THE USE OF DISCRIMINANT ANALYSIS
IN FORECASTING EXCHANGE RATE MOVEMENTS

WILLIAM R. FOLKS, JR.,* and STANLEY R. STANSELL*

This paper presents the results of an exploratory survey of the applicability of discriminant analysis to the determination of the medium-term (two-year) exchange rate changes. Using a discriminant function developed on observations drawn from 1961–1964 and 1965–1968, the authors have correctly predicted the devaluation or nondevaluation of 86 percent of the countries tested for the period 1971–1972. These results indicate predictive power at the .001 level of significance. A reduction of 36 percent in classification error is achieved by the method.

PURPOSE

The purpose of this study is to determine whether the technique of linear discriminant analysis can be of assistance in exchange risk management. Specifically, a discriminant function is developed which, using readily available or estimatable macroeconomic values, will classify countries into two distinct groups: (1) those countries whose currency value relative to the value of the dollar will decrease by 5 percent or more over a two-year period, and (2) those countries whose currency value will not show such a decrease.

The authors believe that such a discriminant function, if reasonably accurate, is of value in corporate exchange risk management. Under normal operating conditions, U.S. based corporations with direct investments overseas generally have an excess of assets over liabilities which are exposed to the risk of currency changes. Thus, a reduction in foreign currency value causes, for accounting purposes, at the least, a loss in the value of exposed assets. Although numerous strategies for adjusting the exchange risk posture of the firm exist, they require some warning for effective use. In addition, some projection of the extent of currency rate change is required to prevent the adoption of exchange adjustment strategies more costly than the losses they were designed to prevent.

*William R. Folks Jr. is Associate Professor of Finance and Management Science at the University of South Carolina. Stanley R. Stansell is Financial Economist for the Farm Credit Administration. The opinions in this paper are those of Professor Folks and Dr. Stansell, and in no way represent opinions or policy of the Farm Credit Administration.
The authors hope that the discriminant function developed in this study will prove useful in providing an early warning of impending downward exchange rate changes. Armed with this warning, corroborated possibly by local sources, nonstatistically based projections, and other information, the exchange risk manager can then detail closer surveillance of the currency under suspicion, take long-range steps for adjusting the exchange risk posture of the firm, and develop contingency plans for short-term measures as and when the decrease in currency value becomes imminent.

In the subsequent sections the term “devaluing” countries or currencies will be used to describe those currencies which, relative to the dollar, lose 5 percent or more of their value. Classification of a currency in this category does not necessarily mean that a formal devaluation, in the sense of a notification to the International Monetary Fund of a change in par value or central rate, has occurred. A loss in value may occur if the country elects to float its currency vis-a-vis the dollar and if it subsequently floats downward by 5 percent or more. Alternately, a revaluation of the dollar would place a currency in the “devaluing” group if that country did not match the revaluation by one of its own. These diverse methods of adjusting relative currency value have led the authors to define a devaluing country as one in which the direct exchange rate (dollar value of one unit of foreign currency) at the end of a two-year period is 95 percent or less of the direct exchange rate at the beginning of the period. Throughout, market rates are used, rather than par values.

The choice of a period of two years over which to make the classification is an attempt to meet conflicting goals: (1) the time period over which the prediction is made must be short enough to be of use to the manager, and (2) the time period also must be long enough to reduce the obscuring effects of political and speculative inputs on the actual timing of the devaluation. While a government intent on fighting devaluation of a currency may fight a rearguard action for several years, an inability to correct the basic economic factors which cause currency weakness must lead to exchange rate changes.

The choice of a 5 percent change in currency value as the method of classification requires some comment. In a floating exchange rate situation, as is now current, such a choice might appear arbitrary. However, it is the authors’ judgment that a 5 percent change in value over a two-year period is a good estimate of what a significant change in currency value might be. Any change smaller than this amount may not merit the surveillance inclusion as a devaluing country might indicate. In addition, the International Monetary Fund’s last arrangement for fixed rates before the February 1973 dollar devaluation allowed exchange rate bands of 4½ percent. Of course, the exchange rate for any currency is a price whose possible values are continuous, and a characterization of exchange rate movements into two discrete categories (devaluation—no devaluation) ignores the degree to