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Time-varying causality between equity and currency returns in the United Kingdom: Evidence from over two centuries of data☆

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HIGHLIGHTS

- Transfer Entropy causality test.
- DCC-MGARCH Hong tests for time-varying causality.
- Time-varying information spillovers between equity and currency markets.
- Stock-currency market interaction in a mature market versus emerging markets.
- Extensive data sample.

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ABSTRACT

We analyse the dynamics of the causal interaction between the stock and foreign exchange markets for the United Kingdom using monthly data going as far back as 1791. First, we consider static causality tests, yielding mixed results. Given the evidence of structural breaks in the relationship between equity and currency returns, we use next the Dynamic Conditional Correlation-Multivariate Generalised Autoregressive Conditional Heteroskedasticity time-varying tests for Granger causality. The time-varying testing strategy we implement allows us to detect whether any causal relationship exists at each point in time between stock price and exchange rates returns. We find overwhelming evidence of time-varying information spillovers between the equity and currency returns. We check the robustness of our findings by running the entire battery of tests for two emerging market economies, namely, India and South Africa starting in 1920 and 1910 respectively. On the whole, the United Kingdom results are comparable to those in India and South Africa. As such, our results encompass the fragmented findings from our static tests as well as those in the extant literature.

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1. Introduction

Establishing whether and to what extent there exist information spillovers among financial markets is important in portfolio diversification as well as risk management for policymakers, regulators, financial institutions, multinational firms and investors.

Against this backdrop and that of increased global financial integration, understanding how the equity and currency markets are related to one another is key. The theoretical literature on the linkages between the equity and currency markets is based on two main models: the flow-oriented [1] and the stock-oriented [2,3] models.

According to the flow-oriented model, exchange rate changes can help predict developments in the equity market. The model postulates that, following a depreciation of the domestic currency, the international competitiveness of domestic firms improves. The ensuing rise in exports would translate into higher earnings and increased stock prices.

On the other hand, the stock-oriented model postulates that developments in the stock market spill-over to the currency market via the financial account. For instance, one possible channel is the effect of an increased demand for financial assets such as stocks on the exchange rate. A bullish domestic stock market signals better economic prospects. Hence, capital inflows increase and the domestic currency appreciates [4].

While either theoretical model posits a unidirectional information spillover between the equity and currency markets, empirical causality can be bidirectional [4,5].

Against this backdrop, an extensive strand of the literature examines empirically the linkages between the equity and currency markets both in developed as well as emerging economies. Recent studies include: [4–16].

By and large, the literature is inconclusive on the empirical nature of the relationship between the equity and currency markets. The lack of empirical consensus can be attributed to a number of factors such as the sample and frequency of the data used in the study, the degree of capital control and the size of the equity market in the country being analysed [5,14]. In the same perspective, another important aspect explaining the conflicting results from the literature is of a methodological nature. For instance, some models differ on the assumption about the nature of the data generating process of variables. Indeed, as we will show, such different approaches have a significant implication for the findings. Depending on these factors, results may either corroborate the flow-oriented model, the stock-oriented hypothesis or both. In yet other cases, there could be no evidence of any interactions between the two markets.

In the same vein, structural breaks are a key feature of financial data. Hence, some studies investigate the importance of accommodating structural breaks in modelling exchange rate returns. To illustrate, Rapach and Strauss [17] argue that structural breaks do play a relevant empirical role in real-time forecasting of the exchange rate returns volatility for a group of developed countries (Canada, Japan, Switzerland and the United Kingdom). However, Huseyin Bilgin et al. [18] find that although structural breaks characterise exchange rate returns volatility in three Asia-pacific economies (Hong Kong, India and Singapore), accounting for breaks in the unconditional variance does not improve the exchange rate returns volatility's out-of-sample forecast.

That said, a key aspect of the nature of the relationship between the stock and foreign exchange markets is that it is not stable across time due to structural breaks in the data. Using different sample periods or regimes for the same countries, some studies find evidence of a switching nature of the information spillover between the equity and currency markets [8,11,13,15].

This study contributes to the extant body of the literature by providing new evidence on the dynamics of information spillovers between the equity and currency markets in a developed market economy, namely the United Kingdom. Studies investigating the causality between equity and currency returns in the United Kingdom are rather scant, and much like the existing literature on different countries, yield conflicting results. To illustrate, in a recent study, Wong [6] finds no support for causality in either direction between equity and currency returns in the United Kingdom. Yet, Tudor and Popescu-Dutaa [12] and Stavarek [19] argue that there do indeed exist interactions between the equity and currency markets in the United Kingdom, with the former leading the latter. On the contrary, Nieh and Lee [20] find very limited (one-day) evidence of currency market developments leading equity markets outcomes.

Against such an unsettled backdrop about the nature of causality between equity and currency returns, we first implement a set of parametric and nonparametric Granger causality tests as is the practice in most studies in the literature. However, these tests are essentially static; they only capture the average causality effect over the given sample or regime and hence cannot describe the entire dynamics of information spillovers [21]. For these reasons, we use, for the first time in this literature, the Dynamic Conditional Correlation-Multivariate Generalised Autoregressive Conditional Heteroskedasticity (DCC-MGARCH) Hong tests for time-varying Granger causality to investigate whether and to what extent the nature of information spillover between the United Kingdom equity and currency markets changes across time.

The key appeal of the DCC-MGARCH Hong tests is that causality at each point in time can be analysed. As such, we can pin down time-varying financial contagion. In addition to detecting unidirectional time-varying causality, the tests also show the overall (bidirectional) causal relationships. Furthermore, the tests can be used to establish any evidence of instantaneous information spillover obtaining from nonsynchronous trading [21].

Our contribution is also novel in that, unlike existing studies in the literature which rely on relatively shorter samples, we consider a very wide span of time, using data on foreign exchange rates and stock prices as far back as possible.

We find that the time-varying Granger causality tests results encompass findings based on the static counterparts. There is overwhelming evidence that the nature and significance of the causal relationship between equity and currency returns