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## Journal of The Japanese and International Economies

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# Information, investment, and the stock market: A study of investment revision data of Japanese manufacturing industries

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### ARTICLE INFO

#### Article history:

Received 14 September 2007

Revised 3 September 2008

Available online 16 September 2008

#### JEL classification:

E-22

E-44

#### Keywords:

Investment revision

Martingale

Stock return

q theory

Market share

Flexible accelerator theory

### ABSTRACT

**Ogawa, Kazuo, and Suzuki, Kazuyuki**—Information, investment, and the stock market: A study of investment revision data of Japanese manufacturing industries

We examined investment behavior in the Japanese manufacturing industry using investment revision data to analyze investment behavior from a fresh angle. We tested the martingale investment hypothesis and then the q-theory of investment by looking at the response of stock return and investment to news arriving at firms. The martingale hypothesis was accepted at early stage of investment planning, but not at later stages. We also found evidence for the validity of the q-theory hypothesis. Investment was responsive to profit rate revision and sales revision, but stock return responded only to profit rate revision. Further investigation revealed that investment was also motivated by expansion of market share for sales, especially for industries with rapid technological progress. *J. Japanese Int. Economies* **22** (4) (2008) 663–676. Institute of Social and Economic Research, Osaka University, Osaka, Japan; School of Commerce, Meiji University, Tokyo, Japan.

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## 1. Introduction

Current fixed investment, added to capital stock, contributes to future production activities. Thus future prospects of output markets as well as production factor markets are of paramount importance in determining investment. Although the importance of expectations with respect to investment activities has been well recognized, there have been very few studies that have tackled directly how incoming information makes firms change their expectations and thus revise their investment plans. This is mainly because expectation is intrinsically unobservable and researchers have to somehow specify the stochastic process driving the basic factors of investment. Under the assumption that the firm's optimal investment plan is determined by maximizing its firm value, one ingenious bypass to avoid handling expectations is the use of stock market information for conveying all of the information that is relevant for investment. That is, the future profitability of the investment is summarized into one variable, Tobin's  $q$ .<sup>1</sup> Appealing as this theory is, empirical work is not necessarily supportive of the positive relationship between investment and the stock market.<sup>2</sup>

In this study we examined how new information is utilized in revising investment plans in Japanese manufacturing industries. A new feature of our study is the use of investment revision data in the Short-term Economic Survey of Enterprises in Japan (Tankan), compiled by the Bank of Japan, without imposing any assumptions on a prior expectation formation by firms. By regressing investment revision based on incoming information, we may discover how firms revise their investment in response to incoming information. Moreover, under the rational expectation hypothesis, investment reflects all of the information available to the firm that is relevant to the future prospects of output markets as well as input factor markets. It implies that investment revision is a martingale, as is shown below. The martingale property of investment is in line with that of consumption originally derived by Hall (1978) from the permanent income hypothesis. We can test this martingale hypothesis using investment revision data. Schankerman (2002) was the first to demonstrate that investment revision is a martingale.

Our approach has another advantage in that we can test the well-celebrated  $q$ -theory of investment by examining simultaneously the response of stock price, as well as investment, to incoming information.

Our main findings are as follows: First, firms make their investment plans by fully exploiting all available information, in the sense that the information available before the revision date has no explanatory power in predicting investment revision, at early stage of investment planning, but not at later stages. Second, investment revision and stock return are significantly affected by a revision of the profit rate. This might explain the positive correlation between investment and stock return. Third, once sales revision is taken into consideration, investment revision is more responsive to sales revision than is profit revision. However, stock return does not respond to sales revision, which implies that the relationship between investment and stock return is not stable. Rather, our evidence suggests that attention should also be paid to the market share aspect of the investment decision, as investment is partly driven by the firm's desire to expand its market share for sales.

This paper is organized as follows: In Section 2, after a brief explanation of a theoretical idea underlying our empirical work, we specify equations to be estimated that associate investment revision with incoming news. We also set up a framework to test the  $q$ -theory of investment. Section 3 describes our data on investment revision. Section 4 shows empirical results and discusses their implications. Section 5 concludes this study.

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<sup>1</sup> For seminal work on Tobin's  $q$ , see Tobin (1969) and Hayashi (1982).

<sup>2</sup> There are numerous studies on the relationship between the stock market and investment. For example, see Barro (1990), Morck et al. (1990), Blanchard et al. (1993), and Lamont (2000).

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