FINA 7360: International Finance

CASE I: SOLUTIONS

● Regression from 1978:II-2021:III

Regression Statistics	
Multiple R	0.266218
R Square	0.070872
Adjusted R Square	0.055472
Standard Error	0.048753
Observations	185

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0.032815	0.010938	4.602094	0.003953
Residual	181	0.430202	0.002377		
Total	184	0.463017			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.0061	0.004905	-1.24402	0.2151	-0.01578	0.003576
$I_d - I_f$	0.013913	0.004068	**3.420206**	0.000773	0.005886	0.021939
$i_d - i_f$	-0.00391	0.001725	**-2.26737**	0.02455	-0.00731	-0.00051
$y_d - y_f$	0.002006	0.003109	0.645253	0.51958	-0.00413	0.00814

1. Signs:
a. $I_d - I_f$ has a positive coefficient. It is consistent with PPP.
b. $i_d - i_f$ has a negative coefficient. It is consistent with Monetary Approach.
c. $y_d - y_f$ has a positive coefficient. Trade Balance explains this sign.

2. R^2 is around 7%. It is not that low for a series expected to follow a random walk. $I_d - I_f$ & $(i_d - i_f)$ are significant at the standard 5% level. Overall, I'll feel comfortable recommending this model.

2)
Forecasting equation

$$E[s_t] = -0.0061 + 0.013913\,(I_d - I_f)_t - 0.00391\,(i_d - i_f)_t + 0.002006\,(y_d - y_f)_t$$

$$E[S_t] = S_{t-1} * (1 + E[s_t])$$

Note: I am going to use a Random Walk assumption for all the explanatory variables. That is, this period's realization is the best forecast for next period.

Year	I_d-I_f	i_d-i_f	y_d-y_f	S_t	s^F_t	S^F_t	$S_t - S^F_t$
2021:III	0.4706	-0.030	0.4905	1.3470			
2021:IV	0.9331	-0.100	-0.7064	1.3500	0.0147	1.3668	-0.0168
2022:I	1.1207	-0.550	0.6856	1.3152	0.0300	1.3905	-0.0753
2022:II	0.5641	-0.080	-0.4636	1.2162	0.0325	1.3580	-0.1418
2022:III	-1.7160	0.220	-0.2529	1.1134	0.0285	1.2509	-0.1375
2022:IV				1.2077	-0.0079	1.1046	0.1031

4) MSE = 0.01112 and **MAE = 0.09490**

5) Forecasting S_t using the Forward Rate ($F_{t,90}$).

Let's use the linear IRP approximation: $F_{t,T} \approx S_t\,[1 + (i_d - i_f) \times T/360]$.

Yea	i_d-i_f	S_t	$S^F_{t+90} = F_{t-1,90}$	$S_t - S^F_t$
2021:III	-0.030	1.3470		
2021:IV	-0.100	1.3500	1.3369	0.0131
2022:I	-0.550	1.3152	1.3163	-0.0011
2022:II	-0.080	1.2162	1.1344	0.0818
2022:III	0.220	1.1134	1.1919	-0.0785
2022:IV		1.2077	1.1746	0.0331

MSE = 0.00282 and **MAE = 0.04151**

6) Forecasting with the Random Walk model.

Yea	S_t	S^F_t	$S_t - S^F_t$
2021:III	1.3470		
2021:IV	1.3500	1.3470	0.0030
2022:I	1.3152	1.3500	-0.0348
2022:II	1.2162	1.3152	-0.0990
2022:III	1.1134	1.2162	-0.1028
2022:IV	1.2077	1.1134	0.0943

MSE = 0.00610 and **MAE = 0.06678**

Using the MAE evaluation metric, the model performs well relative to the RWM, but not the Forward Rate. (Note that the MSE metric favors the Forward Rate too). Based on this result, I would not recommend the model.