its age, and the industry it belongs to, are important to consider before drawing conclusions about investment-cash flow sensitivities.

We also confront our empirical results with the theoretical results of Myers and Majluf (1984) who find that more liquid firms invest more; and Jensen (1986) and Hart and Moore (1995) who have argued that firm managers may prefer internal funds to debt to finance investment in order to avoid monitoring by financial institutions. We present evidence about the role that banks and other financial intermediaries play in channeling funds into productive investment among all our categories of firms. We analyze how additional debt, both short- and long- run, is directed to new investment, and how it may or may not complement internal funds status.[7] *The most important element of our strategy is to analyze whether internal liquidity position is a more important determinant of investment for younger than for older firms, and whether new debt from financial intermediaries serves to mitigate informational and liquidity problems, and affect the investment-cash flow sensitivity in our groups of firms.*[8]

The rest of the paper is organized as follows. Section 2 contains the details of the data, the methodology used for handling the data and hypotheses testing, and the estimation method. Section 3 includes the descriptive statistics of the key variables. Section 4 presents the econometric model, while Section 5 contains the estimation results. Section 6 concludes.

[7] This paper does not analyze how a firm's level of debt ratio or degree of indebtness affects its investment behavior. This is important, but will be the topic of another paper.

[8] Almeida, Campello, and Weisbach (2004) and Acharya, Almeida, and Campello (2006) postulate that firms may allocate free cash flow to reducing current debt and building savings and borrowing capacity in order to secure future investment. In such cases, entering the debt ratio as an explanatory variable could be expected to affect the cash flow coefficient.

2. Data and sampling procedures

The data in this study is based on information reported by limited liability companies to the central Norwegian Register of Company Accounts. The accounts are not consolidated, i.e., they do not show all assets, liabilities, and revenue items for a parent company and its subsidiaries separately. Unconsolidated accounts have been used by many other authors, such as Bond et al. (2003), when analyzing companies in Germany, France, and Belgium.[9]

A firm-year observation is here defined as a record with financial and other relevant information for an enterprise (identified by a unique firm number) available in the database for a particular year. The unit of account is constant Norwegian kroner of 1998. The data cover the years 1988-2003. We only include in our sample those enterprises that have provided accounting information for at least five consecutive years, have positive real cash stock holdings, and have real capital stocks and total assets worth more than 50,000 Norwegian kroner of 1998.

We classify firms according to three characteristics: industry, level of cash flow, and age. *First*, the industries we study are Manufacturing, Construction, Transportation, Computer and Data Technology, and Hotels and Restaurants. We think it is essential and useful to document differences in financial conditions across industries other than Manufacturing. According to our knowledge, few empirical studies on the investment behavior of firms for Norway and other countries have analyzed investment-cash flow sensitivity for firms per industry other than Manufacturing. Cleary et al. (2007) also consider other industries in

[9] Bond et al. (2003) studied a subset of their sample where both consolidated and unconsolidated accounts were available. They concluded that their results were not driven by differences in the level of aggregation caused by whether or not the accounts were consolidated.

addition to Manufacturing but they aggregate them to do their empirical analysis.[10] Our econometric results show that financial factors affect firms' investment, but that such effects are different in magnitude across industries.

Second, within each industry group, we classify firms into two subsidiary groups based on the persistence of negative cash flow. The first group consists of firms that experienced negative cash flow for three or more years consecutively.[11] Firms with no more than two consecutive years of negative cash flow were classified as firms with persistent positive cash flow. We then test whether persistent negative cash flow can influence the effect of the responsiveness of investment to cash flow, and if such an effect is different for firms that have markedly persistent positive cash flow. We think that if a firm experiences 3 years of *consecutive* negative cash flow, it must be a firm that is facing some sort of liquidity distress. We do not find it relevant to characterize firms that experience negative cash flow exporadically during its lifecycle as having liquidity problems.

Third, to test directly the effect of market imperfections and financial frictions, we classify firms as old or young, within each of the industries and within each of the two groups of firms described above (with and without persistent negative cash flow). A firm is

[10] Papers using Norwegian firm-level data are Johansen (1994) and Nilsen (2004). Johansen uses an unbalanced panel of Norwegian manufacturing firms for the years 1977-1990 to estimate a standard adjustment-cost model of investment, and concludes that the smallest firms seem to be the most financially constrained. Nilsen (2004) follows Hansen (1999) by using a threshold regression technique to analyze the impact of financial constraints on investment. He uses an unbalanced panel of importer firms in the Norwegian manufacturing sector for the period 1978-1990, and finds the cash-flow coefficient to be statistically significant and almost twice as big for the indebted firms than for the solvent banks.

[11] We did not choose to have a sample of firms with 4, 5 or 6 consecutive years of negative cash flow because we wanted to have a sample of firms that one can characterize as having persistent positive cash flow. It is obvious that a sample of firms with 2 consecutive years of negative cash flow can hardly be characterized as facing liquidity problems.

classified as old if it is older than the median of the age of all firms in its corresponding group (i.e., type of industry and level of cash flow); while a firm is classified as young if it is younger than the median of the age of all firms in its group.[12]

Let us now present a statistical summary of our key variables.

3. Some general stylized facts. Statistics Summary

First of all, to determine whether a firm is old or young, we calculate the median age of the firms in the group they belong to: its industry and if they experience positive or negative cash flow. Table 1 in the Appendix reports summary statistics for firms with persistent positive cash flow and persistent negative cash flow according to their age and the industry they belong to. There we find the ratio of investment to capital stock (I_t/K_{t-1}), sales ($Sales_t$), the change in the log of sales ($\Delta Sales_t$), the ratio of cash flow to capital stock (CF_t/K_{t-1}), the ratio of net income to total book value of assets ($NetInc_t/Y_{t-1}$), and the year in which the median-age firm was established or founded is denoted in the table by *Age*. *Cash flow* equals cash generated from operations after taxation and interest paid, plus all noncash deductions from income (principally depreciation allowances and amortization) and extraordinary items, minus dividends. *Investment* of year t (I_t) represents investment in plant and equipment during period t, and *capital stock* of year t-1 (K_{t-1}) is the begyning of period (t-1) capital stock. We measure net income ($NetInc_t$) as earnings before interest, taxes, depreciation, and extraordinary items (equivalent to EBITDA in COMPUSTAT).

[12] We think it is appropriate to consider the relative age of the firm and not the absolute age across all the firms and industries because our sample includes both traditionally old and relatively new industries such as Data and Computer Technology. It is therefore not reasonable to compare ages across industries.

The purpose of Table 1 is to see if there are distributional patterns in those variables that are systematically related to the type of cash flow development a firm experiences over its lifecycle (persistent negative or positive cash flow), considering the firm's age. The statistical figures for firms unconditional on their age are not reported in Table 1 to save space, but we present their most important characteristics. Given that we are considering the relative age of the firms, that is the age of the firm within the industry they belong to, we describe firm characteristics within each industry.

(a) We report that unconditional on age, there are systematic patterns in the variables in question across industries with persistent positive cash flow or negative cash flow. For example, the median firm with positive cash flow has an investment to capital stock ratio (I_t/K_{t-1}), sales ($Sales_t$), change in log of sales ($\Delta Sales$), cash flow to capital stock ratio (CF_t/K_{t-1}), and net income to total assets ratio ($NetInc_t/Y_{t-1}$) higher than those of the median firm with persistent negative cash flow. The only exception is the Computer and Data Technology industry, in which the median firm with persistent positive and the median firm with persistent negative cash flow categories have very similar (I_t/K_{t-1}) ratio to each other.

(b) Within each industry, the median firm with persistent negative cash flow is not much younger than the median firm with persistent positive cash flow. Thus, experiencing persistent negative cash flow over a lifecycle is not really a characteristic of young firms, at least not in our sample.

(c) By considering the age of the firms by industry, we find that the medians of the ratio of investment to capital stock (I_t/K_{t-1}), change in log of sales ($\Delta Sales_t$), the ratio of cash flow to capital stock (CF_t/K_{t-1}), and the ratio of net income to total assets ($NetInc_t/Y_{t-1}$) are

higher for *young* firms with persistent *positive cash flow* than for *old* firms with persistent *positive cash flow*. Only sales ($Sales_t$) are larger for the latter firms.

(d) Within each industry, the comparison between the median *young* firm with persistent *positive cash flow* and the *young* firms with persistent *negative cash flow*, indicates that the former firms have a higher ratio of investment to capital stock (I_t/K_{t-1}), larger change in sales ($\Delta Sales_t$) and sales ($Sales_t$), higher ratio of cash flow to capital stock (CF_t/K_{t-1}), and higher ratio of net income to total assets ($NetInc_t/Y_{t-1}$) than the latter firms. In fact, except for Construction, $NetInc_t/Y_{t-1}$ is always negative for the young firms experiencing persistent negative cash flow.

(e) In each industry, the median *young* firm that has experienced persistent *negative cash flow* over its lifecycle has a lower net income to total assets ratio ($NetInc_t/Y_{t-1}$) and cash flow to capital stock ratio (CF_t/K_{t-1}) than the median *old* firm with persistent *negative cash flow*. The exception here is Construction where there is not much difference between the two types of firms. The median *young* firm that has experienced persistent *negative cash flow* over its lifecycle also has a negative $NetInc_t/Y_{t-1}$; here also, the only exception is Construction.

(f) Within each industry, the sales ($Sales_t$) of the median *old* firms with persistent *negative cash flow* are larger than for the median *young* firms with *persistent negative cash flow* (except in Transportation), but not much different from the sales ($Sales_t$) of the median *young* firms with persistent *positive cash flow*.

(g) The degree of leverage, when measured as the relative short-run debt and long-run debt with respect to total assets ratios[13] is, within each industry, larger for the median firm with negative cash flow than for the median firm with positive cash flow, independent of age.

(h) Even though there are systematic patterns for the relevant variables across industries, there are differences in the size variable across industries.

Detail statistics of the positive cash flow and negative cash flow firm-year observations are not here presented due to space limitations. There are however two general characteristics that are worthwhile to mention. First, independent of industry and age, the ratio of cash flow to capital stock (CF_t/K_{t-1}), the ratio of net income to total assets ($NetInc_t/Y_{t-1}$), sales changes ($\Delta Sales_t$), and the ratio investment to capital stock (I_t/K_{t-1}) are significantly larger (smaller) in the sample that considers firm-year observations with positive (negative) cash flows than in the sample that considers the firm as a unit. Importantly, $NetInc_t/Y_{t-1}$ is not only negative for young firms-year observations with negative cash flow but also for old firms-year observations with negative cash flow. This contrast our statistics for $NetInc_t/Y_{t-1}$ for older firms experiencing persistent negative cash flow where again the firm is treated as the unit. Second, the median age of the old and young firms in the sample considering firm-year observations, with positive and negative cash flow, appears to be much lower than the median age of the respectively older and young firm treated as a unit experiencing persistently positive and negative cash flow.

[13] Not reported in Table 1 but available upon request.

Our main conclusions from considering the firm as a unit are: first, in any specific industry, there are differences in the financial structure between firms with negative cash flow and those with positive cash flow; second, there are also differences across industries for firms with negative cash flow and across industries for firms with positive cash flow. Third, the median firm with persistent negative cash flow, young and old and across industries, has higher debt ratios, which may indicate that such firm's managers may not be not risk averse to such external funding, given that it is available, and/or may not mind being monitored by the lending institution. Our final important conclusion is that classifying firm-year observations only according to their age or size does not guarantee that we will have a sample of firms with similar financial structures. Firms (not firm-years) do experience different levels of cash flow over their lifecycles. It is necessary to measure the impact of such pattern on the firm's decision-making.

4. Specification of the Investment equation

The general form of the reduced-form investment equations that we here considered is:[14]

$$\frac{I_{it}}{K_{it-1}} = \alpha \frac{I_{it-1}}{K_{it-2}} + f(X_{it-m} / Y_{it-m-1}) + \beta \frac{cash\ flows_{it-m}}{K_{it-m-1}} + d_t + \eta_i + u_{it}; \qquad (1)$$

where m=0,1. The adjustment cost α reflects the sluggish adjustment of capital stock that Caballero, Engel and Haltiwanger (1995) suggest. X represents variables and lagged values that have been emphasized as determinants of investment from a variety of theoretical

[14] This empirical specification is the most common in the relevant literature; see Mairesse et al. (1999), Bond et al. (2003), and Mizen and Vermeulen (2005).

perspectives. These variables are $\Delta Sales_{t-1}$, $\Delta Sales_{t-2}$ and additional (or changes in) short- and long-run debt at t, $\Delta srcredit_t/Y_{t-1}$ *and* $\Delta lrcredit_t/Y_{t-1}$ respectively, which are all deflated by the total book value of assets Y. Thus, f represents the vector of parameters indicating the sensitivity of investment to such variables. The variation in the user cost of capital is controlled for by firm specific effects, $\eta_{i,}$ which represents the unobserved individual-specific time-invariant effect which allows heterogeneity across individual firms but not across time. The time-fixed effect is represented by d_t, while the disturbance term by u_{it}. These disturbances u_{it} are assumed to be independent across individuals. The parameter β indicates the degree of sensitivity of investment to available internal finance after investment opportunities are controlled for through the variable $\Delta Sales_{t-1}$ and $\Delta Sales_{t-2}$.

Variables in X are included alternatively which means that we have analyzed three specifications of investment behavior, depending on the explanatory variables. These specifications are:

- *Specification 1:* $I_t/K_{t-1,}$ CF_t/K_{t-1}, CF_{t-1}/K_{t-2}, $\Delta Sales_{t-1}$, $\Delta Sales_{t-2}$: the results are shown in column 2 in all the tables from 2 to 6.

- *Specification 2:* $I_t/K_{t-1,}$ CF_t/K_{t-1}, CF_{t-1}/K_{t-2}, $\Delta Sales_{t-1}$, $\Delta Sales_{t-2}$, $\Delta srcredit_t/Y_{t-1}$, and $\Delta srcredit_{t-1}/Y_{t-2}$: the results are shown in column 3 in all the tables from 2 to 6.

- *Specification 3:* $I_t/K_{t-1,}$ CF_t/K_{t-1}, CF_{t-1}/K_{t-2}, $\Delta Sales_{t-1}$, $\Delta Sales_{t-2}$, $\Delta lrcredit_t/Y_{t-1}$, and $\Delta lrcredit_{t-1}/Y_{t-2}$: the results are shown in column 4 in all the tables from 2 to 6.

One important issue here is whether our inferences about the link between investment and liquidity could be biased and therefore subject to the same criticism as related studies using liquidity proxies (e.g., cash flow) for unobservable determinants of investment. As argued, these proxies are highly correlated with the firm's investment opportunities: High

liquidity signals that the firm has done well and is likely to continue doing well. Thus, more liquid firms have better investment opportunities and try to invest more, including using internal funds. Our empirical strategy, however, sidesteps this problem because first of all, as a measure of investment opportunities we consider sales growth $\Delta sales_{t-1}$ to measure its contribution in the firms' investment pattern.[15] Note that the vast majority of firms in our data set are not listed[16], and we cannot therefore obtain a proper measure of Tobin's Q since we have no information about the market valuation of the firms.[17] We have instead included the growth in sales $\Delta sales_{t-1}$ to minimize the problems of multicollinearity.[18]

Moreover, we do not associate cash flow status with credit constraint. Our approach is very much in light with the work of Dasgupta and Sengupta (2008) who suggest that one does not need to interpret a significant large cash flow coefficient as an indication that there are financial market imperfections and that the firm is credit-constrained. It may just be that high liquidity firms transfer some of the current liquidity into the future postponing current potential investment in order to protect themselves from possible credit constraint. We argue

[15] We have also estimated the investment equations with total sales and then net income/total assets. These are not reported due to space limitations but are available upon request. These estimates indicate that the introduction of total sales and net income/total assets as an explanatory variables have little effect on the coefficient measuring investment-cash flow sensitivity.

[16] Most Norwegian firms that are public are in the industries of Oil Extraction, Telecommunications, Shipping, and Financial Services, which we do not deal with here.

[17] The related literature has used Tobin's Q to control for investment opportunities. Yet, the debate has not been settled, as some argue that Tobin's Q is difficult to measure and that there are many other strong assumptions underlying the theory. For example, Gilchrist and Himmelberg (1995), Cummins et al. (1999), Erickson and Whited (2000, 2002), and Alti (2003) argue that measurement problems associated with Tobin's Q will affect any estimated sensitivity of investment to the availability of internal funds.

[18] We have used other proxies for investment opportunities such as Sales/K ration and the ratio of net income (EBITDA) to total assets. We never found substantial qualitative and quantitative differences among the different approaches. These are not presented here but are available upon request.

that it is also unlikely that any possible bias is higher for young firms with persistent positive cash flow than for old firms with persistent positive cash flow. Even if we accept that individual liquidity coefficient estimates may be biased, as long as the bias is the same for young and old firms, the estimated difference in the coefficients will be an unbiased estimate of the true difference. Rejection of equality of the coefficient then indicates that the true effects of liquidity are more important for one set of firms. Indeed, the hypothesis of equality of the coefficients is easily rejected here.

To account for the effect of information problems within our two groups of firms, we rather consider the firm's age to analyze its effect on the link between investment and liquidity. Age can be safely considered exogeneous with respect to a firm's financial choices.

In addition, since there could be possible correlations between the cash flow and investment opportunities; and between the error term of the investment equation and the cash flow, we use the System Generalized Method of Moments (GMM) of Blundell and Bond (1998) for panel data. This estimation method combines the set of moment conditions specified for the equations in first-differences with additional moment conditions specified for the equations in levels. The differences are instrumented by lagged levels of the regressors, and the lagged differences of the dependent variable are included as instruments for equation in levels.[19] Thus, all regressors are assumed to be endogenous. We use the Sargan/Hansen–test of overidentified restrictions as a joint test of model specification and instrumental selection. Moreover, since the moment conditions used by the first-differenced GMM estimator (from which we can also perform the Hansen-test) are a strict subset of those

[19] The timing of the lags we use as instruments consists in all available lags starting t-3.

used by the system GMM estimator, we proceed in doing the Difference Sargan/Hansen test which is based on difference between the two standard Sargan/Hansen statistics. This is a more specific test to the assumption that the right-hand side variables in (1) are uncorrelated with the individual effects. The results on these test, not reported due to space limitations but available, indicate that in all cases that the additional moment conditions used in the level equations accepts their validity at least 5% level. We also report the m1 and m2 test for first- and second-order serial correlation of the first difference residuals. Both the m1 and m2 test are asymptotically standard normal under the null of no serial correlation in the error term. At last, we should mention that we use alternative instrument sets and we never obtain qualitative and quantitative different results.

5. Empirical Results on the investment-cash flow sensitivity

Tables 2 to 6 in the Appendix report the empirical estimates of equation (1) for firms when treated as unit, in each industry that experienced in their lifecycle persistent positive and negative cash flow. Tables 2a,b; 3a,b; 4a,b; 5a,b; and 6a,b, also in the Appendix, present the results for old and young firms, also treated as unit, in each category. We summarize the results as follows. Again, due to space limitations, we do not present the empirical estimates of considering firm-year observations but we however compare them with our results treating firms as a unit.

5.1 Comparing firms with positive and negative cash flow

- Without considering the age of the firm, we find that firms in each industry that have experienced persistent positive cash flow in their lifecycles show significant higher

investment-cash flow sensitivity than firms in the corresponding industries that have experienced persistent negative cash flow in their lifecycle (or are financially weak, as Kaplan and Zingales would categorize them). These results encompass the results of Kaplan and Zingales (1997). The empirical analysis of firm-year observations with positive cash flow gives similar results for three industries Manufacturing, Construction, and Computer and Data Technology.

- Without taking into account age, we find that the investment of firms (when the firm is treated as unit) that are financially weak (have persistent negative cash flow) is not sensitive to cash flow. There are two exceptions: first, firms in Hotels and Restaurants, for which the cash flow coefficient is statistically significant and positive but still significantly smaller than that of their counterparts in the same industry with persistent positive cash flow. The other exception is firms in Computer and Data Technology, where the cash flow coefficient is statistically significant but negative. Cleary et al. (2007) found this negative relation between investment and cash flow for firm-year observations with negative cash flow after considering an aggregated set of industries. In fact, we also find that for negative cash firm-year observations, the coefficient that relates investment and cash flow is negative and significant in each of the industries considered here, which again contrasts our estimates when treating the firm as a unit. This only means that firms continue investing in spite of liquidity shortages.

5.2 Comparing old and young firms with positive and negative cash flow within industries

- When we consider the *age of the firm* as a proxy for the degree of asymmetric information, treating the firm as a unit, and only those firms (by industry) that are *financially strong*, we find that old firms either do not show any sensitivity of investment to cash flow, or show positive sensitivity that is significantly weaker than for younger firms. In the Transportation sector, not even young firms will show any investment-cash flow sensitivity.

- Taking that firm as a unit, *older firms with negative cash flow* in Construction, present a *positive* relationship between investment and cash flow (i.e., there is a reduction in investment while the firm experiences negative cash flow) while for firms in Computer and Data Technology this relationship is *negative* (i.e., firms continue investing in spite of experiencing a shortage of intern liquidity). For firms in the other industries, we found no sensitivity of investment to cash flow. *For younger firms,* we also find a negative relationship between cash flow and investment for younger firms with negative cash flow in Computer and Data Technology; but a positive relationship for younger firms in Hotels and Restaurants. Thus, the predictions of Boyle and Guthrie (2003) are only confirmed with old negative-cash flow firms in Construction, and young negative-cash flow firms in Hotels and Restaurants: there are fewer investment possibilities for these firms due to their shortage in internal funds. Cleary et al. (2007) again found negative sensitivity but did not consider how such negative sensitivity depends on firm age and industry. Brown, Fazzari and Petersen (2008) also found that firms whose sum of their gross cash flow-to-assets variable is negative over the entire sample, have negative cash flow regression coefficients. They do

not either present any results for firms of different ages and per industry. Thus, contrary to Cleary et al. (2007) and Brown, Fazzari and Petersen (2008), we find that not all firms when the firm is treated as a unit tend to increase their investment when they have negative cash flow. This behavior depends on a firm's age and the industry it belongs to. Our results are also different from the results of Kaplan and Zingales (1997), who find that financially weak firms do not show any sensitivity. It is worthwhile to note that results of Kaplan and Zingales (1997), Cleary et al. (2007) and Brown, Fazzari and Petersen (2008) are only confirm when we analyze negative cash flow firm-year observations: there is negative sensitivity of investment to cash flow independent of the industry and age.

- When comparing *older* firms with *positive cash flow (financially strong)* with *older* firms with *negative cash flow (financially weak)* within industries, we find that older and financially weak firms in Construction, and Data and Computer Technology show significantly lower investment-cash flow sensitivity than older firms in the same industries that are stronger financially. Comparing *younger and financially weak firms* with *younger and financially strong firms,* we find that the former firms in Hotels and Restaurants, Computer and Data Technology, Manufacturing and Construction, show a significantly lower cash flow coefficient than the latter firms in the same industries. For firms in Computer and Data technology, this coefficient is relatively smaller and negative whether the firm is old or young. Thus, the cash-flow pattern that the firm experiences over its lifecycle, its age, and the industry it belongs to, play important roles in determining the sensitivity of investment to cash flow. These issues have not been considered before in the literature.

- Within each industry and unconditional on age, we find that the response of investment to new issued debt is in general greater among firms with positive cash flow than for firms with negative cash flow, except for Construction. Thus, the former firms take advantages of having greater amount of liquidity to increase investment but at the same time they allocate part of their new debt to new investment. This result seems to encompase the predictions of Myiers and Majluf (1984): liquid firms prefer to use internal funds and debt to increase investment. When age is however taken into consideration, we find that young firms, either with positive or negative cash flow, increase their investment in an undeniably significant greater proportion to new issued debt than their old counterparts firms. Only in Computer and Data Technology, firms with negative cash flow, young or old, do not allocate their new issued debt to increase investment. These firms probably use this new debt to pay old debt and to alleviate their liquidity problems. We also find that within each industry, there is not much difference between how the median young firm with persistent *positive cash flow* uses additional debt to finance new investment with the median young firm with persistent *negative cash flow*. This may imply that managers in such type of firms may not (or cannot afford to) be risk averse to such external funding, when that it is available, and/or may not mind being monitored by the lending institution. Thus, the conclusions drawn by Jensen (1986) and Hart and Moore (1995) that managers' greater preferences for using internal funds instead of debt, may not always applied. That will depend importantly of the availability of internal funds and the degree of market imperfections. When firms are old and liquid, they can dispense themselves of new debt to finance investment. When firms are more likely to face market imperfections because they are young, even when facing little liquidity (i.e. persistant negative cash flow over certain number of years), they may find it

necessary to use their new issue debt to finance investment even though they are being exposed to be supervised and monitored.

6. Conclusions

This paper analyzes how the liquidity position of firms affects the well-known but controversial relationship between cash flow and investment. To achieve our goal, we classify firms, and not firm-year observations as commonly considered in the related literature, into those that are financially weak or have experienced *persistent negative cash flow* over their lifecycle, and those that are financially strong or have *persistent positive cash flow* over their lifecycle. We also find that classifying the firms according to their age while controlling for whether firms have been financially weak or strong over their lifecycles, is a fruitful approach to reevaluate the results of Fazzari-Hubbard-Peterson, and Kaplan-Zingales, being both of them important works. As far as we know this represents a contribution to the literature.

We find that when one *only* considers *financially strong firms* within the industry they belong to; older firms have lower investment sensitivity to cash flow than younger firms. These results confirm those of *Fazzari-Hubbard-Petersen*. If *we do not however take age into account* and only compare firms that are financially weak with firms that are financially strong, we find that in every industry, the investment-cash flow sensitivity is stronger for financially stronger firms than for financially weaker firms, which confirms the *Kaplan-Zingales* results. Our new results extend to the relationship between investment and cash flow for firms experiencing *persistent negative cash flow*. This relationship can be positive,

negative, or not existent, and this depends on the industry in question but not much on the age of the firm. Cleary et al. (2007) classify firm-year observations according to their cash-flow level, and find that firm-year observations with negative cash flow have negative investment sensitivity to cash flow. Brown, Fazzari and Peterson (2008) study the effect of financial variables on R&D of firms that have the sum of their cash flow-to assets ratio negative over their sample period, and find also negative gross cash flow regression coefficient for these firms. They argue that these firms are very small startup companies and constitute a trivial number in relation to their whole sample of firms. Within any of our industries, firms that experience negative cash flow in their life cycle are not a small part of our sample, and not necessarily young or small. We again find that such negative sensitivity, whenever it is significant, applies only to firms in specific industries, either young or old.

We think that with our methodology makes an important contribution to the literature. This methodology is more appropriate than the firm-year approach from both the econometric, economic theory, and economic policy points of view. After all, all the theoretical predictions are based on treating the firm as the basic unit and not firm-years. Optimal policies also are design to be implemented to firms with specific characteristics. It is then important that we know and treat the firm as a unit. It is a mistake to assume that firms always experience negative cash flow early in their lifecycles, and positive cash flow later in their lifecycles. Grouping firm-year observations with negative cash flow does not need to represent the young firms. In fact, this issue has not been studied well in the related literature. Our dataset indicate that within each of our industries, the median firm that experiences persistent negative cash flow is not necessarily younger than the median firm that experiences persistent positive cash flow. Therefore, classifying firm-year observations in the

raw data according to age, even within industries, does not guarantee that we will have a sample of firms with similar financial structures. For example, within of our industries, persistent negative-cash-flow firms have higher leverage independent of age, and the older ones are not much larger than the young ones with persistent positive cash flow. We remark that our work's main emphasis is the analysis of how firms' investment decisions are different among firms experiencing different persistent patterns of cash flow over their lifecycles.

Across industries, there are also differences among firms with negative cash flow and firms with positive cash flow. We conclude that to understand the implications of the different degrees of sensitivity between investment and cash flow, it is important to take into account the cash flow levels a firm faces during its lifecycle, before we consider age and size to be a proxy for credit constraints/asymmetric information. We have demonstrated here that the investment-cash flow sensitivity depends on the cash flow pattern the firm experiences over its lifecycle, on the age of the firm, and on the industry to which the firm belongs.

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Table 1. Statistical summary of main variables by industry. $Sales_t$ are in thousands of Norwegian kroner of 1998

Manufacturing

Positive cash flow – old firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	29284	0.067
$Sales_t$	31879	9584
$\Delta Sales_t$	29284	0.0
CF_t/K_{t-1}	29284	0.333
$NetInc_t/Y_{t-1}$	29284	0.078
Age	31879	1975

Positive cash flow – young firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	33943	0.113
$Sales_t$	38481	5675
$\Delta Sales_t$	33943	0.034
CF_t/K_{t-1}	33943	0.407
$NetInc_t/Y_{t-1}$	33943	0.097
Age	38481	1991

Negative cash flow – old firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	6280	0.022
$Sales_t$	7024	6150
$\Delta Sales_t$	6280	-0.0008
CF_t/K_{t-1}	6280	0.066
$NetInc_t/Y_{t-1}$	6280	0.014
Age	7024	1986

Negative cash flow – young firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	6699	0.068
$Sales_t$	7923	3830
$\Delta Sales_t$	6699	0.024
CF_t/K_{t-1}	6699	-0.009
$NetInc_t/Y_{t-1}$	6699	-0.017
Age	7923	1991

Transportation

Positive cash flow-old firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	14096	0.053
$Sales_t$	15552	4338
$\Delta Sales_t$	14096	0.014
CF_t/K_{t-1}	14096	0.28
$NetInc_t/Y_{t-1}$	14096	0.069
Age	15552	1980

Positive cash flow-young firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	17191	0.042
$Sales_t$	19834	2770
$\Delta Sales_t$	17191	0.040
CF_t/K_{t-1}	17191	0.28
$NetInc_t/Y_{t-1}$	17191	0.085
Age	19834	1992

Negative cash flow-old firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	2688	-0.013
$Sales_t$	3090	1961
$\Delta Sales_t$	2688	-0.013
CF_t/K_{t-1}	2688	0.056
$NetInc_t/Y_{t-1}$	2688	-0.002
Age	3090	1977

Negative cash flow-young firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	3030	-0.013
$Sales_t$	3674	2019
$\Delta Sales_t$	3030	0.025
CF_t/K_{t-1}	3030	0.003
$NetInc_t/Y_{t-1}$	3030	-0.006
Age	3674	1991

Construction

Positive cash flow-old firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	28364	0.067
$Sales_t$	30925	4867
$\Delta Sales_t$	23705	0.005
CF_t/K_{t-1}	28364	0.406
$NetInc_t/Y_{t-1}$	28364	0.089
Age	30925	1983

Positive cash flow-young firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	32577	0.145
$Sales_t$	37472	3729
$\Delta Sales_t$	37472	0.060
CF_t/K_{t-1}	32577	0.545
$NetInc_t/Y_{t-1}$	32577	0.124
Age	37472	1992

Negative cash flow-old firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	3828	-0.013
$Sales_t$	4302	3242
$\Delta Sales_t$	3828	-0.026
CF_t/K_{t-1}	3828	0.073
$NetInc_t/Y_{t-1}$	3828	0.024
Age	4302	1980

Negative cash flow-young firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	3879	0.02
$Sales_t$	4666	2271
$\Delta Sales_t$	3879	0.014
CF_t/K_{t-1}	3879	0.068
$NetInc_t/Y_{t-1}$	3879	0.026
Age	4666	1990

Computer and Data Technology

Positive cash flow-old firms

Variable	*Obs*	*Mean*
I_t/K_{t-1}	3323	0.201
$Sales_t$	3768	4437
$\Delta Sales_t$	3323	0.028
CF_t/K_{t-1}	3323	0.748
$NetInc_t/Y_{t-1}$	3323	0.106
Age	3768	1986

Positive cash flow-young firms

Variable	*Obs*	*Mean*
I_{t-1}/K_{t-1}	3151	0.318
$Sales_t$	3946	3682
$\Delta Sales_t$	3151	0.080
CF_t/K_{t-1}	3151	1.01
$NetInc_t/Y_{t-1}$	3151	0.129
Age	3946	1995

Negative cash flow-old firms

Variable	*Obs*	*Mean*
I_t/K_{t-1}	935	0.195
$Sales_t$	1112	3535
$\Delta Sales_t$	935	0.020
CF_t/K_{t-1}	935	0.136
$NetInc_t/Y_{t-1}$	935	-0.005
Age	1112	1986

Negative cash flow-young firms

Variable	*Obs*	*Mean*
I_t/K_{t-1}	1026	0.393
$Sales_t$	1329	2514
$\Delta Sales_t$	1026	0.122
CF_t/K_{t-1}	1026	-0.062
$NetInc_t/Y_{t-1}$	1026	-0.139
Age	1329	1995

Hotel and Restaurants

Positive cash flow-old firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	8101	0.014
$Sales_t$	8930	4505
$\Delta Sales_t$	8101	-0.005
CF_t/K_{t-1}	8101	0.231
$NetInc_t/Y_{t-1}$	8101	0.087
Age	8930	1986

Positive cash flow-young firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	9998	0.042
$Sales_t$	11643	3292
$\Delta Sales_t/Y_{t-1}$	9998	0.023
CF_t/K_{t-1}	9998	0.245
$NetInc_t/Y_{t-1}$	9998	0.076
Age	11643	1994

Negative cash flow-old firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	2812	$7.4e^{-4}$
$Sales_t$	3155	3588
$\Delta Sales_t$	2812	-0.020
CF_t/K_{t-1}	2812	0.035
$NetInc_t/Y_{t-1}$	2812	0.004
Age	3155	1986

Negative cash flow-young firms

Variable	*Obs*	*Median*
I_t/K_{t-1}	2753	0.006
$Sales_t$	3320	2235
$\Delta Sales_t$	2753	0.009
CF_t/K_{t-1}	2753	-0.031
$NetInc_t/Y_{t-1}$	2753	-0.040
Age	3320	1993

Table 2. Investment and cash flow sensitivity for Manufacturing (z-values in parentheses)

	No negative cash flow for more than 2 years			**Negative cash flow for 3 or more years consecutively**		
	Dependent variable I_t/Y_t			Dependent variable I_t/Y_t		
I_{t-1}/K_{t-1}	-0.074	-0.079	-0.084	-0.012	-0.014	-0.018
	(-1.30)	(-1.35)	(-1.38)	(-1.43)	(-1.54)	(-1.45)
$\Delta Sales_{t-1}$	3.210	2.766	2.584	0.161	0.205	0.211
	(0.87)	(1.03)	(0.87)	(0.50)	(0.86)	(1.10)
$\Delta Sales_{t-2}$	0.260	0.187	0.174	-0.003	-0.012	-0.023
	(0.87)	(-0.92)	(0.71)	(-0.11)	(-0.45)	(-0.85)
CF_t/K_{t-1}	**0.170***	**0.168****	**0.170***	-0.032	-0.033	-0.032
	(1.70)	(1.79)	(1.67)	(-0.47)	(-0.47)	(-0.46)
CF_{t-1}/K_{t-2}	0.140	0.143	0.149	0.008	0.010	-0.023
	(1.27)	(1.31)	(1.30)	(0.66)	(0.70)	(-0.85)
$\Delta srcredit_t/Y_{t-1}$		2.079			*0.408***	
		(1.48)			(2.03)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.079			0.027	
		(1.48)			(1.20)	
$\Delta lrcredit_t/Y_{t-1}$			*3.070 **			0.382
			(1.69)			(0.71)
$\Delta lrcredit_{t-1}/Y_{t-2}$			0.218			0.054
			(1.40)			(1.16)
N observations	65259	65259	65259	12120	12120	12120
N firms	7658	7658	7658	1811	1811	1811
m_1	-1.54	-1.58	-1.49	-3.29	-3.29	-3.26
m_2	0.05	-0.23	-0.07	-1.42	-1.55	-1.42
H	412.92	528.01	592.78	320.99	452.24	465.75
p	0.0	0.0	0.0	0.28	0.069	0.027

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 2a. Investment and cash flow sensitivity for young and old firms in Manufacturing and without negative cash flow for more than 2 years (z-values in parentheses)

OLD FIRMS				**YOUNG FIRMS**		
Dependent variable I_t/K_t				**Dependent variable I_t/K_t**		
I_{t-1}/K_{t-1}	-0.156***	-0.155***	-0.157***	-0.006*	-0.010*	-0.009*
	(-4.68)	(-4.61)	(-4.80)	(-1.68)	(-1.86)	(-1.68)
$\Delta Sales_{t-1}$	3.199**	2.643**	2.711**	0.066	0.332	0.006
	(2.52)	(2.22)	(2.16)	(0.10)	(0.62)	(0.01)
$\Delta Sales_{t-2}$	0.326*	0.312*	0.289*	-0.056	-0.056	-0.069
	(1.91)	(1.75)	(1.75)	(-0.61)	(-0.73)	(-0.75)
CF_t/K_{t-1}	-0.018	-0.037	-0.026	**0.079***	**0.080***	**0.078***
	(-0.16)	(-0.16)	(-0.11)	(1.70)	(1.71)	(1.70)
CF_{t-1}/K_{t-2}	0.685	0.685	0.678	0.009	**0.012***	0.011
	(1.29)	(1.29)	(1.28)	(1.50)	(1.78)	(1.59)
$\Delta srcredit_t/Y_{t-1}$		-1.371			-0.376	
		(-0.95)			(-0.30)	
$\Delta srcredit_{t-1}/Y_{t-2}$		-0.324			*0.017***	
		(-1.07)			(2.05)	
$\Delta lrcredit_t/Y_{t-1}$			*4.022**			*2.794***
			(1.74)			(2.28)
$\Delta lrcredit_{t-1}/Y_{t-2}$			0196			*0.057**
			(1.36)			(1.72)
N observations	26180	26180	26180	28783	28783	28783
N firms	2490	2490	2490	4203	4203	4203
m_1	-2.55	-2.47	-2.42	-1.17	-1.18	-1.15
m_2	-1.52	-1.55	-1.54	0.12	-0.47	0.15
H	418.6	513.0	490.2	860.0	966.87	960.9
p	0.0	0.0	0.0	0.00	0.0	0.0

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 2b. Investment and cash flow sensitivity for young and old firms in Manufacturing with negative cash flow for 3 or more years consecutively (z-values in parentheses)

OLD FIRMS				**YOUNG FIRMS**		
Dependent variable I_t/K_t				Dependent variable I_t/K_t		
I_{t-1}/K_{t-1}	-0.137***	-0.152***	-0.183***	-0.008	-0.013	-0.012
	(-4.58)	(-5.47)	(-4.25)	(-0.74)	(-0.95)	(-0.94)
$\Delta Sales_{t-1}$	0.530	0.337	0.496	0.274	0.315	0.184
	(1.54)	(1.37)	(1.64)	(0.72)	(1.14)	(0.78)
$\Delta Sales_{t-2}$	-0.045	-0.058	-0.082	-0.013	$-2.9e^{-4}$	-0.013
	(-0.72)	(-1.08)	(-1.30)	(-0.20)	(-0.00)	(-0.18)
CF_t/K_{t-1}	-0.071	-0.067	-0.064	0.211	0.172	0.210
	(-0.88)	(-0.84)	(-0.84)	(1.40)	(1.34)	(1.37)
CF_{t-1}/K_{t-2}	0.024	0.023	0.019	-0.037	-0.034	-0.038
	(1.00)	(0.99)	(0.94)	(-1.45)	(-1.48)	(-1.46)
$\Delta srcredit_t/Y_{t-1}$		0.927			0.457	
		(1.49)			(1.57)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.204			0.023	
		(1.45)			(0.75)	
$\Delta lrcredit_t/Y_{t-1}$			0.963			0.239
			(1.00)			(0.58)
$\Delta lrcredit_{t-1}/Y_{t-2}$			0.589			0.040
			(1.16)			(1.08)
N observations	4756	4756	4756	5836	5836	5836
N firms	571	571	571	1052	1052	1052
m_1	-2.21	-2.12	-2.13	-2.70	-2.69	-2.66
m_2	-1.56	-1.56	-1.49	-1.05	-1.40	-1.14
H	402.1	456.4	457.1	373.1	523.3	488.2
p	0.0	0.05	0.5	0.0	0.0	0.0

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 3. Investment and cash flow sensitivity for Transportation (z-values in parentheses)

	No negative cash flow for more than 2 years			**Negative cash flow for 3 or more years consecutively**		
	Dependent variable I_t/K_t			Dependent variable I_t/K_t		
I_{t-1}/K_{t-1}	-0.133**	-0.132	-0.166***	-0.033	-0.037	-0.112*
	(-2.13)	(-2.09)	(2.01)	(1.24)	(-1.23)	(-1.78)
$\Delta Sales_{t-1}$	0.049	-0.688	0.063	0.309	0.197	2.345
	(0.44)	(-0.42)	(0.66)	(0.15)	(0.11)	(1.23)
$\Delta Sales_{t-2}$	0.096	-0.026	0.033	-0.164	-0.205	0.019
	(1.15)	(-0.11)	(0.46)	(-0.55)	(-0.69)	(0.08)
CF_t/K_{t-1}	0.155	0.152	0.157	0.073	0.074	0.045
	(1.21)	(1.21)	(1.22)	(0.48)	(0.52)	(0.37)
CF_{t-1}/K_{t-2}	**0.111***	**0.110***	**0.111***	-0.041	-0.039	-0.039
	(1.70)	(1.70)	(1.70)	(-0.23)	(-0.23)	(-0.24)
$\Delta srcredit_t/Y_{t-1}$		*5.024**			0.228	
		(1.70)			(0.99)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.193			0.216	
		(1.05)			(0.89)	
$\Delta lrcredit_t/Y_{t-1}$			*2.870****			-1.315
			(11.65)			(-0.44)
$\Delta lrcredit_{t-1}/Y_{t-2}$			*0.487****			*0.135***
			(2.76)			(1.91)
N observations	27044	27044	27044	4452	4452	4452
N firms	3786	3786	3786	820	820	820
m_1	-2.33	-2.51	-2.19	-1.74	-1.74	-1.73
m_2	-1.34	-1.33	1.47	0.45	0.38	-0.58
H	1555.2	1221.39	1714.6	575.4	629.3	558.4
p	0.0	0.0	0.0	0.0	0.0	0.0

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 3a. Investment and cash flow sensitivity for young and old firms in Transportation without negative cash flow for more than 2 years (z-values in parentheses)

OLD FIRMS				**YOUNG FIRMS**		
Dependent variable I_t/K_t				Dependent variable I_t/K_t		
I_{t-1}/K_{t-1}	-0.184**	-0.185**	-0.225***	-0.013	-0.007	-0.008
	(-2.33)	(-2.35)	(-4.57)	(-0.74)	(-0.80)	(-0.47)
$\Delta Sales_{t-1}$	0.156	0.390	1.350	1.080	1.127*	0.174
	(0.11)	(0.29)	(0.99)	(1.05)	(1.87)	(0.65)
$\Delta Sales_{t-2}$	0.685**	0.669**	0.748**	-0.493	-0.148	-0.126
	(1.97)	(1.99)	(2.09)	(-1.28)	(-1.22)	(-1.05)
CF_t/K_{t-1}	0.159	0.159	0.171	1.127	**0.499***	**0.415***
	(1.22)	(1.22)	(1.27)	(1.54)	(1.66)	(1.65)
CF_{t-1}/K_{t-2}	0.119	0.119	0.132	-0.106	-0.025	-0.041
	(1.58)	(1.58)	(1.63)	(-1.84)	(-0.85)	(-0.90)
$\Delta srcredit_t/Y_{t-1}$		-0.535			*8.900****	
		(-0.60)			(13.42)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.196			-0.004	
		(0.75)			(-0.05)	
$\Delta lrcredit_t/Y_{t-1}$			-5.710			*2.824****
			(-1.04)			(17.42)
$\Delta lrcredit_{t-1}/Y_{t-2}$			*0.646***			0.049
			(2.49)			(1.00)
N observations	12194	12194	12194	14185	14185	14185
N firms	1332	1332	1332	2390	2390	2390
m_1	-1.98	-1.99	-2.23	-1.54	-2.48	-2.35
m_2	-1.47	-1.48	-1.72	0.98	1.47	1.24
H	1036.8	1072.4	942.8	362.1	417.1	473.3
p	0.0	0.0	0.0	0.02	0.03	0.0

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 3b. Investment and cash flow sensitivity for young and old firms within industries in Transportation with negative cash flow for 3 or more years consecutively (z-values in parentheses)

OLD FIRMS				**YOUNG FIRMS**		
Dependent variable I_t/K_t				Dependent variable I_t/K_t		
I_{t-1}/K_{t-1}	-0.027	-0.031	-0.091	-0.332***	-0.344***	-0.387***
	(-1.13)	(-1.06)	(-1.43)	(-2.87)	(-3.19)	(-3.91)
$\Delta Sales_{t-1}$	-0.066	-0.168	1.252	-0.890	-1.036	-0.272
	(-0.03)	(-0.09)	(0.74)	(-0.68)	(-0.78)	(-0.20)
$\Delta Sales_{t-2}$	0.052	0.038	0.237	-0.441	-0.576	-0.304
	(0.24)	(0.16)	(0.58)	(-1.18)	(-1.35)	(-0.82)
CF_t/K_{t-1}	0.132	0.131	0.107	-0.073	-0.061	-0.100
	(0.85)	(0.82)	(1.04)	(-0.49)	(-0.41)	(-0.60)
CF_{t-1}/K_{t-2}	$-4.7e^{-3}$	-0.002	0.012	-0.092	-0.073	-0.046
	(-0.01)	(0.01)	(0.05)	(-1.03)	(-0.81)	(-0.53)
$\Delta srcredit_t/Y_{t-1}$		1.019			0.017	
		(1.06)			(0.03)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.336			1.12	
		(0.78)			(1.12)	
$\Delta lrcredit_t/Y_{t-1}$			-2.003			*7.917***
			(-0.72)			(3.11)
$\Delta lrcredit_{t-1}/Y_{t-2}$			0.098			*0.465***
			(1.49)			(2.66)
N observations	2105	2105	2105	2210	2210	2210
N firms	320	320	320	483	483	483
m_1	-1.45	-1.45	-1.43	-1.80	-1.83	-2.04
m_2	-0.70	-0.64	-0.97	0.12	0.01	-0.32
H	293.9	303.4	293.09	362.3	383.3	367.7
p	0.69	0.5	0.5	0.0	0.0	0.0

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 4. Investment and cash flow sensitivity for Construction (z-values in parentheses)

	No negative cash flow for more than 2 years			**Negative cash flow for 3 or more years consecutively**		
Dependent variable I_t/K_t						
I_{t-1}/K_{t-1}	-0.032	-0.035	-0.026	-0.018	-0.019*	-0.032*
	(-1.29)	(-1.47)	(-0.68)	(-1.59)	(1.66)	(-1.76)
$\Delta Sales_{t-1}$	0.470	0.168	-0.343	0.043	0.026	-0.192
	(1.25)	(0.64)	(-0.98)	(0.35)	(0.19)	(-0.98)
$\Delta Sales_{t-2}$	0.111**	0.092**	0.018	0.031	0.012	-0.004
	(2.00)	(2.28)	(0.43)	(1.05)	(0.40)	(-0.13)
CF_t/K_{t-1}	**1.095****	**1.039****	**1.345***	-0.017	-0.015	-0.041
	(1.97)	(2.12)	(1.63)	(-0.24)	(-0.24)	(-0.45)
CF_{t-1}/K_{t-2}	-0.197	-0.196	-0.244	0.026	0.025	0.037
	(-1.29)	(-1.34)	(-0.99)	(1.35)	(1.37)	(1.28)
$\Delta srcredit_t/Y_{t-1}$		0.558			0.322	
		(0.84)			(0.52)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.063			0.019	
		(0.70)			(0.98)	
$\Delta lrcredit_t/Y_{t-1}$			*4.992***			*1.212***
			(2.27)			(2.10)
$\Delta lrcredit_{t-1}/Y_{t-2}$			*0.166***			*0.065**
			(2.52)			(1.86)
N observations	54255	54255	54255	6325	6325	6325
N firms	7201	7201	7201	1053	1053	1053
m_1	-1.55	-1.53	-1.29	-1.32	-1.31	-1.29
m_2	0.54	0.47	0.72	-0.49	-0.47	-0.58
H	342.3	421.2	479.4	398.0	491.7	501.5
p	0.08	0.1	0.0	0.0	0.0	0.0

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 4a. Investment and cash flow sensitivity for young and old firms in Construction without negative cash flow for more than 2 years (z-values in parentheses)

OLD FIRMS				**YOUNG FIRMS**		
Dependent variable I_t/K_t				Dependent variable I_t/K_t		
I_{t-1}/K_{t-1}	-0.106	-0.113*	-0.122*	-0.024	-0.046	-0.057*
	(-1.50)	(-1.66)	(-1.73)	(-0.45)	(-1.08)	(-1.88)
$\Delta Sales_{t-1}$	-0.188	-0.367	-0.407	0.422	-0.054	-0.958
	(-1.04)	(-1.54)	(-1.58)	(0.36)	(-0.08)	(-1.20)
$\Delta Sales_{t-2}$	0.011	-0.044	-0.018	0.008	0.029	-0.179
	(0.40)	(-1.14)	(-0.63)	(-0.03)	(0.23)	(-0.99)
CF_t/K_{t-1}	**0.243****	**0.219****	**0.405***	**2.195***	**1.524***	**1.380****
	(2.54)	(2.50)	(1.93)	(1.65)	(1.85)	(2.12)
CF_{t-1}/K_{t-2}	**0.051***	**0.050***	0.035	-0.510	-0.380	-0.267
	(1.90)	(1.85)	(0.97)	(-1.51)	(-1.32)	(-1.53)
$\Delta srcredit_t/Y_{t-1}$		0.500			2.306	
		(1.02)			(1.13)	
$\Delta srcredit_{t-1}/Y_{t-2}$		*0.216****			-0.106	
		(3.00)			(-0.42)	
$\Delta lrcredit_t/Y_{t-1}$			*1.405***			*9.718***
			(2.17)			(2.23)
$\Delta lrcredit_{t-1}/Y_{t-2}$			*0.230***			*0.436***
			(2.10)			(2.19)
N observations	24986	24986	24986	26846	26846	26846
N firms	2480	2480	2480	4503	4503	4503
m_1	-2.76	-2.77	-2.75	-1.27	-0.87	-1.15
m_2	0.57	0.54	0.54	0.10	-0.49	-0.61
H	423.9	510.6	484.7	560.3	662.9	372.1
p	0.0	0.0	0.0	0.0	0.0	0.04

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with cesponding p.

Table 4b. Investment and cash flow sensitivity for young and old firms in Construction with negative cash flow for 3 or more years consecutively (z-values in parentheses)

OLD FIRMS				**YOUNG FIRMS**		
Dependent variable I_t/K_t				Dependent variable I_t/K_t		
I_{t-1}/K_{t-1}	-0.005	-0.006	-0.009	-0.082***	-0.086***	-0.113***
	(-1.33)	(-1.37)	(-1.49)	(-4.81)	(-4.52)	(-7.44)
$\Delta Sales_{t-1}$	-0.019	-0.024	0.023	0.715*	0.624*	0.208
	(-0.33)	(-0.39)	(0.37)	(1.81)	(1.71)	(0.85)
$\Delta Sales_{t-2}$	-0.035	-0.024	-0.021	0.082	0.115	0.024
	(-1.32)	(-0.80)	(-0.83)	(-1.22)	(1.42)	(0.34)
CF_t/K_{t-1}	0.064	0.069	0.066	-0.642	-0.594	-0.562
	(1.09)	(1.19)	(1.16)	(-1.19)	(-1.19)	(-1.20)
CF_{t-1}/K_{t-2}	0.029	**0.024***	**0.026***	0.284	0.259	0.244
	(1.58)	(1.72)	(1.81)	(1.52)	(1.52)	(1.58)
$\Delta srcredit_t/Y_{t-1}$		*0.591**			-0.227	
		(1.75)			(-0.53)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.008			-0.057	
		(1.04)			(-0.64)	
$\Delta lrcredit_t/Y_{t-1}$			*0.966**			2.447
			(1.84)			(1.49)
$\Delta lrcredit_{t-1}/Y_{t-2}$			0.017			*0.162****
			(0.73)			(6.83)
N observations	3146	3146	3146	2904	2904	2904
N firms	418	418	418	603	603	603
m_1	-2.77	-2.83	-2.66	-1.30	-1.27	-1.34
m_2	-0.24	0.20	0.53	-1.02	-1.03	-1.03
H	329.8	356.8	346.2	342.5	390.6	398.6
p	0.1	0.24	0.23	0.08	0.10	0.48

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 5. Investment and cash flow sensitivity for Computer and Data Technology (z-values in parentheses)

	No negative cash flow for more than 2 years			**Negative cash flow for 3 or more years consecutively**		
Dependent variable I_t/K_t						
I_{t-1}/K_{t-1}	-0.011***	-0.013***	-0.117***	-0.061	-0.078	-0.076
	(-2.59)	(-2.85)	(-2.70)	(-1.33)	(1.60)	(-1.54)
$\Delta Sales_{t-1}$	0.489**	0.366	0.589**	0.375	0.203	0.389*
	(1.92)	(1.57)	(2.29)	(1.40)	(0.93)	(1.70)
$\Delta Sales_{t-2}$	0.071	0.081	0.09	-0.090	-0.114	-0.072
	(0.58)	(0.87)	(1.03)	(-0.68)	(-0.81)	(-0.60)
CF_t/K_{t-1}	**0.159*** **	**0.166*** **	**0.158*** **	**-0.051****	**-0.056****	**-0.057****
	(2.98)	(2.73)	(2.81)	(-2.23)	(-2.34)	(-2.20)
CF_{t-1}/K_{t-2}	**0.034*** **	**0.037*** **	**0.035*** **	-0.004	-0.005	-0.005
	(2.59)	(2.80)	(2.65)	(-0.72)	(-1.02)	(-1.07)
$\Delta srcredit_t/Y_{t-1}$		0.463			0.409	
		(1.09)			(1.29)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.139			0.099	
		(1.46)			(0.72)	
$\Delta lrcredit_t/Y_{t-1}$			0.072			0.014
			(0.16)			(0.06)
$\Delta lrcredit_{t-1}/Y_{t-2}$			*0.484**			0.001
			(1.73)			(0.01)
N observations	5253	5253	5253	1504	1504	1504
N firms	1019	1019	1019	339	339	339
m_1	-2.75	-2.75	-2.74	-2.39	-2.36	-2.36
m_2	1.22	1.17	1.21	-0.54	-0.74	-0.69
H	340.01	451.7	484.6	244.8	264.2	263.5
p	0.09	0.07	0.0	0.04	0.07	0.10

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 5a. Investment and cash flow sensitivity for young and old firms in Computer and Data Technology without negative cash flow for more than 2 years (z-values in parentheses)

OLD FIRMS				**YOUNG FIRMS**		
Dependent variable I_t/K_t				Dependent variable I_t/K_t		
I_{t-1}/K_{t-1}	-0.052*	-0.085*	-0.061*	-0.011	-0.011	-0.015*
	(-1.88)	(-1.92)	(-1.95)	(-1.34)	(-1.30)	(-1.79)
$\Delta Sales_{t-1}$	0.201*	0.120	0.213**	0.194	-0.450	-0.070
	(1.70)	(1.21)	(2.11)	(0.31)	(-0.93)	(-0.13)
$\Delta Sales_{t-2}$	0.124	0.071	0.125*	0.013	-0.092	-0.002
	(1.58)	(0.97)	(1.65)	(0.09)	(-0.47)	(-0.02)
CF_t/K_{t-1}	**0.062***	**0.056***	**0.060***	**0.287*****	**0.294*****	**0.297*****
	(1.77)	(1.82)	(1.81)	(3.12)	(4.93)	(3.27)
CF_{t-1}/K_{t-2}	0.029	0.025	0.031	0.034	0.033	**0.046***
	(1.35)	(1.20)	(1.36)	(1.33)	(1.30)	(1.77)
$\Delta srcredit_t/Y_{t-1}$		*0.440**			0.742	
		(1.72)			(1.41)	
$\Delta srcredit_{t-1}/Y_{t-2}$		*0.292***			*0.312**	
		(2.25)			(1.79)	
$\Delta lrcredit_t/Y_{t-1}$			0.183			*1.062**
			(0.60)			(1.85)
$\Delta lrcredit_{t-1}/Y_{t-2}$			0.105			0.659
			(0.96)			(1.54)
N observations	2761	2761	2761	2293	2293	2293
N firms	387	387	387	604	604	604
m_1	-4.91	-4.48	-4.87	-2.05	-2.05	-2.06
m_2	0.14	-0.27	0.13	-0.01	-0.07	0.19
H	333.9	342.8	350.4	244.2	238.2	266.0
p	0.1	0.1	0.1	0.19	0.20	0.20

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 5b. Investment and cash flow sensitivity for young and old firms in Computer and Data Technology with negative cash flow for 3 or more years consecutively (z-values in parentheses)

OLD FIRMS				**YOUNG FIRMS**		
Dependent variable I_t/K_t				Dependent variable I_t/K_t		
I_{t-1}/K_{t-1}	-0.018	-0.022	0.017	-0.120	-0.128	-0.132
	(-1.01)	(-1.03)	(-0.94)	(-1.41)	(-1.58)	(-1.62)
$\Delta Sales_{t-1}$	0.148**	0.165	0.235**	1.041**	0.654*	0.764*
	(1.17)	(1.39)	(2.01)	(2.02)	(1.88)	(1.83)
$\Delta Sales_{t-2}$	-0.01	-0.018	0.016	-0.198	-0.238	-0.200
	(-0.16)	(-0.28)	(0.31)	(-0.75)	(-0.74)	(-0.70)
CF_t/K_{t-1}	**-0.024****	**-0.024****	**-0.023****	**-0.111***	**-0.118****	**-0.107**
	(-2.25)	(-2.24)	(-2.16)	(-1.89)	(-1.97)	(-1.85)
CF_{t-1}/K_{t-2}	0.002	-0.002	-0.002	-0.010	-0.012	-0.011
	(-0.44)	(-0.39)	(-0.35)	(-0.74)	(-0.98)	(-0.97)
$\Delta srcredit_t/Y_{t-1}$		0.195			0.461	
		(1.02)			(1.57)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.152			0.059	
		(1.42)			(0.28)	
$\Delta lrcredit_t/Y_{t-1}$			0.292			-0.285
			(1.26)			(-0.71)
$\Delta lrcredit_{t-1}/Y_{t-2}$			-0.010			-0.163
			(-0.18)			(-0.85)
N observations	717	717	717	713	713	713
N firms	125	125	125	204	204	204
m_1	-3.25	-3.33	-3.32	-2.03	-2.04	-2.03
m_2	0.59	0.55	0.56	-0.69	-0.77	-0.73
H	633.4	675.3	721.1	311.4	333.4	329.2
p	0.0	0.0	0.0	0.0	0.0	0.0

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 6. Investment and cash flow sensitivity for Hotels and Restaurants (z-values in parentheses)

	No negative cash flow for more than 2 years			**Negative cash flow for 3 or more years consecutively**		
Dependent variable I_t/K_t						
I_{t-1}/K_{t-1}	-0.001	-0.006	-0.005	-0.021*	-0.025*	-0.017
	(-0.66)	(-0.53)	(-0.55)	(-1.66	(-1.74)	(-1.33)
$\Delta Sales_{t-1}$	0.047	0.093	-0.279	0.464	0.048	-0.087
	(0.13)	(0.20)	(-0.97)	(0.95)	(0.17)	(-0.43)
$\Delta Sales_{t-2}$	0.022	0.024	0.020	-0.204	-0.167**	-0.048
	(0.55)	(0.50)	(0.59)	(-1.29)	(-1.98)	(-0.74)
CF_t/K_{t-1}	0.007	0.005	0.007	**0.219*** **	**0.251*** **	**0.240*** **
	(1.15)	(0.76)	(1.15)	(3.44)	(3.95)	(3.94)
CF_{t-1}/K_{t-2}	0.009	0.012	0.008	-0.076	-0.070	-0.061
	(0.80)	(1.05)	(0.76)	(-1.01)	(-0.90)	(-0.81)
$\Delta srcredit_t/Y_{t-1}$		*2.222***			*3.584***	
		(2.38)			(3.45)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.046			*0.182**	
		(0.33)			(1.71)	
$\Delta lrcredit_t/Y_{t-1}$			*2.756****			*2.604****
			(7.13)			(3.88)
$\Delta lrcredit_{t-1}/Y_{t-2}$			$-9.4e^{-3}$			0.018
			(-0.18)			(0.51)
N observations	16701	16701	16701	4902	4902	4902
N firms	2463	2463	2463	820	820	820
m_1	-2.53	-2.53	-2.12	-2.65	-2.89	-2.99
m_2	-1.64	-1.64	0.49	1.21	1.24	0.87
H	473.9	527.4	546.6	410.3	476.0	481.2
p	0.0	0.0	0.0	0.0	0.01	0.0

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 6a. Investment and cash flow sensitivity for young and old firms in Hotel and Restaurants without negative cash flow for more than 2 years (z-values in parentheses)

OLD FIRMS				**YOUNG FIRMS**		
Dependent variable I_t/K_t				Dependent variable I_t/K_t		
I_{t-1}/K_{t-1}	-0.001	-0.013	0.003	-0.042***	-0.039***	-0.054***
	(-0.88)	(-0.60)	(0.12)	(-3.74)	(-3.33)	(-3.34)
$\Delta Sales_{t-1}$	0.242	0.202	-0.056	0.241	-0.229	0.119
	(0.48)	(0.50)	(-0.15)	(0.46)	(-0.25)	(0.12)
$\Delta Sales_{t-2}$	0.206	0.239	0.054	-0.018	-0.372	-0.531
	(0.99)	(1.06)	(0.45)	(-0.39)	(-1.01)	(-1.28)
CF_t/K_{t-1}	**1.102*** **	**1.272*** **	**1.279*** **	**0.484** **	**0.541** **	**0.513***
	(2.93)	(2.96)	(2.99)	(2.26)	(2.06)	(1.74)
CF_{t-1}/K_{t-2}	0.460	0.355	0.247	**0.141*** **	**0.157** **	**0.210*** **
	(0.62)	(0.96)	(0.59)	(2.63)	(2.32)	(2.58)
$\Delta srcredit_t/Y_{t-1}$		0.072			1.223	
		(0.16)			(1.01)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.135			0.102	
		(0.54)			(1.09)	
$\Delta lrcredit_t/Y_{t-1}$			*5.439***			*3.022***
			(5.67)			(2.67)
$\Delta lrcredit_{t-1}/Y_{t-2}$			-0.032			*0.07**
			(-0.19)			(1.89)
N observations	7072	7072	7072	8128	8173	8173
N firms	793	793	793	1520	1522	1522
m_1	-3.85	-3.78	-4.86	-1.87	-1.87	-1.68
m_2	-1.05	-1.11	0.21	0.71	-0.45	1.23
H	436.5	566.0	454.8	342.7	420.9	455.4
p	0.0	0.0	0.0	0.02	0.03	0.0

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.

Table 6b. Investment and cash flow sensitivity for young and old firms in Hotels and Restaurants with negative cash flow for 3 or more years consecutively (z-values in parentheses)

OLD FIRMS				**YOUNG FIRMS**		
Dependent variable I_t/K_t				Dependent variable I_t/K_t		
I_{t-1}/K_{t-1}	-0.062	-0.077	-0.082	-0.032	-0.039*	-0.008*
	(-1.40)	(-1.49)	(-1.54)	(-1.43)	(-1.88)	(-1.80)
$\Delta Sales_{t-1}$	-0.398	-0.343	-0.414	1.452	0.799	0.109
	(-1.42)	(-1.40)	(-1.41)	(1.18)	(1.53)	(0.31)
$\Delta Sales_{t-2}$	-0.068	-0.085	-0.027	-0.336	-0.204**	-0.088
	(-0.61)	(-0.79)	(-0.42)	(-1.41)	(-2.27)	(-1.18)
CF_t/K_{t-1}	-0.141	-0.228	-0.114	**0.193*** **	**0.189*** **	**0.220*** **
	(-0.34)	(-0.41)	(-0.29)	(3.79)	(3.38)	(3.31)
CF_{t-1}/K_{t-2}	-0.055	-0.030	-0.053	**-0.068***	-0.079	-0.006
	(-0.58)	(-0.37)	(-0.55)	(-1.70)	(1.40)	(-0.12)
$\Delta srcredit_t/Y_{t-1}$		*3.216***			*3.802***	
		(2.74)			(3.16)	
$\Delta srcredit_{t-1}/Y_{t-2}$		0.123			0.214	
		(0.66)			(1.40)	
$\Delta lrcredit_t/Y_{t-1}$			*1.175***			*3.299***
			(2.64)			(8.31)
$\Delta lrcredit_{t-1}/Y_{t-2}$			*0.186***			-0.061
			(2.01)			(-0.94)
N observations	2358	2358	2358	2042	2042	2042
N firms	301	301	301	459	459	459
m_1	1.34	-0.92	-0.75	-1.90	-2.21	-2.26
m_2	-0.31	-0.13	-0.90	1.20	0.79	0.98
H	415.0	1089.3	522.9	293.5	373.2	454.1
p	0.0	0.0	0.0	0.26	0.27	0.0

*Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level. m_1 and m_2 are tests for first-order and second-order serial correlation in the first-difference residuals, where the null hypothesis is no serial correlation (values outside the range ±1.96 reject the null at the 95% level). H is the Hansen test, with corresponding p.