Econometrics II students

Froot and Thaler (1990) explain in simple terms the concept of ``uncovered interest parity" (UIP) and analogous concept of ``forward discount bias" (FDB).
[Froot, K. A. and R. H. Thaler, " Anomalies Foreign Exchange."
Journal of economic perspectives, summer 1990 issue, vol 4(3),179-192.]

Daily transactions in foreign exchange markets in a recent year were worth $430 billion, when the daily US GNP was $22 billion and total world trade was only about $11 billion (per day). Hence such a huge market volume is attributed to speculation and the question is whether it makes markets more or less efficient.

The name UIP, uncovered interest parity suggests that it is not covered by hedging in forward markets and interest parity is the interest differential between domestic and foreign interest rates. The empirically estimable equation for the UIP model is:

$$s_{t+k} - s_t = \alpha + \beta(i_t - i_t^*) + \varepsilon_{t+k} \quad (1)$$

where s_t denotes (possibly log) spot dollar price of foreign exchange (say, DMarks) at time t, i_t denotes current k-period dollar interest rate, i_t^* denotes k-period foreign (DMarks) interest rate, and ε_t are errors. The left side may be written as Δs_{t+k} and represents currency depreciation over k periods. The parity condition is satisfied if $\alpha = 0$ and $\beta = 1$.

The name FDB, forward discount bias model uses so-called forward prices. In foreign exchange markets `forward' refers to (possible log) today's dollar price of foreign exchange to be delivered at a specific date k time periods out in the future denoted by $f_{t,k}$. Since forward discount is simply another measure of interest differential, we can substitute it in the (1) leading to the estimable equation for the FDB model as:

$$s_{t+k} - s_t = \alpha + \beta(f_{t,k} - s_t) + \varepsilon_t \quad (2)$$

We rewrite (1) as autoregressive distributed lag model ADL(1,0)

$$y_t = \beta_1 + \beta_2 y_{t-1} + \beta_3 x_t + \varepsilon_t \quad (3)$$

Using $k = 1$, y_t denotes spot exchange rates of DM at month t, and $x_t = (i_t - i_t^*)$, where i_t^* is a monthly interest rate starting with annualized three-month interest rates on DM's in Germany and i_t is similar interest rate in the US. For example, if the annualized interest rate is 8%, $i_t = (1.08)^{(1/12)} - 1$ satisfies the equation $1.08 = (1 + i_t)^{12}$. Often researchers simply divide by 12 to obtain montly interest rate, although this is not appropriate if monthly transactions are contemplated.

Clearlywe need $\beta_2 = 1$ and $\beta_1 = \alpha$ for (3) to reduce to (1). Now a **joint** test of the parity condition requires $\beta_1 = \alpha = 0$, $\beta_2 = -1$, and $\beta_3 = 1$.

Often one uses the log transformation and annualization of interest rate is done by simply muldiplying or dividing by 12 or 4 as the case may be.

Phillips, et al Jof Applied Etrics vol 11, pp1-22 , 1996 discusses robust tests for forward market efficiency with empirical evidence from 1920's. The model is

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where f is for log forward exch. rate for a given currency contracted at time t for delivery at time t+k, s is for log spot exchange rate. market rationality and zero mean risk premium leads to a=0 abd b=1.

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where affixes i,j refer to currencies of country i and j. This takes care of multi-currency effects.