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The mortgage spread as a predictor of real-time economic activity

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Abstract

We analyze the predictive content of the mortgage spread for U.S. economic activity. We find that the spread contains predictive power for real GDP and industrial production. Furthermore, it outperforms the term spread and Gilchrist–Zakrajšek spread in a real-time forecasting exercise. However, the predictive ability of the mortgage spread varies over time.

Keywords: mortgage spread, forecasting, real-time data

JEL codes: C53, E37, E44

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1. Introduction

The empirical literature has found that credit spreads contain predictive power for U.S. economic activity. Credit spread means the difference between the yields on various corporate bonds and government bonds. Credit spreads have predictive content because they are indicators of changes in the supply of credit and the expectations of default.

Walentin (2014) shows that the spread between the mortgage rate and government bond rate (the mortgage spread) affects economic activity. Although financial frictions in the mortgage market are important for business cycle fluctuations, the predictive content of the mortgage spread has received little attention in the literature. In a recent paper, Hännikäinen (2014) finds that the mortgage spread predicts U.S. industrial production in the 2003:M6–2014:M3 period.

This paper analyzes the real-time out-of-sample predictive power of the mortgage spread for U.S. real activity. We compare the forecasting performance of the mortgage spread to that of two widely-used leading indicators, namely, the term spread and a credit spread discussed in Faust et al. (2013) and Gilchrist and Zakrajšek (2012) (henceforth GZ spread). Finally, we examine whether the predictive power remains stable over time.

The main finding from this study is that the predictive ability of the mortgage spread exceeds that of the term spread and GZ spread. However, the predictive power of the mortgage spread fluctuates over time.

2. Methods

Following Stock and Watson (2003), we analyze the predictive power using the linear, horizon-specific h-step ahead model:

$$Y_{t+h}^{h} = \beta_0 + \sum_{i=0}^{p} \beta_{1i} X_{t-i} + \sum_{j=0}^{q} \beta_{2j} Y_{t-j} + u_{t+h}^{h}, \qquad t = 1, ..., T \tag{1}$$

where $Y_{t+h}^{h} = (400/h)ln(GDP_{t+h}/GDP_t)$ is the growth over the h quarters, $Y_{t-j} = 400ln(GDP_{t-j}/GDP_{t-j-1})$, X_t is the spread, and u_{t+h}^{h} is an error term.

We estimate (1) at each forecast origin by OLS using a rolling window of 60 observations. We allow the lags of Y_t to vary between zero and four and the lags of X_t to vary between one and four. We determine the lag lengths by minimizing the Bayes Information Criterion (BIC).

We quantify out-of-sample forecast performance by computing the mean squared forecast error (MSFE) of the mortgage spread forecast relative to that obtained from an autoregressive (AR) model. For the AR model, we consider lags between one and four and choose the lag length with the BIC. If the relative MSFE is less than one, the model with the spread has produced more accurate forecasts than the AR model. This implies that the spread contains marginal predictive power. Because both the spread model and the benchmark have a recursive BIC lag length selection, we might use both nested and non-nested models when generating out-of-sample forecasts. The Giacomini and White (2006) test allows the comparison of both nested and non-nested models and is therefore appropriate for our purposes.

If the relative forecasting performance varies over time, the average performance over the whole out-of-sample period may give a misleading picture of the predictive power. We analyze time variations in the relative forecasting performance using the

Giacomini and Rossi (2010) fluctuation test, which is equal to the Giacomini and White (2006) test computed over a rolling out-of-sample window. Under the null hypothesis, the two methods yield equally accurate forecasts at each point in time. If the null is rejected, one of the methods outperformed its competitor at some point in time.

3. Forecasting results

We analyze whether the mortgage spread (the difference between the 30-year mortgage rate and ten-year Treasury bond rate) is a useful leading indicator for GDP and industrial production. We also compare the predictive power of the mortgage spread to that of the term spread (the difference between ten-year Treasury bond rate and three-month Treasury bill rate) and the GZ spread. The sample period runs from 1975:Q1 to 2012:Q4. Different vintages of real GDP and industrial production are obtained from the Philadelphia Fed's real-time database. The interest rate data are from the St. Louis Fed's database and the GZ spread is downloaded from Simon Gilchrist's web page. Following Faust et al. (2013), the forecasts are made using data available in the middle month of each quarter. For real GDP and industrial production, we use the February, May, August, and November vintages of data. All interest rates are from the first month of each quarter.

First, we consider the whole out-of-sample period from 1992:Q1 to 2012:Q4. The results for real GDP are summarized in Panel A of Table 1, whereas Panel B contains the results for industrial production. The first row in both panels provides the root MSFE of the AR benchmark. The subsequent rows show the MSFE of a candidate spread model relative to the MSFE of the benchmark. The statistical significance is evaluated using the one-sided Giacomini and White (2006) test.

The results show that the mortgage spread contains predictive power for real GDP growth. The mortgage spread model produces more accurate forecasts than the AR benchmark, regardless of the forecast horizon and whether we forecast the first-release or the final values.[1]Although the differences in the MSFE values are quite large, the null of equal predictive accuracy cannot be rejected. Interestingly, the ability of the mortgage spread to forecast GDP growth is superior to that of the term spread and GZ spread in seven of the eight forecast horizon/true value combinations. The term spread and GZ spread typically perform poorly in the forecasting exercise.

Table 1: Out-of-sample MSFE values

	First-release				Final values			
A. GDP	h=1	h=2	h=3	h=4	h=1	h=2	h=3	h=4
AR	2.09	1.95	1.77	1.65	2.31	2.03	1.87	1.77
Mortgage spread	0.88	0.92	0.94	1.02	0.91	0.92	0.94	0.99
GZ spread	0.90	1.06	1.27	1.34	0.90	1.04	1.21	1.28
Term spread	1.22	1.16	1.22	1.27	1.14	1.14	1.20	1.23
B. Industrial production								
AR	5.58	4.96	4.61	4.28	5.74	5.06	4.71	4.35
Mortgage spread	0.87*	0.79*	0.80*	0.87	0.87*	0.79*	0.81*	0.87
GZ spread	0.92	1.19	1.32	1.28	0.93	1.19	1.32	1.29
Term spread	1.11	1.00	1.02	0.98	1.09	0.99	1.01	0.98

Asterisks mark rejection of the Giacomini and White (2006) test at the 1% (***), 5% (**), and 10% (*) significance levels, respectively.

[1]We use values recorded in the real-time dataset two quarters after the quarter to which the data refer as final values (cf. Faust et al., 2013).

Panel B suggests that the mortgage spread is a useful leading indicator for industrial production. The mortgage spread model produces lower MSFE values than the benchmark for all forecast horizons. In six of the eight forecast horizon/true value combinations, the mortgage spread contains statistically significant predictive power. Furthermore, it outperforms the term spread and GZ spread in each of the eight cases.[2]

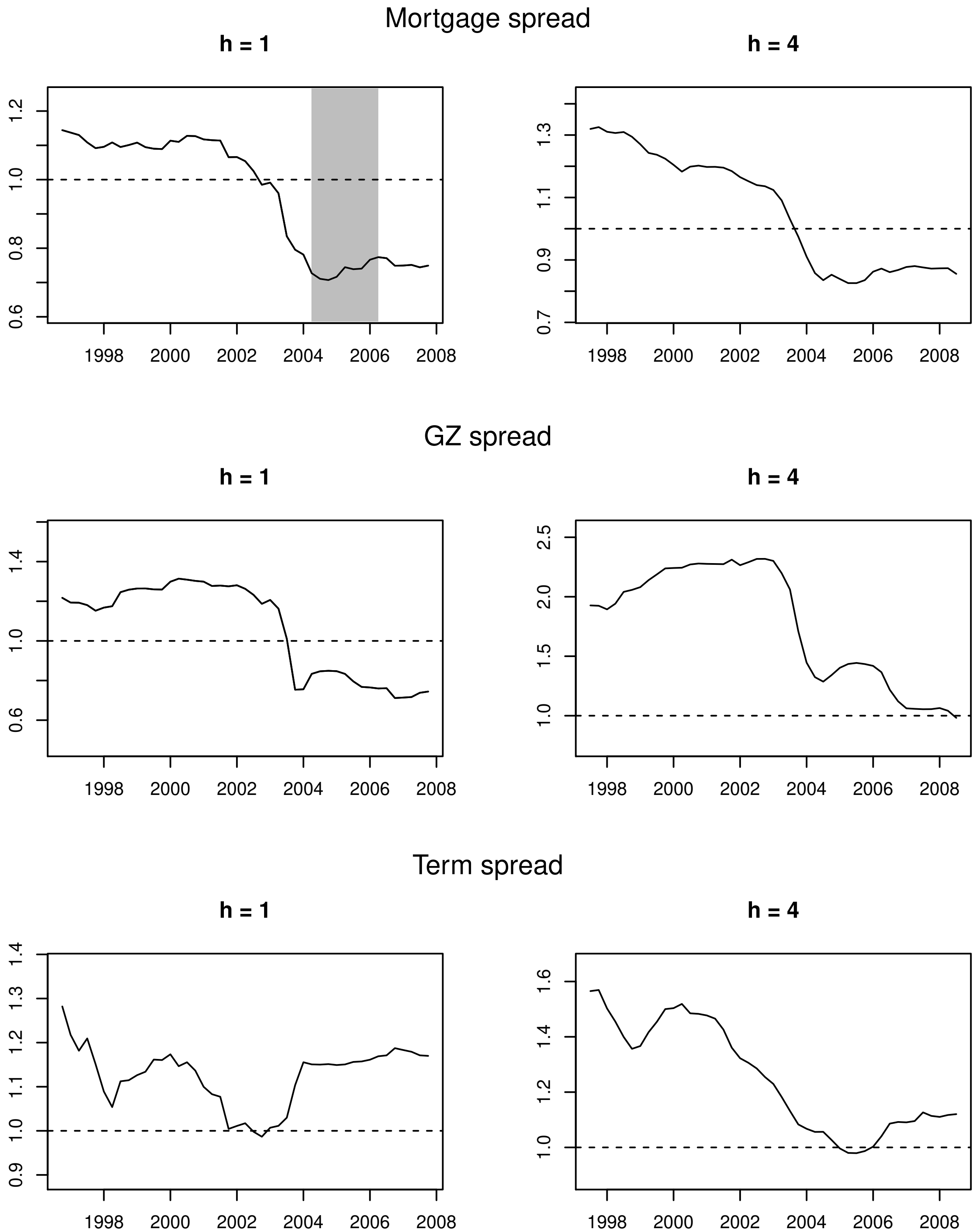
Next, we plot the relative MSFE values computed over a rolling window of 40 quarters. Figures 1 and 2 show the results for real GDP and industrial production, respectively. To save space, we report the results only for the first-release values at $h = 1$ and $h = 4$. The results for the other two horizons, and for the final values, are qualitatively similar.

The performance of the mortgage spread as a predictor of output growth is somewhat episodic. At the beginning of the out-of-sample period, the mortgage spread model produces less accurate forecasts than the benchmark. However, later in the sample, inclusion of the mortgage spread improves forecast accuracy. The fluctuation test rejects the null at $h = 1$ for windows centered at 2004:Q1–2006:Q1 for GDP and at 2004:Q2–2007:Q2 for industrial production. Because the mortgage spread performs well in the latter part of the sample, the results imply that the frictions in the mortgage market are important in explaining recent business cycle fluctuations (see Hännikäinen, 2014; Walentin, 2014).

Figures 1 and 2 reveal that the term spread and GZ spread have episodically predictive power (cf. Ng and Wright, 2013). However, the rolling relative MSFE values for these two spreads are typically above one, sometimes by quite a substantial margin. Figures 1 and 2 confirm our previous finding that the predictive ability of the mortgage spread, in most cases, exceeds that of the term spread and GZ spread.

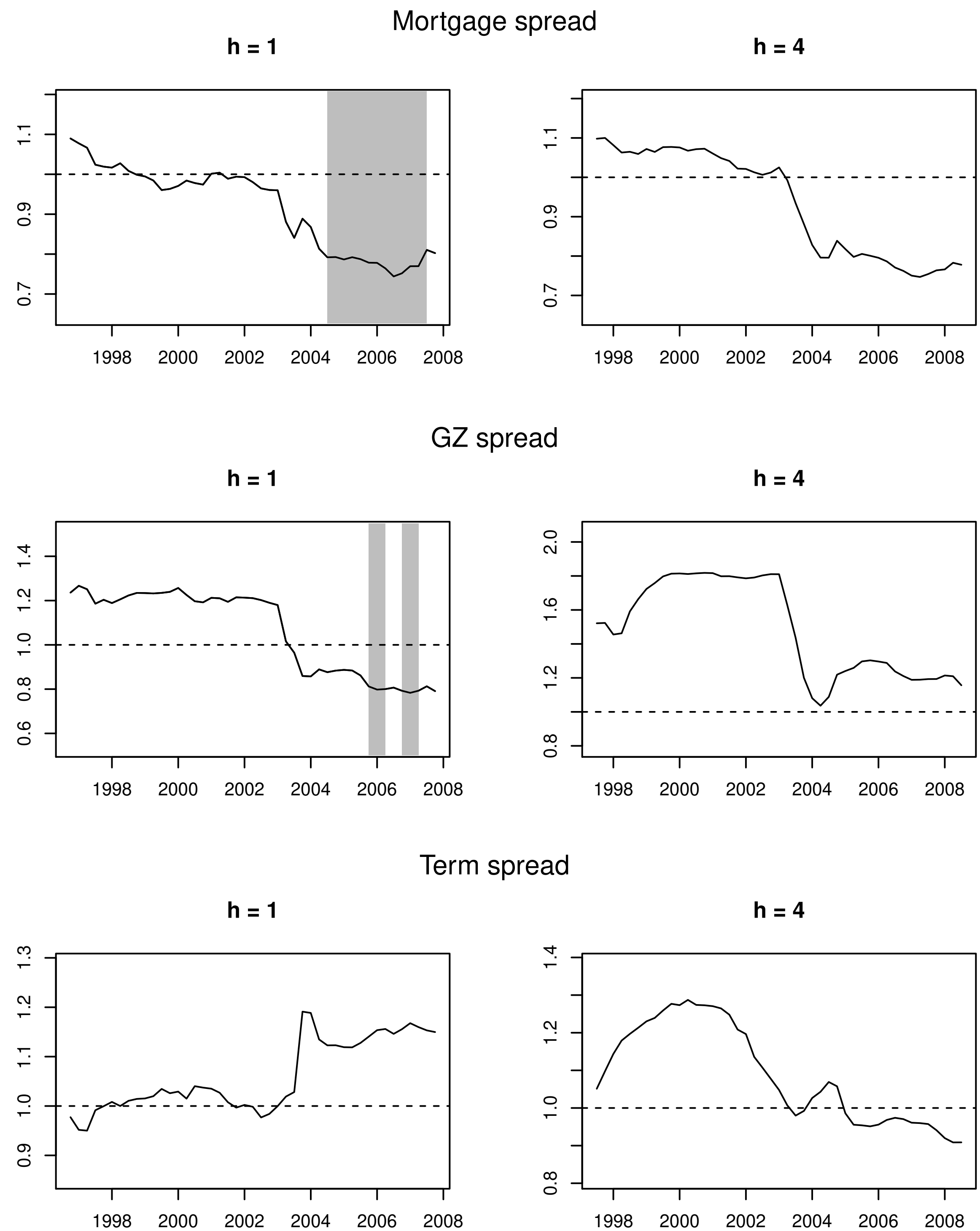
[2] The general conclusions are the same if we estimate the models using an expanding window estimator.

Figure 1: Rolling relative MSFE values for GDP



The shaded areas denote the midpoints of windows in which the Giacomini and Rossi (2010) fluctuation test rejects the null of equal forecast accuracy at the 10% significance level.

Figure 2: Rolling relative MSFE values for industrial production



See the notes to Figure 1.

4. Conclusion

This paper examined whether the mortgage spread has real-time predictive power for U.S. economic activity. We find that the mortgage spread is a useful leading indicator for real GDP and industrial production growth. However, the predictive power fluctuates over time. The mortgage spread has been particularly informative since early 2000s. Interestingly, our results show that the mortgage spread typically outperforms the widely-used term spread and GZ spread.

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