

# Predicting recessions with interest rate spreads: a multicountry regime-switching analysis

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## Abstract

This study uses Markov-switching models to evaluate the informational content of the term structure as a predictor of recessions in eight OECD countries. The empirical results suggest that for all countries the term spread is sensibly modelled as a two-state regime-switching process. Moreover, a simple univariate model turns out to be a filter that transforms accurately term spread changes into turning point predictions. The term structure is confirmed to be a reliable recession indicator. However, the results of probit estimations show that on average the Markov-switching filter does not improve the forecasting ability of the spread. © 2002 Elsevier Science Ltd. All rights reserved.

*Keywords:* Term structure; Economic fluctuations; Forecasting; Regime-switching

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## 1. Introduction

In recent years, numerous empirical studies have been carried out to evaluate the usefulness of spreads between long and short-term interest rates as leading indicators of real economic activity. While in most of these studies linear regression-based techniques are applied to forecast output growth rates<sup>1</sup>, some authors have done probit estimations in order to calculate the likelihood of future economic recessions. In such probit models the dependent variable is a recession dummy that equals one if the economy is in recession and zero otherwise, whereas the explanatory variable

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<sup>1</sup> See, among many others, Harvey (1991); Plosser and Rouwenhorst (1994); Bonser-Neal and Morley (1997); Davis and Fagan (1997) and Kozicki (1997).

is a lagged potential recession predictor. Estrella and Hardouvelis (1991) and Estrella and Mishkin (1998) provide evidence for the United States that the yield spread significantly outperforms other popular financial and macroeconomic indicators in forecasting recessions, particularly with horizons beyond one quarter. Bernard and Gerlach (1996) and Estrella and Mishkin (1997) extend this research to multicountry analyses, while Funke (1997) supplies additional evidence for Germany. In his recent study Dueker (1997) confirms the US results presented by Estrella and Mishkin (1998) using a modified probit model which includes a lagged dependent variable and additionally allows for Markov-switching coefficient variation.

In this paper, the predictive power of the yield spread for eight industrialized countries is reconsidered by combining regime-switching and probit models in a different way. Following Lahiri and Wang (1996), we first fit univariate two-state Markov-switching model to the term spread of the USA, Canada, Japan, Germany, France, the UK, Italy and the Netherlands respectively. As a next step we investigate whether one of the estimated states is systematically related to economic recessions. This is done by a graphical analysis where the estimated regime-probabilities are plotted against business cycle phases (Filardo, 1999). Finally, a formal assessment of the usefulness of the regime-switching technique is offered by estimating probit models where the explanatory variable is the calculated Markov-regime probability (Ang and Bekaert, 1998). The results of these estimations are then compared with the ones which are obtained by using only the spread as a leading indicator.

The main empirical findings presented in this paper are the following. For each country the yield spread can be characterized as a two-state regime-switching process. Furthermore, in nearly all cases one of the two regimes is more or less closely related to recessions, while the other one corresponds to economic expansion or recovery phases. The yield curve is confirmed to be a quite reliable recession predictor across the evaluated countries, because on average it signals recessions a considerable time before they actually begin, and produces only a few signals that falsely indicate business cycle turning points. As regards the chosen technique, the regime-switching model turns out to be an appropriate filter that efficiently transforms changes in the term spread variable into accurate and unambiguous turning point predictions. However, the final results of probit estimations also show that applying the Markov-switching filter does not significantly improve the forecasting ability of the term spread. Though the optimal lead times of regime-probabilities are, in many cases, identical to the most successful forecasting horizons according to probit estimations which contain the unfiltered spread, there seems to be a trade off between the sharp probabilities of the Markov-model and the accuracy of fitting independent recession dates.

The paper is structured as follows. The next section briefly reviews the theoretical link between interest rate spreads and real economic activity. In section 3, the regime-switching specification and the estimation method is described. Section 4 reports the estimation results. The predictive power of the yield curve is thoroughly analyzed in section 5. Section 6 concludes the paper.

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