Information and noise in stock markets: Evidence on the determinants and effects using new empirical measures

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Statement of originality

I certify that work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Preface

Some of the research presented in this thesis has also been incorporated in four working papers co-authored with Prof. Talis Putnins, Assoc. Prof. Eliza Wu, and Prof. Jonathan Brogaard. The four papers are titled:

1. "What moves stock prices? The role of news, noise, and information";
2. "Noisy prices and capital allocation efficiency";
3. "Time-varying gambling in stock markets and its effect on asset prices";
4. "Stock markets as casinos: International evidence on the drivers and effects of gambling in stock markets".

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The first working paper is scheduled for presentation at the American Finance Association (AFA) Annual Meeting in San Diego, California in January 2020.

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List of Abbreviations

2SLS	Two-Stage Least Squares
AMEX	American Stock Exchange
CRSP	Center for Research in Security Prices
ETF	Exchange traded fund
EU	European Union
GBGC	Global Betting Gaming Consultants
GDP	Gross Domestic Product
IDV	Individualism versus Collectivism
IV	Instrumental Variable
IVR	Indulgence versus Restraint
NYSE	New York Stock Exchange
OLS	Ordinary Least Squares
SEC	Securities and Exchange Commission
SIC	Standard Industrial Classification
SIRCA	Securities Industry Research Centre of Asia-Pacific
VAR	Vector Auto-Regression
VMA	Vector Moving Average
UAI	Uncertainty Avoidance Index
US	United States of America

Abstract

This thesis comprises four studies relating to stock market efficiency, its measurement, its effects, and its determinants.

The first study proposes novel empirical measures that separate different types of information and noise as drivers of stock return variance. Specifically, the new methods disentangle four components: market-wide information, private firm-specific information revealed through trading, firm-specific information revealed through public sources, and noise. Overall, in US stocks, 31% of the return variance is attributable to noise, 37% to public firm-specific information, 24% to private firm-specific information, and 8% to market-wide information. Since the mid-1990s, there has been a dramatic decline in noise and an increase in firm-specific information, consistent with increasing market efficiency.

The second study examines how noise affects inference in existing empirical measures, such as idiosyncratic volatility (one minus the R^2 of a market model) and decompositions of cash flow and discount rate news. This thesis finds that after accounting for noise, cash flow information plays a considerably larger role in driving individual stock returns than previously believed and discount rate information plays a smaller role. Furthermore, the decrease in idiosyncratic volatility (increase of market model R^2) since 1997 is the result of a decrease in noise during this recent period. The evidence indicates that the market has become more efficient in the past two decades, contrary to what is implied by standard interpretations of R^2 as an inverse measure of efficiency.

In the third study, this thesis examines the real effects of stock market efficiency by analysing the relation between noise in stock prices and the efficiency of corporate investment and capital allocation at both the firm and industry levels. The analysis uses a long time-series of data from 1963, as well as a cross-section of 42 countries. Consistent with the notion that noise decreases investment efficiency, this research finds strong evidence that noise is negatively associated with the sensitivity of corporate investment to firms' growth opportunities and the sensitivity of industry-level investment to value added. These findings highlight the important real effects of

secondary market quality in determining firms' investment behaviour and the efficiency with which capital is allocated.

The forth essay provides evidence on how individual investors' behaviour, in particular investors' gambling activity in stocks, affects stock market efficiency. We develop novel measures of the amount of gambling in stock markets based on the turnover differences between lottery stocks and non-lottery stocks, and validate the measure. Using a global sample, we examine how much gambling occurs in different countries, what determines these levels, and how the gambling that occurs on stock markets affects a country's capital markets. We find that culture and economic factors are all significant drivers of a country's gambling propensity in both traditional venues and stock markets. Interestingly, we find a substitution effect—restrictions/bans on traditional gambling lead to a spillover of gambling onto stock market(s). Exploiting regulation of traditional gambling as an instrument, we find that increased gambling on stock markets makes them more liquid and efficient. Our findings have implications for using gambling regulation as a policy instrument to affect financial market quality.

Collectively, these studies contribute to our understanding of market efficiency, how to measure it, what drives its variation through time and across stocks, and how it affects resource allocation across companies and sectors.