

Abstract

This paper documents evidence that a substantial share of New Zealand firms rely on astrological consultations to make their investment decisions. A randomized information experiment is conducted with the managers of these firms to explore how astrological predictions affect their investment expectations and decisions. The key finding of this paper is that firms' investment plans are influenced through astrological predictions.

Motivation

Investment is a key determinant of a nation's progress. When planning their investments, firms are faced with high uncertainty about future market conditions and need to form expectations about the profitability of such plans.¹ Such uncertainty can have a significant impact on aggregate economic activity.² How do firms plan their investments?

Survey evidence indicates that both investment plans and actual decisions can be explained by managers' expectations.³ Ubiquitous evidence of deviations from rational expectations suggests that managers need to rely on a broad range of non-economic information for investment decisions. Superstitious beliefs have been found to affect individuals' financial decisions.^{4,5}

This paper presents survey evidence that a substantial share of New Zealand firms rely on astrological consultations when making their investment plans.

Survey Question: **Do your business decisions depend on any form of astrological forecasts?**

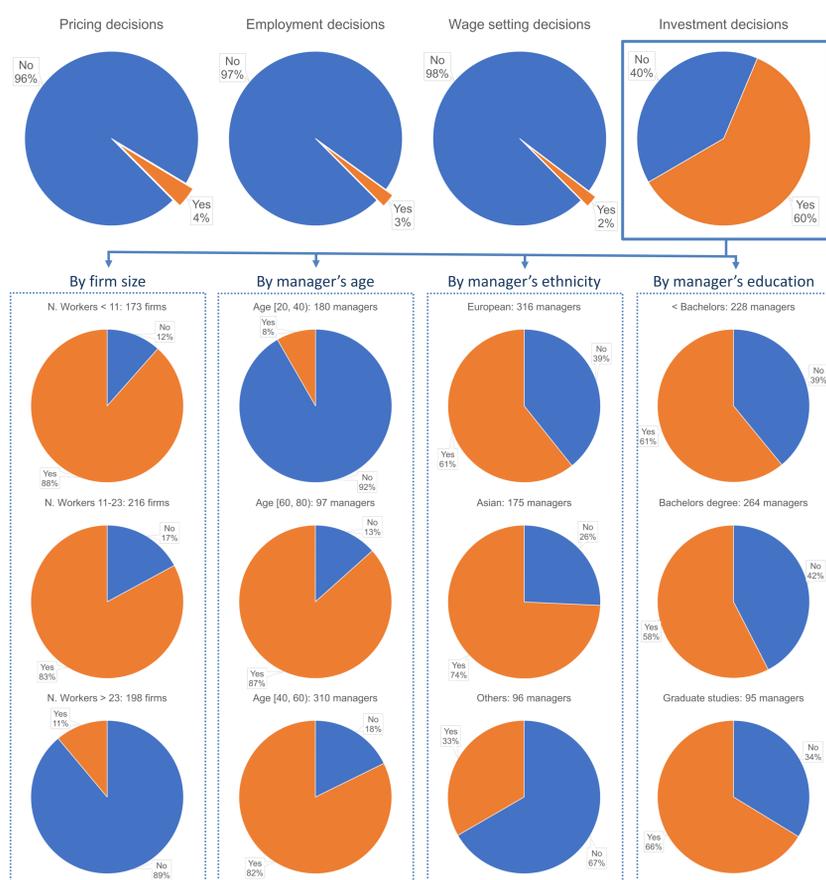


Chart 1. Frequencies of Survey Responses on Use of Astrology for Economic Decisions.

Survey Framework

A total of 6,250 firms were randomly chosen from the population of firms that employ six or more workers in New Zealand. The sampling controlled for firm size, sectors, and subsectors, according business demography data, and covered the following sectors: manufacturing, trade, construction, transportation, and professional and financial services.

The survey was conducted in two waves: (i) main survey between December 2016 and February 2017; (ii) follow-up survey between December 2017 and February 2018. The surveys were conducted via phone. The main respondents were the managers or directors of the firms. From the 6,250 firms contacted, 587 responded to the main wave, and 266 participated in the follow-up wave.

Experimental Design

An experiment was designed to uncover the causal effect of exogenous astrological predictions on firms' investment decisions.

- First survey wave asked firms for their one year-ahead investment plans.
- Sample was randomly divided in treated and control groups.
 - 212 firms, 78% of treatment group, consented to participate in experiment.
 - Astrological forecasts from a professional were provided to these firms.
 - The firm's planned investment were predicted to have an average return:
 - Treatment 1: greater than 5%;
 - Treatment 2: between 1% and 5%; or,
 - Treatment 3: less than 1%.
- One year later, follow-up survey asked firms about their actual decisions in the previous year.

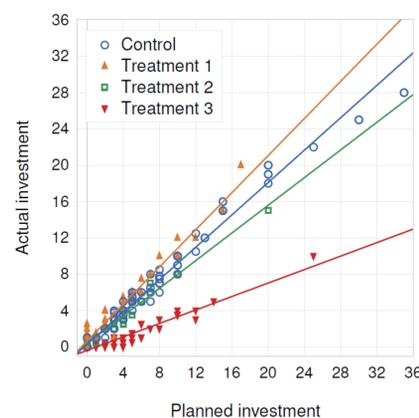


Chart 2. Planned versus Actual Investment.

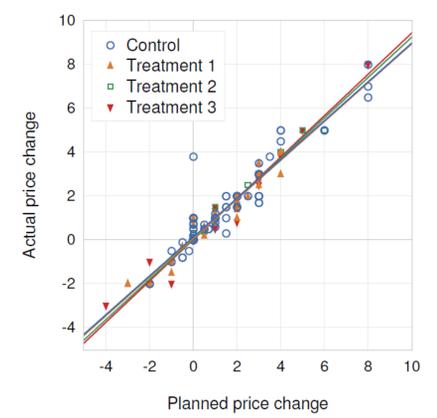


Chart 3. Planned versus Actual Price Change. (placebo effects test)

Results

The astrological treatment clearly appears to influence firms' investment decisions. Relative to the control group, only treatment 1 and 3 led to statistically significant changes in investment decisions (see Table 1). Pessimistic astrological predictions are found to have a stronger effect causing firms to hold back on their planned investment more strongly. On average, firms receiving the prediction of a return below 1% tended to under-invest about 2.7 percentage points more than the firms that did not receive any astrological prediction. This suggests that exogenous information on return predictions can have an asymmetric effect on firms' investment decisions.

Table 1. Estimates of Treatment Effects on Investment Decisions.

Effects/variables	(1)	(2)	(3)	(4)
Treatment 1 (D_i^1)	0.948*** (0.152)	0.958*** (0.175)	1.046*** (0.208)	0.900*** (0.217)
Treatment 2 (D_i^2)	-0.161 (0.208)	-0.041 (0.228)	0.062 (0.247)	-0.277* (0.145)
Treatment 3 (D_i^3)	-2.724*** (0.418)	-2.698*** (0.401)	-2.640*** (0.411)	-2.776*** (0.299)
Investment plan (k_i^e)				-0.187*** (0.030)
N. Obs.	266	266	266	266
R-squared	0.378	0.419	0.429	0.650
Sector effects	No	Yes	Yes	Yes
Firm controls	No	No	Yes	Yes

Notes: Each column corresponds to one regression of: $k_i - k_i^e = \delta_0 + \delta_1 D_i^1 + \delta_2 D_i^2 + \delta_3 D_i^3 + \Phi X_i + u_i$, where k_i stands for actual investment reported by firm i twelve months after its planned investment k_i^e was collected; D_i^1 , D_i^2 , and D_i^3 stand for dummy variables corresponding to each treatment group; X_i stands for control variables. Robust standard errors reported between brackets. *** and * denote coefficient estimates statistically significant at the 1% and 10% levels of significance.

Concluding Remarks

The main insight of this paper is that there seems to exist an informational gap in firms' investment decision-making that is not addressed by standard sources of economic information, hence their need for alternative sources of information such as astrology. The effect of astrology on investment decisions is found to be robust to several sources of heterogeneity, such as manager's age, ethnicity and education, and firm's characteristics.

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