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Abhandlungen

Corporate Investment and Financing Constraints: Connections with Cash Management

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I. Introduction

The sensitivity of corporate investment to financial variables was indicated long ago (e.g. Meyer and Kuh (1957)) and is by now an established fact. It is also well documented that this sensitivity is more pronounced for some firms than for others. For instance Fazzari et al. (1988) find that financial variables affect investment more for firms with low dividend payout rates; Hoshi et al. (1991) document a weaker sensitivity of investment to finance for Japanese firms belonging to a Keiretsu than for independent firms; Whited (1992) reports a stronger sensitivity for firms without a bond rating.

Current academic debate revolves around the interpretation of these findings. To the extent that firms face costly or rationed external finance, marginal investments may be sufficiently profitable when financed with internal funds, before these have been exhausted. The same marginal investments may not be sufficiently profitable to raise external finance for. The firm is then said to be financially constrained, the implication of which is that an increase in internal funds will generate an increase in investment unrelated to changes in investment opportunities. Fazzari et al. (1988) and related studies claim that the sensitivity of investment to increases in internal funds is driven by financing constraints resulting from informational problems in capital markets, which we will refer to as the financing constraints paradigm. However, this body of applied literature has not succeeded so far in developing a structural model of investment subject to financing constraints. Instead, it relies on the ad

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hoc addition of financial variables – usually cash flow – to existing investment models.

Kaplan and Zingales (1997) do present a simple theoretical model of investment with costly external finance. They demonstrate that theoretically, the investment-cash flow sensitivity is not a useful indicator of financing constraints as it does not necessarily relate monotonically to the cost of external finance or the level of internal funds available. They also show that firms seemingly rich in the amount of internal funds available nevertheless display a stronger sensitivity of investment to cash flow. Their explanation is that firms with high levels of internal funds have incentives to use additional earnings for financing excessive, unprofitable investments.

The explanation of the investment-cash flow sensitivity is important from an academic as well as a policy perspective. From an academic point of view, we want to know whether the sensitivity of investment to financial factors stems from unspecified financing channels, or simply from error in capturing financing constraints in combination with error in the measurement of investment opportunities. From a policy point of view, the existence of a financing channel can shed some light on the sources of the volatility in corporate investment behaviour. Moreover, if shown to exist, knowledge of the composition of the financing channel can guide policymakers in their attempts to alleviate the problems of corporates being unable to raise sufficient funding for profitable investment.

While Kaplan and Zingales (1997) propose to discard the use of investment-cash flow sensitivities in the empirical analysis of financing constraints, I propose not to throw out the baby with the bath water. The aim of this paper is to suggest fruitful avenues for research to explore more comprehensively the relevance of financing constraints, even though I do not pretend to build a structural model of investment subject to financing constraints. Instead, I propose a flexible reduced form model that allows for the truly simultaneous analysis of financial and investment decisions.

One such financial decision that is closely linked with the investment decision in an environment with informational imperfections and concomitant financing constraints is the cash management decision. Specifically, I consider how well cash holdings measure financing constraints when the financing constraint affects cash management as well as the investment decision. In doing so, I sympathise with those who are con-

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cerned with endogeneity problems in the application of observed cash holdings as measures of financing constraints and want to stress the importance of analysing what constitutes a constrained firm. Furthermore, the focus on cash management links up with some of the unresolved issues in the debate between Fazzari et al. (1988, 2000) and Kaplan and Zingales (1997, 2000). The connection between capital structure management and investment subject to financing constraints is also considered, but looks less promising.

The paper proceeds as follows. Section II. presents the financing constraints paradigm, i.e. the analysis of financing constraints under the joint assumption that 1) moderately constrained firms can be distinguished from severely constrained firms and 2) the investment-cash flow sensitivity conveys the impact of financing constraints. The weaknesses in modelling the financing channel in investment are discussed in conjunction with proposed solutions. The resulting reading of the literature suggests that financing constraints are relevant in the corporate investment decision, although the evidence is far from unambiguous. This provides an understanding of the penned up concern with the paradigm that revolves around the use of the joint hypothesis, as discussed in section III. The contemporary debate revolves more around the identification of the constrained firm than around the interpretation of investment-cash flow sensitivities as measuring financing constraints. This situation has arisen from conflicting empirical results when we strictly believe that the investment-cash flow sensitivity signals the tightness of financing constraints. In section IV. I suggest the use of possible connections between cash management and investment, but also between debt management and investment to obtain clearer indications of when corporate investment is in fact subject to financing constraints. In addition, a simple and flexible econometric model for the simultaneous analysis of investment and these financial decisions is outlined. I conclude in section V.

II. The Financing Constraints Paradigm

In this section we discuss the pros and cons of two classes of models used for analyzing the role of financing constraints in corporate investment.[1]

[1] A more elaborate overview is in *Bruinshoofd* (2003).

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1. *Q-models and Reduced Form Investment Equations*

a) The Analysis of Financing Constraints

The typical empirical Q-model or reduced-form investment equation looks like equation (1).

$$I = \beta_1 \textit{ Investment opportunities} + \beta_2 \textit{ Internal funds} + \varepsilon \tag{1}$$

Here *Investment opportunities* refers to a (sub)set of investment fundamentals which includes but is not limited to Q, sales growth, the user cost of capital, and sales-assets or sales-capital stock measures. *Internal funds* refers to a (sub)set of financial variables, wherein cash flow plays a predominant role in most of the applied work, but the stock of liquid assets is also used on occasion (e.g. Fazzari et al. (1988); Fazzari and Petersen (1993)).

Ideally, when financing constraints do not matter *Investment opportunities* are sufficient to characterise a firm's investment level, whereas $E(\beta_2) = 0$. Then, a firm can finance all profitable investment, regardless of whether it can finance this investment with internal funds or has to raise external finance. In contrast, when financing constraints do matter, firms sometimes feel compelled to reconsider investment decisions for lack of (reasonably priced) external finance, while internally available finance has been depleted. The timing of investment then coincides with increments in internal funds, i.e. $E(\beta_2) > 0$.

In practice, estimates for β_2 are typically positive regardless of whether we expect financing constraints to matter for a particular (sub)set of firms or not. Off course, the Q-model uses potentially noisy stock prices to compute investment opportunities, while reduced form models may be particularly ill suited for determining the deep parameters of the investment decision. As a result, variables that provide additional information regarding expected firm profitability may appear in the estimated investment function, even though they are not structural determinants of investment. Cash flow is a usual suspect in this regard. The validity of these models as tools to analyse the impact of financing constraints on investment then requires that the mismeasurement of investment opportunities – and hence the informational content of the financial variables – is the same for constrained and unconstrained firms alike. If this requirement is met the excess sensitivity of constraint firms' investment to financial variables still reflects the presence of binding financing constraints.

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b) Main Criticism

Excess sensitivity tests are useful indications of the relevance of financing constraints only when the informational content of financial variables is the same for constrained and unconstrained firms alike. Should investment opportunities for example be measured with more error for younger and smaller firms, financial variables may have greater informational content in the investment decisions of these firms and obtain greater empirical importance solely for that reason.[2] Differential error in measuring investment opportunities may thus render up the excess sensitivity test as a useless indicator of financing constraints.[3]

Two responses to this criticism can be identified from the literature. One is to attempt to control for the informational content of changes in internal funds by extracting the part that correlates with innovations in investment opportunities. The sensitivity of investment to the pure liquidity content of changes in internal funds can subsequently be assessed. Gilchrist and Himmelberg (1995, 1998) find that even after controlling for its informational content, constrained firms exhibit excess sensitivity to changes in internal funds. Another response is to search for semi-natural experiments wherein changes in wealth are conceivably uncorrelated with the error in measuring investment opportunities. Lamont (1997), for instance, investigates the investment decision of non-oil segments of conglomerates that also contain a segment in the oil industry. He finds that, after the 1986 oil price decline, non-oil investment is curbed following a drop in oil segments' cash flow.[4]

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[2] See *Alti* (2003) for a simulation demonstration of this argument. In Alti's model young firms face uncertainty regarding long term growth potential. Then, projects contain the option value of long term growth prospects, which makes Q a noisy measure of contemporary project quality. Cash flow has informational content as it contains news on project quality. For older firms the option value of long term growth potential dissipates, making Q more informative of contemporary investment plans and reducing the informational content of cash flow. Alti's simulation results illustrate that error in measuring investment opportunities accounts for excess sensitivity results of similar magnitude as *Fazzari* et al. (1988) report for their subset of relatively young low dividend payout firms.

[3] *Erickson* and *Whited* (2000) illustrate empirically how measurement error in Q may explain excess sensitivity results. They decompose the error in measuring Q into the possible inequality of marginal and average q (Hayashi's (1982) sufficient conditions are not met), of average q and Tobin's Q (the observed market value of the firm may diverge from management's valuation), and the error in the measurement of Tobin's Q using accounting data.

[4] *Hovakimian* and *Titman* (2005) use voluntary asset sales as an exogenous internal source of finance. They find that constrained firms' investment is more sen-

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2. *Euler Equations*

If errors in measuring Q cloud the usefulness of excess sensitivity tests in assessing the relevance of financing constraints, then Euler equations may offer a way around. The main advantage of Euler equations over Q-models is that one abstains from using noisy stock market information to characterise investment opportunities.

a) The Analysis of Financing Constraints

An Euler equation can be derived from the same optimisation procedure that results in the standard Q-model of investment. First order conditions are rearranged differently, however, so that the shadow value of an extra unit of capital drops out of the analysis. The analysis therefore no longer focuses on the market value of additional capital relative to its replacement value, but emphasises the intertemporal allocation of investment instead.[5] Specifically, firms are expected to trade off the net benefits of investing today against the net benefits of postponing investment to the future. Absent costly external finance and absent quantity constraints to the amount of external finance available to the firm, the marginal product of capital (net of user and adjustment costs) represents the net benefits of investment. When applied to the data, specification tests should not reject such standard Euler equations when the assumption of no financing constraints is valid.[6]

Financing restrictions may for instance take the form of a nonnegativity constraint on dividend payments in combination with a debt-capacity constraint (e. g. Whited (1992); Van Ees et al. (1998)) or more straightforwardly by considering the firm to face a higher discount rate when its nonnegativity constraint on dividends binds (Hubbard et al. (1995)). The idea is that such constraints, when they are binding, drive a wedge between firms' expected returns to contemporary and future investments, so that standard Euler equations are misspecified.

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sitive to the proceeds of such sales. *Holtz-Eakin* et al. (1994b) obtain that the receipt of an inheritance contributes positively to the probability that an individual becomes an entrepreneur, while *Holtz-Eakin* et al. (1994a) present a positive impact of an inheritance on the probability that the entrepreneur remains in business.

[5] Also, we can relax the strict assumptions (of constant returns to scale in the production and adjustment cost functions as well as competitive markets) that the Q approach requires.

[6] See for example *Schianterelli* (1996) for a more formal discussion.

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Empirical implementation of the alternative, financing constraints augmented Euler equation requires a characterisation of the shadow value of relaxing the external financing constraint by one unit. Whited (1992), for example, models this shadow value as a non-linear function of leverage and coverage. Hubbard et al. (1995) use firms' cash flows and a measure of aggregate credit constraints. The augmented Euler equation can be applied to the investment decisions of a priori constrained firms and specification tests subsequently evaluate whether the characterisation of the financing constraint is accepted by the data.

b) Main Criticism

While the Euler approach does not require the use of noisy stock market information, this does not automatically shield the approach from any measurement problems. More specifically, the researcher must now estimate the marginal product of capital, net of marginal adjustment costs and the user cost of capital. It seems a bit optimistic to assume that this all works without error and it is not obvious that the marginal productivity of capital and its user cost will be measured with less error than, say, the market value of the firm.

Furthermore, Euler equations may have difficulty in picking up the effects of financing constraints when they remain approximately equally tight over time. Specifically, while firms may face financing constraints now and in the future, the restriction may be a constant in an intertemporal sense. This issue can be overcome by using data over a period of time long enough to ensure sufficient variation in the tightness of financing constraints. As typically panel data sets include many firms but a limited number of years, it is not clear to what extent this issue is sufficiently obviated in applied research.

Last, while misspecification tests may reject the frictionless markets, standard Euler equation for a priori constrained firms, additional insight into the nature of the financing constraint can only be obtained when the financing constraint is actually modelled and its shadow value is empirically characterised. This leaves a degree of discretion to the researcher and results in ad hoc modelling that resembles the ad hoc inclusion of financial variables in the Q model and reduced-form investment equations. Hence, the claim that Euler equations are better equipped to identify the deep parameters of the investment model can be acknowledged in the financing constraints application only after we have identi-

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fied theoretically the deep parameters of the financing constraints. This has shifted the playing field towards the main contemporary challenges faced by the financing constraints paradigm, discussed extensively in the next section.

III. Contemporary Challenges for the Paradigm

The major challenges for the financing constraints paradigm have a methodological character. Specifically, the empirical implementation of the financing constraints hypothesis relies on the joint assumption that we can identify constrained and unconstrained firms and subsequently, that the investment-cash flow sensitivity (ICFS) indicates the relevance of financing constraints in the sense that tighter constraints imply a stronger sensitivity. The empirical testing of any joint hypothesis involves the risk of circularity and indeed, following the influential contribution by Fazzari et al. (1988) the emphasis in the empirical literature on financing constraints has been on detecting excess ICFS. This literature and some of its conflicting results are discussed in section III.1. After years of growing unease with this approach Kaplan and Zingales (1997) most strongly voiced the concern of using the ICFS to identify financing constraints. Instead they suggested to redirect research attention towards marking a firm's financial status as constrained or unconstrained, so that we may gain a better understanding as to whether financing constraints determine the ICFS. In section III.2. we summarise what has become known as the Kaplan and Zingales critique.

1. Does the ICFS Measure Financing Constraints?

Fazzari et al. (1988) cleared the way for the general belief that the investment-cash flow sensitivity is a useful indicator of financing constraints. Their influential contribution made the plausible case that US firms paying low dividends face higher costs of raising funds externally than their counterparts paying high dividends. In line with this conjecture, they show that low payout firms are also the ones that exhibited the highest ICFS. Devereux and Schiantarelli (1990) demonstrate that small and young UK firms were most sensitive to cash flow in their investment decision, claiming the conceivability that small and young firms are more prone to informational problems to invoke the financing constraints explanation. Subsequent contributions attributed informational problems to Japanese firms outside industry groups (Hoshi et al.

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(1991)) and US firms whose insiders trade relatively heavily in the firm's own stock (Oliner and Rudebusch (1992)), to name just a few.[7]

This rapid initial success of the financing constraints paradigm created a tendency for subsequent studies to focus more heavily on demonstrating excess sensitivity results than on the in-depth analysis of what constitutes a constrained firm. As such, the maintained hypothesis that the ICFS is a useful indicator of financing constraints can be blamed for implementation of ad hoc sample splits. Pointing towards the obtained excess sensitivity results validates such splits afterwards.[8] Hu and Schiantarelli (1998) provide a particularly clear illustration of this search for excess sensitivities. Their switching regression framework is specifically designed to discriminate investment observations displaying a strong ICFS from observations with no or only moderate ICFS.

To a certain extent, this maintained hypothesis can also explain the heavy reliance on uni-variate stratification procedures in the analysis of financing constraints, where firms are assigned the constrained or unconstrained status on the basis of a single variable only. Such procedure assumes not only that financing constraints are relatively easily identified, but additionally assumes that they are simply and monotonically related to a single variable, say size, leverage or dividend payout. In combination with the maintained hypothesis that the ICFS is a useful indicator of financing constraints, this produces some peculiar results with ad hoc interpretations. For instance, small firms are sometimes found to display excess sensitivity of investment to cash flow, which is interpreted by noting that small firms are "typically younger, less well-known, and hence more vulnerable to capital market imperfections induced by information asymmetries and collateral requirements" (Gilchrist and Himmelberg (1995: 551)). Oliner and Rudebusch (1992), arguing that small firms are expected to face relatively high transaction costs for external finance due to fixed components in issuance costs, find no differential ICFS between small and large firms. Hu and Schiantarelli (1998) find that size increases, rather than decreases, the probability that firms face binding financing constraints. Their interpretation invokes agency problems associated with the dispersed ownership of large firms'

[7] See *Schiantarelli* (1996) and *Hubbard* (1998) for more extensive overviews of relevant empirical studies.

[8] *Schiantarelli* (1996) also points out the undesirable methodological feature of assigning firms a time-invariant constrained or unconstrained status, neglecting the possibility that the same firms may face binding constraints in some years, but not in others.

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shares that outweighs the fact that these large firms may be older and well known to investors. We shall discuss similarly conflicting findings on uni-variate splits using leverage and cash holdings later on. For now, let us stress that the discussion above suggests that size – and indeed many other variables analyzed in isolation – may not capture adequately the multiplicity of factors that influences a firm's financial strength and ability to raise external finance after all.[9]

The financing constraints paradigm is further brought under a cloud by findings that some of the firms that are classified as facing financing constraints actually appear to be quite rich in terms of the amount of internal funds they have. We are hard pressed to explain why these firms should behave constrained, when they could have increased investment outlays considerable from their internal means, had they so chosen. Schnure (1997) makes this point for the firms that Lamont (1997) considers to be financially constrained. Kaplan and Zingales (1997) do so for the firms that Fazzari et al. (1988), the parent of this literature, consider to be financially constrained on the basis of dividend payout behaviour.

While these findings have not eradicated the belief that ICFS are useful measures of financing constraints, they have succeeded in shifting attention towards new ways to identify which firms suffer from such constraints and have stressed the need for theoretical models.

2. *Identifying Financing Constraints*

Kaplan and Zingales (1997), KZ97 hereafter, lead the vanguard of the attack on the entrenched research on investment and financing constraints. Using a simple investment model with financing constraints, they show that among the 49 financially constrained firms in Fazzari

[9] *Hu* and *Schiantarelli* (1998) adhere to this argument. In addition to size their switching function incorporates leverage, coverage and cash holdings as well as year and industry dummies. The possibility that size correlates with other variables in the switching function already suggests that its partial effect may not be comparable to the excess sensitivity results using size in a uni-variate stratification procedure. Also see *Gomes* (2001) in this regard. *Van Ees* et al. (1998) also argue for a multivariate analysis, where multiple unobserved factors associate with financing constraints. Specifically, they propose factor analysis, which discriminates the data on the basis of unobserved factors. The joint loading of multiple variables on the same factor can provide a clearer indication of the differential in access to and cost of external finance for different groups of firms.

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et al. (1988), the most constrained firms actually display the lowest ICFS.[10]

The KZ97 model shows that a non-monotonic relationship between the ICFS and informational problems may result directly from the underlying structure of the marginal cost of external finance and the curvature of the marginal product of capital function. The simple maximisation problem (cf. KZ97: 174) is given in (2),

$$\begin{array}{ll} \max \Pi(I) - F(E,k) - I & \\ \text{s.t.} \qquad I = W + E & \end{array}, \tag{2}$$

where $\Pi(I)$ is the revenue function which is dependent only on the current investment level, I, and $F(E,k)$ represents the premium paid on external finance, which depends positively on both the level of external funds acquired (E) and the degree of informational problems (k). Investment is financed by a combination of internal funds (W) and external funds.

From the first-order condition of (2) the sensitivity of investment to changes in wealth can be derived (cf. KZ97: 174):

$$\frac{\partial I}{\partial W} = \frac{F_{EE}}{F_{EE} - \Pi_{II}} \tag{3}$$

where F_{EE} denotes $F(.)$ differentiated twice with respect to E and Π_{II} likewise stands for $\Pi(.)$ differentiated twice with respect to I. Assuming a concave revenue function ($\Pi_{II} < 0$) the sensitivity of investment to changes in wealth is shown by (3) to depend on the convexity of the cost of external finance with respect to the amount of external finance raised.

Since differential sensitivities are at the centre of attention in the empirical analysis of financing constraints, the partial derivatives of (3) with respect to wealth and the degree of informational problems are given in (4) (cf. KZ97: 175) and (5) (cf. Kaplan and Zingales 2000: 709) below.

$$\frac{\partial\left(\frac{\partial I}{\partial W}\right)}{\partial W} = \left(\frac{\Pi_{III}}{\Pi_{II}^2} - \frac{F_{EEE}}{F_{EE}^2}\right)\frac{\Pi_{II}^2 F_{EE}^2}{\left(F_{EE} - \Pi_{II}\right)^3} \tag{4}$$

[10] More generally, for a sample of 1,317 US firms *Cleary* (1999) demonstrates that those that are most likely to face binding financing constraints actually display the lowest ICFS.

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$$\frac{\partial\left(\frac{\partial I}{\partial W}\right)}{\partial k} = \frac{F_{EEk}\Pi_{II}(\Pi_{II} - F_{EE}) + F_{Ek}(F_{EEE}\Pi_{II} - F_{EE}\Pi_{III})}{(F_{EE} - \Pi_{II})^3} \tag{5}$$

KZ97 focus on changes in wealth (4) in their critical review, which results theoretically in a positive and monotonic connection with the ICFS only if there is "a certain relationship between the curvature of the production function and the curvature of the cost function at the optimal level of investment" (KZ97: 175). Fazzari et al. (2000) stress that the empirical test should not explore the ICFS for firms with different levels of wealth, but rather subdivide firms based on their expected degree of informational problems, i. e. they suggest sorting firms on the basis of k. It follows from (5), however, that the ICFS is neither necessarily monotonic nor necessarily increasing in the degree of informational problems either (also see Kaplan and Zingales (2000)).[11]

A similar result obtains with regard to observed leverage; Almeida and Campello (2002) illustrate that in an environment where financing constraints apply to the quantity of credit available (rather than its price), the ICFS is highest for firms that face the lowest degree of financing constraints and vice versa. Their model specifically provides a counter-intuitive role for debt: firms with large amounts of debt are relatively unconstrained (these are the firms that have the largest equity multipliers).[12]

Theoretically, therefore, there is no unambiguous, monotonic relationship between observed levels of internal funds or leverage and the inci-

[11] Specifically, *Fazzari* et al. (2000) assume a positive premium, one that increases in the amount of external finance ($F_{EE} > 0$) and does so at a faster rate for firms with a higher degree of informational problems ($F_{EEk} > 0$). Furthermore, assuming diminishing returns to investment ($\Pi_{II} < 0$), the denominator as well as the first term in the numerator of (5) are positive. Let $F_{Ek} > 0$ (the premium rises in the degree of informational problems). Then, for a revenue function that is quadratic in I ($\Pi_{III} = 0$) and a premium function quadratic in E ($F_{EEE} = 0$), this second terms is zero and (5) overall is positive. However, when $\Pi_{III} > 0$, the second term is negative and may outweigh the first, suggesting a lower ICFS when the degree of informational problems increases.

[12] The mechanism builds on moral hazard which requires firms to put up a minimum share of the necessary investment outlays to ensure diligence. The least constrained firms therefore have the largest equity multipliers, implying that any given increase in internal funds allows them to raise investment by a larger fraction than more constrained firms, who have smaller equity multipliers. In the limit, the unconstrained firm does not need to put up any own funding, resulting in an infinite equity multiplier and the ability of the firm to apply all-debt financing of investment.

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dence of financing constraints as captured by the ICFS. In addition, the empirical testing of opposing theoretical views on the connection between internal funds and leverage on the one hand and the ICFS on the other hand is cumbersome, as financing constraints are inherently unobservable. Hence, one cannot distinguish constrained and unconstrained firms flawlessly and check whether the ICFS is higher for the former group of firms, as would be the laboratory experiment to test the validity of the ICFS as a useful measure of financing constraints.[13]

IV. Managing Finances and Financing Constraints

The reconciliation of the traditional financing constraints literature with the KZ97 critique may lie in some of the simplifying assumptions adopted in the latter. Specifically, the KZ97 investment model is a static optimisation problem in which W – interpreted as the amount of internal funds available for investment, or retained earnings – is given exogenously. In that sense, W is like manna from heaven. It is unclear where it comes from while its value in a more dynamic setting is not recognised. Alternatively, one may assume that the amount of W_t with which the firm starts period t is determined in the past and the need for a certain level of W_{t+1} is also taken into account in the investment and financing decisions in period t. The value of W_t and the decision over W_{t+1} stems from the objective to inter-temporally minimise the cost of finance. For example, a firm with low k_t but high expected k_{t+1} has an incentive to finance current investment with more external finance than it would in a one-shot investment decision, since this avoids higher costs of external finance in period $t+1$.[14]

To the extent that this critique applies, KZ97's conclusion that the ICFS is not a useful measure of financing constraints is moderated. In fact, KZ97 assume that observed levels of internal wealth flawlessly measure financing constraints and this allows them to interpret their empirical findings as saying that the ICFS does not. However, when inter-

[13] *Gomes* (2001) simulates a sample of firms that resembles observed first and second moments in observed data on such key financial variables as capital stock, investment rate and sales growth as well as the observed autocorrelation in investment rates. This provides a laboratory to investigate the role of financing constraints as it allows for the classification of the firms in his data set with 100 % precision to the constrained and unconstrained subclasses. Gomes shows that ICFS patterns do not reflect this flawless stratification of the data.

[14] Also note how this argument runs parallel to the inter-temporal minimization of the capital stock adjustment costs within the Euler framework.

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nal funds do not associate monotonically with financing constraints (even though the ICFS may do so) it is unclear whether firms with lower levels of internal funds should display a stronger ICFS. In this regard, we should note that some of the more recent theoretical contributions to the debate include dynamically optimal demand for internal funds in an environment with financing constraints. These contributions demonstrate that a non-monotonic relation between the level of internal funds and the degree of financing constraints is possible.[15]

The important notion in this reconciliation is that the investment decision is but one of many financial decisions the firm has to make. Firms additionally decide on inventory holdings, liquidity holdings, the capital structure, and dividend payments, to name just a few decision variables. Clearly, these decisions are highly interrelated. While at any point in time a firm may strictly be able to increase investment expenditures, it may for instance feel reluctant about the required dividend cuts, because dividend cuts are perceived as bad news in the stock market (e.g. Lintner (1956); Healy and Palepu (1988)). The aim of this section is precisely to consider such interdependencies of financial decisions that make the firm feel constrained in its investment decision in ways we cannot hope to capture by such factors as firm size, age, or connections to industry groups.[16] We focus on debt (subsection IV.1.) and cash holdings (subsection IV.2.) only, because their theoretical connection to financing constraints is ambiguous, and accordingly they have produced some of the more striking and contradicting results when applied as sample stratification devices to the financing constraints analysis.[17] Connections of optimal cash and debt decisions with the analysis of investment subject to financing constraints are discussed in subsection IV.3., while the outline of an empirical model linking the cash and investment decisions is presented in subsection IV.4.

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[15] In *Dasgupta* and *Sengupta* (2001) the decision over the amount of internal funds to transfer to the future in the form of liquidity depends on expected future profitability and expected future financing constraints. The result of this richer theoretical specification is that it is not unlikely "for more constrained firms to end up with higher cash endowment today and show greater cash flow sensitivity of investment" (*Dasgupta* and *Sengupta* (2001: 3)).

[16] At the same time, these interdependencies may deliver constrained investment in some years, but not in others. This allows for a time-variant constrained or unconstrained financing status as in *Hu* and *Schiantarelli* (1998) that nevertheless does not rely on the assumption that the ICFS is a useful measure of financing constraints.

[17] For the sake of expositional clarity I consider the debt and cash decisions separately, even though they are likely to be jointly determined.

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1. Managing the Capital Structure

The theoretical connection between leverage and the incidence of financing constraints is ambiguous and empirical evidence is mixed. These mixed conjectures and findings may relate to the practice that observed debt levels are used as proxies for unobserved debt capacity constraints. When comparing a cross-section of firms and assuming that firms have more or less similar debt capacity, firms with high debt levels more likely face binding debt constraints. For example Whited (1992) interprets low leverage a priori as sorting out relatively unconstrained firms, since these firms have the ability to incur further debts without immediately running into capacity constraints. Van Ees et al. (1998) acknowledge this reasoning, but at the same time note that low leverage is an ex post proxy for severe credit rationing. Their argument is that when looking at historical levels of corporate indebtedness, a history of low debt likely points to a low debt capacity. Hence, they suspect that firms with historically low levels of debt run into debt constraints more quickly and display constrained investment behaviour.

The issue is further complicated by noting that "the firm may [...] plan to cover part of normal investment outlays with new borrowing, but it tries to restrain itself enough to keep debt safe – that is, reasonably close to default-risk free. It restrains itself for two reasons: first, to avoid any material costs of financial distress, and second, to maintain financial slack in the form of reserve borrowing power [which] means that it can issue safe debt if it needs to" (Myers 1984: 589). Hence, a firm may rationally decide to maintain some precautionary spare debt capacity and target a level of indebtedness that lies below its debt capacity.

There is a broad literature on the management of the capital structure that we can refer to in an attempt to shed some light on this unclear connection between leverage and financing constraints. Myers and Majluf (1984) present the seminal model that rationalises pecking order behaviour in capital structure adjustment in an environment with asymmetric information. Within this model, firms exhaust internal funds first, before they turn towards external sources of finance and when they do, they prefer safe debt to equity. They then issue safe debt up to the point where they no longer need further funding, or hit their debt capacity constraint, whichever comes first. What is important within the context of this section, is that in the Myers and Majluf world, firms do not perceive an optimal capital structure (cf. Modigliani and Miller (1958)) and

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they do not feel constrained in their investment decision until they actually hit their debt capacity constraints.

Opposed to this pecking order view is the static trade-off theory, in which firms are assumed to trade off the costs of an additional unit of debt in terms of increased cost of financial distress, against its benefits in the form of additional tax shield. Myers (1984:589) concludes that "[t]he static tradeoff story works to some extent, but [...] actual debt ratios vary widely across apparently similar firms. Either firms take extended excursions from their targets, or the targets themselves depend on factors not yet recognised or understood". Harris and Raviv (1991) provide an overview of capital structure models based on informational asymmetries, which defines a great many potential determinants of capital structure. Furthermore, the spirit of the static tradeoff theory for instance allows firms to trade off the net benefits of raising an additional unit of debt today against the net benefit of having the option to raise an additional unit of debt in the future. Thus within a static tradeoff world, firms may already feel constrained in their investment decision even though they did not hit their debt capacity constraints just yet.

The empirical evidence has so far failed to provide unambiguous support for either the pecking order or the static tradeoff theory. While the present paper does not intend to provide a platform for an in-depth analysis of the empirical literature on this topic, let us note some of the more important contributions. Rajan and Zingales (1995) provide international evidence on the determinants of capital structure that suggests that this structure is relevant to a firm's value. Shyam-Sunder and Myers (1999) find strong evidence of a pecking order in corporate capital structure adjustment. Target adjustment effects are also observed, but the authors demonstrate that such effects would emerge even if the factual data generating process were pecking order.[18] Frank and Goyal (2003) report evidence contrary to the pecking order theory.

2. *Managing Corporate Cash Holdings*

Lack of clarity also surrounds the theoretical and empirical connection between corporate cash holdings and financing constraints. For example Hu and Schiantarelli (1998) find that firms with low cash ratios are more likely to face a higher premium on external finance. This corresponds

[18] See *Chirinko* and *Singha* (2000) for a critical comment.

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with the theoretical considerations of KZ97, who regard cash as part of a firm's pool of internal means with which it might finance additional investment. As discussed above, however, it does not concur with KZ97's empirical findings, which attach the lowest ICFS to the firms with the lowest levels of cash holdings. It also contrasts with Hovakimian and Titman (2005), who find that large cash holdings increase the probability that the firm faces a high premium on external finance. Hovakimian and Titman explain their findings by noting that constrained firms have incentives to hold larger cash balances. Such an explanation suggests a precautionary motive for firms to hold cash and introduces restrictions in the access to external finance as one of its determinants.[19]

While the number of studies exploring the determination of corporate cash holdings falls far short of that exploring the corporate capital structure, the evidence broadly supports the view that a precautionary motive exists for corporates to hold cash. Kim et al. (1998: 335) for example find evidence of a "tradeoff between low return on liquid assets and the benefit of minimising the need for costly external financing". Opler et al. (1999) stress the role of informational problems in determining optimal precautionary cash balances. Pinkowitz and Williamson (2001) take an international comparative perspective of corporate cash determination in bank-based and market-based financial systems, Ozkan and Ozkan (2004) analyse the effects of specific corporate governance structures, and Dittmar et al. (2003) consider the degree of shareholder protection in corporate cash demand.

Contrary to the literature on debt targets, the available empirical evidence on corporate cash holdings is rather harmonious on the finding that firms do care about the amount of their cash holdings. As an alternative to the active pursuit of cash targets, Opler et al. (1999) propose a passive stance wherein cash has no value for the firm and follows from the pursuit of a net debt target or pecking order behaviour in finance. While they find evidence of such passive cash adjustment, they also find that firms converge towards cash targets at an annual rate of about 20%. Related research by Bruinshoofd and Kool (2004a) stresses that long-run cash targets allow for short-run buffer stock behaviour. Moreover, Bruinshoofd and Kool demonstrate that the annual rate of target convergence may rise to as high as 70% if allowance is made for unobserved hetero-

[19] Similar to *Myers'* (1984) suggestion regarding leverage, firms are argued to constrain themselves to maintain a certain amount of precautionary cash. Also see *Fazzari* et al. (1996, 2000) for similar reasoning.

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geneity in corporate cash targets.[20] As such, we are on rather firm ground in claiming that firms formulate target cash holdings and deem such targets sufficiently important that they may reconsider investment plans when cash management so requires.

3. *Managing Financing Constraints*

While financing constraints are inherently unobservable, we can exploit interdependencies in financial decisions to identify when firms actually run into such constraints. The informational content of debt and cash targets in this regard is discussed in succession.

a) Spare Debt Capacity

As discussed above, when debt capacity constraints are relevant and alternative sources of external finance are costly or hard to come by, firms may pursue the maintenance of spare debt capacity for precautionary purposes and hence target debt levels below their debt capacity. By that rationale, firms that maintain the highest levels of precautionary spare debt capacity expect to face the strictest financing constraints. Hence, we might expect such firms to feel constrained in their investment decisions. However, firms with little need for debt financing – possibly because their investment plans are so modest that they can be realised entirely with retained earnings – also end up with substantial spare debt capacity. Nevertheless, we would not expect such firms to feel in any way constrained in their investment decision. The observational equivalence of supply-constrained and demand-constrained debt financing thus makes debt targets an imprecise measure of how constrained a firm perceives its own investment decision. Furthermore, since spare debt capacity matters most, even if we do find debt targets, that does not necessarily provide a useful measure of the spare debt capacity target. That is, unless we can quantify the debt capacity itself.

b) Debt Targets and Deviations

The latter issue is circumvented by using deviations of debt away from targeted levels as indicators of financing constraints. Provided that tar-

[20] Target adjustment is highest for large shortfalls (cf. *Bruinshoofd* and *Kool* (2004b)).

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geted debt levels mismeasure debt capacity by a fraction that is constant over time for any firm, deviations of debt from targeted levels provide information on changes in spare debt capacity. Nevertheless, it is difficult to demonstrate empirically the relevance of debt targets, given the substantial evidence in favour of the pecking order. By that token, even if we manage to compute meaningful debt target deviations which reflect deviations from targeted spare debt capacity, it is not clear that this will effectively sort out firms that feel particularly constrained in their investment decisions.

c) Precautionary Cash

Complementary to or substituting for precautionary spare debt capacity firms may decide to hold precautionary cash balances. Theoretically, targeted levels of precautionary cash can provide an indication of how constrained the firm perceives its own future investment to be. All else equal, a firm that expects serious problems in raising the finance for its future investment has an incentive to hoard some additional cash. Thus firms with historically high cash targets are perceived to face substantial problems in raising external finance. Of course, this assumes that our empirically estimated cash targets reflect the precautionary motive stemming from financing constraints mainly. We know, however, that an important additional motivation to hold cash is the transaction motive (e.g. Keynes (1936)). Empirically, the transaction motive may be difficult to separate from the precautionary motive. This is specifically so, because factors such as firm size likely affect both the transactions motive (through possible scale economies in cash management) and the precautionary motive (because large firms may be less vulnerable to informational problems in capital markets). Furthermore, while spare debt capacity and cash holdings jointly provide a precaution against the brunt of future financing constraints, each one isolated may substitute for the other. On the one hand, higher levels of debt, to the extent that it is obtained from concentrated lenders, suggests a higher level of monitoring efforts (see Diamond 1984, 1991), which reduces informational problems and concomitant precautionary cash motives. On the other hand, higher levels of precautionary cash reduce the incentive to invest in banking relationships and may in the limit even reduce borrowing capacity (cf. Myers and Rajan (1998)).

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d) Excess Cash

While for all of these reasons cash targets may measure perceived financing constraints with error, the deviations from such targets provide a much clearer indication of what constitutes a constrained firm. Shortfalls of cash relative to target imply that the firm has less cash available than it deems prudent for future transactions and precautionary needs. Since empirical evidence demonstrates that cash targets are important to firms (e.g. Kim et al. (1998), Opler et al. (1999)), shortfalls of cash likely constrain the firm in its investment decision.[21] While this procedure is in the spirit of Kaplan and Zingales (1997) in using the availability of internal funds to measure financing constraints, it allows and controls for the firm's pursuit of a cash target. It thus allows for a more precise test of the ICFS to reflect the tightness of financing constraints. In that regard it is particularly interesting to analyse how firms respond to surpluses of cash relative to target. Such 'free cash' can be used to initiate additional investment and still take the targeted amount of precautionary cash balances into the future. Insofar as investment can be initiated more easily by using surplus cash holdings, it is expected to depend to a lesser extent on cash flow realisations, i.e. firms exhibit a lower ICFS. At least, that is the financing constraints reasoning. Kaplan and Zingales (1997) and Hadlock (1998) claim that the ICFS may point towards firms excessively investing in unprofitable investments (cf. Jensen (1986)). While Opler et al. (1999) find no direct evidence of agency problems in the explanation of levels of cash holdings, they do demonstrate that excess cash tends to disappear via losses. In that sense excess cash may provide firms the leeway to under perform without immediately suffering the consequences. Almeida et al. (2002) find indirect agency effects of cash holdings in terms of a stronger sensitivity of cash accumulation to cash flow for unconstrained firms with low inside ownership.

4. Endogenizing Cash Management in Investment Models

The discussion so far strongly suggests that cash management and investment outlays are simultaneous decisions. Hence it seems natural to explore econometric model specifications that embody this simultaneity. We first discuss the Vectorautoregressive Investment Model (VIM) with

[21] Moreover, while this procedure focuses on whether the financing constraint binds and clearly accommodates that it may bind in some years, but not in others, it does not rely on ICFS results to do so (as in *Hu* and *Schiantarelli* (1998)).

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endogenous financing as developed by Breitung, Chirinko and Von Kalckreuth (2003, hereinafter BCK). BCK's VIM aims to analyze investment and finance truly simultaneously, allowing not only for financial effects in the investment equation, but additionally taking into account that investment decisions feed back to the financing choices. Subsequently we tentatively tailor the VIM to the simultaneous analysis of corporate investment and cash management.

a) Endogenizing Financing in a VIM[22]

The specification of BCK's VIM revolves around an autoregressive distributed lag (ADL) investment equation as shown in equation (6a) (cf. BCK: 7, equation 5).

$$I_{i,t} = \alpha^I(L)I_{i,t-1} + \alpha^F(L)\Delta Fundamentals_{i,t} + \alpha^{Cf}(L)Cf_{i,t} + \eta_i^I + \lambda_t^I + \varepsilon_{i,t}^I \tag{6a}$$

Here I stands for investment in fixed assets, *Fundamentals* denotes investment fundamentals, and *CF* is cash flow, with all variables appropriately deflated. Δ is the first-difference operator, the $\alpha^{\cdot}(L)$ are polynomials in the lag operator and the subscripts t and i indicate time periods and firms, respectively, with time and firm specific error components λ_t^I and η_i^I.

Thus specified the equation relates investment to fundamentals as well as its own lagged levels (capturing persistence) and (lags of) cash flow (capturing financial factors). Finance and investment are then allowed to interact in a relatively unrestricted manner by completing the specification of the VIM with a separate cash flow equation (6b) (cf. BCK: 7).

$$Cf_{i,t} = \beta^I(L)I_{i,t-1} + \beta^F(L)Fundamentals_{i,t} + \beta^{Cf}(L)Cf_{i,t-1} + \eta_i^{Cf} + \lambda_t^{Cf} + \varepsilon_{i,t}^{Cf}\,. \tag{6b}$$

BCK assume that contemporaneous investment does not affect cash flows due to gestation and time-to-build effects, so that the VIM has a recursive structure. A cash flow sock therefore immediately impacts on investment, while shocks to investment affect cash flow only with a one-year lag. Lastly, BCK derive the fundamentals of investment demand from cost-minimizing behaviour given CES production technology.

[22] Our discussion of the VIM focuses strongly on its conceptual idea and provides only for a rudimentary outline of its specification. Refer to BCK for the intricate details on specification, estimation and data issues.

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Fundamentals in their application therefore include changes in the user cost of capital and sales growth.

Although the individual parameters in the VIM – as indeed in any VAR – are difficult to interpret, dynamic multipliers and impulse-responses can illustrate the impact of shocks to investment fundamentals and cash flow on the system. Applying the VIM to German firm-level data, BCK's empirical results summarize as follows. Using dynamic multipliers it is shown that firms' investment responds to changes in the user cost and changes in sales growth. Moreover, these effects are enhanced in the VIM relative to a single equation investment model precisely because of the allowance that is made for feedback effects between investment and finance. Impulse responses demonstrate that similar findings pertain to cash flow shocks. The financial accelerator is alive and well and is 66 % more potent in the VIM relative to the single equation investment model.[23] These findings serve to illustrate the power of the VIM as a tool to analyze the interaction between finance and investment.

b) Tailoring VIM to Endogenous Cash Management

Regarding the connection of cash management and corporate investment we first note that cash facilitates investment in much the same way as cash flow does (cf. Kaplan and Zingales 1997). Additionally, due to the till function of cash holdings, investment also naturally feeds back into cash management (cf. Opler et al. (1999)). Hence following BCK, we expose corporate investment and cash management simultaneously using a modified VIM. Specifically, we replace the cash flow equation with a cash dynamics equation cast in error correction terms

$$\begin{aligned}\Delta C_{i,t} =& \gamma^{I}(L)I_{i,t-1} + \gamma^{\Delta C}(L)\Delta C_{i,t-1} + \gamma^{F}(L)Fundamentals \\ &+ \gamma^{Cf}(L)Cf_{i,t} + \gamma^{CC^*}(L)[C - C^*]_{i,t-1} + \eta_i^C + \lambda_t^C + \varepsilon_{i,t}^C\end{aligned}, \tag{7a}$$

in combination with a slightly modified investment equation

$$\begin{aligned}I_{i,t} =& \delta^{I}(L)I_{i,t-1} + \delta^{\Delta C}(L)\Delta C_{i,t} + \delta^{F}(L)Fundamentals_{i,t} \\ &+ \delta^{Cf}(L)Cf_{i,t} + \delta^{CC^*}(L)[C - C^*]_{i,t-1} + \eta_i^I + \lambda_t^I + \varepsilon_{i,t}^I\end{aligned}, \tag{7b}$$

[23] Interestingly, using confidential CreditWorthiness Ratios (CWR) computed by the Bundesbank, they find that firms with endangered CWR do not change investment in response to changes in fundamentals, but are much more responsive to changes in cash flow. These results corroborate a financing constraints reading.

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where C denotes cash holdings and C^* cash targets, both deflated by assets. *Fundamentals* now capture those factors driving cash targets (for example cash flow volatility and the reliance on short-term debt in debt financing) in addition to the investment fundamentals. Cash dynamics (equation (7a)) depend on investment and cash flow (capturing the till function of cash) and lagged deviations of cash holdings from targeted levels (capturing convergence to target cash levels), while persistence is captured by lagged cash dynamics.[24] The single most important feature of this system of equations is that it allows deviations of cash holdings from targeted levels $[C - C^*]$ to impact investment spending while also allowing for (possibly lagged) feedback effects from investment outlays to cash dynamics.

As before, dynamic multipliers can be used to assess the impact on cash and investment of changes in fundamentals, which now include changes in cash targets. Impulse response analysis conveys the impact of cash shocks on investment, controlling for the notion that firms manage cash and the capital stock simultaneously. While simple and insightful as such an exercise would be, we may push the VIM even further by investigating the impact of constraints on the interaction between cash management and corporate investment.

For example, in the unrestricted VIM in equations (7a) and (7b) observed cash dynamics exert an independent effect on investment. One may wonder whether cash dynamics as such should affect investment through a separate channel or whether the connection between cash and investment should run primarily through excess cash, i.e. deviations of cash from targeted levels. Comparing impulse responses from a restricted VIM that excludes $\delta^{\Delta C}(L)\Delta C_{i,t}$ from the investment equation with the impulse responses of the unrestricted VIM may shed light on this issue.

Asymmetric effects of excess cash on investment may also be considered. Does positive excess cash impact in the same way on investment as negative excess cash (shortage cash) does? $\delta^{CC^*}(L)[C - C^*]_{i,t-1}$ may be partitioned on the sign (or indeed the size) of excess cash and a subsequent

[24] Due to the till function of cash holdings it is not obvious that contemporaneous investment should not affect cash dynamics. In fact, while contemporaneous investment may impact on cash dynamics, cash management may only affect investment after a year has ended with excess or shortage cash, turning the recursive structure of the VIM around.

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comparison of constrained and unconstrained impulse responses provides insight into the relevance of asymmetric effects of excess cash.[25]

Alternatively, Kaplan and Zingales (1997) may be interpreted as hypothesising a link between excess cash and the sensitivity of investment to cash flow. In the VIM, an alternative implementation of the Kaplan and Zingales hypothesis implies that $\delta^{Cf}(L)Cf_{i,t}$ is conditional on the sign or size of the excess cash. Again, a comparison of restricted and unrestricted impulse responses provides a way to test this hypothesis.

Lastly, BCK consider the VIM with an investment and a separate cash flow equation. We have replaced the latter with the dynamic cash equation. Deleting the separate cash flow equation essentially conveys the idea that the origin of cash is exogenous to the corporate cash management and investment decisions. We have maintained this hypothesis so far mainly for illustrative purposes. Alternatively, a separate cash flow equation may be taken on board in addition to a cash dynamics equation in an expanded VIM. Such extension allows for feedback effects from constrained investment behaviour to the ability to generate future cash flows.

Taken together, the VIM presents a simple and flexible tool to simultaneously analyse investment and financial decisions. Moreover, the ease with which it may be tailored to the simultaneous analysis of corporate investment and cash management makes the VIM also a potentially powerful tool in the contemporaneous debate on investment and financing constraints.

V. Conclusions

The financing constraints paradigm builds on the joint assumption that firms facing financing constraints can be distinguished from firms that do not and that when facing financing constraints, firms' investment displays excess sensitivity to financial variables. The heavy reliance of research within this paradigm on the ICFS as a measure of financing constraints has produced some conflicting results. For example, small firms are sometimes argued to face tighter financing constraints than large firms do, when this is suggested by excess sensitivity patterns.

[25] In a standalone analysis of (7a) *Bruinshoofd* and *Kool* (2004b) assess the dependence of γ^{CC^*} on levels of excess cash and find that target adjustment is faster when cash falls short of its target.

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When excess sensitivity patterns suggest otherwise, however, large firms are argued to face tighter financing constraints.

Furthermore, for some firms displaying particularly strong sensitivity of investment to cash flow it is difficult to imagine that they are in any way constrained by the availability of internal funds when deciding on their investment outlays, as these funds seem available in abundance. The observation that such firms display a strong ICFS, whereas firms with considerably lower levels of internal funds display a considerably lower ICFS, has provided an important impetus to reduce the reliance on the ICFS as measuring financing constraints. Attention has instead shifted towards more direct measures of financing constraints as well as more solid theoretical foundations for the relationship between finance and investment for constrained firms.

Recent theoretical advances suggest that cash is a noisy measure of contemporaneous financing constraints, because it is affected by the expectation of future financing constraints as much as by contemporaneous financing constraints. Empirical contributions focusing on corporate cash management confirm this result: firms target cash holdings and the precautionary motive to hold cash relates to perceived future financing constraints. Hence, despite apparently abundant cash holdings, firms may constrain themselves in investment outlays to maintain a certain amount of precautionary cash. Using these new insights, I have made a strong recommendation to use information on optimal cash management policies to identify firms that face financing constraints. Specifically, knowledge of the corporate cash targets allows us to measure how much 'free cash' firms have and free cash is what firms can readily commit to new investments without having to walk to external capital markets. Firms with lots of free cash therefore seem least likely to face financing constraints and vice versa.

The simultaneous analysis of optimal cash holdings and investment subject to financing constraints can thus shed light on whether financially constrained firms display stronger ICFS or not. Vectorautoregressive Investment Models (VIMs) look promising in putting the connection between corporate investment and cash management to the empirical test. Surely then, the liaison of these areas of applied research is worth exploring further.

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Summary

Corporate Investment and Financing Constraints: Connections with Cash Management

This paper surveys the use and usefulness of the investment-cash flow sensitivity in the broad literature on financing constraints in corporate investment. Building on the intense and ongoing debate on this subject matter, it explores directions for further research. Specific attention is paid to connections between corporate investment and cash management. Contemporary research on corporate cash management provides promising footholds to determine more sharply the instances where firms lack the internal means to initiate investment projects. The paper subsequently draws the outlines of a methodology to empirically assess more clearly the role of cash management in financially constrained investment and the informational content of the investment-cash flow sensitivity therein. (JEL E41, G31, G32)

Zusammenfassung

Unternehmensinvestitionen und Finanzierungszwänge: Beziehungen zum Cash-Management

Die Arbeit enthält einen Überblick über die Nutzung und den Nutzen der Sensitivität des Investment-Cash-flow in der allgemeinen Literatur über Finanzierungszwänge auf dem Gebiet der Unternehmensinvestitionen. Aufbauend auf der intensiven und andauernden Debatte zu diesem Thema, untersucht dieses Papier Richtungen für weitere Forschungsarbeiten. Besondere Aufmerksamkeit wird dabei den Beziehungen zwischen Unternehmensinvestitionen und Cash-Manage-

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ment eingeräumt. Zeitgenössische Forschungsarbeiten auf dem Gebiet des Cash-Management von Unternehmen bieten vielversprechende Ausgangspunkte für eine schärfer umrissene Bestimmung von Fällen, in denen Unternehmen nicht über genügend interne Mittel verfügen, um Investitionsprojekte auf den Weg zu bringen. Anschließend skizziert das Papier die Methodologie für eine klarere empirische Bewertung der Rolle des Cash-Management bei den hier behandelten Investitionen des darin liegenden Informationsgehalts der Sensitivität des Investment-Cash-flow.

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