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The yield curve in a small open economy ☆

Mariano Kulish *, Daniel Rees

Economic Research, Reserve Bank of Australia, GPO Box 3947, Sydney, NSW, Australia

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ABSTRACT

Long-term nominal interest rates in a number of inflation-targeting small open economies have tended to be strongly correlated with those of the United States. This observation has recently led support to the view that, in these economies, the long-end of the yield curve has decoupled from its short-end and naturally to a concern that monetary policy may have lost some of its autonomy. We set up and estimate a two-country small open economy model in which the expectations hypothesis and uncovered interest rate parity hold to study the co-movement of long-term nominal interest rates of different currencies. We show that differences in the persistence of domestic and foreign disturbances, a hypothesis for which we find support in recent data, can explain the observed pattern of correlations. These correlations are not evidence of weaker monetary policy.

1. Introduction

Long-term nominal interest rates in a number of inflation-targeting small-open economies, such as Australia, Canada, New Zealand, Norway, Sweden and the United Kingdom, have moved very closely with those of the United States over the past seventeen years or so. Fig. 1 shows the pattern of interest rate correlations at different points on the yield curve for each country with the US.[1] The pattern is stark: long-term nominal rates are highly correlated with their US counterparts and generally more so than rates at shorter maturities. This pattern of strong correlations has given support to the view that long-term nominal interest rates in these small economies have somehow decoupled from short-term policy rates. A consequence of this is that short-term policy decisions may be perceived as having limited consequences on long-term real interest rates and as a result on the stance of monetary policy. This may suggest that the ability of policy makers in small countries to stabilize their economy is impaired.

This view that the long-end had decoupled from the short-end was first advanced by Greenspan (2005) when he referred to the behavior of bond markets as a conundrum. In his February 2005 testimony to Congress Greenspan said that: *"For the moment, the broadly unanticipated behavior of world bond markets remains a conundrum. Bond price movements may be a short-term aberration, but it will be some time before we are able to better judge the forces underlying recent experience."* Greenspan's remarks refer to the correlation between short rates and long rates in a single country while Fig. 1 refers to the correlation between long rates of different currencies, but both observations support the same idea: that long rates in these economies divorced from their policy rates.[2]

Traditionally, the transmission mechanism of monetary policy is understood as going from a short-term nominal interest rate to a long-term real interest rate, which in turn influences aggregate demand. For a short-term nominal rate to influence a long-term real rate, the short-term nominal rate must first influence long-term nominal rates. In other words, standard optimizing forward-looking theory implies the expectations hypothesis, according to which the yield curve never decouples. In standard monetary models, monetary policy matters precisely because long-term nominal interest rates are never fully decoupled from the expected path of the policy rate.[3]

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* Corresponding author. Tel.: +61 2 9551 8841; fax: +61 2 9551 8833.
E-mail addresses: kulishm@rba.gov.au (M. Kulish), reesd@rba.gov.au (D. Rees).
[1] The pattern is robust to the filtering of the data. For example, for the unfiltered data, in the case of Australia, these correlations are 0.56, 0.76 and 0.85 for 3 month, 5 year and 10 year maturities, respectively.

[2] See, for example, Norges Bank (2005), Bollard (2007), and RBA (2007).
[3] This point is convincingly made by Rotemberg and Woodford (1997).

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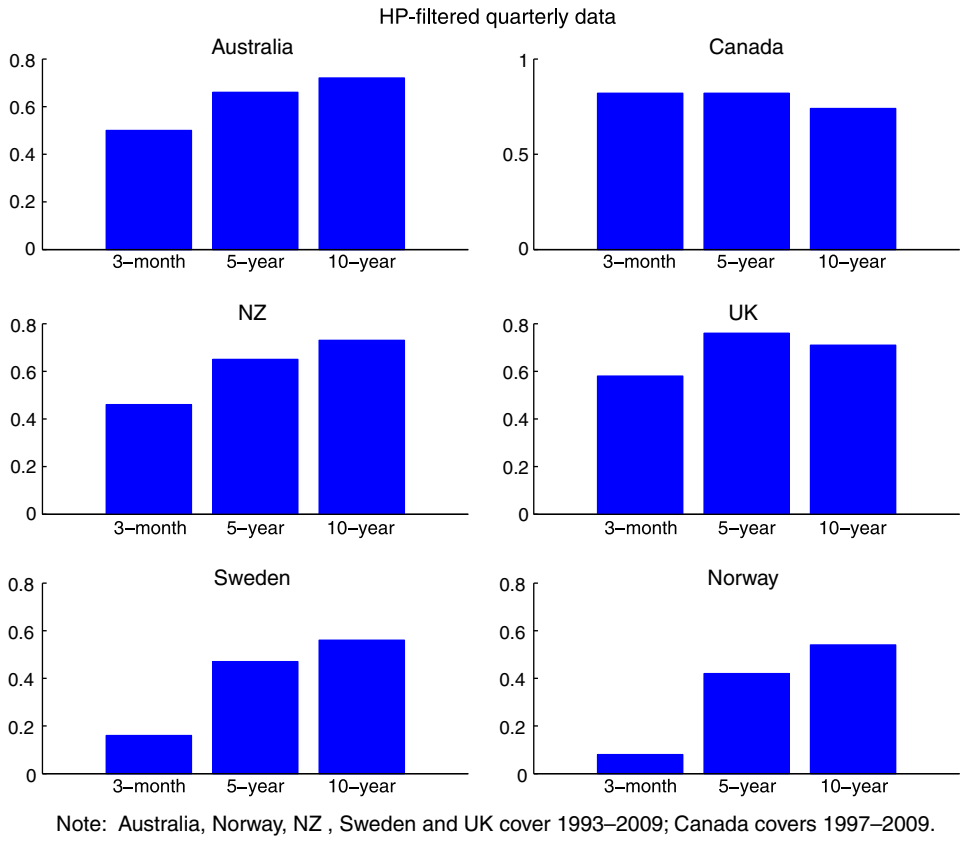

Fig. 1. Cross correlations with US interest rates.

Are the reduced-form patterns of correlations of Fig. 1 consistent with theory? What are the underlying forces at work in the determination of the domestic yield curve? We address these questions and uncover a mechanism in optimizing general equilibrium that can give rise to the observed reduced-form correlations. In particular, we find that if foreign disturbances are more persistent than domestic ones, a hypothesis for which we find support in recent data, then it makes sense for the correlation between domestic and foreign interest rates to vary at different points along the yield curve. Moreover, these correlations are consistent with a model in which uncovered interest rate parity holds and long-term nominal interest rates are priced by the expected path of short-term policy rates.

Other papers have tackled the related question of how much domestic and foreign factors influence domestic interest rates. For example, Campbell and Lewis (1998) use an event study to examine how Australian bond yields respond to new information and find that US economic news has a larger effect than domestic news on Australian yields. Tarditi (1996) estimates a reduced-form model of the Australian 10-year bond yield and finds that a one percentage point increase in the US 10-year bond yield is associated with around half a percentage point increase in Australian long-term yields.

There is also a large literature that analyses the yield curve with affine term structure models. These studies typically assume that bond yields are affine functions of unobservable factors and incorporate cross-equation restrictions that eliminate arbitrage opportunities (see Backus et al. (2001), Backus and Wright (2007), Knez et al. (1994), Duffie and Kan (1996), and Dai and Singleton (2000)). But while factor models have been relatively successful in matching key statistical properties of the yield curve, factor models are not structural. Recent work addresses this issue by fitting the term structure to macroeconomic factors, either by combining them within unobserved factors, as in Ang and Piazzesi (2003) and Bernanke et al. (2004), or by incorporating a no-arbitrage model of the term structure within a macroeconomic model as in Rudebusch and Wu (2004), Bekaert et al. (2006) and Hordahl et al. (2006).

Our approach is different. We set up a micro-founded two-block model consisting of a small open economy and a large (closed) economy and extend the set of equilibrium conditions in both the large and small economies to allow for an explicit consideration of the co-movement of foreign and domestic interest rates. In our model, the expectations hypothesis links interest rates of different maturities and uncovered interest rate parity links interest rates of different currencies. Short-term nominal rates are set by the monetary authorities on the basis of the fundamentals of their economies. In this respect our analysis resembles that of Evans and Marshall (1998), but unlike them, we study the behavior of a small open economy's yield curve and pay particular attention to its relation to the large economy's yield curve. We then estimate the model's parameters and examine its ability to match the co-movement of interest rates of different currencies. As we show below, the estimated model captures the pattern of Fig. 1 remarkably well.

The rest of the paper is organized as follows. Section 2 describes the model. Section 3 examines the dynamics of the yield curve in this model. Section 4 discusses the estimation of the model and presents some additional independent evidence for differences in exogenous persistence. Section 5 then contrasts the model's moments with their empirical counterparts. Section 6 discusses deviations from uncovered interest rate parity and Section 7 concludes.

2. The model

We extend the Galí and Monacelli (2005) small open economy model in two ways. First, we increase the set of equilibrium conditions in both the large and small economies to incorporate interest rates of longer maturities. Second, we add foreign and domestic demand shocks. Instead of working through the details of the derivation,