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Journal of Banking & Finance 25 (2001) 1161–1186

Journal of  
BANKING &  
FINANCE

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# Interdependence and dynamics in currency futures markets: A multivariate analysis of intraday data

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Received 4 February 1999; accepted 28 March 2000

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## Abstract

This paper investigates long-term interdependencies and short-term dynamics in currency futures utilizing intraday data for six major foreign currencies: the British Pound, Deutsche Mark, Swiss Franc, Australian Dollar, Canadian Dollar, and Japanese Yen. Lack of cointegration (CI) among the foreign exchange futures is found to be the prevailing mode of behavior, but some *temporary* deviations from the no-CI condition are detected. There is a notable overlap between detected CI relationships and the timing of policy changes, world events, and regime shifts, indicating that the observed CIs are event-driven. The robustness of the CI results is checked with respect to variations in the model, lag structure, data period, sample horizon, and currency basket grouping. Impulse–response functions (IRFs) reveal that currency markets are in general efficient and absorb new information within the day. The interdependence among currencies is found to be asymmetric. © 2001 Elsevier Science B.V. All rights reserved.

*JEL classification:* C3; G13; G15

*Keywords:* Intraday data; Foreign currencies; Cointegration

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## 1. Introduction

Investigation of long-term interdependencies and short-term price dynamics across and within currency markets provides valuable insight for traders and policy makers since these patterns signal potential informational inefficiency and hence, possible asset mispricing. Traders are interested in interdependencies and price dynamics because they may offer profitable arbitrage opportunities, while policy makers are eager to understand the nature of the information transmission process in order to coordinate policy internationally, and to design remedies for market imperfection problems such as delays between information arrival and valuation process.

King and Wadhvani (1990) provide a theoretical foundation for interdependence among financial markets. According to the model proposed by these authors, attempts by the rational economic agents in each market, to infer from price changes in other markets, creates a contagion across the markets. In this framework, price changes in any one market will be sensitive to price changes elsewhere, as well as the market fundamentals, and mistakes and idiosyncratic changes in any one market will carry over to the rest. The King and Wadhvani view is consistent with the “Meteor Shower” hypothesis put forward and empirically validated by Engle et al. (1990), according to which volatility spills over across markets, rather than remain market-specific in character. In addition, King and Wadhvani present empirical evidence that as volatility increases contagion strengthens. Harvey and Huang (1991) maintain that although disclosure of *private information* through trading can partially explain the fluctuations in the currency futures markets, as proposed by King and Wadhvani, it is the *public announcement* of macroeconomic news that constitutes the prime motivator of the movements in the currency futures markets and the most likely factor to induce volatility in these markets.

In the recent years, the long-term interdependence among financial markets has been widely investigated using the cointegration (CI) technique. It is well known that interdependencies described by a CI relationship across prices can significantly improve the prediction of future price values. Granger (1981, 1986) provides a link between CI and efficiency. According to Granger, in informationally efficient markets, prices of assets should not be cointegrated; if asset prices are cointegrated and market participants can profitably use this information, *markets should be considered inefficient*. Granger’s proposition opened a new venue for testing market efficiency with CI tests serving as the standard tool. Subsequently, numerous studies examined presence of CI across currencies, using daily or monthly data, and pair-wise or system-based tests. The findings of these studies are mixed. For example, MacDonald and Taylor (1989) and Hakkio and Rush (1989) apply the Engle–Granger pair-wise procedure to a number of currencies (vis-à-vis the British Pound) and fail to reject the absence of pair-wise CI. Baillie and Bollerslev (1989), Sephton and Larsen

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