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Estimating the market risk premium[☆]

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Abstract

This paper provides a method for estimating the market risk premium that accounts for shifts in investment opportunities by explicitly modeling the underlying process governing the level of market volatility. I find that approximately 50% of the measured risk premium is related to the risk of future changes in investment opportunities. Evidence of a structural shift in the underlying volatility process suggests that the simple historical average of excess market returns may substantially overstate the magnitude of the market risk premium for the period since the Great Depression.

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1. Introduction

The market risk premium is one of the most important numbers in finance. Unfortunately, estimating and understanding its value has proven difficult.

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Although a substantial body of research shows that expected returns vary over time, the static approach of estimating the risk premium as the simple average of historical excess stock returns remains the most commonly employed method in practice.¹ Merton (1980) suggests estimating the risk premium based on the theoretical relationship between expected returns and the contemporaneous variance of returns. Although this theoretical approach is appealing, empirical research has failed to document a significant positive relationship between expected returns and the level of market volatility.² Scruggs (1998) provides evidence suggesting the failure to find a positive relationship between excess returns and market volatility may result from not controlling for shifts in investment opportunities. Lettau and Ludvigson (2001) make a similar point, showing that rejections of the consumption capital asset pricing model may also be due to a failure to control for shifts in investment opportunities. In this paper, I develop a method for estimating the market risk premium based on the equilibrium relationship between volatility and expected returns when there are discrete shifts in investment opportunities—specifically, changes in the level of market volatility. I use this method to demonstrate the importance of accounting for the dynamic nature of market risk when estimating the risk premium from ex post market returns.

The volatility of market returns during the past century has varied significantly. Schwert (1989a, b) studies historical variations in market volatility and relates the fluctuations to changes in economic and financial market conditions. My results suggest that, as a result of changes in the level of market volatility, the simple historical average of excess market returns obscures significant variation in the market risk premium and that over half of the measured risk premium is associated with the risk of future changes in investment opportunities. My analysis also suggests that, as a result of a structural shift in the likelihood of future high-volatility periods, the simple historical average of excess market returns may substantially overstate the magnitude of the market risk premium for the period since the Great Depression.

In my model, market risk is characterized by periodic episodes of high market volatility followed by a return to a lower, more typical level. I assume that the evolution of these volatility states follows a Markov process, and I model the market risk premium as a function of the underlying process governing the evolution of the two volatility states.³ The expression for the equilibrium risk premium in my model is a special case of the Merton (1973) intertemporal capital asset pricing model. Because individuals anticipate future changes in the volatility state and corresponding

¹For examples of research showing that expected returns vary over time, see Fama and Schwert (1977), Shiller (1984), Campbell and Shiller (1988), Fama and French (1988, 1989), Campbell (1991), Hodrick (1992), and Lamont (1998). Bruner et al. (1998) survey a sample of 27 “highly regarded corporations” and find that the estimates of the risk premium are generally based on either the arithmetic or geometric average of historical excess market returns.

²See Campbell (1987), French et al. (1987), Baillie and DeGennaro (1990), Glosten et al. (1993).

³Many researchers, including Schwert (1989a), Turner et al. (1989), Cecchetti et al. (1990), Pagan and Schwert (1990), Hamilton and Susmel (1994), Hamilton and Lin (1996), Schaller and Van Norden (1997), and Kim et al. (2000) have used a two-state Markov-switching model to describe the time series properties of market returns.

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