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journal homepage: www.elsevier.com/locate/jfecDisagreement and asset prices[☆]Bruce I. Carlin^{*}, Francis A. Longstaff, Kyle Matoba

Anderson Graduate School of Management, University of California, Los Angeles, 110 Westwood Plaza, Los Angeles, CA 90095, USA

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ABSTRACT

How do differences of opinion affect asset prices? Do investors earn a risk premium when disagreement arises in the market? Despite their fundamental importance, these questions are among the most controversial issues in finance. In this paper, we use a novel data set that allows us to directly measure the level of disagreement among Wall Street mortgage dealers about prepayment speeds. We examine how disagreement evolves over time and study its effects on expected returns, return volatility, and trading volume in the mortgage-backed security market. We find that increased disagreement is associated with higher expected returns, higher return volatility, and larger trading volume. These results imply that there is a positive risk premium for disagreement in asset prices. We also show that volatility in and of itself does not lead to higher trading volume. Instead, only when disagreement arises in the market is higher uncertainty associated with more trading. Finally, we are able to distinguish empirically between two competing hypotheses regarding how information in markets gets incorporated into asset prices. We find that sophisticated investors appear to update their beliefs through a rational expectations mechanism when disagreement arises.

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1. Introduction

Understanding how disagreement affects security prices in financial markets is one of the most important issues in finance. When participants in a market disagree with each other, an investor who goes out on a limb and

takes a position based on his unique expectations could face a greater risk of being wrong. Such trading risk or adverse-selection risk differs fundamentally from the traditional types of market risks that are priced in asset values. This means that investors who trade when disagreement exists could require additional compensation for bearing this risk. Despite the fundamental nature of this issue, though, significant controversy in the literature still remains about how disagreement risk affects expected returns and asset prices.

On one hand, an extensive theoretical literature implies that divergence in beliefs or opinions should lead to a positive risk premium. For example, [Varian \(1985, 1989\)](#), [Abel \(1989\)](#), [David \(2008\)](#), and many others argue that the equity premium puzzle could be explained in terms of a risk premium for heterogeneous beliefs or differences of opinion, or both. As such, it appears that investors should be compensated for bearing trading risk or the risk due to adverse selection when disagreement arises.

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^{*} Corresponding author. Tel.: +1 310 825 2508.

E-mail address: bruce.carlin@anderson.ucla.edu (B.I. Carlin).

On the other hand, Miller (1977) argues that differences of opinion in the market can lead to lower expected returns (higher prices) when short-sale constraints are present. This occurs because pessimists sit out of the market and asset prices reflect only the valuation of optimists. Chen, Hong, and Stein (2002) and Diether, Malloy, and Scherbina (2002) find compelling support for the Miller hypothesis in several markets in which there are binding short-sale constraints. However, Boehme, Danielsen, Kumar, and Sorescu (2009) and Avramov, Chordia, Jostova, and Philipov (2009) find evidence to the contrary. Either way, this still leaves open the more fundamental issue of how disagreement is priced in general markets without significant short-sale constraints, illiquidity, or other trading frictions.

To best resolve the controversy, we would ideally want to study a market with several key characteristics. First, the market should be highly liquid and essentially free from short-sale constraints. Second, the key drivers of an asset's value should be easily defined and common knowledge. Finally, disagreement about these key drivers among the institutions that actually trade the assets should be directly observable. This last condition bypasses the measurement uncertainty that results when an indirect proxy for disagreement is used.

In this paper, we analyze a time series of prepayment speed (PSA) forecasts issued by major Wall Street mortgage dealers and then consider how disagreement affects expected returns, return volatility, and trading volume in the agency mortgage-backed security (MBS) market.¹ This market provides unique advantages. First, because the PSA forecasts are given for various interest rate scenarios and the mortgage-backed securities are guaranteed by the US government, credit risk and interest rate risk do not affect the dealers' PSA estimates. Thus, the only cash flow uncertainty associated with a mortgage-backed security is the timing of prepayments. In turn, the timing of cash flows is a key factor affecting how investors value mortgage-backed securities. This allows us to precisely correlate disagreement with the return characteristics of mortgage-backed securities. Second, the PSA forecasts are made by members of the trading desks at the same institutions that intermediate the trade of mortgage-backed securities. Therefore, we know directly what the dealers' best estimate is for the key input to valuing the assets under consideration, which allows us to best study the relation between disagreement and asset prices.

Using PSA estimates from July 1993 to January 2012, we construct a disagreement index and find a surprisingly high level of disagreement among the participants in the survey. We show that disagreement is time-varying, correlated with financial and macroeconomic variables, and magnified when major events occur in financial markets

(e.g., the failure of Long-Term Capital Management, the September 11 attacks, and Lehman Brothers default).

Following this, we study whether disagreement is priced in the market. To examine whether disagreement about prepayment rates affects the expected returns of mortgage-backed securities, we use the standard approach of regressing ex post realized returns on the ex ante measures of disagreement and other proxies for risk premia. For disagreement to be priced in expected returns, the disagreement index should have predictive power for subsequent returns on mortgage-backed securities even after controlling for the other ex ante risk premium proxies. Using a proprietary data set of daily returns on the Fannie Mae To Be Announced (TBA) security closest to the current coupon mortgage rate, we construct a measure of monthly returns.² Including the disagreement index in the regression significantly increases the predictive power, and the coefficient on the disagreement variable is positive and highly significant. Based on this, we can conclude that increased disagreement is associated with higher expected returns, which supports the thesis that disagreement is associated with a positive risk premium, as posited by Varian (1985, 1989) and Abel (1989). Further, because we control for several measures of market risk in our empirical specification (e.g., interest rate risk, the S&P 500 volatility index (VIX), the monthly excess return on the CRSP value weighted index, and the effective duration of the Lehman/Barclays US MBS index), this implies that disagreement risk is likely to be a form of trading risk or risk due to adverse selection.

Finally, we analyze the relation between disagreement, return volatility, and trading volume. We use a simple vector autoregression (VAR) framework in which we include all three variables with lags and controls. We find that increasing disagreement is followed by periods of higher volatility and trading volume. This is consistent with Shalen (1993) and Zapatero (1998), who posit that disagreement and price volatility should be positively correlated. More strikingly, though, we find that volatility in and of itself does not lead to higher trading volume. Instead, it is only when more disagreement exists that trading volume increases. Our findings lend support to the predictions of Harris and Raviv (1993), that differences in opinion is the primary channel through which uncertainty leads to higher trading volume. To our knowledge, our study is the first to empirically show the importance of this channel. Our results are also consistent with the empirical findings of Kandel and Pearson (1995), who find that dispersion in analyst forecasts affects trading volume, particularly around anticipated earnings announcements. Interestingly, we find that higher trading volume is associated with lower subsequent disagreement. We view this as intuitive: As investors learn through trade, they have opportunities to update their beliefs about the drivers of asset value.

¹ Providers of PSA estimates included Barclays, Bank of America, Bear Stearns, Credit Suisse, Deutsche Bank, Donaldson, Lufin, and Jenrette, Goldman Sachs, HSBC, JP Morgan Chase, Lehman Brothers, Merrill Lynch, Morgan Stanley, Nations Bank, Prudential, Greenwich Capital, Salomon Brothers, Smith Barney, and UBS Warburg. These dealers intermediated the majority of trade in MBS markets during the period that we analyze in this paper.

² The To Be Announced market is a highly liquid market in which buyers and sellers agree on the future sale prices of mortgage-backed securities but do not specify which particular assets will be delivered. Details about this market are in Section 3.2.

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