Lecture Series 1.4

International Parity Conditions / Exchange Rate Determination

This lecture series rounds off our inquiry into the relationship between macroeconomic variables and the determination of exchange rates. We start out with a look at the so-called "International Parity Conditions". They are simple relations that emphasizes the fact that real returns rather than nominal returns is what ought to matter to investors. If one further ignores the uncertainty, and thus risk, associated with the future course of interest rates, inflation rates, and exchange rates, one obtains a set of "Parity Conditions" relating all of these variables. If investors are rational in the manner in which they form expectations about the economy, and if risk premia on the various currencies fluctuate randomly, then one may expect these simple relations to approximate the actual *average* behavior of the markets fairly well. In any case, they form a consistent set of predictions that provides an important benchmark for any forecasts. However, our inquiry into the performance of the Parity Conditions will reveal that they often are very inaccurate. In particular, we dentify the large violations of the "Purchasing Power Parity" theory as the source of genuine *foreign exchange risk*, and we shall discuss the implications of this for capital budgeting and hedging. In spite of the obvious shortcomings of the Parity Conditions, we find them to be useful guides to the *long run* behavior of exchange rates.

Next, we turn to a more intuitive discussion of the so-called *Asset Marker Approach to Exchange Rate Determination*. This is a theoretical approach that emphasizes the supply and demand for a currency that arises from the demand and supply of the financial assets denominated in this currency. Hence, it stresses motive 2 in the language of Lecture Series 1.2, or the motives associated with the Capital Account in the language of Lecture Series 1.3. One of the predictions are that future exchange rate changes are largely unpredictable - certainly in the short run - and that current events, or news announcements, move the exchange rate over the course of the day. We illustrate the reasoning by a few examples that show how the market reacts according to the updated expectations regarding the future course of the economy induced by the new events/announcements. Finally, we note how the exchange rate in the short run responds quite dramatically to the release of new economic data in the U.S.

This is consistent with the view that short run exchange rate changes are largely impossible to forecast because they depend on upcoming news that by definition is unpredictable. These considerations are important for the assessment of exchange rate behavior in the short to intermediate run.

SOME STYLIZED FACTS ABOUT EXCHANGE RATES

- (1) Exchange rates are much more volatile than national price levels. Hence, PPP cannot hold in the short run, and nominal and real exchange rates tend to move in the same direction.
- (2) Exchange rates behave like a random walk, i.e. there is very little, if any, tendency to reverse a movement away from PPP, and the successive changes in the exchange rates are largely unpredictable.

- (3) Spot and forward exchange rates typically move in tandem, with the forward rate quoted at a more or less stable premium or discount relative to the spot rate. Hence, the forward rate frequently appears to provide a biased prediction of future spot rates.
- (4) Exchange rate volatility seems to differ across alternative exchange rate regimes.
- (5) The correlation between exchange rate changes and current values of so called fundamental macroeconomic factors such as the money supply, the current account deficit, growth in GDP, or energy prices, is weak.

FEATURES OF MODERN EXCHANGE RATE MODELS

- (1) Currencies must be viewed as financial assets. The exchange rate helps equilibrate the demand for a particular national money stock to the outstanding supply, and more broadly equilibrate the global demand for financial assets denominated in a given currency to the current supply of these assets.
- (2) The willingness to hold financial assets in a given currency depends on the expected future values of the exchange rate, since the exchange rate development directly affects the rate of return on the assets relative to assets denominated in other currencies.
- (3) The expectations regarding the future values of the exchange rate in turn depends on the future course of the factors expected to have an impact on the exchange rate. Thus, the demand for the financial assets denominated in a given currency depends on forecasts of a range of future domestic and international economic variables.
- (4) Factors that tend to support the value of a currency are:
 - a low growth rate of the money supply (reputation of the central bank).
 - a low expected domestic rate of inflation.
 - a high domestic real interest rate.
 - a high domestic rate of economic growth.
 - a domestic trade surplus.
 - central bank support for the currency.
 - an increase in capital inflow.
 - a high degree of political and economic stability.
 - a favorable investment climate in the domestic economy.
 - and much more
- (5) When "news" hit the market and cause the expectations about the future development of the factors in (4) to change, then the exchange rate will immediately move to reflect the new expectations regarding the future value of the factors and hence the future value of the exchange rate itself.

THE FX MARKET RESPONSE TO NEW INFORMATION

The interpretation of the FX market response to economic news can be organized by 'rolling the chain of events above backwards". This involves the following steps:

- (5) Register the receipt of information;
- (4) Identify the significant economic content of the news piece;
- (3) Modify your expectations regarding the future course of relevant economic factors;
- (2) Update your expectations regarding the future spot exchange rates in light of this;
- (1) Appropriately revise your holdings of assets denominated in different currencies in response to the changed risk-return assessment of these assets.

SPECIFIC EVENTS:

The 1992 lowering of interest rates in the U.K. following the abolishment of the British pounds ties to the EMS produced a sharp depreciation of the pound. This was, of course, not a surprising outcome of the policy decision by the British Central Bank. Nonetheless, it may be helpful to trace through the mechanical steps above to see how this line of reasoning works. It also sets up the more complicated interpretation of events during the German tight monetary policy stance:

5 + 4. News arrives; it informs the market of a lowering of short-term interest rates in the U.K.

- 3. Market participants lower their forecasts of future U.K. interest rates as well; it may also serve as a signal that the Central Bank in the U.K. is very concerned about the state of the British economy; Finally, it implies that the British have abandoned the idea of a rapid return to the ERM system.
- 2. This tends to lower the expected FC returns on British assets. In particular, chances are that further lowering of rates may follow if the economy does not respond to the expansionary monetary policy. This could lead to a further weakening of the pound in the future.
- **1.** Market participants will attempt to get out of the British pound denominated assets immediately. This implies an immediate depreciation of the pound on the FX markets.

For a more complicated scenario, consider the reaction in the FX markets to announcements of surprising increases in the German money supply during the tight monetary policy regime in 1992-93:

- 5 + 4. News arrives; it informs the market of an unexpected increase in the German money supply.
- **3**. Market participants, knowing the Bundesbank's dedication to fight inflation, now expect the Bundesbank to keep an even tighter lid on the money supply in the future, and certainly not

lower their interest rates any time soon.

- 2. This tends to increase the expected value of the DM in the FX market in the foreseeable future. More investors will tend to hold DM denominated assets in the future when the DM is expected to be strong on the FX markets.
- 1. Market participants will attempt to purchase more DM denominated assets immediately. This implies an immediate appreciation of the DM on the FX markets.

Hence, due to specific expectations regarding the policy reaction to the economic news, the "market' anticipates a strengthening of the DM which, as usual in financial markets, has an immediate impact on the market price, or the exchange rate. It appreciates today.

EXCHANGE RATE FORECASTING

All the various determinants of exchange rates can serve as a basis for exchange rate forecasting:

SHORT RUN:

1)	Current spot Rate	[Stylized Fact: Random Walk]	
2)	Forward Rate	[Unbiased Forward Rate Hypothesis]	
3)	Ratio of Interest Rates (Gross)	[International Fisher Effect]	
4)	Ratio of Expected Inflation Rates (Gross)	[Purchasing Power Parity]	
5)	Fundamental Factors	[Large Scale Econometric Model]	
6)	Technical Analysis	[Charting; Resistance/Support Levels]	
LONG RUN:			
1)	Inflation Expectations	[PPP + Economic Analysis]	

	- underlying inflationary fundamentals	
2)	General Economic Growth and Stability	[Fundamental Assessment]
3)	Reliance on Long Term Trends	["Technical Analysis"]

- 3) Reliance on Long Term Trends
 - historical movement will persist

SOME RECOMMENDATIONS:

VERY SHORT RUN: (days or weeks)	Use Spot; check with Forward and Fundamental Factors
SHORT/MEDILJM RUN: (months or a few years)	Use Different Parity Conditions and Fundamental Analysis
VERY LONG RUN: (beyond 5 years)	Use PPP; Long Term Interest Rates and other Gauges of Inflation