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Fixed investment/fundamental sensitivities under financial constraints

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ABSTRACT

While most models with financial market imperfections predict investment by financially constrained firms to be more sensitive to financial variables, contracting models argue that investment by such firms should be more sensitive to fundamental determinants of investment because fundamentals capture both investment opportunities and changes in the financial position. By first grouping U.S. manufacturing firms as either financially constrained or unconstrained, this paper examines systematic differences in investment/fundamental sensitivities. The findings show that, as expected of contracting models, investment by financially constrained firms is more responsive to fundamentals. These fundamentals are captured by two prominent empirical measures: profitability shocks and mandated investment rate.

1. Introduction

The investment literature identifies fundamental determinants of investment as one of the main determinants of fixed capital investment at the firm level. However, there are different views on investment/fundamental sensitivities of, especially, financially constrained firms. For example, many

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models in the financial market imperfections literature expect investment by financially constrained firms to be less sensitive to fundamentals but more responsive to financial variables. Conversely, according to contracting models, which study costly borrowing of firms in the presence of financial frictions, financially constrained firms' investment behavior is predicted to be more responsive to fundamentals when compared to the investment behavior of financially unconstrained firms. This is due to the fact that changes in fundamentals capture changes in not only investment opportunities but also financial positions. If the shock to fundamentals is persistent, it improves the expected marginal benefit of investment. However, for the same reason, it also improves the terms of trade in financial transactions of the firm. If the expected profit increases, the probability of default declines with the increasing value of the firm. Therefore, the agency cost, which compensates risk neutral lenders for expected loss from default, must also decrease.[1]

This paper, in light of such arguments in the literature, tries to understand whether or not investment by expected-to-be financially constrained firms really responds more strongly to shocks to fundamentals than investment by financially unconstrained firms. When compared to previous empirical studies, one main contribution of the paper is the use of alternative measures of fundamentals. In the literature, there are many concerns about the predictive power of one of the most commonly used fundamental determinants of fixed capital investment: Tobin's q (the ratio of asset market value of a firm to its replacement cost of capital). Alternatively, empirical papers based on investment models with non-convex adjustment costs introduce new measures of fundamentals. These present a forward-looking behavior – an important feature that can allow fundamentals to better capture investment opportunities. In this paper two of these are used as fundamental determinants of investment: profitability shocks and the mandated investment rate (a gap measure between the desired and actual capital stocks).[2] In the analyses, Tobin's q is also included for the purpose of comparison.

The analyses in the paper are based on a reduced form investment equation, in which both fundamental determinants of investment and financial variables are taken as explanatory variables, as well as their interaction terms in some specifications. The regressions are separately run for financially constrained and unconstrained firms. Based on the regression results, systematic differences in the estimated coefficients of the fundamental variables of financially constrained and unconstrained firms are investigated. A firm-level panel data set is constructed from the COMPUSTAT database. The set includes U.S. manufacturing firms for the period of 1983–1996. Different firm characteristics are used to identify financially constrained firms. The criteria are the level of capital stock, number of employees, dividend to capital ratio, dividend payout, debt-to-capital ratio, firms' bond rating, and the KZ (Kaplan and Zingales) index. The ratio of cash flow to capital, sales to capital, and working capital to capital are the financial variables included in the analyses.

The empirical findings support the prediction of contracting models. Firms with financial constraints exhibit a stronger investment-fundamental sensitivity when compared to the group of firms that are less constrained financially. Even though it is not the main purpose of the paper, in the regression outcomes we can also observe investment/financial variable sensitivities across firm classifications because the regression specifications already include financial variables in addition to fundamentals. In the analysis, it can be seen that the investment/financial variable sensitivity of financially constrained firms is lower in many cases than the investment/financial variable sensitivity observed in the group of unconstrained firms.

The rest of the paper is organized as follows. Section 2 presents a contracting model of investment. Section 3 gives information about the link between investment, fundamentals, and financial variables,

[1] This negative relationship between the profitability shock (one measure of fundamentals) and the agency cost is firmly established by the literature on defaultable debt, for instance, Carlstrom and Fuerst (1997), Bernanke, Gertler, and Gilchrist (2000), Cooley and Quadrini (2001), and Hennessy and Whited (2007) for corporate finance, Chatterjee, Corbae, Nakajima, and Rios-Rull (2007) for consumer finance, Marcet and Marimon (1992) and Cooley, Marimon, and Quadrini (2004) for long term contract. In the literature, it is clear that default history and current earnings are the most important factors in determining credit limits and interest rates for any unsecured debt financing in reality.

[2] "Fundamental Q" would be another good candidate (Del Boca, Galeotti, & Rota, 2008; Gilchrist & Himmelberg, 1995, 1998). It has not been included in the study because it has been already reported in the literature that the significance of financial variables drops and fundamentals get more significant with "Fundamental Q."