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The critical role of conditioning information in determining if value is really riskier than growth

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ABSTRACT

Conditional asset pricing models have been used to determine whether the value premium and other CAPM anomalies are due to risk. We show that the conclusions on whether these anomalies are due to risk are very sensitive to the choice of the information variables used to define good and bad states of the world. We use a conditional CAPM framework allowing for alternative sets of plausible conditioning information and find that value appears to be riskier than growth in only about ten to twenty percent of specifications. We find even less evidence that size, issuance, momentum, and asset growth portfolio returns are due to risk. Overall, our results suggest that common CAPM anomalies are not due to risk.

1. Introduction

In the last decade, the three-factor model of Fama and French (1993) and the four-factor model of Carhart (1997) have emerged as the most widely used models to estimate risk and abnormal returns. Yet some researchers have questioned whether the risk premiums in these models arise from non-diversifiable economy wide risk. Accordingly, there is an important debate in the literature over the sources of the risk premiums in the three and four-factor models. In a series of papers, Fama and French (1993, 1995, 1996) argue convincingly that the size and value premiums are due to risk; value stocks and small stocks tend to be companies that are more sensitive to financial distress and thus bankruptcy, especially in bad economic times.[2] Others, such as Lakonishok et al. (1994), argue that the betas (returns) to value-related strategies are not higher (lower) in bad times relative to good times, results arguably at odds with a risk story.[3] In a recent paper, Petkova and Zhang (2005) use a conditional CAPM approach to analyze the riskiness of value and growth. Petkova and Zhang's approach is based on the observation that the Lakonishok, Shleifer, and Vishny study uses *realized* market excess returns to define good and bad states. Petkova and Zhang, drawing on a large conditional CAPM literature, say that what matters for defining good and bad states are *expected* market returns, not realized returns. They create an expected market risk premium using a standard set of four business cycle variables (i.e., the default premium, the term premium, the dividend yield, and the short-term

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[2] Other papers which conclude that the premiums are consistent with a risk explanation include Ang and Chen (2007), Bansal et al. (2005), Chen and Zhang (1998), Cohen et al. (2003), Franzoni (2006), Hansen et al. (2006), Jagannathan and Wang (1996), Lettau and Ludvigson (2001), Lustig and Van Nieuwerburgh (2005), Petkova (2006), Santos and Veronesi (2006), and Zhang (2005).

[3] Other papers which conclude that the premiums are inconsistent with a risk explanation include Barberis and Shleifer (2003), Barberis et al. (2005), Daniel and Titman (1997), Hwang and Rubesam (2007), Shleifer et al. (1997).

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Treasury bill rate). Next, they estimate "beta-premium sensitivities" for value and growth portfolios by regressing conditional betas of value and growth portfolios on the expected market risk premium. These tests find that value portfolios exhibit larger beta-premium sensitivities than growth portfolios, consistent with the conclusion that value is riskier than growth.

In this paper we reexamine the conclusions from Petkova and Zhang (2005), and other conditional CAPM studies, that value is riskier than growth.[4] We study the robustness of conditional CAPM-based findings that value is riskier than growth by examining variations in the conditioning variables used to construct expected market risk premiums. We note that the results from many of the papers in this literature are likely to be dependent on the specific conditioning variables used to construct expected market risk premiums. For example, we observe that the four conditioning variables used in the in Petkova and Zhang are chosen in a similar manner as many other authors have; Petkova and Zhang simply use what is most common in the literature and say essentially that on page 189 "Our choice of variables is standard from the time-series predictability literature".

However, other conditional CAPM papers, using different conditioning variables (or subsets of the previously mentioned four variables), reach different conclusions on the riskiness of value and growth. For example, Lewellen and Nagel (2006) use direct estimates of betas and alphas from moving-window estimations and find little evidence that value betas covary positively with the expected market risk premium.[5] The conflicting results across conditional CAPM papers concerning the sources of the value premium arise in part from the use of different conditioning information to estimate conditional betas and expected market risk premiums. Essentially, the problem is that inter-temporal versions of the CAPM (see, for example, Merton (1973)) and the Arbitrage Pricing Theory (Connor, 1984 and Ross, 1976) do not tell us the identity of the factors, thus, one uses "reasonable" proxies, usually based on the variables ability to predict market returns, in coming up with conditioning variables to use in conditional CAPM tests. Since there is no absolute agreement on the correct factors, and in many cases, a lack of strong theoretical motivation in factor selection, researchers have a relatively large degree of freedom in choosing the state variables used as conditioning information.[6] Thus, it is feasible that a nontrivial portion of the conditional CAPM results reported in the literature are simply due to luck.

We expand the set of conditioning variables used in Petkova and Zhang and other papers to consider additional variables which have been shown to predict the market and are likely to be related to the state of the economy. These alternative conditioning variables include the factors from the Fama and French (1993) three-factor model, the Chen et al. (1986) economic factors, the unemployment rate, the annual growth rate of industrial production, the ratio between durable goods expenditures and personal income, the ratio of savings to personal disposable income, the NBER expansion and contraction states, the Leading Composite Index calculated by the Conference Board, and the Consumer Sentiment Index from the University of Michigan. We use simple groupings of these conditioning variables to generate expected market risk premiums and then study the riskiness of the value and growth portfolios. Thus, the additional conditioning variables we consider are all plausible candidates, and in fact, from an ex ante standpoint, are arguably as likely of candidates as the more commonly used four factors (the default premium, the term premium, the dividend yield, and the short-term Treasury bill rate).

Over 1927–2005, we find that only one of the expected market risk premiums that we examine results in evidence consistent with value being riskier than growth, and that specification is the one obtained from the standard four business cycle variables. None of the other specifications result in statistically significant positive beta-premium sensitivity differences between the value and growth portfolios. When we look at the "big picture" (i.e., across subsets of the information set, across subperiods, and across different ways of estimating conditional betas — including "rolling" betas estimated using a market model and conditional "fitted" betas estimated using the four standard business cycle variables), we find that four out of 28 total specifications result in the conclusion of value being riskier than growth. On the other hand, we also find that four out of 28 specifications result in statistically significant negative beta-premium sensitivity spreads between value and growth portfolios, suggesting that value is *less* risky than growth. We also estimate beta-premium sensitivities for size-sorted portfolios. The results for small and big portfolios are not consistent with a risk explanation.

To develop a better sense for exactly how sensitive the risk tests are to the choice of conditioning variables, we perform simulations (or more precisely, specification searches) in which we estimate the beta-premium sensitivities for all possible combinations of the conditioning variables. In the simulations, we estimate the percentage of times that the beta-premium sensitivities are consistent with a risk explanation for the value, growth, and value-minus-growth portfolios as we vary the model used to construct expected market risk premiums. Overall, the low rejection rates in the simulations strongly suggests that the conclusion of value being riskier than growth is not robust to alternative conditioning information and is, in fact, close to rejection rates that one would observe by chance.

We also explore if the conditional CAPM can explain the magnitude of the returns to the book-to-market and size-sorted portfolios. Petkova and Zhang (2005) find that the four standard business cycle variables are not able to explain the value premium. In our simulation framework, using all possible conditional CAPM models generated from the combinations of the conditioning variables, we estimate pricing errors for the value and growth portfolio returns. We find that many of the simulation models generate positive pricing errors, suggesting that there exists important variation in how often the conditional CAPM can explain the value and the size premiums as a function of the researcher's choice of conditioning variables.

Finally, we apply our simulation tests to the ability of the conditional CAPM to explain the risk of other CAPM anomalies from the literature, such as momentum (Jegadeesh and Titman, 1993), share issuance (Daniel and Titman, 2006) and asset growth

[4] Other studies which find that the conditional CAPM helps to explain the value premium include Chen and Zhang (1998), Jagannathan and Wang (1996), Lettau and Ludvigson (2001), Lustig and Van Nieuwerburgh (2005) and Santos and Veronesi (2006).

[5] See also Ang and Chen (2007), Andersen et al. (2005), Chen and Zhao (2009), Franzoni (2006), Hwang and Rubesam (2007) and others.

[6] See for example, Bossaerts and Hillion (1999), Brennan and Xia (2005), Cooper and Gulen (2006), Ferson et al. (2003), Foster et al. (1997), Goyal and Welch (2008), Pesaran and Timmermann (1995) and Sullivan et al. (1999).