

The effect of business risk on manufacturing investment Sectoral survey evidence from Ireland[☆]

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Abstract

This paper analyses the results of a special sample survey on risk and investment carried out using the European Union investment survey sampling frame for Ireland. The paper looks at decision-making by large manufacturing firms located in Ireland to see whether their investment decisions can be understood within the various models of risk that economists use. Equilibrium and disequilibrium models are examined to see what best explains the behaviour revealed by the firms' responses. The paper develops a categorisation of the main theoretical channels of influence from risk to investment. In the light of this theory, the survey replies of Irish firms are used to assess the importance of the different channels of influence. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

There is a measure of consensus that risk is a missing variable in explaining the relatively volatile behaviour of investment (Driver and Moreton, 1991; Pindyck and Solimano, 1993; Price, 1995). But theoretical work has proceeded faster than empirical observation. There

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are a great number of plausible models but we simply do not know which transmission mechanism from risk to investment is most important.

This knowledge gap must cause problems for policymakers on two fronts. Those charged with promoting investment will not know where specific market failures might lie. Those charged with reducing risk, e.g. by promoting macroeconomic stability will have difficulty in knowing the economic variables that are most important to stabilise from the perspective of encouraging investment.

Surprisingly little is known about the mechanisms by which risk of various sorts affect the investment decisions of firms. This contrasts with the numerous theoretical models, both of the capital stock under risk (Nickell, 1978; Aiginger, 1987; Driver and Moreton, 1992) and the timing of investment behaviour (Dixit and Pindyck, 1994). To put it crudely we have little idea whether the main mechanism is risk attitude (e.g. aversion), or the effect of irreversibility, or non-linearities operating via Jensen's inequality. Neither do we know whether the main problem for firms is one of input cost risk or demand risk, though the respective models may yield different results.

Our ignorance is compounded by the lack of any real knowledge of the ex-post controls that firms tend to employ in response to disequilibrium between actual and desired capacity. For example, in the event of a downward demand shock with irreversible excess capacity, do firms tend adjust price or capacity utilisation or both? Faced with a similar upward shock and long lead times do firms tend to raise price, to lengthen order books or to subcontract?

In this paper we first categorise some major models in the literature of capital investment under risk. In Section 3, we use the results of a survey of large Irish manufacturing firms to assess the relevance of these theories. Section 4 concludes.

2. Categorising theories of capital investment under risk

Economic theory offers a bewildering variety of ways in which investment can be affected by risk (Aiginger, 1987; Driver and Moreton, 1992; Abel et al., 1996). Not only there are several possible transmission mechanisms but the strength and even the sign of these effects are heavily influenced by variation in the functional form of standard economic relationships. Here we make some observations about the most important effects of risk.

2.1. Non-linearities

If marginal profit is linear in the stochastic variable, risk will not bias the input decision. Non-linearities in the marginal profit function arise due to specific forms of demand or production functions. In general the influence of risk on investment is ambiguous. The literature has tended to focus on the case of price-taking firms with substitutability between factors. In this case we expect investment to be biased towards the fixed factor by both demand and input cost risk. We refer to this as the convexity mechanism. For monopoly or imperfect competition the convexity effect is weakened and the direction of bias may be reversed under demand risk (Pindyck, 1991).

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