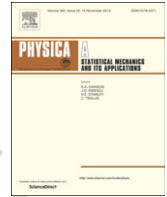




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Q1 Do foreign exchange and equity markets co-move in Latin American region? Detrended cross-correlation approach

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HIGHLIGHTS

- We investigate the relationship between foreign exchange and stock markets.
- We apply the Granger causality to verify the direction of causality.
- Also, detrended cross-correlation approach (ρ_{DCCA}) was used.
- Our results suggest a positive cross correlation.
- ρ_{DCCA} coefficient facilitates the understanding of its explanatory depth.

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ABSTRACT

This paper investigates the dynamics of the relationship between foreign exchange markets and stock markets through time varying co-movements. In this sense, we analyzed the time series monthly of Latin American countries for the period from 1991 to 2015. Furthermore, we apply Granger causality to verify the direction of causality between foreign exchange and stock market and detrended cross-correlation approach (ρ_{DCCA}) for any co-movements at different time scales. Our empirical results suggest a positive cross correlation between exchange rate and stock price for all Latin American countries. The findings reveal two clear patterns of correlation. First, Brazil and Argentina have positive correlation in both short and long time frames. Second, the remaining countries are negatively correlated in shorter time scale, gradually moving to positive. This paper contributes to the field in three ways. First, we verified the co-movements of exchange rate and stock prices that were rarely discussed in previous empirical studies. Second, ρ_{DCCA} coefficient is a robust and powerful methodology to measure the cross correlation when dealing with non stationarity of time series. Third, most of the studies employed one or two time scales using co-integration and vector autoregressive approaches. Not much is known about the co-movements at varying time scales between foreign exchange and stock markets. ρ_{DCCA} coefficient facilitates the understanding of its explanatory depth.

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1. Introduction

Numerous studies have been conducted regarding the dynamic relationship between stock prices and exchange rates. Whether stock price influences or is influenced by the exchange rates is inconclusive in the literature. Various researchers have focused on the relationship between these two because of the predictability of their influence on one another [1]. These variables have more important implications for the emerging stock markets that are sensitive to exchange rate policies [2]. Our focus in this paper is to study the effect of these variables on each other in the Latin American market conditions, mainly in Brazil, Chile, Mexico, and Argentina. Recently, changes in international regulations and elimination of capital inflow hindrances, currency exchange limitations, and adoption of floating exchange rates in foreign exchange and stock markets have become more interdependent [3].

The two most relevant theories regarding this scenario are the traditional and portfolio balanced approaches. The traditional approach suggests that exchange rate affects stock prices. According to this approach, the exchange rate appreciation (depreciation) affects the firm via the balance sheet and income statement items. It increases (decreases) the overall value of firm, resulting in the equity prices. The second approach is portfolio balanced approach, which refers to the effect of stock prices on the exchange rate. The rise in stock prices tend to attract foreign investors, leading to an increase in foreign capital inflow and creating demand for the local currency, and consequently, the local currency appreciates and vice versa [4].

Empirical literature related to these approaches starts with the study of Franck and Young [5]. They argued no relationship exists between exchange rate and stock prices. Instead, they supported the asset market approach and negated the traditional and portfolio balance approaches. Thereafter, Agarwal [6] tested the relationship between the exchange rate and stock prices, and found that exchange rate affects the stock prices supporting the traditional approach. Several studies [7–10] support the portfolio balanced approach [6,11,12] were inclined toward the traditional approach. Although the reported results of many studies contradict these two approaches and are inclined toward the asset market approach, these results are echoed in the studies of Franck and Young [5], Nieh and Lee [1], Ong et al. [13], Ratner [14]. The direction of the causality differs in different market conditions and might be at different time scales, forcing us to accept one and negate the other explanation. Our question is that do these two markets co-move? To the best of our knowledge, very little is discussed in the literature regarding the co-movement of these markets.

Researchers employ different approaches and methodologies in the literature while delineating the relationship between stock returns and foreign exchange rate movements such as Granger causality, cointegration, error correction mechanism, and linear regression [15,7,16,10,14]. Most of the literature use the Engle–Granger cointegration to find the possible linkages between these variables. This procedure has its own limits. If both markets are asymmetric, using Engle–Granger methodology can lead toward biased results by accepting the null hypothesis of no cointegration [17]. Traditional models do not capture the co-movements between these two markets because they only accommodate one or two time scales to interpret in terms of short or long run. In this paper, we attempt to provide a new perspective on the ambiguous relationship by employing the detrended cross-correlation coefficient ρ_{DCCA} as developed by Zebende [18], across different time scales for non-stationary time series. This methodology is novel in the context that the generation of cross correlation coefficients at different time scales can be helpful to understand this dilemma, because the investor behavior in these two markets can be different with respect to their different investment horizons, leading to foreign exchange and stock market co-movements at different time scales [19] use the detrended cross correlation coefficients to study the oil and exchange rate nexus.

In this paper, we hypothesize that depending on the market condition, portfolio balanced approach does not always exist. Foreign capital can impose upward or downward pressure on the exchange rate. For instance, if the stock market is not fragile in context of volatility, then it could limit the effect of foreign capital on the exchange rate. Although seizing an opportunity for profit, the injection of foreign capital or its flight has a considerable influence on the exchange rate. Using the data on Latin American major economies, we want to investigate the dynamics of the relationship between stock price indexes and foreign exchange rates under different market conditions. To understand the volatility in these relationships, we apply ρ_{DCCA} at different time scales to determine whether (a) co-movements exist in these markets, (b) these markets are positively or negatively correlated, (c) these relationships change on varying time scale.

Our study focuses on four markets in Latin America because the major portion of the Latin American economy depends on these four countries, namely, Brazil, Chile, Argentina, and Mexico with respect to GDP (Gross Domestic Product). Since 1980–1990, these economies were the major beneficiaries of capital flows in context of portfolio investments. Except for the 1994 currency crisis of Mexico, these economies became more open to the foreign direct investment, capital liberalization, and privatization process, resulting in the enormous growths in exports and the Latin American economy [20–23]. Our study is relevant to the essential policy implications in context to exchange rate, capital liberalization, and monetary policies in Latin America as an emerging market. To understand the dynamics of the relationship between foreign exchange and stock markets is pivotal for the multinational organizations and investors in this region to enable them to equip and hedge against adverse movements in foreign exchange.

This article is organized into sections. Section 2 provides some empirical studies on the linkages between foreign exchange rates and stock prices. Section 3 provides the data, methodology, and some preliminary descriptive information of our variables. Section 4 discusses the findings and empirical results, and Section 5 concludes the paper.

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