ELSEVIER

Journal of International Money and Finance
19 (2000) 657–672

Journal of International Money and Finance

www.elsevier.nl/locate/econbase

Testing for asymmetry in the link between the yield spread and output in the G-7 countries

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Abstract

The difference in yields between long-term and short-term securities has been used both as a business cycle leading indicator and as an indicator of the direction of monetary policy. This paper tests for an asymmetry, in the form of a threshold effect, such that the impact of the yield spread on the conditional expectation of output growth is greater on one side of the threshold than on the other. We test using data from the G-7 countries, and find that, while the yield spread does generally show a significant link with output, only in the United States and Canada is there strong evidence of an asymmetry of this type. This evidence suggests a high value of the threshold in both the United States and Canada. © 2000 Elsevier Science Ltd. All rights reserved.

JEL classification: E52

Keywords: Yield spread; Asymmetry; Economic activity

1. Introduction

There has been a good deal of recent interest in the link between yield spreads and aggregate economic activity, for several related reasons. First, the yield spread, specifically the difference in yields between long-term and short-term interest-bearing securities, has been found to be one of the most useful business cycle leading indicators; see, for example, Estrella and Hardouvelis (1991), Bernanke and Blinder

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PII: S0261-5606(00)00023-1

(1992), Cozier and Tkacz (1994) and Lahiri and Wang (1996). Second, there is a popular argument (espoused by Laurent 1988, 1989, for example) to the effect that the interest rate spread acts as an indicator of the direction of monetary policy. To the extent that this is true, the value of the spread in serving as a leading indicator of aggregate activity could be the result of its value in summarizing the current impact of monetary policy, which may affect aggregate output in the future.

A third important point is that the yield spread (or slope of the yield curve) is a variable that can be observed immediately, and with virtually no measurement error or approximation error arising from the use of an index, which distinguishes it from many other indicators and is one possible explanation for its empirical usefulness as a business cycle indicator.

The present paper examines this yield spread–output link, and in particular the possible existence of asymmetries in the relationship. The examination of asymmetries is suggested by, and in part derives its importance from, the frequently-reported finding of asymmetries in derived measures of current monetary policy or money supply changes, such as those of Cover (1992), Morgan (1993) and Karras (1996). At the same time, this paper uses data from the entire G-7 group of countries, rather than the United States alone.[1] Asymmetry, if present, implies that the information content of the spread cannot be fully exploited in a linear model. Less formally, the existence of asymmetry here, as in other contexts where policy can affect events, would imply that we should anticipate greater proportionate impacts for some values than for others; policy actions and forecasts should be adapted accordingly.

To test whether the yield spread has an asymmetric impact on the conditional expectation of output growth, we test for a threshold effect in the relation.[2] We do so by treating as unknown the threshold beyond which the effect of the yield spread becomes greater (or smaller); evidence of a threshold effect is evidence in favour of asymmetry (or of some other non-linearity which can be approximated in this way). We use the test proposed by Hansen (1996), which allows testing for a threshold effect without a priori knowledge of the threshold value. Treating the threshold as unknown has the advantage that it allows us to consider the likelihood of asymmetry contingent upon a number of different threshold points, and also requires us to use a test which explicitly accounts for the fact that the choice of threshold is based on the likelihood. Earlier test procedures that implicitly or explicitly use threshold values that maximize the likelihood of finding asymmetry invalidate the nominal distributions used for inference; we will return to this point below. Moreover, by leading us to consider a set of possible thresholds, this method gives us a more general overview of the usefulness of the asymmetry hypothesis in describing the relation between yield spreads and output.

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[1] Karras also pursues this strategy in examining asymmetries in derived measures of money supply shocks, but aggregates the data across a sample of European countries rather than examining individual country effects.

[2] Hereafter we will refer simply to an effect on output, rather than on the conditional expectation of output growth. In doing so we do not intend to presuppose a causal, as opposed to purely predictive, relation.