The effect of economic policy uncertainty on the long-term correlation between U.S. stock and bond markets☆

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ABSTRACT

We investigate the time-varying long-term correlation of U.S. stock and bond markets, as influenced by an economic policy uncertainty (EPU) index based on the modified DCC-MIDAS model. Considering the structural breakpoints of the 1997 Asian financial crisis and the 2008 financial crisis, we extend the model by incorporating dummy variables to adjust the long-term correlation during different periods. The empirical results show that the modified model is more efficient than the baseline model. Moreover, consistent with the flight-to-quality phenomenon, we further find that EPU has a significant negative influence on long-term stock-bond correlation.

1. Introduction

Stocks and bonds are two main types of asset allocation. The time-varying relationship between them has received considerable attention, and there have been many attempts to understand their co-movement during the past few years (Kim et al., 2006; Connolly et al., 2005; Aslanidis and Christiansen, 2014; Chen et al., 2014). Moreover, investors' portfolio optimization, risk management, and hedging choices may be vastly improved by taking the long-term relationship between two main asset classes into consideration (De Goeij and Marquering, 2004; Baele et al., 2010; Perego and Vermeulen, 2016). Recently, (Asgharian et al., 2015) have shown that stocks and bonds are likely connected because investors expect that the future cash flows and discount rates of both returns will be influenced by common economic factors. It is generally known that the United States is of great importance in its international influence and financial market size. Therefore, understanding the driving factors behind the long-term stock-bond correlation in the United States is crucial to formulating and implementing investment strategies. In this paper, we explore two interesting but rarely researched issues: whether the economic policy uncertainty (EPU) index has an impact on long-term stock-bond correlation and how the time-varying relationship reacts to financial crises.

Recently, the impact of policy risk on the market is growing and economic policy decisions influence economic activity. Uncertainty pertaining to economic policy decisions, regardless of its origin (whether from fiscal or monetary policy decisions), will discourage investor confidence and firms from investing, and thus, have a profound impact on the stock and bond markets. Many prior studies emphasize the importance of uncertainty in economic policy (Colombo, 2013; Antonakakis et al., 2013; Dakhlaoui and Aloui, 2016). (Baker et al., 2016) constructed an EPU index to measure the uncertainty related to monetary, fiscal and other relevant policies, and the study showed that the EPU index influences the intensity of the business cycle and investment. It has been widely recognized that EPU has a significant impact on the stock market (Dakhlaoui and Aloui, 2016; Arouri et al., 2016) and bond market (Wisniewski and Lambe, 2015). However, there is very little research investigating the role of EPU on the long-term correlation between stock and bond markets.

In this paper, we examine how EPU drives time-varying stock-bond correlations based on different effects on stock and bond returns. Specifically, we extend the DCC-MIDAS model proposed by (Colacito et al., 2011) to allow long-term correlation driven by EPU and incorporate dummy variables to adjust the correlation during different periods. By adding (Bai and Perron, 2003) test, we detect the multiple structural breakpoints during the time-varying correlation. Considering the structural breakpoints of the 1997 Asian financial crisis and the 2008 financial crisis, we divide the sample period into

three sub-sample periods to test whether or not a certain financial crisis impacts long-term stock-bond correlations. The model can combine daily stock and bond returns with the monthly EPU index and take financial market turmoil into account. The results show that innovations in the EPU index have a significant negative impact on long-term stock-bond correlations, explaining the existence of the flight-to-quality phenomenon (Kim et al., 2006; Baele et al., 2010; Dua and Tuteja, 2016; Perego and Vermeulen, 2016). Moreover, the long-term co-movement of stock and bond returns is negative during periods of market turmoil.

This article contributes to the existing literature in several ways. Firstly, we explore the link between economic policy uncertainty and the long-term stock-bond correlation using the DCC-MIDAS model. By investigating the long-term co-movement and relating it to economic policy uncertainty, we provide new empirical evidence that EPU has a significant negative influence on long-term stock-bond correlation. Second, considering structural breaks, we apply the well-known BP test to identify the breakpoints and extend the DCC-MIDAS model, which combines the DCC specification (Engle, 2002) and the GARCH-MIDAS framework (Engle et al., 2013), and create a new model by incorporating dummy variables to explore the time-varying relationship in different periods. Identifying the structural changes caused by financial crises during the long-term relationship, we find that the modified model fits more accurately. Finally, another key contribution of this study is that it provides an alternative mechanism that could potentially explain the correlation between the U.S. stock and bond markets, based on capital movements induced by the flight-to-quality phenomenon. As investors substitute safe assets for riskier assets, bond and stock market returns become negatively correlated.

The remainder of the article is organized as follows. First, in Section 2, we introduce the related literature. Then we focus on data and methodology in Section 3. Section 4 discusses the empirical findings and conducts further analysis. We conclude in Section 5.

2. Literature review

This paper studies the co-movement between the stock market and government bond market and attempts to explain the effect of economic policy uncertainty (EPU) on the long-term correlation. There is a strand of literature that investigates the co-movement of stock and bond returns.

Over the past few years, the nature of co-movements between stock and bond markets has received considerable attention. There have been many attempts to comprehend their fundamental relationship. The existing related research generally reaches an agreement on how stock and bond returns co-move over time. Early study represented by (Campbell and Ammer, 1993) implicitly assume that the stock-bond correlation is time invariant and the observed levels cannot be justified by economic fundamentals. More recently, several studies have shown that the co-movement between stock and bond returns exhibits considerable time variation (Asgharian et al., 2015; Andersson et al., 2008; Perego and Vermeulen, 2016; Li et al., 2015). (De Goeij and Marquering, 2004) argue that co-variances between stock and bond returns tend to be relatively low after bad news in the stock market and good news in the bond market. (Andersson et al., 2008) show that stock and bond prices move in the same direction during periods of high inflation expectations, while epochs of negative stock-bond return correlation seem to coincide with subdued inflation expectations. (Li et al., 2015) find that innovations in the policy uncertainty index impact negatively and asymmetrically on stock-bond correlations. Long-term correlation tends to be small and negative during economic downturns, supporting the flight-to-quality phenomenon.

The underlying factors of the long-term time-varying correlation between stock and bond returns are controversial. A few variables that may affect the stock-bond correlation are macro-finance factors, since we expect future cash flows and discount rates to be influenced by the same macro-finance factors. (Andersson et al., 2008) investigate the influence of inflation and expected stock market uncertainty on the time-varying stock-bond correlation, and they find that expected inflation is positively related to time-varying co-movement, while expected stock market uncertainty, as measured by implied volatility, is negatively related to it. (Asgharian et al., 2015) use the DCC-MIDAS model to examine the impact of macro-finance factors on the correlation between stock and bond returns and find that macro-finance factors are good at forecasting long-term correlation. In contrast, (Baele et al., 2010) find that macroeconomic fundamentals contribute little to explaining stock and bond return correlations but that other factors, especially liquidity proxies, play a more important role. (Aslanidis and Christiansen, 2014) provide new evidence that macro-economic factors have only a little explanatory power when the correlation is largely positive. However, when the stock-bond correlation is largely negative, these factors are the most useful explanatory variables.

(Baker et al., 2016) propose the EPU index to measure the uncertainty in monetary, fiscal, and other relevant policies. Recently, the focus on the effect of EPU on the stock and bond markets is increasing (Brogaard and Detzel, 2015; Wisniewski and Lambe, 2015; Arouri et al., 2016). (Antonakakis et al., 2013) present the following rationale for the correlation between EPU and stock market returns. Uncertain economic policies significantly influence expected cash flows and discount rates. High levels of policy uncertainty can also cause households and businesses to hold back on spending, investment, and hiring. Therefore, uncertainty induced by economic policy has a profound influence on the overall financial market and the national economy.

Our paper is related to but different from the above studies. To begin with, we incorporate the economic policy uncertainty index into an appropriately modified long-term correlation component and take structural break points into consideration. Specifically, we investigate what effects EPU may have on long-term stock-bond correlations by using DCC-MIDAS (Colacito et al., 2011). To adjust the correlation that cannot be explained by EPU around the recession periods, dummy variables are added to extend the baseline model. The empirical results show that the modified model is more efficient.

3. Data and methodology

In this study, we combine daily U.S. stock and bond market returns with the monthly U.S. economic policy uncertainty index. Stock and bond market returns in the U.S. are calculated using the S & P 500 index and the 10-year government bond price index from the Bloomberg database. We take logarithm prices to calculate the returns. To measure the uncertainty of economic policy, we use the EPU index constructed by (Baker et al., 2016)[1] The sample starts on 3 January 1985 and ends on 27 May 2016, with a total of 7511 observations.

Fig. 1 depicts the monthly evolution of the EPU index. Obviously, EPU captures turbulent economic events, such as the American financial crisis from 2007 to 2009 and the European debt crisis in 2011. The American financial crisis in 2007−2009 exerted a profound influence on the economy, such as the crash of international trade flows (Chor and Manova, 2012). (Steelman and Weinberg, 2015) discussed public policy responses during this crisis. As seen in Fig. 1, the EPU index reached a peak around 2008. In addition, some important member states of the Eurozone were unable to repay their government debt or bail out over-indebted banks, which resulted in sovereign credit risk and redenomination risk in the Eurozone in 2011. (Basse, 2014) and (Sibbertsen et al., 2014) analyzed the structural breaks in the long-term relationship between government bond yields in several Eurozone member states caused by this debt crisis, and the results implicated

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[1] EPU data are available on www.policyuncertainty.com