



The leading indicator property of the term spread and the monetary policy factors in Japan[☆]



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ABSTRACT

Many studies have observed the leading indicator property of the term spread (LIPTS), which indicates that the term spread—the difference between long- and short-term interest rates—has information on future economic conditions. We examine whether this property is related to monetary policy or not by using Japanese monthly data with consideration for structural changes. Results of structural change tests show that the term spread has predictive ability for the future economic activity from 1982:4 to 1997:8. Decomposing the term spread into three parts; one is explained by past monetary policy shocks, another is explained by expected future call rates and the other is the remaining part, we find that all three parts are significantly related to the future economic growth rate. Hence, we find that the monetary policy plays an important role for the LIPTS.

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1. Introduction

Information on future economic activity is helpful for various economic agents. If business entrepreneurs learn more about future economic activity, they can plan better business projects. If policymakers get to know more about future economic conditions, they can adopt better policies. Researchers have long examined the predictive ability of various economic variables for future business cycles. For example, Estrella and Mishkin (1998) make a comparison of the abilities for future recessions of some financial

variables. Existing studies, such as Estrella and Hardouvelis (1991), Harvey (1991) and Hu (1993), find the leading indicator property of the term spread (LIPTS), which shows the term spread—the difference between long- and short-term interest rates—has information on future economic conditions. More concretely, the current term spread is positively correlated with future economic activity. If the current term spread broadens, future economic conditions tend to improve, and vice versa. Because many papers support this property, Benati and Goodhart (2008) describe it as having become a “stylized fact”.¹

Why does the term spread provide predictability for the future economic activity? What factors produce the LIPTS? To answer these questions, a theoretical model, which is compatible with the LIPTS has to be proposed. However, in contrast to an enormous volume of empirical studies on the LIPTS, only a few papers have presented theoretical models. In terms of causes of the LIPTS, we can divide the existing theoretical studies into two streams. The first approach proposes models where real sectors, such as productivity, cause the

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¹ Recent studies on the relationship between term spread and future economic activity are introduced in Wheelock and Wohar (2009) and the following website: http://www.newyorkfed.org/research/capital_markets/biblio.pdf.

LIPTS, applying the Consumption-based Capital Asset Pricing Model (C-CAPM) in Lucas (1978).² The second approach considers models where the monetary policy plays an important role in explaining the LIPTS.³ However, because so far, both approaches explain the LIPTS only partially, further extensions are needed.

The comparison of the effectiveness of real sectors in the LIPTS with that of the monetary policy is useful in understanding the direction of the theoretical extensions. In the comparison, we have to extract a factor, which is related to the monetary policy or real sectors from the term spread. If a monetary policy factor in the term spread has a significant correlation with the future economic activity, the second approach may give a convincing explanation. In the case where the factor does not affect the future economic condition, an extension using the first approach may be reasonable. Laurent (1988, 1989) discusses how the term spread reflects a monetary policy stance. In contrast, Plosser and Rouwenhorst (1994) show that the information on future economic growth in the term spread is independent of the information on the current and future monetary policy. Benati and Goodhart (2008) also obtain weak evidence for the relationship between the LIPTS and monetary policy. So far, empirical results for the effect of the monetary policy on the future economic activity through the term spread are not conclusive.

The purpose of this paper is to examine whether or not factors related to the monetary policy included in the term spread affect the future economic activity using Japanese data sets. As mentioned before, the evidence in this investigation may be useful in resolving the mechanism of the LIPTS. To extract the monetary policy factor from the term spread, we employ the following procedure. First, estimating a VAR model proposed by Miyao (2000) to describe the Japanese economy, we compute monetary policy shocks based on the estimated results. Because we assume that the central policy instrument of the Japanese monetary authority, the Bank of Japan, is a call rate, the VAR system includes a call rate.⁴ We regard call rate shocks as exogenous monetary policy or monetary policy shocks.⁵ Next, we calculate the forecast values of future call rates using the estimated VAR model. These values are a factor associated with the expected future monetary policy stance. Third, regressing the term spread on the estimated monetary policy shocks and the future monetary policy stance factor, we decompose the current term spread into a part related to the monetary policy shocks, a part concerned with future monetary policy stance and a remaining part. Finally, based on the regression of the future economic growth rate on these three parts, we investigate the explanatory power of the three factors. If we obtain a significant relationship between the two monetary policy parts and the growth rate, then the monetary policy plays an important role for the LIPTS.

Many existing empirical studies on the LIPTS in the US use spot rates computed from long-term bond data. Fama and Bliss (1987) present a method to calculate the spot rates. However, some studies on the LIPTS in Japan, such as Hirata and Ueda (1998) and Hasegawa and Fukuta (2011), use data on the yield-to-maturity of Japanese long-term government bonds. It is well-known that the yield-to-maturity is affected by the coupon rate. The coupon rates of Japanese government bonds have declined in recent decades. This may cause some problems with the empirical results about the LIPTS in Japan. To avoid this problem, we compute the spot rate data based on the method proposed by Fama and Bliss (1987). By using the spot rate data, we can compare the results with those for other countries in an unbiased way. This is one of the contributions of this paper.

To start the above examination, we have to confirm that the LIPTS is also observed in Japan.⁶ Hence, we first examine whether the term spread has the leading indicator property of future economic growth using Japanese monthly data from 1982:4 to 2007:12. The results do not support the LIPTS for the whole data sample period. This evidence may be affected by structural changes in the Japanese economy as pointed out by Miyao (2000) and Nakashima (2007).⁷ Applying the method proposed by Qu and Perron (2007) and Kurozumi and Tuvaandorj (2011), we investigate structural changes in the parameters of the VAR model in our sample period. The results show that structural changes happen at 1987:6, 1997:8 and 2002:10. Dividing our sample into four subsamples based on these points, we re-examine the LIPTS in each subsample. We find that the term spread has predictive ability for the future economic activity in the first subsample: from 1982:4 to 1987:6 and the second subsample: from 1987:7 to 1997:8. Hence, we investigate whether or not the monetary policy factors in the term spread affect the future economic activity between 1982:4 and 1997:8. Our results show that both monetary policy factors and other factors have explanatory power for future economic growth. This evidence indicates that the monetary policy plays an important role in causing the LIPTS in Japan.

This paper is organized as follows. In Section 2, we examine the LIPTS in our sample period and the effect of structural changes in the Japanese economy on the evidence for the LIPTS. Decomposing the term spread into parts related to the monetary policy and other parts, we investigate whether these parts affect the future economic activity or not in Section 3. Concluding remarks are provided in Section 4.

2. The leading indicator properties of the term spread (LIPTS) and structural changes in the Japanese economy

In this section, we first examine the leading indicator properties of the term spread (LIPTS) using the Japanese data between 1982:4 and 2007:12. Next, we investigate the effects of structural changes in the Japanese economy on the evidence for the LIPTS.

2.1. An examination of the leading indicator properties of the term spread (LIPTS)

Based on the empirical studies by Estrella and Hardouvelis (1991), Estrella and Mishkin (1997), Hamilton and Kim (2002), Nakaota (2005) and other papers, we estimate the following equation by using OLS:

$$\begin{aligned} y_t^k &= \alpha_0 + \alpha_1 \text{spread}_t + \varepsilon_t, \\ y_t^k &\equiv (1200/k) \times (\ln y_{t+k} - \ln y_t), \\ \text{spread}_t &\equiv i_t^l - i_t^s, \end{aligned} \quad (1)$$

⁶ Some papers have investigated the LIPTS using Japanese data. Using the data between 1970 and 1989, Harvey (1991) obtains mixed results for the properties which depend on the sample periods. Hu (1993) finds the evidence for the LIPTS in the period from 1967 to 1991. Pointing out the existence of restrictions in the Japanese financial markets before the middle of the 1980s, Kim and Limpaphayom (1997) support the LIPTS between 1984 and 1991. Galbraith and Tkacz (2000) and Ikeno (2003) find the less evidence for the LIPTS in the sample period including the 1990s. Taking a structural change into account, Nakaota (2005) supports the LIPTS until the middle of the 1990s. Because Wheelock and Wohar (2009) mention that after the middle of the 1980s the LIPTS is not supported in the US, the Japanese results of the LIPTS may be similar to the US. Whereas Hirata and Ueda (1998) find the relationship between the yield spread and future recessions, Bernard and Gerlach (1998) and Ikeno (2003) observe the weak relationship. Hasegawa and Fukuta (2011) find the evidence for the relationship between the current yield spread and future recessions until the middle of the 1990s by taking the structural break into consideration.

⁷ Structural breaks in the LIPTS are also observed by Nakaota (2005) and Hasegawa and Fukuta (2011).

² See Harvey (1988) and Rendu de Lint and Stolin (2003).

³ Estrella (2005) shows that some parameters on the reaction function of the monetary authority affect the LIPTS.

⁴ Miyao (2000) also uses this assumption.

⁵ This interpretation is similar to Bernanke and Blinder (1992) and Miyao (2002).

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