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Attitude towards risk, uncertainty, and fixed investment

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Abstract

We explore the relevance of the risk attitude of managers to the investment-uncertainty relation. Higher moments of the distribution of net profits are used to measure the risk premium of the firm, from which we derive a proxy for the risk aversion of managers. Using an unbalanced panel of Dutch listed firms, we find that in general a low degree of risk aversion coincides with a positive impact of demand uncertainty on investment. More specifically, we find that risk-averse firms respond to demand uncertainty by cutting investment, while the investment undertaken by risk-taking firms responds to demand uncertainty positively.
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1. Introduction

The effect of uncertainty on investment is a prominent topic in investment studies. The literature has identified several channels through which uncertainty can affect investment: (1) the risk attitude of decision-makers (Nakamura, 1999; Nickell, 1978; Zeira, 1990); (2) the shape of the marginal product of capital (Abel, 1983; Caballero, 1991; Hartman, 1972); (3) substitutability of production factors (Hartman, 1976; Leahy & Whited, 1996); (4) irreversibility and the option value of waiting (Dixit & Pindyck, 1994); and (5) financial constraints (Minton & Schrand, 1999). Much effort has focused on testing the impact of channels (2)–(5) on investment. However, the results are not conclusive.

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First, it is not clear whether uncertainty discourages or encourages investment. Different theoretical approaches propose different conclusions. Second, although most studies find the negative effect of uncertainty on investment, it is not clear through which channel uncertainty affects investment.[1] From an empirical point of view, it is hard to identify each channel separately. Almost all empirical research on the effect of uncertainty on investment ignores a fundamental factor in the objective function of the firm: the risk attitude of managers. Most empirical studies assume that managers of the firm are risk neutral when they make investment decisions.

In reality, however, managers are more likely to be risk-averse. When agency costs between managers and shareholders are absent, managers represent shareholders and the objective function of managers is to maximize shareholders' value. Nickell (1978) argues that only under the assumptions of perfect capital markets and certainty, can one ignore the preferences of the firm's shareholders in considering the firm's decisions. Therefore, under uncertainty shareholders' consumption behavior and their preference structure become important. In this case, the objective function of the firm should be derived from the intertemporal optimization problem of the owners (consumers) of the firm. When agency costs of management are high, the firm's objective function is to maximize the utility of managers. Although protected by limited liability laws in many countries, managers are trying to avoid bankruptcy since they do not want to lose their private benefits of control. Although it facilitates the analysis, the assumption of risk-neutrality is not realistic. This suggests that we should treat firms as agents who are maximizing the expected discounted *utility* of profits rather than maximizing discounted profits.

The consequences of ignoring non-neutral risk attitudes of managers in investment studies can be severe. First, attitude towards risk, reflected in the utility function of the investment decision makers, is a prominent determinant of the investment-uncertainty relation. Second, neglecting attitude towards risk messes up the impact of other important factors predicting the effect of uncertainty on investment. For example, many authors, after assuming risk neutrality and obtaining a negative sign of uncertainty in investment equations, conclude that irreversibility induces the negative effect of uncertainty on investment.[2] However, since a higher degree of risk aversion is likely to generate a negative impact of uncertainty on investment, one could argue that it might be the risk aversion attitudes of managers of the firm rather than irreversibility that induces the negative effect. Defining separate empirical indicators of risk aversion and irreversibility would be a requisite to identify both channels. Gollier (2000) finds that the degree of risk aversion of agents increases with financial constraints. According to Gollier capital market imperfections may discourage investment not only because of limited access to external finance but more directly because they discourage individuals' willingness to bear risk. Therefore, if the impact of risk attitude could be isolated and controlled, the estimated impact of other factors, like irreversibility, could be purified and made more informative.

The debates and mixed evidence in the literature on the investment-uncertainty relationship suggest that we should go back to the risk attitude of managers to investigate firm investment behavior under uncertainty. Caballero (1991) argues that "the relationship between changes in price uncertainty and capital investment under risk neutrality is not robust. . .it is very likely that

[1] For a review of the empirical research on the investment-uncertainty relationship, see Chapter 6, Lensink, Bo, and Sterken (2001).

[2] Among 20 empirical studies surveyed by Lensink et al. (2001), 17 papers find a negative effect of uncertainty on investment, 11 of these 17 papers explain the negative effect of uncertainty by explicitly referring to the irreversibility hypothesis.

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