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Effects of macroeconomic uncertainty on the stock and bond markets ☆

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ABSTRACT

In this paper we show that the long-run stock and bond volatility and the long-run stock–bond correlation depend on macroeconomic uncertainty. We use the mixed data sampling (MIDAS) econometric approach. The findings are in accordance with the flight-to-quality phenomenon when macroeconomic uncertainty is high.

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1. Introduction

In this paper we investigate how the long-run volatility and correlation of stocks and bonds are influenced by macroeconomic uncertainty. We apply the macroeconomic uncertainty index (MUI) recently developed by Bali et al. (2014). The macroeconomic uncertainty index is based on the dispersion in survey forecasts for various macroeconomic variables. We apply the mixed data sampling (MIDAS) approach to combine the quarterly MUI with the daily stock and bond returns. This particular approach allows us to investigate the effect of macroeconomic uncertainty on the long-run stock and bond characteristics. To begin with, we consider univariate specifications for the conditional stock and bond volatility. Subsequently, we investigate the conditional stock–bond correlation. We find that macroeconomic uncertainty holds significant influence on the long-run stock volatility and the long-run stock–bond correlation, while the long-run bond volatility is unaffected. The long-run correlation tends to be small/negative when macroeconomic uncertainty is high. This finding is in accordance with the flight-to-quality phenomenon, i.e. the transfer of money from the high-risk stock market to the low-risk bond market in bad times.

The previous literature documents that the stock and bond comovement is influenced by various macro-finance variables, e.g. Viceira (2012) and Asgharian et al. (2014). However, the current paper is the first to investigate the effects of macroeconomic uncertainty on the stock–bond comovement. Bali et al. (2014) find that the MUI explains a significant proportion of the cross-sectional dispersion in stock returns.

The structure of the remaining part of the paper is as follows. Firstly, we present the data and methodology in Section 2. Subsequently, we show the in-sample results for long-run volatility (Section 3) and long-run correlation (Section 4). Then we provide out-of-sample analysis before we conclude.

2. Data and methodology

The sample period is from 1986Q1 to 2014Q2. We use the daily returns from the settlement prices of the S&P500 futures contract traded at the CME and the 10-year Treasury note futures contract traded at the CBT (both series are available from DataStream).

Following Bali et al. (2014), we construct the macroeconomic uncertainty index (MUI) as the first principal component of seven cross-sectional dispersion variables for the current quarter forecasts from the Survey of Professional Forecasters (SPF) database at the Federal Reserve Bank of Philadelphia (real GDP growth and level, nominal GDP growth and level, GDP price index growth and level, and the unemployment rate). The MUI explains 55% of the variation in the seven underlying series.

We investigate the effects of macroeconomic uncertainty on the long-run stock (and bond) volatility using the GARCH–MIDAS model of Engle et al. (2013). We allow the long-run variance to depend on the lagged MUI, similar to how Asgharian et al. (2013) account for influence from an exogenous variable on the stock volatility.

The stock return at day $i = 1, \ldots N_t$ in quarter t follows the process: $r_{i,t} = \mu + \sqrt{\tau_t g_{i,t}}\varepsilon_{i,t}$, where $\varepsilon_{i,t}|\Phi_{i-1,t} \sim N(0,1)$ and $\Phi_{i-1,t}$ is the information setup to day $(i-1)$ of period t. The total variance is divided into a short-run component $g_{i,t}$ and a long-run component τ_t:

$$\sigma_{it}^2 = \tau_t g_{i,t}. \tag{1}$$

The short-run component follows a GARCH (1,1) process: $g_{i,t} = (1-\alpha-\beta) + \alpha\frac{(r_{i-1,t}-\mu)^2}{\tau_t} + \beta g_{i-1,t}$ where $\alpha > 0$ and $\beta \geqslant 0$, $\alpha + \beta < 1$. The long-run component is the smoothed realized volatility in a MIDAS regression where MUI_{t-k} enters directly ($K = 12$ in this paper):

$$\log(\tau_t) = \theta_0 + \theta_1 \sum_{k=1}^{K} \varphi_k(w_1, w_2)\mathrm{MUI}_{t-k}. \tag{2}$$