Further evidence on bear market predictability: The role of the external finance premium

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\textbf{ABSTRACT}

This paper revisits bear market predictability by employing a number of variables widely used in forecasting stock returns. In particular, we focus on variables related to the presence of imperfect credit markets. We evaluate prediction performance using in-sample and out-of-sample tests. Empirical evidence from the US stock market suggests that among the variables we investigate, the default yield spread, inflation, and the term spread are useful in predicting bear markets. Further, we find that the default yield spread provides superior out-of-sample predictability for bear markets one to three months ahead, which suggests that the external finance premium has an informative content on the financial market.

1. Introduction

Stock return predictability has attracted considerable attention in the literature, and a number of variables have been identified as generally good predictors of future stock returns. For example, financial variables, such as the dividend–price, earnings–price, and book-to-market ratios as well as dividend growth, have been found to be significant in predicting future stock returns (Campbell and Shiller, 1988, 1989; Fama and French, 1988; Goetzmann and Jorion, 1993; Pontiff and Schall, 1998; Lewellen, 1999; Lettau and Ludvigson, 2005; Menzly, Santos, & Veronesi, 2004). In addition, macroeconomic variables have also been found to be good candidates for the prediction of stock market movements (Thorbecke, 1997; Rapach, Wohar, & Rangvid, 2005). See Goyal and Welch (2008) for a comprehensive review of stock return predictability.

However, instead of predicting stock returns, some recent studies have shifted the focus to bear market predictability. Shen (2003) shows that by forecasting bear markets, investors can exploit profitable opportunities by optimally timing their portfolios. They can thus obtain higher returns by following a timing strategy rather than a buy-and-hold strategy. Therefore, predicting the turning points of stock markets becomes an informative task in investment. Furthermore, from a policy perspective, predicting the swings in the stock market provides useful information about business cycles (Estrella and Mishkin, 1998). In particular, widespread liquidity problems during bear market periods are more likely to cause credit crunches in financial markets (Bernanke and Lown, 1991). Thus, monetary authorities, which are generally responsible for maintaining and ensuring overall financial stability, can make use of information about future stock market booms and busts when implementing monetary policy \textit{ex ante} (Rigobon and Sack, 2003). As an example, a recent study by Chen (2009) evaluates bear market predictability using various macroeconomic variables, and concludes that the term spread and inflation are useful in predicting the bear markets. Nyberg (2013) subsequently confirms the empirical findings in Chen (2009) using dynamic binary time series models, and Fernandez-Perez, Fernández-Rodríguez, and Sosvilla-Rivero (2014) also show the yield curve predicts the bear market periods in the Spanish IBEX 35.

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Another strand of literature aims at predicting the direction of stock return (see e.g., Nyberg (2011), Leung, Daouk, and Chen (2000), Anatolyev and Gospodinov (2010, 2015)). Predicting the sign of future stock returns for a specified time period (e.g., daily or monthly) may provide investors useful information to time their buying and selling decisions; however, for “long-term” investors who rebalance their portfolios over the duration of a typical stock market cycle may not simply make a decision on a daily or monthly basis. Therefore, predicting the bear and bull markets can further help them to improve the timing of their investment decisions at a longer term since the duration of stock market cycle is taken as unknown ex ante when predicting bear and bull market regimes (Candelon, Pipiack, & Straetmans, 2008).

The purpose of this paper is to examine bear market predictability in stock markets using a range of financial variables, particularly those related to the presence of imperfect capital markets. There are several reasons why this exercise is both useful and appealing. First, although Chen (2009) shows that macroeconomic variables are informative in forecasting bear stock markets, it would be more practically relevant to consider financial variables as predictors, as these are not typically subject to revision. Second, focusing on variables related to imperfect capital markets is motivated by the well-known fact that imperfect capital markets play an important role in the propagation mechanism of exogenous shocks during business cycles (Bernanke and Gertler, 1995; Bernanke, Gertler, & Gilchrist, 1999; Hubbard, 1998). Thus, it is intuitive to relate imperfect capital markets to stock market dynamics. To explore this possibility, we follow existing studies, such as Bernanke and Gertler (1995), Bernanke et al. (1999), and Carlstrom and Fuerst (1997), to measure the changing conditions of credit markets using the external finance premium (EFP), since it has been shown in the literature that the EFP is a key indicator of credit market imperfections. In brief, as the probability that borrowers will default increases, lenders will charge a higher premium to compensate for the greater default risk, and the EFP will rise. Clearly, the increased risk of borrowers defaulting coincides with a more pessimistic economic outlook, which tends to suppress the stock market. That is, changes in the EFP can be used as a proxy to predict stock markets. Compared with the voluminous literature on the predictability of stock returns, few studies explore the predictability of bear markets, particularly using financial variables and measures of EFP. Accordingly, our paper focuses on examining the predictability of bear markets, employing a measure of EFP in addition to other financial and macroeconomic variables.

Using US data from 1952M1 to 2011M12, we consider 14 stock return predictors as potential candidates for predicting bear markets. The variables we consider comprise several valuation ratios (including the dividend–price and earnings–price ratios, and dividend yield), a number of variables related to corporate and equity market activity (the book-to-market and dividend–payout ratios, net equity expansion, and stock return variance), and a macro variable (inflation). We also specify a range of interest rate-related variables, including both short- and long-term interest rates and the term spread (Treasury bill rates, long-term bond yields, long-term bond returns, and the term spread). Finally, we consider the default risk premium as a proxy for the EFP (default yield spread and default returns). Given that existing empirical studies suggest that the cyclical variations in the US stock market are well characterized by Markov switching (MS) models (Maheu and McCurdy, 2000; Perez-Quiros and Timmermann, 2000), we identify bear markets by extracting the filtered probabilities using a two-state MS autoregressive (AR) model of aggregate returns. We then use predictive regression to investigate whether we are able to predict bear markets using various financial variables.

We conduct both in-sample and out-of-sample tests of predictability to evaluate forecasting performance. We find that among the variables investigated, the default yield spread, as measured by Baa-rated corporate bond yields minus Aaa-rated corporate bond yields, performs well in predicting bear markets, especially at horizons of one to three months. To compare our results with Chen (2009), we also implement non-nested tests. The results of these tests also demonstrate that the EFP yields better short-term market predictability than the term spread and inflation. On the other hand, inflation and the term spread best predict bear markets at medium to long horizons. Our findings therefore suggest that including the EFP, which is generally perceived to be a measure of the credit conditions faced by firms, can significantly enhance the predictability of bear markets. This is also reminiscent of past findings that the EFP of firms helps explain asset market movements (Bernanke and Gertler, 1995).

To check for robustness, we apply different measures of bear stock markets. In particular, we use the nonparametric method proposed by Candelon et al. (2008) to obtain an indicator series showing periods of bear market. We also consider the TED spread (the difference between the interest rates on interbank loans and short-term US government debt) as an alternative measure of the EFP, and show that our results remain robust. That is, different measures of EFP all perform well as leading indicators of bear markets.

The remainder of the paper is structured as follows. Section 2 introduces the list of predictors used to forecast bear markets. Section 3 explains the sources of data and the statistical properties of these time series. Section 4 presents a MS model and shows how this model identifies bear market periods. Sections 5 and 6 document our main findings on the predictability of bear markets. Section 7 provides the robustness checks, while Section 8 details the economic significance of predictions of bear markets. Finally, Section 9 offers some concluding remarks.

2. Potential predictors

We consider 14 predictors of bear markets, including financial and macroeconomic variables and various measures of the EFP. A brief explanation of these predictors are as follows.

Dividend–Price Ratio and Dividend Yield The log dividend–price ratio was first proposed by Campbell and Shiller (1988). They show that the log dividend–price ratio \( dp \) can be written as:

\[
dp = d_i - p_i = \bar{dp} + E_i \sum_{j=0}^{\infty} \rho^j [(d_{i+j}^r - r) - (d_{i+j}^r - \bar{d})].
\]
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