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Zero lower bound, unconventional monetary policy and indicator properties of interest rate spreads☆

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ABSTRACT

This paper re-examines the out-of-sample predictive power of interest rate spreads when the short-term nominal rates have been stuck at the zero lower bound and the Fed has used unconventional monetary policy. Our results suggest that the predictive power of some interest rate spreads have changed since the beginning of this period. In particular, the term spread has been a useful leading indicator since December 2008, but not before that. Credit spreads generally perform poorly in the zero lower bound and unconventional monetary policy period. However, the mortgage spread has been a robust predictor of economic activity over the 2003–2014 period.

1. Introduction

The empirical literature focusing on forecasting U.S. real macroeconomic variables has found that interest rate spreads have substantial predictive power for future economic activity. In particular, the term spread, i.e., the difference between the yields on long-term and short-term Treasury securities, has been identified as one of the most informative leading indicators (see, e.g., Stock & Watson, 2003). The term spread has predictive power because it is an indicator of the stance of monetary policy, which is an important driver of business cycles. The relationship between the term spread and future output growth is positive, i.e., higher spread indicates higher future growth.

The previous literature has also documented that various credit spreads contain significant information about subsequent real activity (see, e.g., Bernanke, 1990; Bernanke & Blinder, 1992; Faust, Gilchrist, Wright, & Zakrajšek, 2013; Friedman & Kuttner, 1992, 1998; Gertler & Lown, 1999; Gilchrist, Yankov, & Zakrajšek, 2009; Gilchrist & Zakrajšek, 2012; Mody & Taylor, 2003). Credit spread means either the difference between the yields on various corporate bonds and government bonds of comparable maturity or the difference between the yields on two private debt instruments differing with respect to their rating categories. Credit spreads are informative about future activity because they are indicators of changes in the supply of credit and market participants' expectations of default. They are also, at least to some extent, indicators of an effective monetary policy because the central bank's actions affect the supply of credit and the likelihood of defaults.

The predictive power of interest rate spreads varies over time. For example, it is a well-known fact that the ability of the term spread to forecast future economic activity has diminished since the mid-1980s (Stock & Watson, 2003 and the references cited therein). The changes in the predictive content of the term spread often correspond closely to major changes in the conduct of monetary policy (Bordo & Haubrich, 2008; Estrella, Rodrigues, & Schich, 2003; Giacomini & Rossi, 2006). Therefore, regime shifts in monetary policy are potentially important for the predictive power of the term spread. Similarly, because credit spreads are, at least to some extent, indicators of the stance of monetary

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policy, changes in monetary policy may also affect their predictive ability.

The financial crisis in 2008 changed the Fed's monetary policy altogether. Prior to the crisis the federal funds rate – the Fed's traditional monetary policy instrument – was well above zero. Since December 2008, the federal funds rate has been essentially stuck at the zero lower bound (ZLB). Fig. 1 demonstrates this fundamental change in monetary policy by plotting ten-year and one-year Treasury rates and the federal funds rate from 2000 through 2014. Although the federal funds rate has been at the lower bound of zero,[2] the recovery from the crisis has been slow. Therefore, the Fed has started to use unconventional monetary policies. The Fed has launched asset purchase programs, often referred to as quantitative easing, and used forward guidance. The aim of these two unconventional policies is to lower long-term rates and hence boost economic activity.

The fundamental change in monetary policy since December 2008 is potentially important for the predictive power of interest rate spreads for several reasons. First, in the non-ZLB environment, the term spread correlates negatively with the short-term rate and is uncorrelated with the long-term rate (see Table 2). In contrast, when the short-term rate is fixed at or near zero, the term spread fluctuates essentially one-for-one with the long-term rate. Second, related to the first reason, the possible values of the term spread are restricted when the short-term rate is fixed at the ZLB. In the non-ZLB period, when both the short-term and long-term rates fluctuate, the term spread can be negative, zero, or positive. When the short-term rate is fixed at or near zero, the term spread equals the long-term rate and can thus have only non-negative values. Third, as discussed in Krippner (2013), the term spread is a directionally misleading measure of the stance of monetary policy in ZLB/unconventional monetary policy environments. Tight monetary policy periods in non-ZLB/conventional monetary policy environments have corresponded with low values of the term spread. However, in the ZLB/unconventional monetary policy environment since December 2008, the term spread decreases because the long-term rate falls while the short-term rate remains essentially fixed at the zero level. Hence, the decreasing spread could be misinterpreted as a tightening of monetary policy when actually the use of unconventional methods substantially eases monetary policy. Fourth, the long-term rate depends on the entire path of expected future short-term rates. Hence, if the short-term rates are assumed to be at the zero level for a sufficiently long period, the ZLB constraint on short-term rates should also affect the behavior of the long-term rates. However, Swanson and Williams (2014) find that, for instance, the ten-year Treasury rate was essentially unconstrained by the zero bound throughout 2008–2010. Since late 2011, the sensitivity of the ten-year Treasury rate to macroeconomic news has fallen, indicating that the long-term rate has been affected by the ZLB.[3] This finding suggests that the predictive ability of interest rate spreads depending on the long-term Treasury rate might have changed since the onset of the ZLB/unconventional monetary policy period.

The short-term rates in the U.S. have been effectively constrained by the ZLB only in the 1930s and since 2008. Although very low interest rates have been rare, Bernanke, Reinhart, and Sack (2004) and Chung, Laforte, Reifschneider, and Williams (2012) argue that the ZLB restriction is nowadays much more likely to become binding than in the past. The primary reason for this is the change in the way central banks conduct monetary policy. Modern central banks have adopted an inflation target and are thus committed to keeping inflation at a low level. Low and less volatile inflation has in turn allowed for lower interest rates.

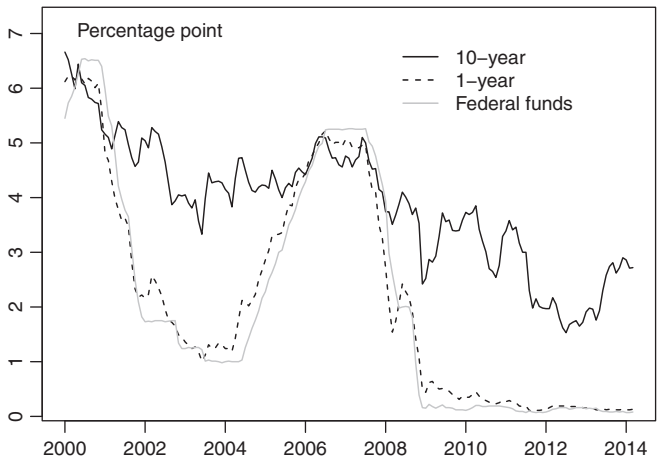

Fig. 1. Treasury rates since 2000. Notes: Sample period 2000:M1–2014:M3. The data are extracted from the Federal Reserve Economic Data (FRED) (Federal Reserve Bank of St. Louis).

Low inflation and interest rates increase the probability that negative shocks will force the central bank to lower the short-term rate to the ZLB. As a consequence, we believe that empirical study of the leading indicator properties of interest rate spreads when the ZLB restriction is binding is highly worthwhile.

In this paper, we examine whether the ZLB and unconventional monetary policy have affected the real-time out-of-sample predictive power of the term spread and a set of credit spreads for U.S. industrial production. The main finding from this study is that the predictive content of the term spread has changed since the beginning of the ZLB/unconventional monetary policy period. We find that the term spread does not contain predictive power for future economic activity in non-ZLB/conventional monetary policy environments. However, the term spread is a useful leading indicator in the ZLB/unconventional monetary policy period. Thus, our results support the view that changes in monetary policy affect the predictive ability of the term spread (see Estrella, 2005). The results also indicate that the mortgage spread (i.e., the difference between the 30-year mortgage rate and ten-year Treasury bond rate) is a particularly informative leading indicator. It is a robust predictor of industrial production growth across a variety of sample periods and forecast horizons. The mortgage spread systematically contains predictive power in our real-time forecasting exercise both in the non-ZLB/conventional monetary policy and ZLB/unconventional monetary policy periods.

The remainder of the paper is organized as follows. In Section 2, we describe the econometric methodologies. Section 3 presents the empirical results, and Section 4 contains concluding remarks.

2. Methodology

In this section, we briefly describe the econometric methodologies used in this paper. The purpose of this study is to examine whether different spreads forecast future economic activity in the ZLB/unconventional monetary policy period.[4] In order to analyze this question, we follow Stock and Watson (2003), Rossi (2013), and Ng and Wright (2013) and

[2] Investors always have the option of holding cash, so interest rates cannot be reduced below zero.

[3] Swanson and Williams (2014) offer two explanations for their findings. Until late 2011, market participants expected that the Fed would raise the short-term rate from zero within a few quarters, which minimized the effect of the ZLB on long-term Treasury rates. On the other hand, the unconventional monetary policy actions have helped offset the effects of the ZLB on long-term rates.

[4] Monthly industrial production is used to gauge the state of the economy. The most frequently used measure of economic activity in the previous literature is the quarterly GDP. In our case, the number of observations is important because the ZLB/unconventional monetary policy period is relatively short (running from December 2008 to March 2014). Therefore, monthly industrial production is more appropriate for our purposes.