

Sandmo A. On the theory of the competitive firm under price uncertainty.

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The standard model of the competitive firm is based on the assumption that demand conditions are known at the time when the production decision is made. This paper develops the theory under the alternative assumption that the firm only knows the probability distribution of the price and that it is averse to risk. [The *Social Sciences Citation Index*® (SSCI)® indicates that this paper has been cited in over 150 publications since 1971.]

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"The foundations for a theory of economic behaviour under uncertainty had been available at least since the late 1940s, but it was not until several years later that economists began to apply the foundations to analyses of specific economic problems. Stimulated to a large extent by the work of Kenneth Arrow of Stanford University, I had written several papers on aspects of consumer behaviour under uncertainty, exploring the implications of the so-called expected utility theorem for theories of saving and portfolio choice. As a next step, it was natural to turn one's attention to firm behaviour and study the production decisions of firms when demand conditions were known only in a probabilistic sense. I started to work on this problem in Bergen in the summer of 1969, and completed the paper at the Center for Operations Research and Econometrics at the University of Louvain, Belgium, where I spent the following academic year on leave of absence.

"This kind of research was very much in the air at the time, and several other people, notably Baron¹ and Leland,² were doing related work taking a similar approach. Many more were following the new developments in the area, and for that reason it was a rewarding problem to be working on; it was easy to find people to talk to who had a serious interest in this kind of research.

"I do not myself consider this article to be my best paper, and it is natural to speculate on why it has come to be cited so often. One reason is surely purely historical: it happened to be one of the first papers in a new area, and a reference to it therefore describes in a convenient way the author's own approach to the subject. Apart from that, the attraction of the paper probably lies in its simplicity. New ideas about modelling attitudes to risk were just in the process of being absorbed into the economics profession, but many probably felt that the ideas were difficult to understand and evaluate in the abstract; my article presented them with an application to one of the simplest of all economic models, known to all economists since their first year of study. Moreover, the paper did not push the subject very far, indicating a number of problems to which the analysis could be extended, and a large number of papers have been written on this and related topics since then. Much of this work has been surveyed by Hey.³

"One of the less satisfactory features of the paper is its assumption that the firm as such has well-defined attitudes to risk, and that its behaviour is governed by risk aversion. On the one hand, this formulation disregards the fact that a firm consists of a group of individuals, whose personal attitudes to risk may not easily be aggregated. On the other hand, the formulation does not take into account the possibility of sharing risks through the stock market. These features may have accounted for some critical references, but I still feel that there is something to be said for my own approach in terms of descriptive realism."

1. Baron D P. Price uncertainty, utility and industry equilibrium in pure competition. *Int. Econ. Rev.* 11:463-80, 1970. (45 cites.)
2. Leland H E. Theory of the firm facing uncertain demand. *Amer. Econ. Rev.* 62:278-91, 1972. (Cited 110 times.)
3. Hey J D. *Uncertainty in microeconomics*. Oxford, England: Martin Robertson, 1979. 261 p.