

Department of Finance

Essays on Investor and Broker Behavior in Equity Markets

Yijie Li

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Yijie Li

Supervising professor

Professor Matti Suominen, Aalto University School of Business, Finland

Thesis advisors

Doctor Matthijs Lof, Aalto University School of Business, Finland

Doctor Sami Torstila, Aalto University School of Business, Finland

Preliminary examiners

Professor Albert Menkveld, Vrije Universiteit Amsterdam, Netherlands

Doctor Kam-Ming Wan, Hanken School of Economics, Finland

Opponent

Professor Albert Menkveld, Vrije Universiteit Amsterdam, Netherlands

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This doctoral dissertation studies the behavior of investors and brokers in equity markets. It consists of an introductory chapter and three self-contained essays.

The first essay, joint with Matti Suominen, studies the impact of unemployment and its growth on the expected stock market returns both theoretically and empirically using the U.S. data. Our theoretical model predicts that the expected equity return increases with unemployment and unemployment growth, and that the impacts of unemployment and its growth on the expected equity returns reinforce each other. Our empirical evidence supports these predictions, even when alternative measures of unemployment and its growth are used. Additionally, we find that FED tends to smooth the high stock market returns caused by high unemployment and high unemployment growth using various monetary policies, but these FED actions do not drive the stock return predictability of unemployment.

The second essay investigates the impact of trader anonymity on unsophisticated liquidity using a novel measure – duration-until-next-unsophisticated-order (DUNUO). I analyze DUNUO following anonymous and non-anonymous trades on Nasdaq Helsinki, where a voluntary post-trade anonymity model was launched. I find that DUNUO is statistically and economically longer after anonymous trades than after non-anonymous trades, suggesting a negative impact of anonymity on unsophisticated liquidity. This essay also shows that the negative impact of anonymity on unsophisticated liquidity decreases with a declining level of information asymmetry. This relationship is robust to alternative measures of unsophisticated liquidity.

The third essay, utilizing the same voluntary anonymity model, examines the determinants of brokers' choice for anonymity. This essay shows that, in a market where brokers can choose to reveal or conceal identities in the real-time trade feed on a monthly basis, local brokers and brokers who provide online discount brokerages to retail investors are more reluctant to select anonymity. This essay also provides evidence that the brokers' trading patterns can explain their anonymity choices.

Keywords Unemployment; Equity Returns; Trader Anonymity; Liquidity; Unsophisticated Investor; Broker

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Introduction

The participation of investors and brokers in equity markets is indispensable for the market to function smoothly, and their behavior affects the equilibrium in the market. The three essays of this dissertation study the behavior of investors and brokers and how their behavior affects or is affected by the market or other market participants in different contexts.

The first essay, co-authored with Matti Suominen, examines both theoretically and empirically the impact of unemployment and its growth on future stock market returns with a special interest in the effect of the interaction of unemployment and its growth, assuming that employment status affects investors' borrowing capacity and thus stock market participation (e.g., Constantinides, Donaldson, and Mehra, 2002; and Lustig and van Nieuwerburgh, 2005). It provides a theoretical explanation for the macro-financial linkages that are widely documented in previous studies (e.g., Boyd, Hu, and Jagannathan, 2005; Flannery and Protopapadakis, 2002; Korniotis and Kumar, 2013, and McQueen and Roley, 1993) from an investor participation and risk-sharing point of view. The fewer the number of investors in the market, the more risk an investor needs to bear, and the higher the return she requires.

The second essay studies the unsophisticated investors' reactions to broker anonymity at the order level conditional on the level of information asymmetry, based on the assumption that broker identity represents a distinct clientele and serves as a proxy for trader identity (e.g., Linnainmaa and Saar, 2012). It first provides empirical evidence supporting the suggestion of Madhavan and Cheng (1997), Reiss and Werner (2005), and

Seppi (1990) that anonymity discourages uninformed liquidity, and then complements Foucault, Moinas, and Theissen (2007) by showing that the impact of anonymity on unsophisticated liquidity varies with information asymmetry. I find that when the level of information asymmetry becomes lower, the negative impact of trader anonymity lessens.

The third essay investigates the determinants of brokers' choice for trader anonymity. Prior literature focuses on the characteristics of trades as the determinants of anonymity choice (e.g., Comerton-Forde, Putnins, and Tang, 2011), while the role of brokers is largely overlooked. By comparing brokers' characteristics and their choice for anonymity, I find that local brokers and brokers who provide online discount brokerages to retail investors are more reluctant to select anonymity. This essay also provides evidence that broker characteristics related to trading costs are important determinants of brokers' anonymity choice, suggesting a linkage between brokers' trading patterns and their preference for anonymity. The second and the third essay jointly show that brokers' trading behavior is influential to both themselves and other market participants. The three essays are introduced in more detail in the following part.

Essay 1: Equity Returns, Unemployment, and Monetary Policy

In the first essay, joint with Matti Suominen, we study the effect of unemployment and its growth on future stock market returns both theoretically and empirically. In our theoretical model, agents' borrowing capacity is assumed to be constrained by their employment status, so higher unemployment leads to lower market participation and reduced risk-sharing capacity in economy. This assumption is in line with the idea presented in earlier studies including Constantinides, Donaldson, and Mehra (2002) and Lustig and van Nieuwerburgh (2005). Following this, we show that the equilibrium expected equity return increases with concurrent unemployment given that there are fewer agents sharing the risk, so each agent needs to carry more and requests additional reward for risk. We then prove that an expectation of high unemployment growth raises stock market returns by lowering both

future and concurrent stock prices, and most importantly, that the impacts of unemployment level and growth reinforce each other. The last prediction suggests that unemployment growth affects the expected equity returns asymmetrically, depending on the level of unemployment.

Using the monthly U.S. unemployment data and S&P 500 real returns from January 1948 to March 2020, we show that our empirical findings are consistent with our theoretical predictions: both short-term and long-term forward stock returns are highest when both unemployment and the change in unemployment are high. This result is robust to alternative unemployment measures, such as lagged unemployment data and unemployment forecasts.

In this essay, we also investigate theoretically and empirically how the policies of the federal reserve bank, FED, interact with the stock return predictability of unemployment. Our model shows that the FED can smooth the high stock market return which is driven by high unemployment and high unemployment growth by expanding balance sheet and cutting interest rate. Our empirical results provide evidence supporting our theoretical predictions that the FED responds in times of high unemployment and/or high unemployment growth, and we find that the impacts of unemployment and its growth on stock returns are not driven by the predictable FED actions, nevertheless.

Essay 2: The Impact of Anonymity on Unsophisticated Liquidity and Changing Information Asymmetry

In the second essay, I examine empirically how trader anonymity affects unsophisticated liquidity at the order level and investigate the asymmetry of this impact depending on the level of information asymmetry in stock market. Findings in existing literature studying the impact of trader anonymity on market quality are mixed. While the majority of studies provide evidence of anonymity improving market liquidity (e.g., Comerton-Forde, Putnins, and Tang, 2011; Comerton-Forde and Tang, 2009; Dennis and Sandås, 2019; Friederich and

Payne, 2014; Garfinkel and Nimalendran, 2003; and Meling, 2020), some suggest that anonymity deters uninformed liquidity (e.g., Madhavan and Cheng, 1997; Reiss and Werner, 2005; and Seppi, 1990). The mixed evidence can be reconciled by the idea presented in Foucault, Moinas, and Theissen (2007), which proves theoretically that anonymity affects liquidity asymmetrically depending on the level of information asymmetry. This essay complements this strand of literature by providing empirical evidence concerning unsophisticated liquidity specifically.

By utilizing order- and trade-level data of Nasdaq Helsinki, where a voluntary post-trade anonymity model was enacted on March 24th, 2014, I examine a newly proposed measure of unsophisticated liquidity – duration-until-next-unsophisticated-order (*DUNUO*) – following anonymous trades and non-anonymous trades and find that anonymous trades tend to be associated with longer *DUNUO* and thus lower unsophisticated liquidity. Following this, I investigate the role played by information asymmetry in the effect of anonymity by examining the difference between *DUNUO* following anonymous trades and *DUNUO* following non-anonymous trades around earnings announcements on announcement days. The result shows that this difference becomes significantly smaller during the post-announcement period, which is associated with lower information asymmetry, suggesting that lowering the level of information asymmetry reduces the negative impact of anonymity on unsophisticated liquidity.

Furthermore, this essay presents evidence of unsophisticated liquidity providers being more sensitive to anonymity than demanders in times of high information asymmetry. It also shows that unsophisticated traders' unwillingness to trade increases with the degree of anonymity.

Essay 3: Who Chooses to Trade Anonymously? Trading Patterns, Costs, and Market Reaction

In the third essay, I investigate the prior differences between the brokers who chose to trade

anonymously and those who chose to trade non-anonymously when a voluntary post-trade anonymity model was launched on Nasdaq Helsinki on March 24th, 2014. This study differs from the existing literature by examining the characteristics of brokers, instead of the characteristics of trades (e.g., Comerton-Forde, Putnins, and Tang, 2011) or types of traders (e.g., Admati and Pfleiderer, 1991; Forster and George, 1992; and Rindi, 2008), as the determinants of anonymity choice.

Under this voluntary anonymity model, brokers can choose to reveal or conceal their identities in the real-time trade feed on a monthly basis at their discretion. The results show that Nordic brokers and brokers who provide online discount brokerages to retail investors are more conservative in selecting anonymity. In addition, brokers making different choices for anonymity are found to differ in aspects including order size, order aggressiveness, and trading costs.

By further examining the differences between brokers' trading costs related characteristics, I find that the difference between brokers' trading cost standard deviation of the five largest stocks on Nasdaq Helsinki and that of the remaining large-cap stocks serves as a strong determinant of their anonymity choice. Brokers who have a smaller difference in the trading cost standard deviation between stock groups are more likely to select anonymity, implying that brokers who make more efforts on controlling costs tend to prefer anonymity. Meanwhile, there is evidence that the difference between brokers' average trading cost of the five largest stocks and that of the remaining large-cap stocks being a weak determinant of anonymity choice: brokers who have a greater difference in average trading cost between stock groups are more likely to choose anonymity. This result suggests that brokers who potentially benefit more from anonymity do prefer anonymity.

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