

TEACHING FINANCIAL MODELING OF FOREIGN EXCHANGE RATES USING THE US DOLLAR AND THE EURO EXCHANGE RATES

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ABSTRACT

Foreign exchange rate modeling is an important aspect of multinational corporate financial management. Foreign exchange rate forecasts are needed for decision making for foreign direct investment (FDI), capital budgeting, capital structure analysis, tax planning, and transfer pricing. This paper shows how to download daily foreign exchange rates from the internet for use in determining if the rates for the US Dollar and the Euro are time-dependent or serially correlated, over the period of the life of the EURO from January 4, 1999 to June 26, 2023. We examine four sub-periods over the life of the Euro. During the first and third periods, the USD/EUR forex rate exhibits USD depreciation and the second and fourth periods exhibit EUR depreciation. We find that the USD/EUR exchange rates exhibit correlation over time and that the lagged USD/EUR rate is a reliable predictor of the daily rate. However, the changes in daily FOREX rates for the USD/EUR follow a random walk.

Keywords: Foreign exchange modeling, foreign exchange parity conditions, Dollar/Euro rate, random walk

1. INTRODUCTION

One of the fundamental factors influencing foreign direct investment (FDI) decisions of multinational corporations (MNC) is the foreign exchange rate effect, both long-term and short-term. Although there are numerous ways to hedge against foreign exchange rate effects, MNCs cannot totally eliminate foreign exchange rate losses or gains even with hedging, as discussed in McGowan, Asabere, and Collier (1993). Consequently, the MNC decision-maker needs to understand not only the impact that foreign exchange rate changes have on the value of a multinational subsidiary and the FDI process, but also the factors that influence foreign exchange rate changes. In standard textbooks (Butler, 2016, and Madura, 2021) dealing with international finance, one can find several chapters devoted to the discussion of the random nature of foreign exchange rate changes and additional chapters explaining how foreign exchange rate changes affect the investment and financing decisions of MNCs. Courses that teach multinational corporate finance and international business management spend a significant amount of time discussing foreign exchange rate parity conditions and the impact of foreign exchange rates on the FDI and the capital budgeting project decisions (McGowan, 2008). The purpose of this paper is to show how to collect foreign exchange rate data and how to use that data for foreign exchange rate modeling.

It is necessary for an MNC to develop forecasts of future exchange rates, since the net cash flow generated by the multinational subsidiary in the foreign currency will eventually be repatriated after being converted to US dollars. Foreign exchange rate parity conditions summarize the relationships among several relevant rates such as the current spot rate, the future spot rate, forward rates, interest rates and inflation rates (McGowan and Collier, 1993). However, one of the basic features of foreign exchange rate changes is that the rates follow a random walk. Thus, from an instructional point of view, it is important to demonstrate to students, who may later become MNC decision makers, how to analyze the behavior of foreign exchange rates. Further, the interrelations among these pedagogical concepts are illustrated in the Schematic Diagrams 1, 2, 3, and 4 given below.