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Short Communication

On economic uncertainty, stock market predictability and nonlinear spillover effects☆

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ABSTRACT

This paper uses a *k*-th order nonparametric Granger causality test to analyze whether firm-level, economic policy and macroeconomic uncertainty indicators predict movements in real stock returns and their volatility. Linear Granger causality tests show that whilst economic policy and macroeconomic uncertainty indices can predict stock returns, firm-level uncertainty measures possess no predictability. However, given the existence of structural breaks and inherent nonlinearities in the series, we employ a nonparametric causality methodology, as linear modeling leads to misspecifications thus the results cannot be considered reliable. The nonparametric test reveals that in fact no predictability can be observed for the various measures of uncertainty i.e., firm-level, macroeconomic and economic policy uncertainty, vis-à-vis real stock returns. In turn, a profound causal predictability is demonstrated for the volatility series, with the exception of firm-level uncertainty. Overall our results not only emphasize the role of economic and firm-level uncertainty measures in predicting the

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volatility of stock returns, but also presage against using linear models which are likely to suffer from misspecification in the presence of parameter instability and nonlinear spillover effects.

1. Introduction

Stock market volatility is of utmost importance to policy makers and portfolio managers when reflecting on future corporate health and investment prospects (Poon & Granger, 2003; Rapach & Zhou, 2013). Asset returns are functions of the state variables of the real economy, and the real economy itself displays significant fluctuations. Beyond standard theoretical or empirical justifications of such fluctuations based on productivity and/or policy shocks, a recent strand of literature relates the impact of various forms of firm-level, macro-financial and policy-generated uncertainty to movements in output, inflation, investment, employment and interest rates (Bloom, 2009; Jones & Olson, 2013; Jurado, Ludvigson, & Ng, 2015), which in turn are expected to affect the mean and volatility fluctuations of stock returns. Empirical evidence along this line of reasoning – yet only for stock returns – can be found in the works of Antonakakis, Chatziantoniou, and Filis (2013), Kang and Ratti (2013), Gupta, Hammoudeh, Modise, and Nguyen (2014), Chang, Chen, Gupta, and Nguyen (2015) and Jurado et al. (2015).

In light of the recent evidence, we investigate whether news-based measures of economic policy uncertainty (EPU) (Baker, Bloom, & Davis, 2015), firm-level and macro-financial uncertainty indices (Jurado et al., 2015), could comprise reliable predictors of S&P500-based real stock returns and volatility. For our purpose, we use the recently developed nonparametric causality test by Nishiyama, Hitomi, Kawasaki, and Jeong (2011), which is applied to monthly and quarterly datasets that span very long periods, i.e., 1900:1–2014:2 for EPU, 1960:7–2011:12 for macroeconomic and financial uncertainty, and 1970:1–2011:2 for the firm-level uncertainty index respectively. As opposed to the results reported in recent works, this is the first study to our knowledge that compares alternative measures of uncertainties in predicting not only stock returns, but also their volatility fluctuations. Furthermore, given the use of Nishiyama et al. (2011) nonparametric approach, we provide evidence in favor of possible misspecification in linear models as reported in the existing studies thus far, due to structural breaks and nonlinearity. The rest of the paper is organized as follows: Section 2 presents the methodology, while Section 3 discusses the data and results. Finally, Section 4 concludes.

2. Methodology

We briefly describe the methodology proposed by Nishiyama et al. (2011), with the test restricted to the case when the examined series follow a stationary nonlinear autoregressive process of order one under the null. Nishiyama et al. (2011) motivated the high-order causality by using the following nonlinear dependence between series

$$x_t = g(x_{t-1}) + \sigma(y_{t-1})\in_t \tag{1}$$

where $\{x_t\}$ and $\{y_t\}$ are stationary time series and $g(\cdot)$ and $\sigma(\cdot)$ are unknown functions which satisfy certain conditions for stationary. In general, y_{t-1} has information in predicting x_t^K for a given integer K. Consequently, the null hypothesis of non-causality in the Kth moment is given by

$$H_0 : E(x_t^K \,|\, x_{t-1}, \ldots_1, y_{t-1}, \ldots, y_1) = E(x_t^K \,|\, x_{t-1}, \ldots, x_1) w.p.1. \tag{2}$$

where $w.p.1$ abbreviates to "with probability one". Formally, we say that y_t does not cause x_t up to the Kth moment if

$$H_0 : E(x_t^K \,|\, x_{t-1}, \ldots, x_1, y_{t-1}, \ldots, y_1) = E(x_t^K \,|\, x_{t-1}, \ldots, x_1) w.p.1. \quad \text{for all} \quad k = 1, \ldots, K \tag{3}$$