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Discount rate or cash flow contagion? Evidence from the recent financial crises☆

Junhua Jiang

University of Vaasa, Department of Accounting and Finance, P.O. Box 700, FI-65101, Vaasa, Finland

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ABSTRACT

Breaking the US and Greek equity market returns into a discount rate component and a cash flow component by the method of Campbell (1991), the study investigates the discount rate and cash flow contagion of the subprime mortgage crisis and European sovereign debt crisis to the Nordic equity markets. The study shows that the subprime crisis displays both discount rate contagion and cash flow contagion to the Nordic markets and the effect of discount rate contagion is more pronounced. The sovereign debt crisis, on the other hand, does not show either discount rate contagion or cash flow contagion to the Nordic markets. However, the study provides some evidence that expectations of lower future cash flows resulting from the sovereign debt crisis spread to the Finnish market.

1. Introduction

Previous studies on equity market contagion concentrate on the overall contagion effect of shocks to the equity returns in the crisis-originating country on the equity returns in other countries (e.g., Forbes and Rigobon, 2002; Bekaert et al., 2005; Baur, 2012; Bekaert et al., 2014). The study by Campbell (1991) suggests that shocks to equity returns can be decomposed into two components: a discount rate news component and a cash flow news component, reflecting changes in expectation of future discount rates and changes in expectation of future dividends, respectively. Hence, an interesting question is whether the overall contagion effect is from the discount rate (news) component or the cash flow (news) component of equity returns. The answer to this question may have important policy implications. The decrease of the equity market returns in the crisis-originating country could result from expectations of higher future discount rates (cost of capital), or from expectations of lower future corporate earnings, or from both. Consequently, contagion from the discount rate component would suggest that expectations of higher future discount rates transmit from the crisis-originating country to other countries and thus economic policies aiming at lowering future discount rates or cost of capital may be more effective. In contrast, contagion from the cash flow component would imply that expectations of lower future corporate earnings spread from the crisis-originating country to other countries and thus economic policies aiming at directly increasing corporate earnings may be more effective.

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E-mail address: jjiang@uva.fi

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The purpose of the study is to investigate the discount rate and cash flow contagion of the US subprime mortgage crisis and European sovereign debt crisis to the Nordic equity markets.[1] Specifically, treating US and Greece as the two countries where the subprime crisis and European debt crisis originated, the study examines the discount rate contagion and cash flow contagion of these two countries to each of the four Nordic countries (Denmark, Finland, Norway and Sweden). Given that the four Nordic countries are geographically close and economically homogenous and each of them has its own currency, Nordic equity markets to some extent provide a "controlled experiment" for studying the impact of currency difference on the contagion effect.

The study is closely related to the previous research of Ammer and Mei (1996), Phylaktis and Ravazzolo (2002), Engsted and Tanggaard (2004), Baele and Soriano (2010), and Wang et al. (2013). Decomposing stock returns by the method of Campbell (1991), Ammer and Mei (1996) investigate the financial and economic linkages of 15 international stock markets. They measure financial linkages by the correlations between discount rate news components and economic linkages by the correlations between cash flow news components. In the same spirit, Phylaktis and Ravazzolo (2002) examine the financial and economic integration of the stock markets in the US and Pacific-Basin countries, Engsted and Tanggaard (2004) document the comovements of the stock markets in the US and UK, and Wang et al. (2013) study the discount rate components correlation and cash flow components correlation between mainland China and Hong Kong stock markets. Baele and Soriano (2010) explore the financial and economic integration of European stock markets with the US market, defining the beta of a local market with the US discount rate component as a measure of financial integration and the beta of a local market with the US cash flow component as a measure of economic integration.

However, the study differs from the previous studies in the following ways. Firstly, to our best knowledge, the study is the first to investigate the contagion effect of both the discount rate component and cash flow component of equity returns, focusing on the recent financial crises.[2] More specifically, we first decompose the equity returns of the US and Greek market into a discount rate component and a cash flow component by the vector autoregressive (VAR) framework of Campbell (1991). Then we study the contagion of the discount rate component and cash flow component separately. Secondly, while previous studies use correlation coefficients to examine the linkages of international equity markets (e.g., Ammer and Mei, 1996; Phylaktis and Ravazzolo, 2002; Engsted and Tanggaard, 2004), this study uses the spillover indexes of Diebold and Yilmaz (2012) to analyze the contagion effect of the recent financial crises. As pointed out by Forbes and Rigobon (2002), estimates of correlation coefficients during crisis periods may be biased upward due to the impact of high market volatility. On the other hand, the spillover indexes of Diebold and Yilmaz (2012) are straightforward to compute and can be used to study both the total spillovers and the directional spillovers between different financial markets (see e.g., Diebold and Yilmaz, 2012; Zhou et al., 2012; Antonakakis and Vergos, 2013). Thirdly, the study compares the contagion effect of two financial crises. This comparison could deepen our understanding of the different characteristics of the two financial crises.

The study reveals that the subprime crisis displays both discount rate contagion and cash flow contagion to the Nordic markets, with the effect of discount rate contagion being more pronounced, while the sovereign debt crisis does not show either discount rate contagion or cash flow contagion to the Nordic markets. The study also provides some evidence that the cash flow component of the Greek market has significantly larger impact on the Finnish market during the current sovereign debt crisis, implying that expectations of lower future cash flows resulting from the sovereign debt crisis spread to the Finnish market and thus economic policies aiming at directly increasing Finnish corporate earnings may be more effective.

The remainder of the study proceeds as follows. Section 2 reviews the related literature. Section 3 describes the data used in the study. Section 4 presents the methods. Section 5 shows the empirical results and Section 6 concludes the study.

2. Related literature

One line of related literature is the studies on return decompositions. Utilizing the log-linear return approximation in Campbell and Shiller (1988), Campbell (1991) shows that unexpected stock returns can be decomposed into two components (news about future returns and news about future dividends) and proposes a VAR method to obtain each of those two components. Campbell and Vuolteenaho (2004) use the VAR based return decomposition approach to break the beta of a stock into a cash-flow beta and a discount-rate beta. They show that the two-beta model can explain the size and value anomalies in stock returns.

The seminal work of Campbell (1991) and Campbell and Vuolteenaho (2004) has generated numerous applications of the VAR based return decomposition approach (e.g., Ammer and Mei, 1996; Baele and Soriano, 2010; Cenedese and Mallucci, 2016; Engsted and Tanggaard, 2004; Khan, 2008; Phylaktis and Ravazzolo, 2002; Wang et al., 2013). However, Chen and

[1] In this study, contagion refers to the intensified spillover effects during crisis period relative to tranquil period. Previous literature proposes alternative definitions of contagion (see e.g., Bekaert et al., 2005 and Forbes, 2012). Previous studies define linkages of discount rate components as financial linkages and linkages of cash flow components as economic linkages (e.g., Ammer and Mei, 1996; Baele and Soriano, 2010). Thus contagion from the discount rate component may be referred to as financial contagion and contagion from the cash flow component as economic contagion.

[2] Phylaktis and Ravazzolo (2002) study the financial and economic integration of the stock markets in the US and Pacific-Basin countries. In the section of robustness check for the influence of the Asian financial crisis on their findings, they compare the discount rate component correlations and cash flow component correlations during the pre-crisis period and the post-crisis period. However, they focus on the Asian financial crisis and do not specifically study the correlations of the return components during the post-crisis period since their "post-crisis period" (1990.01-1998.12) also includes the time up to the crisis.