Journal of Banking & Finance 54 (2015) 239–253

Contents lists available at ScienceDirect

Journal of Banking & Finance

journal homepage: www.elsevier.com/locate/jbf

A comparison of the information in the LIBOR and CMT term structures of interest rates

Robert Brooks [a,*], Brandon N. Cline [b,1], Walter Enders [a,2]

[a] The University of Alabama, Culverhouse College of Business, 200 Alston Hall, Tuscaloosa, AL 35487, United States
[b] Department of Finance and Economics, Mississippi State University, 312 McCool Hall, Mississippi State, MS 39762-9580, United States

ARTICLE INFO

Article history:
Received 8 August 2013
Accepted 11 January 2015
Available online 22 January 2015

JEL classification:
E43

Keywords:
Term structure
Expectations hypothesis
LIBOR
Forward rates

ABSTRACT

We investigate the information contained in the London Interbank Offered Rate (LIBOR) and the U.S. Constant Maturity Treasury (CMT) term structure of interest rates and report three novel findings. First, we document that the information contained in term structures are significantly different from one another. Second, we provide evidence of a significant change in the nature of this difference as the financial crisis began. Third, we find that the significant changes in the information content of CMT and LIBOR are consistent with significant shocks to credit default swap rates and tenor swap rates.

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

The London Interbank Offered Rate (LIBOR) is an average interest rate based on funding between two banks, whereas the Constant Maturity Treasury (CMT) rate is based on direct obligation of the United States government. Although LIBOR reflects market expectations, it also contains other information not present in CMT rates, such as default information and differing term premiums. Since U.S. government regulators do not directly seek to manipulate LIBOR, one would expect the LIBOR rate to behave substantively different from similar maturity government managed interest rates.

Between November 2001 and August 2006, the average of the ratio of the 60-day standard deviation for 3-month LIBOR and 3-month CMT was roughly 1.0. Between August 2006 and July 2007, however, one month LIBOR was virtually constant while other short term rates, such as CMT, exhibited significant volatility. Thus, this same ratio averaged 0.25. After July 2007 and until February 2014, the average daily ratio was 1.8. Clearly, there have been significant changes in the relationship between LIBOR and CMT.

As the financial crisis unfolded, LIBOR appeared to delink from other benchmark rates (see Abrantes-Metz and Metz, 2012; Abrantes-Metz and Verstein, 2013; and Abrantes-Metz et al., 2011). By 2012, numerous investigations were underway and many lawsuits were filed alleging collusion in the setting of LIBOR rates (as well as other currencies' interbank offer rates) ensnaring almost all contributing banks. For example, on June 27, 2012, three different regulatory agencies announced fines against Barclays Bank. Specifically, the fines levied against Barclays Bank are $200 million by the Commodity Futures Trading Commission, $160 million by the United States Department of Justice, and £59.5 million by the Financial Services Authority.[3]

Given the alleged period of fraudulent manipulation of LIBOR settings prior to and during the financial crisis, questions regarding the informational content of this rate versus others naturally arise. Brooks et al. (2012) (BCE hereafter) examine the information in the United States Treasury term structure of interest rates and document that the information content of U.S. Constant Maturity Treasury (CMT) rates has changed in recent years. Specifically, employing the methodological approach of Fama (1984a,b, 2006), they illustrate that current interest rates contain more information about subsequent rate changes than expected holding period returns.

* Corresponding author. Tel.: +1 205 348 8987.
E-mail addresses: rbrooks@cba.ua.edu (R. Brooks), brandon.cline@msstate.edu (B.N. Cline), wenders@cba.ua.edu (W. Enders).
[1] Tel.: +1 662 325 7477.
[2] Tel.: +1 205 348 8972.

[3] See "Libor Scandal," at http://en.wikipedia.org/wiki/Libor_scandal and sources cited therein. Accessed on April 8, 2014.

http://dx.doi.org/10.1016/j.jbankfin.2015.01.006
0378-4266/© 2015 Elsevier B.V. All rights reserved.

In this study, we extend the analysis to LIBOR and explore differences in the information content between LIBOR and CMT rates. Aside from the alleged collusion, there are several additional reasons why the information content of LIBOR may be different from CMT. First, LIBOR is based on AA-rated banks; hence, LIBOR is expected to reflect higher default risk. Fama (1986) finds that expected returns on money market securities exhibit time-varying default premiums and specifically shows that default premiums are higher during recessions. LIBOR is an interbank market rate and therefore should not be plagued by "flight to quality" issues during financial distress. Second, U.S. banking regulators do not directly seek to target and manipulate LIBOR. LIBOR is simply an aggregate survey response based on contributing banks' answer to the following question, "At what rate could you borrow funds, were you to do so by asking for and then accepting interbank offers in a reasonable market size just prior to 11 am London time?"[4] Thus, the loose monetary policy after the financial crisis began created significant liquidity, making U.S. Treasury securities more attractive.

There are also several technical and secondary reasons for observed differences between LIBOR and CMT. First, U.S. Treasury securities are exempt from state and local taxes, which creates a partially tax exempt investment. Second, often U.S. Treasury securities are "on special" in the repurchase market. This provides additional compensation for U.S. Treasury holders willing to engage in securities lending. Third, the supply of U.S. Treasury securities varies significantly over time, dependent upon U.S. federal deficits. Fourth, U.S. Treasury securities receive preferential treatment at U.S. commercial banks with no (or low) capital requirements and can be used to fulfill a variety of regulatory requirements. Finally, U.S. Treasury securities are suitable for advanced refunding escrow for municipal bonds, which increases the relative demand for treasuries when tax exempt bond yields fall significantly.

We therefore contrast the informational content of the LIBOR term structure with that previously documented for CMT rates and make several important contributions. First, we extend the work of BCE by using LIBOR data and a common curve fitting procedure based on the work of Nelson and Siegel (1987) and Svensson (1995).[5] Second, we document for the first time a significant difference in informational content between the LIBOR and CMT rates. In particular, we show that prior to the financial crisis and even during the period of apparent manipulations LIBOR primarily contained information about changes in future spot rates, whereas CMT rates also contained information about return premiums.

Next, we illustrate that during the financial crisis the information content of LIBOR and CMT dramatically changed. After the start of the crisis, LIBOR abruptly departs from containing information about future rate changes to containing information regarding return premiums. For CMT, the shifts around the financial crisis are less dramatic. Specifically, there is a departure from predicting both future rate changes and return premiums to containing more information on return premiums. By examining the differential between the two markets, we document that the informational content changes between the two markets are significant and persisted even after the LIBOR manipulation was well-known and fines levied. Finally, we show that the difference in information contained in CMT and LIBOR is consistent with significant changes in credit exposure and tenor effects.

Collectively, we illustrate that the information content of CMT and LIBOR is distinctly different. These documented differences are significant enough that we caution forecasters that, when seeking expectation information regarding the future course of interest rates, it is important to distinguish between CMT and LIBOR.

The outline of our paper is as follows: Section 2 identifies the data, describes the curve fitting method employed, and presents the general framework for representing the term structure of interest rates. Selected hypotheses are also proposed. Empirical results from the methodology are presented in Section 3. Section 4 concludes.

2. Data and theoretical framework

2.1. Data

Our examination uses LIBOR data from the British Bankers Association and CMT data provided in the H.15 file produced by the Board of Governors of the Federal Reserve System.[6] A curve-fitting method detailed below is used to construct a complete database of implied monthly discount factors. The LIBOR daily data begins in January 1986 and runs through December 2013. The initial LIBOR data consists of 1-, 3-, 6-, 9-, and 12-month rates. The remaining monthly rates were added on January 2, 1987. The one-week rate was added on December 1, 1997, and the overnight and two-week rates were finally added on January 2, 2001. CMT data is available prior to January 1986, so we include LIBOR and CMT in our analysis from January 1986 through December 2013.

2.2. Theoretical framework

Following BCE, we examine monthly horizons. Hence, a methodology is needed to estimate a monthly CMT curve as well as a monthly LIBOR curve. Motivated by the work of Nelson and Siegel (1987), Svensson (1995) develops a methodology employing estimates of level, slope, and multiple curvature terms. Steeley (2008) tests a variety of term structure estimation methods and finds this method to be extremely well-specified. BCE call this approach the LSC model due to the estimates of level, slope, and curvature. We use the general form that can be expressed as

$$r(\tau_j : t_i) = \sum_{n=0}^{N} b_{n,t_i} C_{j,n}(\tau_j; s_n),$$

where

$$C_{j,0}(\tau_j; s_0) = 1,$$

$$C_{j,1}(\tau_j; s_1) = \frac{s_1}{\tau_j}\left[1 - \exp\left\{-\frac{\tau_j}{s_1}\right\}\right],$$

$$C_{j,n}(\tau_j; s_n) = \frac{s_n}{\tau_j}\left[1 - \exp\left\{-\frac{\tau_j}{s_n}\right\}\right] - \exp\left\{-\frac{\tau_j}{s_n}\right\}; \quad \textit{for } n > 1,$$

and where $r(\tau_j : t_i)$ denotes the spot interest rate observed at calendar time t_i expressed in years, with maturity τ_j, measured in years from t_i, and $b_{n,t}$ denotes the fitted parameters for level, slope and curvatures. The scalar, s_n, is deterministic and has several constraints. The scalar essentially applies various weights to different locations on the term structure. Note that s_0 is not used, but allows for the simple summation expression of the general equation. Based on the work of Nelson and Siegel (1987) and Svensson (1995), we require $s_1 = s_2$.

The five-parameter version with fixed scalars $s_1 = s_2 = 0.2$, $s_3 = 0.4$, $s_4 = 0.6$, and $s_5 = 0.8$ is applied for LIBOR since maturities extend only to one year. The five-parameter version with fixed

[4] See https://www.theice.com/iba/libor last referenced on June 27, 2014.

[5] A curve fitting procedure is used to facilitate comparison with previously reported CMT rates because a complete set of prices is not available for CMT data.

[6] As of February 1, 2014, the administration of LIBOR has moved to the Intercontinental Exchange.

Download English Version:

https://daneshyari.com/en/article/5088666

Download Persian Version:

https://daneshyari.com/article/5088666

Daneshyari.com