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The Impact of Growth Opportunities on the Investment-Cash Flow Sensitivity

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Abstract

This paper investigates the impact of growth opportunities on the interpretation of investment-cash flow sensitivity of large Belgian companies. We use data on long time listed firms, recent IPO firms and large unlisted firms to incorporate a wide variation in information asymmetry. Our results reveal that when information asymmetry is high, decreasing cash flow sensitivity as growth prospects improve is not necessarily caused by agency costs of free cash flow. Rather, it may indicate that capital constrained firms increase the use of external financing in high growth periods as these financing sources then tend to become more appealing.

JEL classification: G3; G31; G32

Keywords: *Investment Decisions; Financing Decisions; Financing Constraints; Asymmetric Information; Stock Listing*

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1. Introduction

In perfect capital markets, investment decisions are driven by investment opportunities while the financing choice is irrelevant. However, the literature shows that investment decisions may be distorted, either by capital constraints (e.g., Fazzari et al., 1988, 2000; Greenwald et al., 1984; Hubbard, 1998; Carpenter and Petersen, 2002a) or by misalignment between managerial and minority shareholder interest in public firms (e.g., Jensen, 1986; Deloof, 1998; Richardson, 2006; Degryse and de Jong, 2006). Both effects cause cash flow sensitivity of investment. Likely the most important variable used in the literature to disentangle both sources of sensitivity is growth opportunities (e.g., Hoshi et al., 1991; Vogt, 1994; Audretsch and Weigand, 2005; Degryse and de Jong, 2006; among others). Specifically, when firms suffer from financial constraints, growth prospects are expected to cause increases in cash flow sensitivity and under investment. By contrast, as improving growth opportunities help to resolve over spending problems, cash flow sensitivity should decrease with growth if it results from agency issues

Preceding logic as well as most empirical evidence on the relationship between growth opportunities and cash flow sensitivity is based on a perspective of established long time listed firms that can relatively easily tap external capital markets. However, in practice most firms suffer from severe asymmetric information problems, be it because they have only recently been listed through IPO or more importantly because they are unlisted (Holod and Peek, 2007; Giannetti, 2003).[1] Novel to the literature we show that the relationship between investment-cash flow sensitivity and growth

[1] La Porta et al. (1999), Giannetti (2003), among others claim that quoted companies are not the dominant corporate form and often represent only a minor share of a countries' GDP. Claessens and Tzioumis (2006) report that in their sample, covering large companies in 19 European countries with size well above the listing requirements of European stock exchanges, only about 13% of firms are listed.

opportunities changes depending upon the degree of asymmetric information.[2] Additionally, we show why growth prospects need not increase but rather decrease capital constraints in firms suffering from severe asymmetric information. As a third contribution, this paper is one of the first to document how corporate investment policy differs between comparable firms functioning in the same institutional environment except for their access to the capital market, as our sample includes long time listed companies, recent IPOs and large unlisted firms. Fourth, our sample contains firms that change their public status between unlisted and listed during the sample period which enables us to control for possible biases caused by the endogeneity of the public/private status.

Our sample comprises all Belgian non financial firms filing consolidated accounts over the period 1992-2003. Using data from a single country has the advantage that we do not have to control for potentially many differences in institutional environment. In fact, Belgium – being a typical continental European country where the bulk of large (consolidating) companies remain unlisted and listed firms are predominantly controlled by large shareholders - is an interesting environment to test investment-cash flow sensitivity. In particular, as Belgian listed firms typically have a dominant shareholder, there is little need to control for important differences in governance. The same holds true for our sample of unlisted firms, where roughly 80% is controlled by one shareholder or family.[3]

[2] Several authors also introduce the notion of time varying cash flow sensitivity by evaluating the symptoms of financing constraints as a function of macro-economic variables. Almeida et al. (2004) for example take into account the changes in corporate liquidity demand over the business cycle. Others like Allayannis and Mozumdar (2004) and Audretsch and Elston (2002), take into account the notion that capital market imperfections are not stable over time, leading to changes in financing constraints as a function of macro-economic fluctuations.

[3] Because the bulk of unlisted firms have one shareholder, most of these companies cannot suffer from conflicts among large shareholders either. Deleting the 20% unlisted companies with more than one owner, has no effect on our main findings.

Our research only considers firms that publish consolidated accounts, listed as well as unlisted. In Belgium, listed firms always have to file such accounts, while unlisted companies are only subject to this requirement once they are of sufficient size and have no (consolidating) parent.[4] These latter size criteria are substantially higher than those used as minimal listing requirements on European stock exchanges. As a result, the size of many Belgian listed and unlisted consolidating firms is comparable. In addition, consolidating private firms are subject to the same accounting rules and mandatory publication format of financial statements as the listed ones. Furthermore, analogous to public companies, the accounts of private companies also need approval of a certified accountant. Consequently, the accounting data are likely to be both of high quality and easily comparable across our sample firms.

Previewing our results, we find – in line with other studies – that recent IPO firms invest more than long time listed firms, while investment ratios of the latter are similar to those of the unlisted companies over the sample period.[5] Furthermore, investment by long time listed firms is little cash flow sensitive while unlisted companies and recent IPOs show important levels of investment-cash flow sensitivity. However, contrary to empirical studies on samples mainly limited to long time listed firms, investment-cash flow sensitivity of IPOs and unlisted firms in our sample proves to decrease significantly during periods of high growth opportunities. We show that this phenomenon can be explained by the timing of the acquisition of extra external financing. By contrast, for long time listed firms the acquisition of external

[4] The size requirements for consolidation are discussed in our sample description. Consolidated accounts have the additional advantage that they help us to overcome possible distortions due to the presence of some pyramidal ownership in the sample.

[5] This suggests that, consistent with empirical observation in many parts of the world, a stock listing is not necessarily a natural phase in the life cycle of a company, as remaining unlisted can be a viable strategic choice. In fact, Boot et al. (2006) analyze theoretically the firm's choice between private and public ownership. They show that managers need decision making autonomy to optimally manage the firm and thus trade off an endogenized control preference against the higher cost of capital accompanying greater managerial autonomy.

financing does not result in a drop in cash flow sensitivity. Additional robustness checks based on the methodology of Almeida en Campello (2005) show that for the long time listed companies as well as the recent IPOs in our sample there is a significant substitution effect between internal and external financing. For unlisted companies this is only the case in periods of high growth, which supports our timing arguments.

The remainder of this paper is organized as follows. In Section 2 we give an overview of the investment-cash flow sensitivity literature and construct our hypotheses concerning the impact of information asymmetry and financing opportunities on investment policy. Section 3 contains the sample description, variable measurement and methodology. Section 4 presents and discusses the results, while Section 5 contains the conclusions.

2. Investment-Cash flow Sensitivity: Literature Review and Hypotheses

Following, the seminal work of Fazzari et al. (1988), many researchers have studied the investment-cash flow sensitivity (mainly) for publicly quoted companies by distinguishing firms on the basis of a priori indicators of financing constraints. The conflicting results generated by this methodology have, however, been criticized (e.g., Kaplan and Zingales, 1997, 2000; Cleary, 1999; Moyen, 2004; Allayannis and Mozumdar, 2004; Almeida et al., 2004; among others).

Recent studies try to gain a better understanding of these empirical findings by focusing on the causes of cash flow sensitivity (e.g., Pawlina and Renneboog, 2005; Degryse and de Jong, 2006; among others). In particular, the asymmetric information problem of Myers and Majluf (1984) suggests that firms may suffer from under investment when the acquisition of external financing is costly. In that case,

investment outlays will depend on the availability of internally generated resources, resulting in positive investment-cash flow sensitivity. Not only extra equity may become excessively costly, but information asymmetry may also hamper firms in obtaining additional debt (Stiglitz and Weiss, 1981; Greenwald et al., 1984). Watson and Wilson (2002) show that a financial pecking order among will be most apparent when information asymmetry between insiders and outsiders is greater, leading to higher costs associated with external financing. As this problem increases with investment opportunities, it is typically argued that cash flow sensitivity should be higher for firms with high investment opportunities (Fazzari et al., 1988). Next to asymmetric information, firms are also affected by the agency problem of free cash flow. At least in the case of listed firms, where management and ownership tends to be separated, over investment of free cash flow (Jensen, 1986) can cause a positive relationship between cash flow and investment. This problem is likely worse for firms with little investment opportunities.[6]

Following Hoshi et al. (1991) and Vogt (1994), the different response of cash flow sensitivity to changing investment opportunities (or growth opportunities), has been used to disentangle over-and under-investment issues. High growth opportunities combined with higher investment-cash flow sensitivity is believed to be a symptom of under investment (e.g., Audretsch and Elston, 2002; Bond et al., 2003; Audretsch and Weigand, 2005; among others), while a decrease in cash flow sensitivity should point to problems of free cash flow (e.g., Deloof, 1998; Gugler, 2003; among others).

[6] Del Brio et al. (2003) show for example on Spanish data that the level of free cash flow as well as the investment opportunities influences the market reaction to investment announcements.

Several authors find a combination of both effects (e.g., Degryse and de Jong, 2006; Pawlina and Renneboog, 2005; among others).[7]

Preceding logic does not take into account that growth opportunities may be correlated with an increased use of external financing. The reason for this is that most studies concentrate on mainly long time publicly traded firms, which - a priori - are less influenced by information-related financial market imperfections. Holod and Peek (2007) show however, using data on listed as well as unlisted banks, that access to external financing is influenced by the degree of information asymmetry associated with the listing status, especially in periods of monetary tightening. When information asymmetries are important, the gap between the cost of internal and external financing becomes substantial. One would then expect that firm characteristics affecting this gap - like growth opportunities – will influence the firm's access to external financing. This occurs for example when, in periods of high growth, the benefits from investment opportunities overcome the costs of external financing and/or external financing costs are smaller compared to low growth periods. We argue below that the timing of the acquisition of external financing is likely to significantly distort measured investment-cash flow sensitivities for firms suffering from important information asymmetries. When information asymmetry is limited, the cost gap between internal and external financing is relatively small and the availability of external financing is therefore less likely to influence investment behavior.

[7] For completeness it should be mentioned that, without focusing on the over – vs. under investment debate, some studies investigate the impact on cash flow sensitivity of ownership and governance characteristics (Hoshi et al. 1991; Goergen and Renneboog, 2001; Schiantarelli and Sembenelli, 2000), banking relationships (Houston and James, 2001; Aivazian et al., 2005) or institutional factors (Bond et al., 2003). Most of these studies find important differences in cash flow sensitivity, suggesting that firm characteristics like group membership or country specific institutional characteristics may have an impact on a firm's investment/financing behavior.

In particular, consistent with arguments and empirical evidence in Hovakimian and Hovakimian (2007), Boyle and Guthrie (2003) and Hennessy and Whited (2005), companies suffering from severe information asymmetry, may be forced to postpone investment to periods when additional financing is available at reasonable cost. If this "suboptimal" timing in investment is not too costly – e.g., in terms of foregone product market opportunities – this behavior might even trigger significant net cost savings by attracting external resources during low cost financing windows. Since –in view of the information problems– debt financing will be easier to attract compared to equity, available external financing resources for the most constrained subsample are likely to consist of interest bearing debt (Watson and Wilson, 2002; Hall et al., 2004). Furthermore, lenders typically improve their evaluation of borrowers when the latter can show that their prospects ameliorate. In fact, Altman and Narayanan (1997) claim that banks make extensive use of growth measures in order to classify companies as financially sound. Simultaneously, following Berger and Udell (1998), and consistent with the evidence in Korajczyk and Levy (2003) one can argue that, as owners observe that the debt carrying capacity of their firm improves, they may also prefer more debt financing in high growth periods. When information-related financial market imperfections diminish, opportunities to continuously attract external financing at lower costs improve, both in debt and equity markets, while internal and external financing become better substitutes. As a result, cash flow sensitivity due to capital constraints should be limited. Furthermore, although there is ample evidence that long time listed firms also time the acquisition of external financing (e.g., Korajczyk and Levy, 2003; Pastor and Veronesi, 2005; among others), due to the substitutability of external and internal resources, the impact of an increased use of

external resources on measured cash flow sensitivity should be limited for these firms.[8]

In sum, we expect firms suffering from important information asymmetries to show higher investment-cash flow sensitivity. In periods of high growth opportunities however, this cash flow sensitivity is lower compared to low growth years due to the impact of increased external financing. For firms with low levels of information asymmetry the impact of external financing on measured cash flow sensitivity should be smaller.

3. Sample, Variable Measurement and Univariate Statistics

3.1 Sample Description

Our sample covers the 12 years 1992-2003, and initially consists of all consolidated financial statements of Belgian firms. These data were gathered from the NBB (National Bank of Belgium) and the Belfirst database (Bureau Van Dijk). Issuing consolidated statements only became mandatory in 1992, and then only for firms of sufficient size.[9] As mentioned before, these thresholds are significantly above the minimal size requirements for listing on European stock exchanges.[10] Contrary to unlisted firms, listed companies are obliged to publish consolidated statements, irrespective of size. As within our ultimate sample only 7 firms publish consolidated

[8] Preceding logic suggests that for low levels of information asymmetry the distortion of measured investment-cash flow sensitivity from timing external financing is limited. Hence in samples (mainly) consisting of long time listed companies –as is the case in most empirical studies– decreasing cash flow sensitivity with increasing growth opportunities most likely indicates agency costs of free cash flow.

[9] Filing consolidated accounts becomes obligatory when 2 out of the following 3 size thresholds are exceeded: turnover over 50 million euros, total assets over 25 million euros and the company employs more than 500 workers. From the year 2000 on, these criteria where relaxed to 25 million; 12.5 million and 250 respectively.

[10] NYSE-Euronext, the largest exchange in Europe, generally proposes an equity book value of above 1.5 million euros as a minimum listing (size) requirement.

accounts because the latter obligation is binding, the impact of this difference in treatment is limited.[11]

We further exclude all financial firms as well as all companies that are either state owned or mere production entities from a large international parent. In order to identify the latter companies we used ownership data from either the Amadeus database (Bureau Van Dijk) or from the firms' websites. To minimize the influence of outliers in our analysis, we replace extreme observations of all ratio variables with missing values. Extreme observations include values in the 99th percentile and, for variables with negative values, also those in the 1st percentile.[12]

Because of the presence of pyramidal structures, the status of being unlisted requires special attention. Specifically, we exclude unlisted companies that either have a publicly quoted parent or subsidiary. Furthermore, subsidiaries from parents that have to issue consolidated accounts do not need to issue these consolidated statements themselves, except for publicly quoted firms that always have to publish such accounts. Nevertheless within our sample 66 unlisted firms that satisfy the size requirements but have a consolidating parent, voluntarily consolidate. We leave these firms in our sample but perform robustness checks on possible biases created by voluntary disclosure by re-estimating our equations without these firms. Results are robust.

As we wish to avoid selection biases, it is important that companies can enter or leave during the sample period. The most important reason for entering the sample is data availability or meeting the size requirements for consolidation. Exiting the sample prematurely is either caused by bankruptcy (17 firms), takeover (14 firms), no

[11] Our results are robust for deleting these firms.
[12] Results are similar if, instead of trimming, variables are winsorized at 1 percent.

longer meeting size requirements (10 firms) or the fact that the accounting data was not available at the time of sample construction.

Finally, our sample also includes firms that change their public/private status. Within our sample period, 40 companies went public but only for 13 of them consolidated accounts are available for the years preceding IPO. For the 6 firms with a going private transaction during the sample period, no consolidated accounting data was available for the period following the event.[13]

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INSERT TABLE 1 ABOUT HERE
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Table 1 Panel A represents the sample composition over the different years. Overall our sample consists of 2040 firm year observations for which 1472 correspond to unlisted and 567 to listed companies. Panel B of Table 1 gives an overview of the industry distribution. Manufacturing includes the largest number of firms (133), followed by services (121) and distribution (78). This distribution over sectors is quite representative for the Belgian economy as a whole.

3.2 Variable Measurement and Methodology

A wide range of models has been used to test investment-cash flow sensitivity. A baseline investment model typically consists of a measure of internally generated funds and investment opportunities. We use the following standard specification, analogue to Audretsch and Weigand (2005), which has been augmented with the variables of interest for our study:

[13] Overall our sample includes 326 companies for which we have consolidated statements covering only unlisted years, 86 firms covering only listed years and 13 firms for which the sample includes both listed and unlisted years.

$$\frac{I_{it}}{K_{it-1}} = \alpha_i + \mu_t + \beta_1 \frac{\Delta S_{it}}{K_{it-1}} + \beta_2 \frac{CF_{it}}{K_{it-1}} + \beta_3 \frac{\Delta WC_{it}}{K_{it-1}} + \beta_4 \frac{\Delta EF_{it}}{K_{it-1}} + \beta_5 \ln ta_{it-1} + \delta_1 LnonIPO_{it} + \delta_2 LIPO_{it} + \delta_3 \left(LnonIPO_{it} * \frac{CF_{it}}{K_{it-1}} \right) + \delta_4 \left(LIPO_{it} * \frac{CF_{it}}{K_{it-1}} \right) + \varepsilon_{it} \quad (1)$$

In equation (1), I_{it} stands for gross investment defined as the change in the real capital stock (K) plus depreciation. Capital stock (K) is proxied by tangible fixed assets. The parameter α_i represents an unobservable firm level fixed effect while μ_t is used to control for fixed time effects. [14] ΔS represents the growth of real sales. As a measure of internally generated funds we use a measure of real cash flow (CF). In line with Bhagat et al. (2005) and Lins et al. (2005) we take into account that some of the internally generated funds are committed to debtors (via interests) or to the government (through taxes). Therefore we start out from EBITDA and subtract interests and taxes to arrive at our cash flow measure. All variables are normalized by the capital stock at the beginning of the period. In order to correct for relative price differences over the years, we deflate all nominal values with the consumer price index.

Due to the unavailability of a market price for unlisted firms, we use sales growth instead of Tobin's Q as a measure of investment opportunities. This approach is also applied by Konings et al. (2003) and Audretsch and Weigand (2005), among others. However, just as Tobin's Q, this measure may not sufficiently capture investment opportunities. As a result some of this information may also be captured by cash flow.

[14] In our basic analysis we do not include industry effects as they can be considered to be subsumed by the individual fixed firm effects implied by the differencing in the Arellano and Bond methodology. We checked for the robustness of our results by including industry dummies to capture consistent heterogeneity in investment policy across different industries. Results are very similar to the ones reported and are available upon request.

In order to identify the liquidity role of cash flow, we augment our investment model by the change in net working capital relative to the real capital stock (ΔWC/K), an approach also used by Audretsch and Weigand (2005) and Degryse and De Jong (2006). Fazzari and Petersen (1993) point out that a firm confronted with financing constraints typically adjusts net working capital to smooth investment relative to cash flow shocks. A constrained firm is expected to show a negative relationship between investment and the change in net working capital. By contrast, if cash flow signals investment opportunities rather than liquidity, we should observe a positive coefficient for the change in net working capital in the investment equation.

As an indicator of access to external financing we use, analogue to Baker et al. (2003), the relative change in (interest bearing) debt plus equity, measured by paid in capital (ΔEF/K). As an alternative measure of this external financing ratio, we also use a bank debt ratio (ΔBD/K) measured by the relative change in total bank debt.[15,16,17] The models including a bank debt ratio instead of an external financing ratio are considered because the composition of the additional external financing resources may be very different between unlisted and listed firms. Finally, we include a size variable (Lnta) measured as the natural logarithm of total assets at the beginning of the period. The literature (e.g., Audretsch and Elston, 2002) commonly uses size as a proxy for the firm's capacity to access external financing. As we want to make sure that our findings concerning differences in investment behavior between

[15] We do not include trade credit because it is highly correlated with sales. Within our sample of large and well established firms this is not surprising, as it are mainly small entrepreneurial firms that actively use trade credit as a substitute for bank debt.

[16] Another source of external debt is bonds. However few firms use it. In fact the median value is 0 and the average amount used as a percentage of total assets is 0,4% and 1,6% for unlisted and listed firms respectively. Other small (on average and in median terms) debt entries include other financial debts, subordinated debt, leasing, prepayments received, social security and taxes, accruals.

[17] As a robustness check we replaced total bank debt and equity (i.e. a measure of both long and short term external finance) with short term bank debt (i.e. a measure of short term external finance). We also split up total bank debt into short term and long term bank debt. We finally also replaced total bank debt with total debt. Our main findings remain robust.

subgroups of firms are not distorted by size differences, we explicitly account for company size in our investment models. A formal definition of our variables is provided in appendix.

We compare differences in investment-cash flow sensitivity between unlisted, recent IPO firms and long time listed companies. The extensive literature on corporate governance and on initial public offerings indicates that unlisted companies suffer significantly more from asymmetric information problems and capital market imperfections as compared to their listed counterparts (e.g., Allen, 1993; Jensen, 1989; Pagano et al., 1998; Faure-Grimaud and Gromb, 2004; among others). Simultaneously as they have no small outside shareholders, cash flow sensitivity in unlisted firms is expected to reflect capital constraints rather then free cash flow problems.

Furthermore, although an IPO reduces capital market imperfections a firm faces (e.g., Kim, 1999; Mahérault, 2000; among others) recent IPO-companies still suffer more from asymmetric information problems as compared to long time listed firms (Degryse and de Jong, 2006). To distinguish between these groups of firms, we split the subsample of listed companies in a long time listed and a recent IPO subgroup. We introduce two stock listing dummy variables $LnonIPO_{it}$ and $LIPO_{it}$ as well as interactions of these dummies with the cash flow ratio in the investment equation. $LnonIPO_{it}$ takes the value 1 if firm i was listed in year t but did not go public 3 years or less prior to t, otherwise $LnonIPO_{it}$ is 0. Similarly, when a company i was listed in year t and went public 3 years or less prior to t, it is classified as a recent IPO and $LIPO_{it} = 1$; otherwise $LIPO_{it} = 0$. Note that companies can shift from unlisted to recent IPO and, eventually, even to the long time listed subgroup during our sample period.

In equation (1) we use interaction terms instead of split samples because we control for the endogeneity of the public/private status as well as the other explanatory variables by using the Arellano and Bond (1991) GMM methodology. In fact, recent literature has pointed out the endogeneity problems that accompany cash flow sensitivity research. Gugler (2003), Konings et al. (2003), Schiantarelli and Semnenelli (2000) among others argue that GMM estimators that control for possible endogeneity of the explanatory variables, avoid most of the problems with traditional investment models based on OLS estimation. Nevertheless, we also perform extra robustness checks on distortions due to the likely simultaneity of investment and financing decisions later on.

In a further stage we also introduce additional interaction terms within the subsets unlisted firms, long time listed firms and recent IPOs to separate out the impact of high and low levels of growth opportunities. To that end we construct a sales growth dummy (SG) that is assigned the value 1 if the sales growth ratio of a company during a certain year is higher than the subsample's (unlisted, long time listed or recent IPO) median over the sample period. Notice that each firm's growth dummy (SG) can change over the sample period, so that firms may be reclassified as their growth opportunities alter. This approach differs from some other authors (e.g., Degryse and de Jong, 2006; Pawlina and Renneboog, 2005; among others) who classify companies into high and low opportunity subgroups rather than identifying changes within a firm's opportunities over the sample period. By allowing the composition of subgroups to vary over time, our approach enables us to evaluate adjustments in firm specific investment policy as opportunities change.[18]

[18] Allowing for such changes is useful. By estimating investment equations by year, Audretsch and Elston (2002) show that the degree of financing constraints indeed changes over time. Schiantarelli and Sembenelli (2000) introduce a firm specific business cycle indicator by allowing cash flow sensitivity to change between years of increasing or decreasing cash flow levels.

3.3 Univariate Statistics

Table 2 contains summary statistics (Panel A) and univariate tests (Panel B) for the variables used in our (reported) models. We split up the full sample (Column 1) in the three relevant subgroups; unlisted (2), long time listed firms (3) and recent IPO firms (4). Although long time listed companies show on average higher investment ratios (I/K) than their unlisted peers, the difference is not significant. By contrast, recent IPO firms invest significantly more than other companies. This latter finding is consistent with Carpenter and Petersen (2002b) who report that publicly quoted companies use the capital market as an active source of investment financing predominantly in the first years after listing. The sales growth ratio (ΔS/K) indicates that long time listed companies grow somewhat faster over the sample period, although the difference with the group of unlisted firms is not significant. Recent IPO firms however, have a significantly larger growth rate. A similar picture arises for the cash flow ratio (CF/K). The fact that long time listed firms are able to maintain somewhat higher investment levels with comparable fund generation, may be a first indication that they are less financially constrained than unlisted companies. However, as compared to the other firms in our sample, recent IPOs benefit from significantly more internal fund generation. The variable measuring the change in working capital (ΔWC/K) shows no significant difference between the three groups of firms. Although the change in bank debt (ΔBD/K) differs significantly between long time listed and unlisted companies in median terms, the difference is economically small. Within the publicly quoted companies no significant difference can be found between recent IPO firms and the other listed companies on this score. When we look at the total change of external financing (ΔEF/K) however, recent IPO firms differ significantly. In line with the findings in the literature (e.g., Baker et al., 2003 and

Carpenter and Petersen, 2002b), IPO firms prove to make more use of the stock market in financing their investment needs. Finally, the univariate statistics for the size variable (Lnta) show that in our sample long time listed companies are significantly larger than both recent IPO firms and unlisted companies, in mean as well as in median terms. These differences however, do not seem to be important economically.[19]

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Panel B of Table 2 splits up the subsamples even further in low and high growth years based on the SG dummy variable as defined in Section 3.2. Two important results should be noted in this Panel. First, differences in investment ratios are never significant between unlisted and long time listed companies although they are always somewhat higher for the latter. Recent IPO firms however, seem to invest significantly more but mainly in high growth years. Second, differences in the change in the bank debt ratio as well as the external financing ratio between subgroups depend strongly on the level of growth opportunities. It is interesting to note that, while in low growth years, the relative change in external financing differs significantly between long time listed and unlisted companies, this difference disappears when growth opportunities are high. In the latter case however, recent IPO firms differ drastically from the long time listed companies. In sum, we find that only in high growth periods unlisted companies seem able to attract levels of external financing similar to those of long time listed companies. In Contrast, recent IPO firms

[19] The fact that our unlisted firms are not much smaller than our listed companies need not be surprising since our unlisted sample companies are well established. Although the listed firms are older, on average, the average age of both our listed and unlisted sample firms amounts to 51 respectively 34 years.

differentiate themselves from the long time listed companies specifically in high growth periods.

Preceding numbers only reflect a general tendency covering the whole 12 year sample period. Important differences within the sample, both between years and individual firms may occur. A first indication of this is given by Figure 1.

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Figure 1 shows the yearly average (median) investment ratio for the long time listed companies, recent IPO firms and the unlisted subgroup. It reveals that, while investment spending of long time listed and IPO companies follows a more volatile and cyclical pattern, the investment rate of unlisted firms is much smoother. In particular, when listed companies show very high levels of investment expenditure, the unlisted firms seem to follow more slowly and remain at lower levels. Conversely, decreases in investments are also less pronounced, so that in some years unlisted firms invest even more than the long time listed companies. In the following section we look into the forces shaping these investment patterns.

4. Investment-Cash Flow Sensitivity in Different Information Environments

In the first Section (4.1) we consider the model (1) from Section 3. In Section 4.2 we analyze how growth opportunities affect investment-cash flow sensitivity and how this may be influenced by external financing opportunities. Finally, in Section 4.3 we perform some robustness checks.

4.1 The Investment Rate and Cash Flow Sensitivity

The regression results for our investment equation (1) are reported in Table 3. Panels A and B use the change in total external financing or the change in bank debt respectively. As mentioned above, models are tested with GMM estimators in first differences using the Arellano and Bond (1991) method. The validity of using lagged values of both the dependent variable and the endogenous regressors as instruments[20] was evaluated with the Sargan test of over-identifying restrictions and direct tests of serial correlation in the residuals. The validity of instruments was never rejected.[21,22]

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In line with results from earlier studies, the estimated coefficient of the sales growth ratio ($\Delta S/K$) - which controls for growth opportunities - is positive in both panels. The significantly negative coefficient of the change in working capital ($\Delta WC/K$), suggests that the cash flow ratio does not capture opportunities but rather liquidity from internally generated funds. Also our control variable for size (Lnta) is positive and significant over all models, indicating that all else being equal, larger companies are able to invest more. Panels A and B of Table 3 show that the change in external finance ($\Delta EF/K$) as well as the change in total bank debt ($\Delta BD/K$) has a positive impact on the investment ratio. Furthermore, the dummy coefficients for stock listing are only significant for recent IPO firms (LIPO). This indicates – in line

[20] The instruments we use are *I/Ki,t-j* for *j >= 2*, and second lags of all other explanatory variables.
[21] The M1 and M2 tests, reported in the respective tables, suggest that the error term has a moving average structure of order one (significant first order correlation but non significant second order correlation), as one would expect in the differenced form of the equation, when the idiosyncratic component of the error term in the level equation is serially uncorrelated. Both tests together with the Sargan test suggest that variables lagged twice or more are legitimate instruments.
[22] In order to check the sensitivity of our results, we exclude the observations with negative investment ratios from our sample (as in Konings et al., 2003). Negative investment ratios may be an indication of distress, or at least of downsizing or restructuring. This behavior is not necessarily related to growth opportunities and might distort our overall findings. Results are very comparable to the ones reported.

with our univariate statistics - that, controlling for growth opportunities, financing sources and size, only recent IPO firms invest significantly more as compared to their unlisted peers.

Turning to the investment-cash flow sensitivity, Table 3 shows that the coefficient for cash flow CF/K (0.7150 in Panel A and 0.6390 in Panel B) is large and significant, indicating that for unlisted firms investment expenditures are strongly dependent on internally generated funds. For listed companies the situation is different. The interaction terms of cash flow sensitivity with LnonIPO and with LIPO - that capture the extra effect relative to unlisted firms - imply that investment-cash flow sensitivity is significantly lower in publicly quoted companies. For recent IPO firms however the reduction in cash flow sensitivity is somewhat smaller compared to long time listed companies. We also evaluate the significance of the net effect of cash flow sensitivity for publicly quoted companies by applying a Wald coefficient test to the form (CF/K + LnonIPO*CF/K = 0) and analogous for LIPO. The results from these tests are reported at the bottom of the Table.[23] The net effect coefficient of the cash flow ratio for long time listed firms is insignificant in both Panels A and B. These results are comparable to the findings of Bond et al. (2003) who also find little investment-cash flow sensitivity for Belgian, German and French listed companies.[24] By contrast, similar to Degryse and de Jong (2006), for recent IPO firms (LIPO) we still find a significant level of investment-cash flow sensitivity (0.5433 in Panel A and 0.2941 in Panel B). While for the unlisted subgroup, where small public shareholders are

[23] A similar approach is used by Audretsch and Weigand (2005).

[24] Deloof (1998) finds positive investment-cash flow sensitivity on a small set of Belgian quoted companies for the 1981-1991 sample period using OLS. The cash flow sensitivity was however only significant for companies without an active internal capital market. The fact that, overall, research only reports limited cash flow sensitivity for long time listed Belgian firms may not be surprising. For these latter mature companies are unlikely to suffer much from capital constraints. Furthermore, in view of the presence of large owners, and the fact that in publicly quoted Belgian firms – as in most Western European countries - there is a reasonably good protection of small outside shareholders, agency problems likely are kept in check.

absent, it is hard to attribute the positive investment-cash flow sensitivity to agency costs, we can not off hand draw the same conclusions for our results concerning recent IPO firms. In the latter companies, cash flow sensitivity could also indicate free cash flow problems caused by the conflict of interest between insiders and small outside shareholders. We address this issue further in a robustness check later on.

4.2. Cash Flow Sensitivity, Growth and Financing Opportunities

In Table 4 we investigate the impact of differences in growth opportunities by allowing the cash flow coefficient to change depending on whether the company experiences high or low sales growth relative to other firms in its subgroup. As before, Panel A reports results for the model using the change in total external financing (ΔEF/K) while Panel B shows results for the model including only the change in bank debt (ΔBD/K). As explained in the previous section, we construct a sales growth dummy (SG) that is assigned the value 1 if sales growth of a company during a certain year is higher than its subsample's (unlisted, long time listed or recent IPO) median over the sample period. Next, we split up the cash flow coefficient of both unlisted and listed firms by interacting it with (1-SG) and SG. The variable (1-SG)*CF/K then represents the cash flow ratio of unlisted firms in years of low growth opportunities, while SG*CF/K covers this ratio in high growth years. The variables LnonIPO*(1-SG)*CF/K or LIPO*(1-SG)*CF/K and LnonIPO*SG*CF/K or LIPO*SG*CF/K measure the extra effect on cash flow sensitivity in long time listed and recent IPO firms relative to unlisted companies.

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INSERT TABLE 4 ABOUT HERE
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Looking at unlisted companies first, Panel A as well as Panel B show that the split in cash flow sensitivity does not affect any of the other variables except for the control variable size which is no longer significant.[25] However, consistent with our hypothesis, the cash flow sensitivity in high growth years, although still positive and significant, proves to be much smaller relative to its value in low growth years. In Panel A cash flow sensitivity drops from 1.3993 to 0.6097 between low and high growth periods, while Panel B shows a similar drop from 1.4419 to 0.6715. This implies that when growth opportunities are favorable, investment spending in unlisted companies is less dependent on the availability of internally generated funds. Turning to the long time listed firms, the interaction terms in Table 4 show that investment-cash flow sensitivity is always significantly lower compared to the unlisted subgroup, and that furthermore its net impact is insignificant, in both high and low growth years. Also in line with our arguments, we find that for recent IPO firms the results are somewhat in between unlisted and long time listed companies. Similarly to unlisted firms, recent IPO companies show a decrease in cash flow sensitivity in periods of high growth opportunities where it even becomes insignificant. The resulting cash flow coefficient for recent IPOs in Panel A drops from a significantly positive value of 0.7674 when SG = 0 to an insignificant 0.2194 in high growth periods (a similar significant drop in cash flow sensitivity, from 0.8178 to -0,2819 can be found in Panel B). This indicates that while recent IPO firms are dependent on internally generated funds in periods of modest growth prospects, they are able to overcome this constraint

[25] The loss in significance of the size variable Lnta is due to the fact that larger non listed firms, in comparison to smaller ones, continue to invest more during low growth years. By splitting up the cash flow variable according to growth opportunities, this information gets absorbed in the interaction terms. Furthermore, in all models the coefficient of Lnta remains small economically. This is not surprising as our sample firms are all large companies. Similarly the dummy LnonIPO may change from insignificant to significant in some models. However likewise Lnta, its coefficient remains small economically.

in periods of favorable growth opportunities.[26] Nevertheless, as mentioned earlier, there is a possibility that our results concerning recent IPO firms are affected by managerial discretion. Therefore, we will submit the model of Table 4 to a robustness check later on.

In Table 5 we test our argument that, especially in situations of large information asymmetries and capital market imperfections, the importance of external financing for investment spending increases in high growth periods as these financing sources then tend to become more appealing. Table 5 retakes the model of Table 4 but now interacts the growth dummy (1-SG) and (SG) with the external financing ratio (ΔEF/K) in Panel A or the bank debt ratio (ΔBD/K) in Panel B. This operation has again little impact on the coefficients of the other variables in the investment equation. The result of the interaction between growth and external financing are consistent with our earlier argument that unlisted firms await periods of good prospects to take on additional external financing. Panel A shows that the coefficient for the external financing ratio (ΔEF/K) for unlisted companies is positive and significant only in high growth years (0.2940 when SG = 1). In low growth years (SG = 0), this coefficient is not significantly different from zero. The net effects at the bottom of Panel A show similar results for long time listed companies (0.0906 when SG = 1) and recent IPOs (0.1668) respectively. The coefficients for the external financing ratio are not significantly different from zero for both types of listed companies when growth prospects are low (SG = 0). Our results are in line with Beattie et al. (2006) who find, using survey data on UK companies, that growth opportunities tend to dictate the amount of external financing.

[26] When we only consider the listed firms and replace sales growth with Tobin's Q, our results remain very similar.

As before, we re-estimate the model using the change in bank debt ratio instead of total external financing in Panel B. For unlisted companies the change in bank debt ratio (ΔBD/K) is only significant in high growth periods (0.7613 when SG = 1). For the publicly quoted companies, both recent IPO firms and long time listed, there are remarkable differences between the ΔBD/K (Panel B) and the ΔEF/K (Panel A) models. The coefficient of the change in bank debt ratio is not significantly different from zero irrespective of the level of growth opportunities for the long time listed subgroup. For recent IPO firms however, the availability of bank debt tends to explain investment spending only in low growth years with a coefficient estimate of 0.5717. While results for recent IPO firms in Panel A indicate that ΔEF/K is only significant in high growth periods (SG = 1), the coefficient of ΔBD/K is then not statistically significant. This difference, together with the results for the univariate statistics in Table 2, suggests that for recent IPOs, equity financing dominates in high growth periods. Our findings are in line with Carpenter and Petersen (2002b) who show that equity is more suited in financing IPO companies with high growth opportunities. Overall, compared to unlisted firms, IPO firms seem to be able to almost entirely relax the restrictions of availability of internal financing and bank financing when growth opportunities are high. Long time listed firms can avoid these restrictions also in periods of low growth as they suffer less from information-related market imperfections.

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INSERT TABLE 5 ABOUT HERE
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4.3. Robustness Issues

In order to check whether our interpretations from Tables 3 and 4 concerning information-related financing constraints in recent IPO firms are valid, we submit these models to robustness testing. While, as mentioned before, for the unlisted subgroup, where small public shareholders are absent, it is hard to attribute the positive investment-cash flow sensitivity to agency costs, for recent IPO firms sensitivity could also indicate free cash flow problems caused by the conflict of interest between insiders and small outside shareholders. Therefore, as an extra test we introduce the disciplining role of financial pressure in our investment equations.

We re-estimate the investment models of Table 4 by replacing the growth dummy with a bank debt dummy (BD) which takes on the value 1 if a firm's relative bank debt (total bank debt divided by total assets) is above its subsample's (long time listed, recent IPO or unlisted) median over the sample period and 0 otherwise. The free cash flow theory predicts that financial pressure imposes disciplining (e.g., Jensen, 1986; Nickell et al., 1997; Nickell and Nicolitsas, 1999), so that it should reduce cash flow sensitivity caused by over investment. In contrast, within financially constrained firms it is likely to exacerbate the financing problems and hence increase cash flow sensitivity. Results are reported in Table 6.

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INSERT TABLE 6 ABOUT HERE
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As before, Panel A contains results for the model using the total change in external financing ratio ($\Delta EF/K$), while Panel B shows the results for the model including only the change in bank debt ratio ($\Delta BD/K$). Both Panels support the view that cash flow sensitivity of unlisted companies and recent IPOs can be explained by

capital constraints as the investment-cash flow sensitivity increases for high levels of financial pressure. For the long time listed companies we find, in line with earlier results, no evidence of under investment nor over investment.

As a second and alternative robustness test for our interpretations we use the methodology of Almeida and Campello (2005) concerning the substitution effect between internal and external financing. These authors argue that when investments are constrained by capital market frictions, this substitution is weaker or even non existent compared to a situation of perfect markets with no frictions. On the basis of their reasoning we would expect a strong substitution effect between internal and external financing for long time listed firms. For the unlisted companies, that are less able to shift towards external financing when internal cash falls short, we expect a much weaker or even no substitution effect. Finally, we expect the recent IPOs to be somewhere in between. In order to test these arguments we build a fixed effect model explaining either the change in total external financing ratio ($\Delta EF/K$) or the change in bank debt ratio ($\Delta BD/K$). The explanatory variables are - similar to Almeida and Campello (2005) - the remaining variables from our investment models, $\Delta S/K$, CF/K, $\Delta WC/K$ and lnta.[27] A significantly negative coefficient for the cash flow ratio would indicate a substitution effect between internal and external financing. In models that explain either ($\Delta EF/K$) or ($\Delta BD/K$), but do not include the SG dummy, we only find a significant substitution effect between internal and external financing for the listed companies (long time listed as well as recent IPOs). When we introduce the SG dummy, results are very analogous to our results of Table 5. In particular, for the models explaining the total change of external financing ($\Delta EF/K$) we find significant substitution between internal and external financing in high growth periods (SG = 1)

[27] Results are not reported but available upon request.

for all listed firms. In fact, a substitution effect then even shows for unlisted companies in high growth periods, although much weaker and only marginally significant. The most interesting result occurs in the model explaining the change in bank debt (ΔBD/K). The model shows a substitution effect between internal financing and bank debt for unlisted companies only in high growth periods. For long time listed companies, the substitution effect only seems significant in low growth periods. Finally recent IPO-companies show substitution between cash flow and bank debt in both low and high growth periods. Overall, results from this alternative methodology are very analogous to our findings based on investment-cash flow sensitivity.[28]

5. Conclusions

In this paper we explore the impact of growth opportunities on investment-cash flow sensitivity. Within our sample of large Belgian firms we differentiate between levels of asymmetric information by considering large unlisted companies, recent IPO firms and long time listed firms. The introduction of unlisted companies contributes to the existing literature that considers mainly long time listed companies, thereby omitting those firms that are likely to suffer most from information-related financial market imperfections. Overall, we find strong support for our hypothesis that when information asymmetries are important the measured investment-cash flow sensitivity, while remaining positive, significantly decreases in periods of high growth

[28] As an additional robustness check on our findings, we further extend the model of Almeida and Campello (2005) in order to test for the nature of the relationship between investment and external financing. We estimate a 2SLS system in which both the external financing model of Almeida and Campello (2005) and our basic investment equation are estimated simultaneously. The system is estimated on the three subsamples of interest, unlisted firms, recent IPOs and long time listed companies. Our results reveal that while investment ratios always have a significant positive impact on the change in external financing (or change in bank debt), the reverse causality only holds for unlisted firms and recent IPOs. In line with our earlier findings, long time listed companies show no signs of capital constraints and their investment decisions are therefore not driven by the availability of financing sources (internal as well as external). Unlisted companies on the other hand suffer the most from these financial market imperfections and are strongly dependent on the availability of internal financing.

opportunities, due to the timing of external financing usage. For firms operating under low levels of asymmetric information, this timing does not seem to influence investment-cash flow sensitivity. Our results add insight in the interpretation of investment-cash flow sensitivity under severe information asymmetries when growth prospects are correlated with the use of external financing.

In terms of policy implications, our results offer an explanation why in Belgium, and likely also other continental European countries, the bulk of large firms remain unlisted. Specifically, except for possibly increased financial flexibility, our long time listed sample firms seem to have no need for extra financing opportunities offered by the stock market.[29] This raises questions either about the growth opportunities of these firms or about the functioning of the stock market. In fact, Shleifer and Vishny (1997) as well as practitioners (e.g., Daems, 1999), argue that an insider oriented system with large owners may, next to limiting agency problems, also impose costs on the firm if these block holders oppose important strategic investments in order to avoid seasoned offerings and hence dilution of ownership.[30] Such a policy my create the impression of absence of capital constraints, if there is sufficient funding for day to day investment needs. Finally our research shows that even for large companies the availability of bank financing at a reasonable cost is an important condition for corporate investment. This implies that in periods of monetary tightening not only the investment behavior of small companies but also that of large well established unlisted companies will be influenced. In view of the economic importance of the set

[29] The fact that in most Continental European countries also unlisted firms have to publish their financial statements creates opportunities for comparison and higher quality evaluation by lenders. Hence the mandatory publication also helps to decrease problems of asymmetric information for private firms, and therefore is also favorable to these firms remaining unlisted.

[30] Because of the often voiced problem among practitioners that due to the lack of anti takeover devices, the wish to keep control and firm growth may be conflicting objectives, the Belgian institute for corporate governance has recently launched a proposal to change the Belgian corporate law to allow multiple voting shares, next to single voting stock.

of large unlisted firms, this finding predicts an important impact of monetary policy on aggregate capital expenditures.

Appendix
Description of Variables

Variable measure	Description
Investment ratio (I/K)	$\frac{(\text{Fixed tangible assets})_t - (\text{Fixed tangible assets})_{t-1} + \text{Depreciations}}{(\text{Fixed tangible assets})_{t-1}}$
Sales growth ratio (ΔS/K)	$\frac{\text{Sales}_t - \text{Sales}_{t-1}}{(\text{Fixed tangible assets})_{t-1}}$
Cash flow ratio (CF/K)	$\frac{(\text{EBITDA} - \text{interests paid} - \text{taxes})_t}{(\text{Fixed tangible assets})_{t-1}}$
Δ Working capital ratio (ΔWC/K)	$\frac{(\text{Net Working capital})_t - (\text{Net Working capital})_{t-1}}{(\text{Fixed tangible assets})_{t-1}}$
Δ Bank debt ratio (ΔBD/K)	$\frac{(\text{Total Bank debt})_t - (\text{Total Bank debt})_{t-1}}{(\text{Fixed tangible assets})_{t-1}}$
Δ External financing ratio (ΔEF/K)	$\frac{(\text{Book value debt+paid in capital})_t - (\text{Book value debt+paid in capital})_{t-1}}{(\text{Fixed tangible assets})_{t-1}}$
Size (Lnta)	$\text{Log}(\text{Total assets})_{t-1}$
LnonIPO	Dummy variable: 1 if the firm is listed in a particular year and did not go public 3 years ago or less; 0 otherwise
LIPO	Dymmy variable: 1 if the firm is listed in a particular year and did go public 3 years ago or less; 0 otherwise
SG	Dummy variable: 1 if sales growth in a particular year is higher than the subsample median (unlisted, long time listed or recent IPO) over the sample period; 0 otherwise

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Table 1
Sample Composition and Industry Distribution

Panel A

Year	All Firms	Unlisted	Listed
1993	159	122	37
1994	154	117	37
1995	128	98	30
1996	107	77	30
1997	153	110	43
1998	172	120	52
1999	205	143	62
2000	218	149	69
2001	250	181	69
2002	275	203	72
2003	219	152	66
All	2040	1472	567

Panel B

Industry	Number of firms	Unlisted	Listed
Food & Agriculture	44	34	10
Manufacturing	133	93	40
Construction	20	17	3
Distribution	78	60	18
Transportation	29	27	2
Services	121	95	26
Total firms	425	326	99

Table 2

Summary Statistics and Univariate Tests

Summary statistics Panel A

		Full Sample (1)	Unlisted (2)	Long time listed (3)	Recent IPO (4)	p-values 2<>3	p-values 3<>4
Investment ratio (I/K)	Mean	0.310	0.297	0.306	0.419	0.71	0.00
	Median	0.221	0.204	0.225	0.354	0.52	0.00
Sales growth ratio (ΔS/K)	Mean	0.396	0.279	0.458	0.827	0.21	0.01
	Median	0.091	0.083	0.044	0.272	0.62	0.00
Cash flow ratio (CF/K)	Mean	0.393	0.374	0.409	0.506	0.20	0.06
	Median	0.282	0.280	0.271	0.356	0.25	0.03
Δ Working capital ratio (ΔWC/K)	Mean	0.054	0.044	0.036	0.176	0.88	0.20
	Median	0.016	0.019	0.007	0.031	0.46	0.31
Δ Bank debt ratio (ΔBD/K)	Mean	0.044	0.031	0.071	0.083	0.24	0.83
	Median	-0.002	-0.009	0.000	0.000	0.05	0.72
Δ External financing ratio (ΔEF/K)	Mean	0.112	0.045	0.162	0.571	0.22	0.01
	Median	0.012	-0.011	0.045	0.195	0.03	0.00
Size (Lnta)	Mean	11.627	11.373	12.420	11.959	0.00	0.00
	Median	11.406	11.192	12.245	11.953	0.00	0.00

Summary statistics Panel B

Low growth years (SG = 0)

		Full Sample (1)	Unlisted (2)	Long time listed (3)	Recent IPO (4)	p-values 2<>3	p-values 3<>4
Investment ratio (I/K)	Mean	0.226	0.220	0.223	0.272	0.90	0.11
	Median	0.169	0.162	0.179	0.198	0.56	0.07
Δ Bank debt ratio (ΔBD/K)	Mean	-0.037	-0.075	0.067	-0.012	0.04	0.06
	Median	-0.031	-0.043	0.001	-0.015	0.00	0.03
Δ External financing ratio (ΔEF/K)	Mean	-0.110	-0.167	0.047	0.000	0.01	0.78
	Median	-0.077	-0.099	-0.012	-0.004	0.00	0.96

High growth years (SG = 1)

		Full Sample (1)	Unlisted (2)	Long time listed (3)	Recent IPO (4)	p-values 2<>3	p-values 3<>4
Investment ratio (I/K)	Mean	0.396	0.374	0.410	0.480	0.35	0.02
	Median	0.289	0.263	0.306	0.409	0.17	0.00
Δ Bank debt ratio (ΔBD/K)	Mean	0.101	0.146	0.077	0.220	0.69	0.08
	Median	0.005	0.003	0.001	0.058	0.84	0.02
Δ External financing ratio (ΔEF/K)	Mean	0.336	0.253	0.300	1.060	0.79	0.00
	Median	0.135	0.104	0.099	0.470	0.79	0.00

Notes: For Panels A and B the corresponding p-values for the F-test statistic for the means test and the Wilcoxon Mann-Whitney Z-statistic for the median test are given in the respective rows. Differences between mean and median are only tested between unlisted and long time listed (2<>3) and between long time listed and recent IPO (3<>4) respectively. Variables are defined in Subsection 3.2 and the appendix.

Table 3
Stock Listing and Investment-Cash Flow Sensitivity

	Panel A	Panel B
ΔS/K	0.1193***	0.1083***
	(30.83)	*(17.96)*
CF/K	0.7150***	0.6390***
	(6.34)	*(5.26)*
ΔWC/K	-0.0974***	-0.0908**
	(-2.78)	*(-2.19)*
ΔEF/K	0.0878***	-
	(14.83)	
ΔBD/K	-	0.4169***
		(7.59)
Lnta	0.0716***	0.0516***
	(6.89)	*(3.59)*
LnonIPO	0.0281	-0.0215
	(0.68)	*(-0.42)*
LIPO	0.1217*	0.1558**
	(1.65)	*(2.26)*
LnonIPO*CF/K	-0.7706***	-0.5469**
	(-5.19)	*(-2.13)*
LIPO*CF/K	-0.1717	-0.3449*
	(-0.65)	*(-1.72)*
Sargan	0.408	0.629
m1	-8.24	-12.18
m2	-1.13	0.17
Net effect (Wald coeff test)	Value	Value
CF/K*(1 + LnonIPO)	-0.0556	0.0921
	(0.24)	*(0.16)*
CF/K*(1 + LIPO)	0.5433**	0.2941**
	(4.19)	*(3.19)*

Notes: The dependent variable in all models is the investment ratio (I/K), explanatory variables are defined in Subsection 3.2 and the appendix. Models are tested with GMM, estimated in first differences using the Arellano and Bond (1991) method (White's heteroskedasticity consistent t-statistics in parentheses). The validity of using lagged values from t-2 and before of endogenous regressors as instruments was evaluated with the Sargan test of over-identifying restrictions and direct tests of serial correlation in the residuals m1 and m2. The Sargan test is χ^2 distributed, its *p*-values are reported in the Table. We calculate the significance of the net effect of a variable X on the investment ratio of listed companies (either LnonIPO or LIPO) by applying a Wald coefficient test to the form (1+L)*X = 0. The results from these tests (F-statistics in parentheses) are reported at the bottom of the Table. Level of significance: ***1%; **5%; *10%.

Table 4
Growth Opportunities and Investment-Cash Flow Sensitivity

	Panel A	Panel B
ΔS/K	0.1247***	0.1064***
	(21.44)	*(17.54)*
(1-SG)*CF/K	1.3993***	1.4419***
	(7.22)	*(6.09)*
SG*CF/K	0.6097***	0.6715***
	(4.03)	*(3.57)*
ΔWC/K	-0.1441***	-0.1026***
	(-2.73)	*(-2.77)*
ΔEF/K	0.0885***	-
	(10.16)	
ΔBD/K	-	0.4446***
		(9.55)
Lnta	0.0321	0.0034
	(0.34)	*(0.03)*
LnonIPO	0.0322*	0.0643***
	(1.62)	*(3.12)*
LIPO	0.1504*	0.1545***
	(1.84)	*(4.46)*
(1-SG)*LnonIPO*CF/K	-1.4641***	-1.4631***
	(-5.30)	*(-4.11.)*
(SG)*LnonIPO*CF/K	-0.7755***	-0.7368***
	(-3.42)	*(-2.79)*
(1-SG)*LIPO*CF/K	-0.6318	-0.6240*
	(-1.21)	*(-1.60)*
(SG)*LIPO*CF/K	-0.3903*	-0.9534**
	(-1.63)	*(-2.47)*
Sargan test	0.402	0.324
m1	-8.34	-11.90
m2	-1.25	0.22
Net effect (Wald coeff test)		Value
(1-SG)*CF/K*(1+LnonIPO)	-0.0647	-0.0212
	(0.09)	*(0.01)*
(SG)*CF/K*(1+LnonIPO)	-0.1657	-0.0653
	(1.00)	*(0.07)*
(1-SG)*CF/K*(1+LIPO)	0.7674*	0.8178*
	(2.92)	*(3.48)*
(SG)*CF/K*(1+LIPO)	0.2194	-0.2819
	(0.37)	*(0.65)*

Notes: The dependent variable in all models is the investment ratio (I/K), explanatory variables are defined in Subsection 3.2 and the appendix. The coefficient for the cash flow ratio is split based on the growth opportunity dummy (SG). Models are tested with GMM, estimated in first differences using the Arellano and Bond (1991) method (White's heteroskedasticity consistent t-statistics in parentheses). The validity of using lagged values from t-2 and before of endogenous regressors as instruments was evaluated with the Sargan test of over-identifying restrictions and direct tests of serial correlation in the residuals m1 and m2. The Sargan test is χ^2 distributed, its *p*-values are reported in the Table. We calculate the significance of the net effect of a variable X on the investment ratio of listed companies (either LnonIPO or LIPO) by applying a Wald coefficient test to the form (1+L)*X = 0. The results from these tests (F-statistics in parentheses) are reported at the bottom of the Table. Level of significance: ***1%; **5%; *10%.

Table 5
Growth Opportunities and External Financing

Panel A		Panel B	
ΔS/K	0.0681***	ΔS/K	0.0829***
	(8.68)		*(8.12)*
CF/K	0.4895***	CF/K	0.5926***
	(5.52)		*(5.17)*
ΔWC/K	-0.0414*	ΔWC/K	-0.1110**
	(-1.62)		*(-2.44)*
(1-SG)*ΔEF/K	-0.0971	(1-SG)*ΔBD/K	0.0110
	(-1.25.)		*(0.08)*
SG*ΔEF/K	0.2940***	SG*ΔBD/K	0.7613***
	(9.91)		*(6.72)*
Lnta	0.0415**	lnta	0.0671***
	(2.49)		*(5.66)*
LnonIPO	0.0428***	LnonIPO	0.0093
	(2.63)		*(0.20)*
LIPO	0.0590***	LIPO	0.1647**
	(2.78)		*(2.15)*
(1-SG)*LnonIPO*ΔEF/K	0.0988**	(1-SG)*LnonIPO*ΔBD/K	0.3121*
	(2.22)		*(1.64)*
(SG)*LnonIPO*ΔEF/K	-0.2034***	(SG)*LnonIPO*ΔBD/K	-0.6831*
	(-6.35)		*(-1.70)*
(1-SG)*LIPO*ΔEF/K	0.0646	(1-SG)*LIPO*ΔBD/K	0.5607
	(0.63)		*(1.29)*
(SG)*LIPO*ΔEF/K	-0.1271	(SG)*LIPO*ΔBD/K	-0.6118***
	(-1.31)		*(-3.18.)*
Sargan test	0.181	Sargan test	0.862
m1	-13.05	m1	-11.09
m2	-0.41	m2	-0.08.
Net effect (Wald coeff. test)		Net effect (Wald coeff. test)	Value
(1-SG)* ΔEF/K *(1+LnonIPO)	0.0016 *(0.01)*	(1-SG)* ΔBD/K *(1+LnonIPO)	0.3231 *(1.13)*
(SG)* ΔEF/K *(1+LnonIPO)	0.0906** *(8.38)*	(SG)* ΔBD/K *(1+LnonIPO)	0.0782 *(1.85)*
(1-SG)* ΔEF/K *(1+LIPO)	0.0325 *(0.12)*	(1-SG)* ΔBD/K *(1+LIPO)	0.5717* *(2.71)*
(SG)* ΔEF/K *(1+LIPO)	0.1668* *(3.48)*	(SG)* ΔBD/K *(1+LIPO)	0.1495 *(0.61)*

Notes: The dependent variable in all models is the investment ratio (I/K), explanatory variables are defined in Subsection 3.2 and the appendix. The coefficient for the external financing ratio (Panel A) or the bank debt ratio (Panel B) is split based on the growth opportunity dummy (SG). Models are tested with GMM, estimated in first differences using the Arellano and Bond (1991) method (White's heteroskedasticity consistent t-statistics in parentheses). The validity of using lagged values from t-2 and before of endogenous regressors as instruments was evaluated with the Sargan test of over-identifying restrictions and direct tests of serial correlation in the residuals m1 and m2. The Sargan test is χ^2 distributed, its *p*-values are reported in the Table. We calculate the significance of the net effect of a variable X on the investment ratio of listed companies (either LnonIPO or LIPO) by applying a Wald coefficient test to the form (1+L)*X = 0. The results from these tests (F-statistics in parentheses) are reported at the bottom of the Table. Level of significance: ***1%; **5%; *10%.

Table 6
Robustness Checks

	Panel A	Panel B
ΔS/K	0.1155***	0.1016***
	(30.25)	*(26.24)*
(1-BD)*CF/K	0.7276***	0.6517***
	(7.34)	*(5.38)*
BD*CF/K	1.0956***	1.2889***
	(5.05)	*(5.54)*
ΔWC/K	-0.1549***	-0.1381***
	(-3.92)	*(-3.71)*
ΔEF/K	0.0944***	-
	(20.35)	
ΔBD/K	-	0.4029***
		(12.89)
lnta	0.0289***	0.0490***
	(4.44)	*(4.23)*
LnonIPO	-0.0173	0.0063
	(-0.91)	*(0.23)*
LIPO	0.0707**	0.0761**
	(1.97)	*(2.06)*
(1-BD)*LnonIPO*CF/K	-0.3656***	-0.2457
	(-2.73)	*(-1.47)*
(BD)*LnonIPO*CF/K	-0.9968***	-1.1688**
	(-4.47)	(-2.55)
(1-BD)*LIPO*CF/K	-0.4443*	-0.3609*
	(-1.77)	*(-1.82)*
(BD)*LIPO*CF/K	-0.5575	-0.9127***
	(-0.22)	*(-3.24)*
Sargan test	0.242	0.603
m1	-9.79	-10.93
m2	-0.07	0.42
Net effect (Wald coeff test)	Value	Value
(1-BD)*CF/K*(1+LnonIPO)	0.3620	0.4059
	(1.85)	*(2.59)*
(BD)*CF/K*(1+LnonIPO)	0.0988	0.1200
	(0.95)	*(0.08)*
(1-BD)*CF/K*(1+LIPO)	0.2833	0.2907
	(1.07)	*(2.44)*
(BD)*CF/K*(1+LIPO)	0.5381*	0.3761
	(3.02)	*(1.28)*

Notes: The dependent variable in all models is the investment ratio (I/K), explanatory variables are defined in Subsection 3.2 and the appendix. The coefficient for the cash flow ratio is split based on the financial pressure dummy (BD). Models are tested with GMM, estimated in first differences using the Arellano and Bond (1991) method (White's heteroskedasticity consistent t-statistics in parentheses). The validity of using lagged values from t-2 and before of endogenous regressors as instruments was evaluated with the Sargan test of over-identifying restrictions and direct tests of serial correlation in the residuals m1 and m2. The Sargan test is χ^2 distributed, its *p*-values are reported in the Table. We calculate the significance of the net effect of a variable X on the investment ratio of listed companies (either LnonIPO or LIPO) by applying a Wald coefficient test to the form (1+L)*X = 0. The results from these tests (F-statistics in parentheses) are reported at the bottom of the Table. Level of significance: ***1%; **5%; *10%.

Figure 1
Average and Median Investment Ratios over the Sample Period