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The expected returns and valuations of private and public firms[☆]

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ABSTRACT

Characteristics play a similar role in describing returns in private firms as in public firms. This evidence suggests a causal effect of optimal investment underlying the role of characteristics, as private firms do not have stock prices to over- or under-react on. Common factor models largely describe the cross section of investment returns of both types of firms, suggesting that the common factors are likely aggregate risk factors. Finally, the cost of capital and firm valuations are similar across private and public firms.

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1. Introduction

While all previous assessments of risk, return, cost of equity capital, and valuation ratios have focused on public firms, the importance of private firms in the economy should not be underestimated. For instance, Asker, Farre-Mensa, and Ljungkvist (2015)) find that in 2007 private US firms accounted for 54.5% of aggregate nonresidential fixed investment, 67.1% of private sector employment, 57.6% of sales, and 20.6% of aggregate pre-tax profits. The vast majority of firms in the US are closely held corporations. The 2010 US Census reports seven million corporate tax filers, of which only about eight thousands are public firms. Thus, private firms are an important, but often neglected, part of the economy.

In this paper, we examine the determinants of the cross section of industry investment returns, derived from

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the q theory of investment (Cochrane, 1991; Liu, Whited, and Zhang, 2009) within 10 groups of industries differing by the fraction of private and public firms in the industry. We use the National Bureau of Economic Research industry productivity database that aggregates both public and private firms and the Compustat database to sort industries into deciles according to the fraction of the sales (employees) of public firms in the industry to total industry sales (employees). We identify private industries as those industries in the two bottom deciles and public industries as those in the top decile.[1] Examining investment returns of industries that consist mainly of private firms allows us to address three important issues.

First, investment returns are equal to the weighted average cost of capital.[2] Therefore, if the role of characteristics in investment returns in a sample that includes primarily private firms is similar to their role in investment returns of a sample of mostly public firms, this evidence casts doubt on mispricing as an explanation for the role of these characteristics. The reasons for this is that private firms have no stock prices to over- or under-react on and their managers are less susceptible to misvaluation. Instead, the role of characteristics is likely to stem from their presence in the first order conditions of firms' optimal investment decisions.

Our identification scheme of private firms, and the likelihood that these firms do not overreact or underreact to market prices, enables us to interpret characteristic-based factors. If a factor is a true aggregate risk factor, then it should price all equity, whether it belongs to public or private firms, assuming equity holders of both public and private firms require a premium for bearing the factor's systematic risk. To date the literature has examined only the risk-return relation of public firms, and, therefore, it has not been possible to establish whether common risk factors are sources of aggregate uncertainty or are relevant only for firms that are publicly listed on the stock exchange. Many investment-based studies refrain from claiming that characteristics-based factors are risk factors. In contrast, given our identification of private firms, we are able to interpret the role of these factors.

Second, the investment approach renders it feasible for us to obtain estimates for the cost of capital and valuations of private firms. Cost of capital estimates for private firms are notoriously difficult to obtain because of the lack of stock prices. However, by using investment returns, we can obtain the first estimates of the cost of capital of private firms from asset pricing models. Most firms in the economy are private, and being able to obtain a risk-based measure of the cost of capital is crucial to optimal decision making for these firms. Our paper assesses the only means, to the best of our knowledge, of achieving this goal.

Third, following Belo, Xue, and Zhang (2013), we obtain valuation ratios (that is, Tobin's q) implied by firms' first order conditions with respect to investment. Subsequently, we compare the valuation ratios as well as the cross section of valuation ratios of private and public industries. To the best of our knowledge, ours is the first paper to examine the valuation of private firms and to compare them with those of public firms.

Our main findings can be summarized as follows. First, we show that characteristics that have been shown to describe the cross section of stock returns, namely the investment to capital ratio (I/K), the return on assets (ROA) (see Hou, Xue, and Zhang, 2015a; 2015b), size (which we measure as the stock of capital), and idiosyncratic volatility of returns can summarize the cross section of investment returns of both industry portfolios with a relatively large fraction of private firms and industry portfolios with a relatively small fraction of private firms. Therefore, because characteristics share a similar role in describing average investment returns for both private and public firms, their role is unlikely to stem from stock mispricing simply because private firms have no stock price. Instead, the role of characteristics appears to stem from their fundamental part in the first order conditions for investment decisions (Lin and Zhang, 2013).

Second, a four-factor model derived from the q theory of investment, similar to that in Hou, Xue, and Zhang (2015a), composed of the "market" investment return, an I/K factor, an ROA factor, and a size factor performs well in describing the cross section of investment returns of 20 characteristic-based industry portfolios. The portfolios are composed of five I/K portfolios, five ROA portfolios, five portfolios sorted by idiosyncratic volatility of returns, and five portfolios sorted by the size of the capital stock.

The model performs well in terms of small pricing errors and a large cross-sectional $\bar{R}^2$. This is the case irrespective of the fraction of private firms in each portfolio. Therefore, because the risk factors affect both public and private firms, they are likely to be true aggregate risk factors in that they are aggregate sources of uncertainty in the economy.

Third, based on the estimates from the four-factor model, we calculate the cost of capital (expected return) for all industries and industries with varying degrees of private firms in them.[3] The differences in these estimates across private and public firms are generally small, suggesting that private and public firms have similar costs of equity. No systematic difference exists in the cost of capital in the sense that private firms always have a higher (lower) cost of capital than public firms. Our findings of a similar cost of capital for public and public firms are consistent with Moskowitz and Vissing-Jørgensen (2002) who use estimates of private firm value and profits at the aggregate level and study the returns to aggregate entrepreneurial investment. Fourth, we find that private industries have valuation ratios and a cross-sectional

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[1] The two bottom deciles consist of industries with only private firms.

[2] Cochrane (1991) demonstrates this theoretically for equity-only firms. Liu, Whited, and Zhang (2009) show that expected investment returns are equal to the expected weighted average cost of capital for portfolios sorted on characteristics that give large spreads in average stock returns.

[3] Due to lack of data on industries' capital structure in our database, we can provide evidence on the weighted average cost of capital but not on the cost of equity and the cost of debt separately.

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