

The impact of capital market imperfections on investment–cash flow sensitivity

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Abstract

We examine the investment–cash flow sensitivity of US manufacturing firms in relation to five factors associated with capital market imperfections – fund flows, institutional ownership, analyst following, bond ratings, and an index of antitakeover amendments. We find a steady decline in the estimated sensitivity over time. Furthermore, we find that investment–cash flow sensitivity decreases with increasing fund flows, institutional ownership, analyst following, antitakeover amendments and with the existence of a bond rating. The overall evidence suggests that investment–cash flow sensitivity decreases with factors that reduce capital market imperfections.

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1. Introduction

As argued by Modigliani and Miller (1958), the investment decisions of firms are not affected by their financing decisions in perfect capital markets. Capital markets, however, are not perfect, and existing imperfections introduce a wedge between the costs of external and internal funds. Firms facing higher informational imperfections experience a wider wedge, and therefore are more financially constrained.

A measure that has been used in the literature to assess the degree of financial constraints experienced by firms is the sensitivity of investments to the availability of internal funds, controlling for investment opportunities as measured by Tobin's Q . A number of studies, starting with Fazzari et al. (1988), show that investment is more sensitive

to cash flow for firms that have a high degree of financial constraints.² On the other hand, Kaplan and Zingales (1997) and Cleary (1999) show that investment–cash flow sensitivity can be higher for unconstrained firms.³ Additionally, Gilchrist and Himmelberg (1995), Erickson and Whited (2000) and Alti (2003) argue that measurement problems associated with Tobin's Q affect the estimated sensitivity of investments to the availability of internal funds.

² See Hubbard (1998) for a detailed review of this literature.

³ Allayannis and Mozumdar (2004) show that including firms with negative cash flows can lead to these findings, since these firms are financially distressed and therefore their investments are not sensitive to cash flow. Rauh (2006) presents evidence that capital expenditures decrease as internal funds reduce due to mandatory pension contributions. Moyen (2004) shows that different criteria used to differentiate between financially constrained and unconstrained firms can lead to results consistent either with Fazzari et al. (1988) or with Kaplan and Zingales (1997). According to Gomes (2001) and Alti (2003), investment–cash flow sensitivity can be positive even without any financial frictions.

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There has been little investigation of the evolution of investment–cash flow sensitivities over time. The evidence that exists suggests that it has decreased over time in the US: while earlier papers in the area (Fazzari et al., 1988; Kaplan and Zingales, 1997), using data from the seventies and early eighties, have reported sensitivities in the (0.4, 0.7) range, studies employing data from the late eighties and nineties (Cleary, 1999; Erickson and Whited, 2000) have found sensitivities in the (0.1, 0.2) range. Therefore, in this paper, we first examine whether there is a decline in investment–cash flow sensitivity through time.

Applying the Erickson–Whited estimators to US manufacturing firm data, we find that, consistent with Erickson and Whited (2000), cash flow is not significant in explaining investment for the period from 1992 to 1995. Extending the analysis to a much longer sample period (1970–2001), however, we find that while the role of Q increases and that of cash flow declines (relative to OLS estimates) in explaining investment, cash flow continues to be a significant factor in most of the sub-samples examined.⁴ Of particular interest is the finding that the declining pattern of estimated cash flow effects is robust to the application of the Erickson–Whited estimators.

If investment–cash flow sensitivity is linked with capital market imperfections, then it should decrease with factors that reduce these imperfections. There is some international cross-sectional evidence to support this hypothesis. Wurgler (2000) examines cross-sectional data from 65 countries, and shows that capital allocation is more efficient in financially developed markets. Using cross-sectional data for several countries, Love (2003) and Islam and Mozumdar (2007) show that the sensitivity of investment to cash decreases with financial market development. We pursue this analysis further by focusing on US firms and examining the relation between their investment–cash flow sensitivities and five factors related to capital market imperfections – aggregate fund flows, institutional ownership, analyst following, bond ratings, and corporate governance.⁵ Again, to control for the measurement problems related to Tobin's Q , we apply the GMM estimators of Erickson and Whited (2000) in addition to OLS.

⁴ Polk and Sapienza (2004) too find that cash flow effects remain significant when Erickson and Whited (2000, 2002) estimators are used. Also, using Erickson and Whited (2000) sample and estimators, Hennessy (2004) finds cash flow to be significant for firms with junk-rated debt, and insignificant for those with investment-grade debt.

⁵ Mitigation of capital market imperfections may have two effects: first, it may cause a reduction in the cost of internal funds, and second, it may cause a reduction in the wedge between the costs of external and internal funds. It is the second effect that is of interest from an investment–cash flow sensitivity viewpoint. The mechanism by which this effect may occur is also twofold. First, reduced capital market imperfections could induce a liquidity effect of greater supply of funds to primary capital markets that increases the total pool of external funds available to firms. Second, there could be a narrowing of the information gap between firm insiders and outsiders due to superior information production. The capital market factors that we consider seek to capture one or both of these mechanisms.

Our evidence suggests that the sensitivity of investment to internal funds decreases with factors that reduce capital market imperfections.⁶ Specifically, we find that investment–cash flow sensitivity reduces with increasing fund flows, institutional ownership, analyst following, antitake-over amendments and with the existence of a bond rating. Therefore, the sensitivity of investments to the availability of internal funds cannot be explained solely as an artifact of measurement error.

The rest of the paper is organized as follows. Section 2 provides a brief summary of the basic q model of investments, the measurement error problem in estimating it, as well as the major hypotheses. Section 3 describes the data. Section 4 analyzes the time series characteristics of investment–cash flow sensitivity. Section 5 examines the relation between investment–cash flow sensitivity and the factors associated with capital markets. Section 6 concludes the paper.

2. The q model of investments and hypotheses on investment–cash flow sensitivity in relation to capital market factors

2.1. The q model of investments and measurement error

As a remedy for the measurement error problem highlighted in their critique, Erickson and Whited (2000, 2002) propose a class of GMM estimators that exploit the information in the higher order moments of the regression variables. Using these estimators and a sample of US manufacturing firms over the period 1992–1995, they find that the explanatory power of Q improves dramatically relative to traditional OLS estimates, while cash flow loses significance as a determinant of investment. Naturally then, the first question that needs to be settled is whether the investment–cash flow sensitivity estimates represent anything meaningful, or whether they are purely artifactual.

Consider the simplified version of the standard q investment model presented by Erickson and Whited (2000, 2002). The firm chooses an investment policy to maximize the expected discounted value of cash flow subject to the law of motion for capital. Let I_t denote gross investment; K_{t-1} beginning of period capital stock, and q_t the marginal cost of capital. In perfect markets, investments are determined solely by the shadow price of capital, or marginal q . In particular, considerations of the availability of internal funds should play no role in the process. On the other hand, significant deviations from the perfect market paradigm would result in such considerations playing an important role. In empirical work, marginal q (q_t) is typically approximated by Tobin's average Q (Q_t), while the most commonly used measure of internal funds is cash flow. Erickson and

⁶ Our findings, however, do not allow the inference that investment–cash flow sensitivities in the US have declined because capital market imperfections have decreased over time. While such an inference may appear plausible, it may only be reliably made on the basis of an explicit analysis of the temporal evolution of the relation between the two.

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