Exchange Rates, Interest Rates and Commodity Prices

Edited by

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Preface

The volatility of nominal and real exchange rates has been the major highlight of events since the switch to floating by major currencies in the early 1970s. Interestingly, large fluctuations in exchange rates are observed to have been in concert with those of interest rates, and prices for agricultural, energy and mineral commodities. Whilst exchange rates are fundamentally linked with interest rates (through interest parity conditions), the system is still quite noisy with substantial independent variations in nominal and real interest rates across countries. More intriguing is the alleged link between exchange rates and commodity prices. It is true that exchange rates and commodity prices are both asset prices that respond to news instantaneously, but can something stronger be said about causation? Is exchange rate volatility responsible for the wide swings in commodity prices, or vice versa? These questions themselves concern the broader problems of exchange rate determination and price formation in open economies, which are among the fundamental issues occupying the frontiers of international finance.

The purpose of this volume is to provide a set of selected self-contained studies analysing a number of interrelated questions about interactions of exchange rates, interest rates and commodity prices. While there remains much that is little understood, the conclusions concerning the validity of the theory of purchasing power parity are becoming more and more reliable; the expectations hypothesis of the term structure continues to perform poorly; interest rates are yet to equalise in real terms across countries; and there is evidence of important linkages between commodity prices and exchange rates, and vice versa. Consistent with the main findings, efforts have been made, as and when appropriate, to draw attention to what action and decisions businesses and governments can take to modify adverse effects and to capitalise on opportunities in the future.

M.M.

Acknowledgements

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Contents

Figures

Tables

1. Exchange Rates, Interest Rates and Commodity Prices: An Introduction

Meher Manzur

Why is purchasing power parity (PPP) always and everywhere controversial? Despite overwhelming evidence that sterilised central bank interventions are impotent, why do major industrialised countries (such as the G8) continue to look for accords to stem exchange rate volatility? In a world of increasing globalisation, why are interest rate movements so poorly correlated across countries? Why are the currencies of the resource-based economies depreciating when the commodity prices are holding up? Has the link between exchange rates and commodity prices collapsed? These are among the fundamental questions confronting contemporary research and policy-making in international finance. These questions themselves concern the more fundamental problems of exchange rate determination and price formation in open economies, and the degree of monetary independence and its implications for macroeconomic policy.

This book contributes to an understanding of the key issues relating to the intriguing questions of the link between the exchange rate instability and domestic inflation; the real exchange rate and interest rate manifestations; and the covariability of exchange rates and commodity prices. The book is made up of nine self-contained chapters with a common theme – the behaviour of asset prices and interest rates in international markets. The approach is broadly empirical and applies econometric and modelling techniques to a wide range of recent data for a cross-section of countries.

The purpose of this chapter is to set the stage for the subsequent chapters to follow. We start in the next section with a skeletal review of how the three key variables under focus – exchange rates, interest rates and commodity prices – hold together historically. This descriptive analysis will be followed by an overview of the other chapters of this book.

1.0 HISTORICAL PERSPECTIVES

Exchange rates and interest rates are fundamentally linked by the interest parity condition. The *uncovered version* of this condition stipulates that the interest differential (that is, domestic interest rate minus foreign interest rate) coincides with the expected depreciation of the domestic currency. Since the expected future spot exchange rate is not observable, the uncovered version is modified by replacing the expected future spot rate by the forward exchange rate to obtain the *covered version*, implying that the interest differential is equal to the forward discount or premium.[1] The link between exchange rates and commodity prices derives from PPP. Under PPP, commodity prices are arbitraged internationally so that they are the same in all locations when expressed in terms of a common currency.[2]

In what follows, we provide a brief description of the broad features of major exchange rates in the 1990s, and compare these features with those of the 1960s. Also included is a brief analysis of whether these features are manifested in real interest rates and commodity prices. The purpose here is to describe the features rather than analyse them.

We use quarterly exchange rates for the Group of Seven (G7) countries for 1991(1)–1998(4) to capture the most recent experience with the current floating rate system, and 1961(1)–1968(4), the 'matured' part of the Bretton Woods period of adjustable par values. All data are from *International Financial Statistics* published by the International Monetary Fund. Since the two periods have substantially different implications with respect to the behaviour of nominal exchange rates and monetary policy, we focus on real rather than nominal exchange rates.

Real exchange rates are defined as nominal rates adjusted for inflation. Since prices for individual countries, when expressed in a common currency, are subject to the variability of exchange rates, bilateral real exchange rates based on individual country price levels may be infected with measurement errors. The use of one reference country, such as the USA, gives rise to asymmetries. Following Sjaastad (1990), we resolve these problems by using 'multilateral' real exchange rates which involve defining all prices and exchange rates on an appropriately weighted 'basket' of currencies rather than a single currency. In our context, the basket comprises the G7 currencies; and the average export shares of these countries are used as weights. Alternative weighting schemes were tested and gave the same results.[3]

Table 1.1 gives the mean and standard deviation of the real exchange rate

changes for the 1990s and 1960s. As can be seen, the means are more or less comparable for the two periods, but the standard deviations in the 1990s are considerably larger – on average more than five times larger. This indicates that real exchange rates have been much more volatile in the 1990s compared with the 1960s, that is, the variability of real exchange rates is increased when the nominal exchange rate is floating. This is consistent with Mussa (1987).

Note that greater variability of real exchange rates in a floating rate regime is 'inherent' in the adjustment mechanism. By definition, the exchange rate is the relative price of two national monies (assets), and like other asset prices, is determined in a forward-looking manner in which expectations concerning the future course of events play a key role. Consequently, exchange rates are very sensitive to the receipt of new information. On the other hand, aggregate price levels, which reflect the prices of goods and services, adjust only slowly, and do not jump as new information becomes available. The 'stickiness' of aggregate price levels does not necessarily represent market imperfections, rather it reflects the costs of price adjustment as a result of nominal contracts of finite length (see Frenkel, 1981). This characterisation of exchange rates *vis-à-vis* national price levels is embodied in the 'asset market' theory of exchange rates (see Mussa, 1982).

We now turn to the properties of other prices such as commodity prices and real interest rates. For commodity prices, we use the monthly series of world commodity prices contained in *International Financial Statistics* published by the International Monetary Fund.

Table 1.1 Real exchange rates: G7 (log changes x 100)

Statistic	UK	France	Germany	Japan	Canada	Italy	USA
1960s							
Mean	0.35	−0.21	0.08	−0.70	0.30	−0.29	0.13
Std deviation	2.48	0.66	0.74	1.05	1.00	0.78	0.46
1990s							
Mean	0.25	0.07	0.20	−0.08	0.37	0.16	0.24
Std deviation	6.81	6.93	7.21	7.84	3.12	6.45	3.41

To eliminate seasonal effects, we use twelve-month rates of change rather than monthly changes. For real interest rates, we use the ninety-day US treasury bill rates corrected for US inflation over the following twelve months. As a check, we also defined the real interest rate as the ninety-day

US treasury bill rate adjusted for quarterly inflation in the USA; moreover, we repeated the exercise using the yield on US long-term government bonds and the results (not included here) were very similar. The data on the US treasury bill rates, the yield on long-term bonds and the CPI are all from OECD MEI Database, VAR Econometrics.

The statistics for the twelve-month rates of change of commodity price index and the level of real interest rates are given in Table 1.2. As can be seen, the mean changes for the two series are more or less comparable, but standard deviations of both of them are about five times more variable in the 1990s than in the 1960s. This result is quite similar to the increased volatility of exchange rates, discussed previously. Note that as changes in exchange rates and commodity prices are dimensionally consistent, they are comparable with *levels* of real interest rates.

Table 1.2 Changes in commodity prices and real interest rates

	Commodity prices		Real interest rates	
	1960s	1990s	1960s	1990s
Mean	−1.30	−1.02	−0.02	−0.04
Standard deviation	5.88	19.89	0.32	1.61

To summarise, we observe that exchange rates have been markedly volatile since the switch to floating by the major currencies. Interestingly, we also observe that the additional variability of exchange rates tends to echo those of commodity prices and interest rates. This raises a number of important questions such as why these prices are so volatile, whether there is any systematic link among their variances, business and policy implications of this increased volatility, and so on. Proper resolution of these questions involves a thorough re-examination of the fundamental issues in exchange rate economics. In the eight chapters to follow, we provide new insights to these issues.

2.0 A PREVIEW OF OTHER CHAPTERS

PPP has, historically, occupied the centre stage of research in international finance. In Chapter 2, Yihui Lan provides an up-to-date survey of the contemporary literature on PPP. It covers the literature that has appeared up until July 2000, with the major focus on the research from the last decade.

This chapter has several attractive features. First, it employs an analytical approach to quantify the research into and interest in PPP, as compared to other major topics in international finance. Second, it provides a stylised geometric analysis of the PPP theory. Third, the study uses scientific measures (for example, the half-life measure) to deal with issues related to deviations from the parity and the speed of adjustment. Finally, it provides a succinct analysis of the recent empirical evidence on PPP.

Chapter 3 focuses on the crucial area of exchange rate dynamics. In this chapter, Larry Sjaastad provides an empirical test of the proposition that floating exchange rates can insulate small, open economies from external inflation. For this purpose, an Australian 'commodity currency' model is developed first, which is then extended to deal with real exchange rates as well. An attractive feature of this study is that the nominal version of the model is rich enough to admit tests of various hypotheses, including PPP, monetary independence, interest rate parity, terms-of-trade neutrality and foreign exchange market efficiency. The author uses Swiss data for the post-Bretton Woods period to test the nominal and real versions of the exchange rate model. The results indicate, among others, that the model tracks the Swiss franc nominal exchange rate *vis-à-vis* the dollar and the major European currencies very well, but Swiss PPP real exchange rates are found to be heavily contaminated with measurement error. According to the author, as that error explains the large co-movements in nominal and PPP real exchange rates, those co-movements are largely irrelevant to the PPP debate.

Chapter 4 deals with an important application of PPP. In this chapter, Meher Manzur investigates the relative usefulness of PPP in the measurement of international competitiveness. For this purpose, a new, alternative measure of real exchange rates is first constructed as an indicator of international competitiveness. This new measure, called the 'basket approach', involves defining all prices and exchange rates on an appropriately weighted basket of currencies rather than a single currency. Using data for Japan, Korea, Thailand, Malaysia and Singapore, real exchange rates are calculated based on both PPP and the basket approach. To check for the relative performance of the two measures, cointegration tests are employed. The results indicate that the new measure tends to outperform PPP in tracking the export growth for the sample countries. Moreover, the PPP-based real exchange rates tend to understate the measures of competitiveness for these countries. This result has important implications in terms of the levels of these countries' exchange rates as well as the well-known Balassa hypothesis.

Chapter 5 deals with a particular version of interest rate parity, namely, the equalisation of the real interest rates across countries. A key feature of this