Bond Yield Spreads and Short-Term Interest Rate Movements[1]

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Abstract

The information content of the short end of the term structure depends on the stance of monetary policy. Based on the findings of several authors such as Simon (1990) and Hardouvelis (1988) the bond spreads can predict future short-term rate movements. Hence, we use monthly observations from 1997 to 2000 on inter-bank rate, treasury bill rates, government bond rates and corporate bond rates to better understand the relationship between the predictive power of the term structure and the stance of monetary policy.
Keywords: monetary policy; bond yields; term structure

Abstrak

Kandungan maklumat jangka pendek struktur tempoh bergantung kepada pendirian dasar kewangan. Berdasarkan dapatan beberapa penulis seperti Simon (1990) dan Hardouvelis (1988), spred bon boleh meramalkan pergerakan kadar faedah jangka pendek masa hadapan. Oleh itu, kadar bulanan faedah antara bank, bil perbendaharaan, bon kerajaan dan bon korporat dari 1997 hingga 2000 digunakan bagi menentukan perhubungan antara kuasa ramalan struktur tempoh dan pendirian dasar kewangan.
Kata kunci: dasar kewangan, kadar hasil bon, struktur tempoh.

Introduction

Does the slope of the term structure – the yield spread between longer-term and shorter-term interest rate – predict future changes in interest rate? And if so, is the predictive power of the yield spread in accordance with the expectation theory of the term structure? These questions are important, both for forecasting

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interest rate and for interpreting shifts in the yield curve. If the expectation theory is an adequate description of the term structure, then rational expectations of future interest rate are the dominant force determining current long-term interest rate. On the other hand, if the expectation theory is very far from accurate, then predictable changes in excess returns must be the main influence moving the term structure.

The empirical evidence done by Campbell and Shiller (1991), finds a high yield spread between a longer-term and a shorter-term interest rate forecasts rising shorter-term interest rate over the long term, but a declining yield on the longer-term bond over the short term. This pattern is inconsistent with the expectation theory of the term structure, but is consistent with a model in which the spread is proportional to the value implied by the expectation theory.

Other studies by Hardouvelis (1988) and Simon (1990, 1991) find that the information content of the short end of the term structure depends on the stance of monetary policy, and thus can explain the predictive power for future interest rate. Hardouvelis (1988) finds that spreads between weekly and longer-maturity rates has predictive power for future weekly rates during the study period from October 1979 to October 1982, i.e., when the central bank was not actively smoothing interest rates.

Simon (1990) supports this finding. He finds that the Thursday spread between the Federal Funds rate and three-month Treasury bills helped predict future weekly funds rate movements between 1979 and 1982, but not afterward. However, Simon (1990) also shows that, using a different sample, spreads immediately following meetings of the central bank have predictive power for future short-rate movements.

However, as argued by Roberts, Runkle and Whiteman (1996), there are important differences among the monetary policy regimes in the information content of yield spreads at the short end of the term structure. Moreover, even within a particular regime (e.g. using the contemporaneous reserve accounting, spreads have different predictive power on different days of the reserve settlement period. The findings from their study show that the term structure is not informative for future interest rate movement before 1979, it was informative between 1979 and 1982, and there is information in the short end of the term structure after 1984 when the central bank switched to contemporaneous reserve accounting.

In this paper, we use the monthly observations from 1998 to 2000 on corporate bond and government bond rates with maturities from 1 year to 15 years to better understand the relationship between the predictive power of the term structure and the stance of monetary policy.[2]

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[2] We define the stance of monetary policy by examining the changes in the intervention rate of Bank Negara Malaysia, which later affect the short-term interest rate, see Nur Mariana and Abd. Ghafar (2003).

Model and Data

In examining the information content of the short end of the term structure which depends on the stance of monetary policy, we develop a model to better understand how yield spreads can predict future short-term rate movements. To develop a model that can predict short-term rates, we adopt the approach of Campbell and Shiller (1991).

The basis of those models is based on the following arguments. In order to investigate relations between changes in yield spreads and changes in the short-term interest rate, we need variables that summarize the information in the short-term interest rate. Litterman and Scheinkman (1991), and Chen and Scott (1993) document that the vast majority of variation in the short-term interest rates can be expressed in terms of changes in the level. We measure the level of the short-term interest rates with the three-month inter-bank rate, denoted $Y_{3,t}$,.

We estimate the following regression using ordinary least squares (OLS) over the period January 1998 through December 2000.

$$\Delta SPREAD_{i,m,t} = \beta_{0,i,m,} + \beta_{1i,m} \Delta Y_{3,t} + e_{i,m} \qquad (1)$$

In equation (1), the change from month t to month $t+1$ in the mean yield spread on bonds issued with rating i and maturity m is regressed on contemporaneous changes in the three-month inter-bank rate $Y_{3,t}$.

The data for 3-month inter-bank is compiled from the quotation sheets of 3 months Inter-bank Money Market of Monthly Statistical Bulletin published by Bank Negara Malaysia. Our data on the corporate bonds of 3, 5, 7 and 10 years maturities; and the market indicative yields, i.e., Malaysian Government Securities with maturities 1-15 years and the three-month, six-month and twelve-month Treasury Bills are gathered from the Newsletter of Rating Agency Malaysia.

Findings

The dependent variable in equation (1) is the yield spreads of bonds. As for the explanatory variable, we use the inter-bank rate as a proxy for interest rate movement. Furthermore, we present the t-statistics, which are reported in parentheses below each estimated coefficients. The asterisks * and ** show that

Table 1

Estimated Coefficients for 3-Years Corporate Bonds

Dep. Var.	β_0	β_1	β_2	$\bar{R}^2$	DW
ΔAAA3	-0.0925	0.0237	0.4334	0.1764	2.1902
	(1.8889)	(0.4673)	(2.8015)*		
ΔAA3	-0.0798	0.0148	0.4544	0.1635	1.7825
	(1.4451)	(0.2570)	(2.7416)*		
ΔA3	-0.0850	0.01567	0.4744	0.2046	2.1115
	(1.4928)	(0.2531)	(3.0785)*		
ΔBBB3	-0.0537	0.1338	0.3830	0.1396	1.6213
	(0.5019)	(1.1272)	(2.3676)*		
ΔBB3	-0.1121	0.1629	0.4413	0.2721	2.4638
	(1.4201)	(2.1318)**	(2.9404)*		

Table 2

Estimated Coefficients for 5-Years Corporate Bonds

Dep. Var.	β_0	β_1	β_2	$\bar{R}^2$	DW
ΔAAA5	-0.0868	0.0455	0.3869	0.1616	2.1585
	(1.7628)	(0.8691)	(2.5041)*		
ΔAA5	-0.0681	0.0059	0.5635	0.2912	2.1362
	(1.4933)	(0.1213)	(3.7350)*		
ΔA5	-0.0649	0.0139	0.5304	0.2499	1.8250
	(1.2352)	(0.2398)	(3.3525)*		
ΔBBB5	-0.0514	0.1507	0.2789	0.0721	1.4045
	(0.4281)	(1.1161)	(1.6451)**		
ΔBB5	-0.1049	0.1347	0.5675	0.3710	1.9027
	(1.3030)	(1.8108)**	(4.0447)*		

Table 3
Estimated Coefficients for 7-Years Corporate Bonds

Dep. Var.	β_0	β_1	β_2	$\bar{R}^2$	DW
ΔAAA7	-0.0719	0.0517	0.4244	0.2570	2.1680
	(1.7957)	(1.1356)	(3.1203)*		
ΔAA7	-0.0668	0.0089	0.5987	0.4015	2.0949
	(1.6725)	(0.2045)	(4.6919)*		
ΔA7	-0.0549	0.1029	0.3163	0.1219	1.4649
	(0.7795)	(0.3157)	(1.8979)**		
ΔBBB7^{+}	-0.1466	0.3117	0.0910	0.0708	2.8236
	(0.9704)	(1.9644)**	(0.6698)		
ΔBB7	-0.1782	0.1987	0.1866	0.1293	2.2093
	(1.8270)	(2.1032)**	(1.0871)		

Note: $^{+}$ Use the 5-month lagged of dependent variable

Table 4
Estimated Coefficients for 10-Years Corporate Bonds

Dep. Var.	β_0	β_1	β_2	$\bar{R}^2$	DW
ΔAAA10	-0.0908	0.0643	0.1893	0.0380	1.9760
	(1.6756)	(1.0660)	(1.2147)		
ΔAA10	-0.0475	0.0094	0.6835	0.4878	2.0001
	(1.2681)	(0.2321)	(5.5825)*		
ΔA10	-0.0472	0.0534	0.5661	0.3510	2.2793
	(08978)	(0.9.103)	(4.0804)*		
ΔBBB10	-0.0262	0.1999	0.2376	0.0504	1.4918
	(0.1741)	(1.1755)	(1.3993)**		
ΔBB10	-0.1489	0.2451	0.2570	0.2715	2.1847
	(1.8180)	(3.0109)*	(1.6788)**		

the estimated coefficients are significant at 1% and 5%, respectively. The corrected coefficient of determination (adj. R^2) and the DW-statistics for the identification of autocorrelation are reported in the last two columns of each table. Overall, the adjusted R^2 are satisfactory and there is no autocorrelation problems.

The results in *Tables 1-4* show that the interest rate movement is significant in the influencing the yield spreads for corporate bonds with BB-grade for all maturities. In addition, the yield spreads for corporate bond with BBB-grade is only significant for maturity 7-year. The estimated coefficient implies that 1 percentage point increase in the inter-bank rate increases yield spread by a marginal amount not more than 0.30 percentage point. The result also implies that yield spreads can predict future short-term rate movements.

Table 5
Estimated Coefficients for 1-15 Years Malaysian Government Securities Corporate Bonds

Dep. Var.	β_0	β_1	β_2	$\bar{R}^2$	DW
ΔMGS1	-0.0049	0.3639	0.1777	0.1354	1.8273
	(10.0421)	(1.4194)**	(0.8466)		
ΔMGS2^{+}	-0.1050	0.2835	0.0917	0.0320	2.2736
	(0.9915)	(1.6995)**	(0.5595)		
ΔMGS3^{++}	-0.0527	0.3693	0.0696	0.2080	1.8446
	(0.8376)	(2.2173)**	(0.5632)		
ΔMGS4^{++}	-0.0460	0.3397	0.0445	0.2640	1.9891
	(0.9427)	(2.5565)*	(0.4178)		
ΔMGS5^{++}	-0.0519	0.2469	0.0246	0.1524	2.1153
	(1.1496)	(1.9532)**	(0.2299)		
ΔMGS10	-0.0180	0.0942	0.3520	0.2135	1.6431
	(0.5415)	(1.5455)**	(2.1041)		
ΔMGS15^{++}	-0.0360	0.1805	0.0179	0.0436	2.0918
	(0.8047)	(1.7565)**	(0.0696)		

Note: $^{+}$ Use the 5-month lagged of dependent variable
$^{++}$ Use the 8-month lagged of dependent variable

Table 6
Estimated Coefficients for 3-12 Months Treasury Bills

Dep. Var.	β_0	β_1	β_2	$\bar{R}^2$	DW
ΔTB3	-0.0203	0.1457	0.3539	0.1457	1.7909
	(0.1784)	(1.0900)	(2.0988)**		
ΔTB6	-0.0149	0.2670	0.2038	0.1259	1.8265
	(0.1223)	(1.8823)**	(1.2075)		
ΔTB12	-0.0332	0.1235	0.2994	0.0947	1.8530
	(0.3054)	(0.9662)	(1.7320)**		

The estimation results for government bonds are presented in *Tables 5-6*. The estimated coefficients of inter-bank rate are significant, except the yield spreads for treasury bills 3- and 12-months. It implies that the yield spreads for government bonds could also predict future short-term rate movements.

Conclusion

In conclusion, our results indicate that the term structure relations are helpful in predicting interest rate movement during 1998:01-2000:12. It shows that yield spreads could predict future short-term rate movement and give us to understand the relationship between the predictive power of the term structure and the stance of monetary policy.

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