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Dynamic market participation and endogenous information aggregation [☆]

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Abstract

This paper studies information aggregation in financial markets with recurrent investor exit and entry. I consider a dynamic general equilibrium model of asset trading with private information and collateral constraints. Investors differ in their aversion to Knightian uncertainty: When uncertainty is high, some investors exit the market. Since exiting investors' information is not fully revealed by prices, conditional return volatility and risk premia both increase. The model also implies that exit is more likely when wealth is more concentrated in the hands of less uncertainty-averse investors. The model thus predicts less informative prices toward the end of a long boom. Moreover, economies with looser collateral constraints should see more volatility due to exit and partial revelation. Higher capital requirements potentially improve welfare by inducing more information revelation by prices.

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JEL classification: Ambiguity aversion; Uncertainty; Knightian uncertainty; Information revelation

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[1] The views expressed in this paper are those of the author and do not necessarily reflect the views of the Federal Reserve Bank of Philadelphia or the Federal Reserve System.

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1. Introduction

Investors adjust their stock positions at both the intensive and extensive margins. Around 40% of changes in the stock positions of institutional investors in the U.S. are due to changes at the extensive margin.[2] Most standard rational expectations models with asymmetric information do not capture changes in investor participation in equilibrium. In these models, investors respond to signals by adjusting their asset positions only at the intensive margin. However, changes at the extensive margin have important implications for information aggregation. When investors close out their positions and leave the market as opposed to simply reducing their asset positions, their private signals may not be fully reflected in equilibrium prices and thus will be lost. Moreover, the amount of wealth that investors have also affect their decisions on closing positions. This paper studies information aggregation in a dynamic setting that highlights the important interaction between the changes in the wealth distribution among investors and information aggregation over time. Specifically, I find that a more unequal wealth distribution in favor of the less ambiguity averse investors leads to more information loss.

To study how changes in market participation and the wealth distribution affect information aggregation, I consider a dynamic asset market model that incorporates private signals, ambiguity aversion (or aversion to Knightian uncertainty), logarithmic preferences, and borrowing constraints. When investors are ambiguity averse, their private signals may not be fully revealed in equilibrium. Papers by Condie and Ganguli (2011a,b, 2012) show that, in a static setting, private information that is perceived to be ambiguous need not be revealed by market prices in a rational expectations equilibrium. This paper builds an infinite horizon dynamic model in a perpetual youth setting to study the interaction of wealth distribution dynamics and information aggregation in the long run. In the model, investors receive private signals about the future payoff of risky assets. However, the interpretation of these signals is ambiguous. Specifically, potential investors are uncertain about the likelihood function of the true signal-generating process and evaluate probabilities according to the worst case scenario. If the uncertainty regarding the signal interpretation is high, investors may decide not to invest in risky assets. When there is heterogeneity in the level of ambiguity among investors, the more ambiguous investors exit the stock market, and a partially revealing equilibrium exists in which the private signals of these exited investors are not fully revealed. This leads to information loss and higher return volatility of the risky asset.

Why would ambiguity aversion of investors lead to partial revelation of information in equilibrium? In the model, investors make portfolio decisions over purchasing a risk-free bond and a stock. They each receive an independent private signal from a finite state space about the next-period payout of the stock. In a standard rational expectations model, investors hold non-zero amounts of stock in equilibrium except for knife-edge cases. Given prices, their demand for the stock is responsive to the private signal received. A good signal about future payoffs of the stock leads to more demand for the stock, while a bad signal leads to less demand. In equilibrium, market clearing means that these changes in demand lead to equilibrium prices that are responsive to the signals that investors receive. Investors therefore infer the private signals of other investors

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[2] The source of the data is the 13-F reports by institutional investors. The SEC requires institutional managers with more than \$100 million in exchange traded or NASDAQ-quoted equity securities to file 13-F reports for all equity positions greater than 10,000 shares or \$200,000 in market value. As a result, the holdings data may not contain small positions, short positions, short covering, or derivatives (see Choi et al., 2017 for example). This truncation means that the actual number of extensive margin trades is potentially smaller.

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