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## Predicting severe simultaneous recessions using yield spreads as leading indicators

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Severe simultaneous recessions are defined to occur when at least half of the countries under investigation (Australia, Canada, Germany, Japan, United Kingdom, and United States) are in recession simultaneously. I pose two new research questions that extend upon stylized facts for US recessions. One, are the occurrences of simultaneous recessions predictable? Two, does the yield spread predict future occurrences of simultaneous recessions? I use the indicator for severe simultaneous recessions as the explained variable in probit models. The lagged yield spread is an important explanatory variable, where decreasing yield spreads are a leading indicator for severe simultaneous recessions. Both US and German yield spreads act as leading indicator for severe simultaneous recessions.

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### 1. Introduction

Previous research considers the predictability of recessions of a single country, most often the United States. The yield spread (the long interest rate minus the short interest rate) is known to predict future single-country recessions. In this paper I consider severe simultaneous recessions instead of single-country recessions as it is even more important to be able to foresee these than single-country recessions.

A severe simultaneous recession is defined to occur when at least half of the countries being studied are in recession simultaneously. The countries under investigation are six large developed countries,

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namely Australia, Canada, Germany, Japan, United Kingdom, and United States. To my knowledge, simultaneous recessions have not been predicted previously.

I use the probit model to describe the indicator variable for occurrences of simultaneous recessions. I provide both in-sample and out-of-sample analysis at 1–12 month horizons. Future simultaneous recessions are predictable, and more so at long horizons than at short horizons. The yield spread has an important influence upon the likelihood of future simultaneous recessions. Small yield spreads imply future simultaneous recessions. German yield spreads provide additional explanatory power for predicting future simultaneous recessions over and above US yield spreads. In many ways, the empirical findings regarding severe simultaneous recessions are parallel to the findings regarding single-country recessions.

Why does the yield spread predict future recessions? The literature gives a number of different answers to this question, cf. the overview in [Wheelock and Wohar \(2009\)](#). The yield spread is a measure of the shape of the yield curve. Increasing yield spreads are a leading indicator for expansions and decreasing yield spreads are a leading indicator for recessions. The expectations hypothesis is often used to explain this stylized fact. According to the expectations hypothesis the yield spread is equal to the expected future short rate and a term premium. Falling yield spreads before recessions are caused by both factors, where the decreasing expectations to future short rates is more important, cf. ([Hamilton and Kim, 2002](#)). Another explanation why yield spreads predict future recessions is based upon monetary policy. Tight monetary policy is used to stabilize output growth and causes the yield spread to decrease. The power of the yield spread as a leading indicator depends on the monetary authority's behavior, cf. ([Estrella, 2005](#)). Consumption smoothing across business cycles is another explanation for why the yield spread is a leading indicator in [Harvey \(1988\)](#). When investors expect recessions they sell short term bonds and buy long term bonds, which implies decreasing yield spreads. Yet, [Harvey \(1988\)](#) concerns real interest rates whereas most empirical work is done on nominal interest rates.

Previous research shows that the yield spread is an important predictor for future output, most often measured by GDP growth rates. [Stock and Watson \(1989\)](#) show that the yield spread acts as a leading indicator for the GDP growth rate. [Estrella and Hardouvelis \(1991\)](#) document that a positive yield spread predicts future increases in real economic activity. [Hamilton and Kim \(2002\)](#) confirm the usefulness of the yield spread for predicting future GDP growth rates. In addition, [Hamilton and Kim \(2002\)](#) analyze why the yield spread predicts future GDP growth rates. According to the expectations hypothesis, the yield spread is the expectation of future short rates and a term premium. [Hamilton and Kim \(2002\)](#) show that the most important reason why the yield spread forecasts future GDP growth rates is that low yield spreads imply falling future short rates. Interest rate volatility does not explain the importance of the yield spread. [Estrella \(2005\)](#) provides a theoretical model in which the yield spread explains output and inflation. He shows that the predictive ability of the yield spread depends on the monetary policy reaction function.

The yield spread is also an important predictor for future US recessions. This is not surprising as recessions are naturally related to GDP growth rates. US recessions are dated by the NBER Business Cycle Dating Committee. [Estrella and Mishkin \(1998\)](#) investigate the predictability of future US recessions using probit models. They show that the yield spread is the most promising explanatory variable. [Estrella and Hardouvelis \(1991\)](#) use the yield spread to predict future US recessions within a probit model. [Dueker \(1997\)](#) extends upon this by considering a dynamic probit model where the lagged recession variable is included as an explanatory variable. [Estrella and Trubin \(2006\)](#) contain some practical guidelines about using the yield spread as a leading indicator. This is evidence of the popularity of the yield spread as a leading indicator for US recessions. [Wright \(2006\)](#) shows that using the federal funds rate in addition to the yield spread improves the predictability of future recessions. He considers the likelihood of a recession occurring during successive quarters instead of during a specific quarter as is usual. [Rudebusch and Williams \(2009\)](#) show that the yield spread is better able to forecast future recessions than professional forecasters are. [Kauppi and Saikkonen \(2008\)](#) suggest a dynamic autoregressive probit model to estimate US recessions from yield spreads, where the lagged recession indicator and lagged recession probability are used as an explanatory variable. They also provide improved multi-period forecasts.

Although most research in this area concerns US recessions, there are several international studies. The international studies consider predicting recessions in each country separately. [Stock and Watson](#)

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