



## Fixed investment, liquidity, and access to capital markets: New evidence<sup>☆</sup>

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### ARTICLE INFO

#### Article history:

Received 9 March 2012

Received in revised form 16 October 2012

Accepted 23 December 2012

Available online 12 January 2013

#### JEL classification:

G31

G32

D82

#### Keywords:

Fixed investment

Financing policy

### ABSTRACT

We re-evaluate the cash flow–investment relation from a new angle in a setting where the firm can access capital markets and faces different investment opportunity sets. Instead of relying on cash flow, we introduce other forms of finance to interact with investment. We find that financial variables enter significantly into the investment regressions at different timing. The cash flow effect reduces after the IPO and especially after the SEO, but remains positive for the firm with greater investment opportunities. Similar reductions in the long-term debt effect and especially in the working capital effect are also identified. The reductions are more pronounced in SMEs than in large firms. We draw the following conclusions. First, the cash flow–investment relation is not constant but evolves. Different forms of finance play concomitant roles covering cash flow shortfalls, jointly determining the dynamics of investment. Second, the investment–cash flow sensitivities do not constitute evidence of external financial constraints. Rather, the excess sensitivities are a response to the investment policy that is to drive asset growth or to maintain business operations. Essentially, growth opportunities are not in the cash flow terms but are embedded in the investment policy. Our study offers an alternative explanation for the investment–cash flow sensitivities.

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### 1. Introduction

Going public is a significant new phase for any company in its life cycle. The decision to go public and raise further capital is a response to both investment opportunities and the lack of access to other sources of capital. Fama and French (2005) document that the firm frequently issues equity to finance its asset growth and equity issues are, thus, quantitatively important for firm investment. Virtually all studies concerning the cash flow–investment relation examine the interactions between financial and investment decisions using a sample of publicly listed companies, but equity finance has not been formally acknowledged in the investment function. Goergen and Renneboog (2001), Moyen (2004), Brown and Petersen (2009) and Gatchev, Pulvino, and Tarhan (2010) consider equity capital in the cash flow–investment relation. Moyen and Brown and Petersen, however, look at equity issues at the aggregated market level for a sample of US companies, which offers little insight into how equity capital interacts with the investment behavior at the firm level. Goergen and Renneboog examine the cash flow–investment relation using a sample of UK companies that conduct rights issues, and attribute the excess sensitivities to financial constraints. However, the decision to raise equity capital by way of an initial public offering (IPO) followed up with a seasoned equity offering (SEO) is not random. Firms that tap the equity

market are likely to be those with higher growth opportunities but less access to other sources of capital apart from internal sources of funds. Gatchev et al. introduce seasoned equities into the investment function. They, however, assume that all equity issues implemented by the Compustat companies are for investment purposes. Walker and Yost (2008) show that only 42% of SEOs implemented by the Compustat companies in the period of 1997–2000 are for fixed investment purposes, whereas more than 50% of SEOs are for other purposes. Firms raise equity capital to exploit investment opportunities, reduce liquidity constraints, or improve debt capacity by using the proceeds to retire existing debt. Thus Gatchev et al.'s study leads to an inaccurate inference with respect to equity capital in the financial considerations for the firm's investment decision.

In addition, the majority of earlier studies assume that cash flows are the only source of finance in the cash flow–investment relation and the firm's financial structure is fixed when investment interacts with finance. These implicit assumptions encounter potential misspecification problems. The operating and investment cycles can result in timing difference between cash generation. Operational activities and services have to be paid for in order to maintain business operations and market share. Likewise, investments have to be completed before they are able to generate cash flow. Other forms of internal and external capital, such as working capital, equity capital and long-term debt, can cover cash flow shortfalls between the gaps, and hence should play a role in the cash flow–investment relation. However, these perspectives are apparently missing from the literature. Lemmon and Roberts (2009) use exogenous shocks to the supply of credit to demonstrate the impact of financing constraints on firm investment. Gatchev et al. (2010) make

<sup>☆</sup> I would like to thank Lance Nail (the Editor) and an anonymous referee for their insightful comments. The usual disclaimer applies.

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a meaningful attempt to integrate the financial decision with the investment decision by explicitly including various sources of finance in a multiple-equation framework. They, however, assume that the cash flow–investment relation is fixed; as such, their system-of-equation models do not adequately address how this relation evolves with the changing financial structure of the firm. Several recent studies (Brown & Petersen, 2009; Hadlock & Pierce, 2010) investigate the time-varying nature of the cash flow–investment relation due to the changing financial market condition and macroeconomic activity at the aggregated level. So far, few studies examine the time variation in this relation at the firm level and consider how the variation differs by firms with different financial attributes.

Significant efforts have been put into differentiating the degree of information asymmetries faced by firms in their investment decisions on the basis of the investment–cash flow sensitivities. The majority of the studies test such sensitivities by grouping firms according to a priori degree of informational asymmetries, such as firm size (Fazzari, Hubbard, & Peterson, 1988; Hubbard, 1998), affiliation to banks or industry groups (Hoshi et al., 1991), financial characteristics (Whited, 1992), or balance sheet and income measures of liquidity (Kaplan & Zingales, 1997). Many of these studies find that more constrained firms exhibit a higher sensitivity of investment to cash flow after controlling for Tobin's Q, hence referring the cash flow sensitivities to under-investment as a result of financial constraints or being unable to access external capital. The reliability of these results has been under constant criticism largely due to the measurement errors in Q (Poterba, 1988; Bond, 2004). Other studies find that less constrained firms are more sensitive to cash flow, hence referring the cash flow sensitivities to cash flow containing the information about future investment opportunities (e.g., Bond, 2004; Kaplan & Zingales, 1997; Whited, 2005). The problem of these studies, however, stems from misidentification of the source of investment opportunities. Investment opportunities correspond to the investment programs and are heterogeneous across firms. To attain the goals, the firm explores and pursues the investment policy in line with its growth prospects, business strategy, and financial capacity. Capital expenditures are incurred when the firm adds to the value of an existing fixed asset or acquires new physical assets so as to maintain or increase the scope of operations. It is logical to think that cash flow uncertainty affects firms that undertake new investment programs to fuel future growth more heavily than those whose business operations count on an incremental capital addition to replace or service the exiting capital stock. The investment–cash flow sensitivities are, hence, a concept relative to the individual firm's investment policy corresponding to its growth prospects and financial capacity. Earlier studies ignore this link, and the inference about the excess sensitivities is, thus, controversial.

In this article, we construct a dataset with detailed equity issues and the corresponding fixed investment programs that have been undertaken by companies listed on China's stock market, and address the above issues from two perspectives. Firstly, we re-evaluate the cash flow–investment relation in a more realistic setting where the investment decision interacts with the financial decision. We incorporate equity finance in the form of net cash raised through the IPO and the SEO along with other sources of finance, namely working capital and long-term debt, in the investment function to allow them to possibly influence firm investment. This setup allows us to examine how the cash flow–investment relation evolves with recapitalization of the firm's financial structure following the access to equity market. Firm endowments shape the firm's financial and investment decisions. Small and medium-sized firms (SMEs) with high growth potential often face liquidity uncertainty in their investment activities. We sort firms into size-based portfolios and allow the interactions between the financial and investment decisions to vary by firms with different financial attributes. Our results show that internal capital and external capital enter the cash flow–investment regressions at different timing, and firm investment responds heterogeneously to the concomitant

roles of various sources of funds when they come into play in the investment process. The regressions identify more significant effects of internal capital on fixed investment in SMEs than in large firms prior to the access to capital market, and the effects are significantly reduced as its role is partially substituted by external equity capital in their aftermarket, and the substitution effect is more prominent in SMEs. Our findings reveal the following. The cash flow–investment relation is not static, but evolves with the changing financial regime of the firm, highlighting the role of the stage development in the examined relation. Further, the investment decision incurs adjustment costs, so does the financial decision for undertaking investment activities. In the presence of adverse cash flow changes, the firm will most certainly adjust the accessible funds of various forms to safeguard rather than curtailing or forgoing its investments. The firm would tap external capital first before resorting to internal capital financing, namely working capital. The adjustment strategy is heterogeneous across firms depending on their investment policies and financial positions.

Secondly, we consider the cash flow–investment relation from a new angle in a setting where firms pursue different investment policies and face different investment opportunity sets. On the basis of whether the investment policy is to drive asset growth or maintain business operations, we distinguish between firms with investment opportunities and those with less investment opportunities, and assess separately how fixed investments of firms with different investment opportunities respond to the recapitalization of the financial structure subsequent to the major corporate financing events. A contribution of this different approach is its basis in a realistic view that growth opportunities are explicitly embodied in the investment policy that is not homogeneous across firms, thereby accounting for the observed differences in the investment–cash flow sensitivities. We find that investment-opportunity firms exhibit a significantly greater sensitivity to cash flow than less-investment-opportunity firms in specifications that control for growth opportunities. Our results do not suggest that the investment–cash flow sensitivities constitute evidence of external financial constraints. Rather, the excess sensitivities are a response to the firm's investment policy corresponding to its growth prospects and financial capacity. We conclude that growth opportunities are not in the cash flow terms but are embedded in the firm's investment policy, thereby offering an alternative explanation to the investment–cash flow sensitivities which have been subject to debate for more than two decades.

The remainder of the paper is organized as follows. Section 2 discusses data, construction of firm groups, and the investment models that we estimate in this study; Section 3 presents and discusses empirical results; and Section 4 contains the conclusions and a discussion on directions for future research.

## 2. Data and specifications

### 2.1. Data

We examine a panel of non-financial companies listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange for the period of 1987 and 2009. We construct our dataset from various CSMAR Database and Wind Financial Terminal.<sup>1</sup> The time window for the study is 3 pre-IPO periods (years) and 3 post-IPO periods (years) leading up to the year when the firm is delisted or to 2009 when the data is censored. The 3-year minimum period is to allow for a dynamic analysis of investment. All firms, including suspended firms and delisted firms,

<sup>1</sup> We employed the Initial Public Offerings Database, Seasoned Equity Offerings Database, Stock Market Database and Accounting Research Database developed by the Centre for China Financial Research of the University of Hong Kong and Guo Tai An Information Technology Company Ltd. Wind Financial Terminal, developed by Wind Info, supplied all data relating to seasoned issues, including investment programs, gross proceeds, purposes of issues and alterations of the uses of gross proceeds.

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