IT.SCI.6

A LINEAR PROGRAMMING MODEL TO RECOGNIZE THE ARBITRAGE IN THE CURRENCY MARKET

A. G. K. N. Alupotha[1], **A. A. I. Perera**[2]

[1]*Department of Mathematics and Philosophy of Engineering, Faculty of Engineering Technology, The Open University of Sri Lanka*
[2]*Department of Mathematics, Faculty of Science, University of Peradeniya*

In economics and finance, arbitrage is the practice of taking advantage of a price difference between two or more markets. It involves locking in a riskless profit by simultaneously entering into transactions in two or more markets. The price of one country's currency expressed in another country's currency is called the exchange rates. In other words, the rate at which one currency can be exchanged for another.Moreover, exchange rate has long been viewed in monetary literature as an important channel of monetary transmission.In our analysis, exchange rates on July 11, 2012 of the currency markets of the United States Dollar (USD), Euro (EUR), UK Pound (GBP) and Japanese Yen (JPY) have been considered which are being mostly used as dominators in world trade. It is not obvious, but USD-EUR-GBP-JPY-USD conversion actually makes $0.03415 per dollar converted and most of the time this scenario can occur regularly for different conversions in different currencies. In our work, we formulated a linear programming model to recognize this arbitrage opportunity and hence arbitrage-free or less transactions can be formed in the currency market. In this model, we make available $100 in USD to purchase other currencies and pump through the system. If at the end of the day we get back more than $100, then an arbitrage exists.

According to optimal value of the objective function, there is an arbitrage opportunity if all the transactions are made through the system on that day. Therefore, a number of unnecessary transactions have to be restricted by the governments to make an arbitrage-free or less environment in the currency market. Moreover, deterioration of currency values has been one of the severe reasons to occur arbitrage opportunities. Whereas, the efforts to maintain the most effective exchange rates have a significant impact on domestic inflation.Hence, improving gross domestic product (GDP) and regulating the transfer of foreign currency reserves are the best strategies to maintain an arbitrage-free or less environment as it curbs the deterioration of currency value.