International monetary policy surprise spillovers

Roger Craine [a],[*], Vance L. Martin [b]

[a] *Economics 3880, University of California, Berkeley, CA 94720, USA*
[b] *Economics, University of Melbourne, Victoria 3010, Australia*

Abstract

This is the first paper to examine international monetary surprise spillovers and to estimate the response of security prices to monetary and nonmonetary surprises. Monetary surprises have a slope effect on the domestic yield curve—short maturity yields adjust much more than longer maturity yields. These results are similar to other studies. The following results are new. US monetary surprises spill over and affect Australian yields and equity returns. Australian monetary surprises do not spill over to the US. Nonmonetary surprises are much more important than monetary policy surprises in explaining longer maturity yield changes and equity returns.
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1. Introduction

On April 18, 2001 the US Federal Reserve Open Market Committee (FOMC) surprised financial markets by lowering the Federal Funds Target rate by 1/2% between regularly scheduled FOMC meeting dates. US short maturity rate fell by 1/2% mirroring the cut in the Target rate. The yield on US and Australian five year bonds fell by about 13 basis points. US equity prices increased by almost 3% and the Australian equity prices rose by 1 1/2%. A month later, on May 15 at the regularly scheduled FOMC meeting, the Fed again lowered the Target rate by 1/2%. This widely anticipated reduction in the Target rate had no effect on security markets in the US and abroad.

On July 31, 1996 the Reserve Bank of Australia surprised markets by lowering its Target rate by 1/2%. That day Australia's short maturity rates fell by 1/2% mirroring the cut in the Target rate and Australian longer maturity yields fell by 20 to 30 basis points. US markets did not react to the change in the Australian Target rate.

In the last week of August of 1998 there were no US or Australian monetary policy changes or surprises. But, a cascade of continual bad news about the depth of the Russian financial crisis hit the financial markets culminating in the suspension of trading in the Ruble. Equity markets in the US and Australia fell by over 6%. Australian five and ten year bond yields rose by 30 basis points while comparable US bond yields fell by 25 basis points as investors fled to "quality".

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* Corresponding author.
E-mail addresses: craine@econ.berkeley.edu (R. Craine), vance@unimelb.edu.au (V.L. Martin).

These carefully selected episodes illustrate the main results of this paper. Monetary and nonmonetary *surprises* affect security prices. US and Australian domestic short maturity rates respond to domestic monetary policy surprises as the short maturity rate adjusts immediately to match the newly announced Target. US monetary surprises affect Australian security prices, but Australian monetary policy surprises do not affect US security prices. There are monetary policy surprise spillovers from the US to Australia. Nonmonetary surprises have a much larger impact than monetary policy surprises on long maturity yields and equity returns.

A number of recent papers document that domestic monetary surprises affect domestic bond yields and equity returns; for example, see Bernanke and Kuttner (2005), Cochrane and Piazzesi (2002), and Zettelmeyer (2003). Other papers show that nonmonetary surprises spill over in financial markets, e.g., see Dungey et al. (2005) for a review. This paper is the first to examine international monetary policy surprise spillovers and to jointly estimate the impact of unobserved monetary and nonmonetary surprises on yields and returns.

The empirical monetary surprise literature begins with Kuttner's (2001) seminal "event study" paper. Monetary event days are days when the Central Bank policy committee meets so that they could change the Target rate or days when they actually change the Target rate. Monetary policy surprises occur only on monetary event days. Kuttner reasoned, correctly, that in an efficient market only monetary policy surprises affect current security prices. The trick is to filter the unobservable surprise from the observable data.

Kuttner used a very simple filter. He defined a monetary policy surprise as the (weighted) change in the Federal Funds Futures rate on an event day. Most of the literature on monetary policy surprises follows Kuttner's lead and equates the monetary policy surprise to an observable change in a short maturity yield.

If the change in a short maturity yield on event days is the monetary policy surprise, then regressing a yield change, or equity return on the change in the short rate gives a consistent estimate of the impact of the monetary surprise on the security price. On the other hand, if the event model is misspecified and other factors, such as macroeconomic announcements also affect the short rate on event days, then the observed short rate measures the unobserved monetary surprise with error. Regressing yield changes on changes in the short rate gives an inconsistent estimate of the impact of the monetary surprise on the security price. Furthermore, the event study specification says nothing about the impact of nonmonetary surprises on yield changes or returns on monetary event or nonevent days. A natural question is how important are monetary surprises relative to other surprises and what happens on nonmonetary event days?

We specify a two-country linear simultaneous equation model for the US and Australia to address these questions. The specification generalizes the one-country two-security model in Rigobon and Sack (2003, 2004) to two countries (in principle l) and nine (in principle n) securities. Monetary surprises and nonmonetary surprises affect US and Australian yields and equity and exchange rate returns on monetary event days. Nonmonetary surprises also affect yields and equity and exchange rate returns on nonevent days. The reduced form of the simultaneous model can be written as a factor model. The factors are the monetary and nonmonetary surprises. The factor loadings are the coefficients of interest. The loadings measure the response of yield changes and equity and exchange rate returns to a surprise. The monetary factors are identified *a priori* by heteroskedasticity. US money surprises occur only on US event days and Australian money surprises occur only on Australian event days. Nonmonetary surprises occur everyday. One cannot identify the individual nonmonetary factors *a priori*.

We estimate two versions of the factor model. The general version imposes only the economic restrictions that the monetary factors are heteroskedastic and orthogonal to the nonmonetary factors, and the statistical assumption that the nonmonetary factors are homoskedastic. The general factor model provides estimates of the loadings on the monetary factors, but imposes no restrictions on the number of nonmonetary factors and it gives no information on how individual nonmonetary factors affect security prices. The second model is a parsimonious specification that restricts the number of common nonmonetary surprises and idiosyncratic errors to the number of securities, n. The factor structure of the parsimonious specification is similar to the factor structure in affine models of the yield curve; see for example, Piazzesi (in press). The parsimonious specification provides estimates of the loadings on the monetary and nonmonetary factors. Finally we calculate the bias in event study estimator implied by the general model.

Our estimates show that a domestic monetary surprise twists the domestic yield curve, short rates respond much more than longer maturity yields. Our estimates of the impact of domestic monetary policy surprises on the domestic yield curve are similar to other studies; see for example, Poole et al. (2002). The following results are new. US monetary policy surprises spill over and affect Australian yields and equity returns. Australian five and ten year yields show essentially the same response to Australian and US monetary surprises. Nonmonetary factors are important for understanding the movement in longer maturity yields and equity returns. The ratio of the sample variance on nonevent