APPRAISING CURRENCY STRENGTHS AND WEAKNESSES: AN OPERATIONAL MODEL FOR CALCULATING PARITY EXCHANGE RATES

ROBERT M. EVERETT*
General Electric, Venezuela

ABRAHAM M. GEORGE**
Multinational Computer Models, Inc.

ARYEH BLUMBERG***
Montclair State College

Abstract. This paper presents a model for appraising currencies that is based on an operational variant of purchasing power parity doctrine. The behavior of currencies under different exchange regimes—floating rates, strictly managed rates, crawling peg rates, and fixed exchange rates—is analyzed in detail. The results support this doctrine, provided the parity exchange rate is derived from an interrelationship of differentials in inflation rates and changes in exchange rates of trading partners, both appropriately weighted by trade shares. A discussion of forecasting implications concludes the paper.

INTRODUCTION

This paper presents an operational model for appraising currency strengths and weaknesses that is based on a variant of the purchasing power parity theory.\(^1\) The essence of this doctrine is that in the absence of restrictions on the free working of the price mechanism, exchange rates tend to conform to the purchasing power of currencies. Put simply, this means that, regardless of how currencies are denominated, when adjusted for units, all currencies tend to command the “same” basket of goods. This proposition is the obverse of the Hume-Cantillon theorem: instead of price levels adjusting to conform to fixed exchange rates, exchange rates adjust to price levels. Clearly, this formulation is appropriate to a world of floating exchange rates; moreover, it will be shown that the purchasing power parity doctrine can be adapted to a variety of exchange rate regimes—such as, managed floats, crawling pegs, and fixed exchange rates.

The operational model developed in this paper is represented by the parity chart. (See Figure 1.) Section 2 of this paper provides a detailed exposition of the derivation of the parity line, which represents what a given exchange rate “ought to be,” termed the parity exchange rate. Following Section 3, which discusses briefly the empirical approximations to the model and data sources, evidence in support of the model is presented for four prototypical cases. Tests of the model, however, have been performed for 30 currencies.\(^2\)

The model is designed to provide perspective on future exchange rate movements. The emphasis is on evaluating whether a currency is under- or overvalued at any given time. The predictive power of the model with respect to direction, magnitude, and timing of prospective exchange rate changes is investigated for currencies under different institutional arrangements. We have attempted to draw operational conclusions that directly aid the decision-making process of policy

*Robert M. Everett is Manager of Finance of General Electric, Venezuela. He holds an A.B. in Economics from Tufts University.
**Abraham M. George is President of Multinational Computer Models, Inc., Montclair, NJ, an international financial consulting firm. He holds a Ph.D. in Business Administration from New York University.
***Arzyh Blumberg is Professor of Finance at Montclair State College, NJ. He holds a Ph.D. in Economics from the University of Chicago.

The authors would like to acknowledge helpful comments from the Journal’s referees.
makers and managers. Accordingly, our choice of readily accessible proxies that correspond to the theoretical concepts is commensurate with the conclusions that we have drawn from our results.

The final section summarizes the empirical evidence and discusses the implications of our analysis for forecasting exchange rates.

The purpose of this section is to explain the derivation of the parity line. (Refer to Figure 1.) The horizontal axis measures time from a suitably chosen time origin. The vertical axis measures (1) the difference in the percentage change of the purchasing power of currencies, and (2) the percentage change in the actual (observed) exchange rate from the time origin. The parity line represents parity exchange rates over time; for example, at time $t_a$ the point $P$ represents the percentage change in the parity rate from the time origin $t_o$, and hence enables us to calculate what the exchange rate ought to be according to our formulation of the purchasing power parity doctrine. Point $A$ represents the corresponding percentage change in the actual (observed) exchange rate from the time origin.

In a two-country model, the parity line is easily explained. For the purpose of theoretical exposition, let us assume a time origin that satisfies the condition of equilibrium—that is, purchasing power parity: two currencies, say dollars and marks, if adjusted for their respective units, command the “same” basket of goods.\(^3\) If the change in the purchasing power of country A's currency differs from that of country B's currency, the parity line will have a positive or negative slope, depending on the sign of the difference between changes in the purchasing power of their respective currencies, as measured by a suitable price index.