

FACTOR MODEL FORECASTS OF EXCHANGE RATES

Charles Engel
Nelson C. Mark
Kenneth D. West

November 2009

Appendix A: Additional Empirical Results

This Appendix includes four tables.

Table A.1A: two factor ($r=2$) results with the UK pound as base currency. The formatting and interpretation of this table are identical to that of Table 3 in the paper. The difference is that the UK pound rather than the US dollar is the base currency. As in Table 3 in the paper, the estimation method is maximum likelihood.

Table A.1B: Results for $\hat{F}_{it}-s_{it}$, varying number of factors r , UK pound as base currency. The formatting and interpretation of this table are identical to that of Table 4 in the paper. The difference is that the UK pound rather than the US dollar is the base currency. As in Table 4 in the paper, the estimation method is maximum likelihood.

Table A.2A: two factor ($r=2$) results, when estimation is by principal components. The formatting and interpretation of this table are identical to that of Table 3 in the paper. The difference is that estimation is by principal components rather than maximum likelihood. As in Table 3 in the paper, the US is the base currency.

Table A.2B: Results for $\hat{F}_{it}-s_{it}$, varying number of factors r , when estimation is by principal components. The formatting and interpretation of this table are identical to that of Table 4 in the paper. The difference is that estimation is by principal components rather than maximum likelihood. As in Table 4 in the paper, the US is the base currency.

Table A.1: Results with UK Pound as Base Currency

A. Two Factor (r=2) Results

<u>Model</u>	<u>Sample/ No.</u> <u>Currencies</u>	<u>Statistic</u>	<u>Horizon h</u>			
			<u>1</u>	<u>4</u>	<u>8</u>	<u>12</u>
$\hat{F}_{it-s_{it}}$	long / N=9	median U	1.005	1.019	1.034	1.042
		#U<1 or (t>1.282)	3(1)	2(1)	2(0)	1(0)
$\hat{F}_{it-s_{it}}$ + Taylor	long / N=9	median U	1.006	1.036	1.044	1.043
		#U<1 or (t>1.282)	2(1)	1(1)	1(0)	1(0)
$\hat{F}_{it-s_{it}}$ + Monetary	long / N=9	median U	1.014	1.084	1.230	1.400
		#U<1 or (t>1.282)	2(0)	2(0)	2(0)	2(0)
$\hat{F}_{it-s_{it}}$ + PPP	long / N=9	median U	1.002	1.024	1.031	1.105
		#U<1 or (t>1.282)	4(1)	3(1)	3(1)	4(1)
$\hat{F}_{it-s_{it}}$	early / N=17	median U	1.005	1.016	1.057	1.077
		#U<1 or (t>1.282)	6(1)	6(1)	4(2)	4(0)
$\hat{F}_{it-s_{it}}$ + Taylor	early / N=17	median U	1.006	1.033	1.064	1.100
		#U<1 or (t>1.282)	6(1)	4(1)	4(1)	3(0)
$\hat{F}_{it-s_{it}}$ + Monetary	early / N=17	median U	1.006	1.044	1.158	1.284
		#U<1 or (t>1.282)	5(2)	7(3)	6(2)	3(1)
$\hat{F}_{it-s_{it}}$ + PPP	early / N=17	median U	0.998	0.989	1.016	1.057
		#U<1 or (t>1.282)	10(3)	10(3)	8(3)	6(2)
$\hat{F}_{it-s_{it}}$	late / N=10	median U	1.004	1.001	0.959	0.876
		#U<1 or (t>1.282)	4(0)	5(0)	6(0)	7(0)
$\hat{F}_{it-s_{it}}$ + Taylor	late / N=10	median U	1.001	0.993	0.968	0.853
		#U<1 or (t>1.282)	4(1)	6(0)	6(0)	7(1)
$\hat{F}_{it-s_{it}}$ + Monetary	late / N=10	median U	1.025	1.240	1.671	1.940
		#U<1 or (t>1.282)	1(0)	0(0)	0(0)	1(0)
$\hat{F}_{it-s_{it}}$ + PPP	late / N=10	median U	1.006	1.075	1.189	1.258
		#U<1 or (t>1.282)	3(0)	1(0)	1(0)	1(0)

Table A.1: Results with UK Pound as Base Currency (continued)

B. Results for $\hat{F}_{it-s_{it}}$ Varying Number of Factors r

<u>No. of Factors (r)</u>	<u>Sample/ No. Currencies</u>	<u>Statistic</u>	<u>Horizon h</u>			
			<u>1</u>	<u>4</u>	<u>8</u>	<u>12</u>
1	long / N=9	median U	1.009	1.033	1.062	1.107
		#U<1 or (t>1.282)	0(0)	0(0)	0(0)	0(0)
2	long / N=9	median U	1.005	1.019	1.034	1.042
		#U<1 or (t>1.282)	3(1)	2(1)	2(0)	1(0)
3	long / N=9	median U	1.002	1.017	1.082	1.096
		#U<1 or (t>1.282)	3(2)	2(1)	0(0)	0(0)
1	early / N=17	median U	1.006	1.036	1.051	1.074
		#U<1 or (t>1.282)	1(0)	2(0)	2(0)	5(0)
2	early / N=17	median U	1.005	1.016	1.057	1.077
		#U<1 or (t>1.282)	6(1)	6(1)	4(2)	4(0)
3	early / N=17	median U	1.001	1.014	1.056	1.088
		#U<1 or (t>1.282)	8(3)	5(3)	6(2)	3(1)
1	late / N=10	median U	1.007	1.041	1.101	1.214
		#U<1 or (t>1.282)	1(0)	0(0)	0(0)	1(0)
2	late / N=10	median U	1.004	1.001	0.959	0.876
		#U<1 or (t>1.282)	4(0)	5(0)	6(0)	7(0)
3	late / N=10	median U	1.001	1.060	1.164	1.195
		#U<1 or (t>1.282)	4(0)	3(0)	3(0)	4(0)

Table A.2: Results with Principal Components Estimation

A. Two Factor (r=2) Results

<u>Model</u>	<u>Sample/ No.</u> <u>Currencies</u>	<u>Statistic</u>	<u>Horizon h</u>			
			<u>1</u>	<u>4</u>	<u>8</u>	<u>12</u>
$\hat{F}_{it}-s_{it}$	long / N=9	median U #U<1 or (t>1.282)	1.018 4(2)	1.046 3(2)	1.045 3(2)	1.064 1(1)
$\hat{F}_{it}-s_{it}$ + Taylor	long / N=9	median U #U<1 or (t>1.282)	1.018 3(2)	1.069 2(2)	1.128 0(1)	1.094 1(1)
$\hat{F}_{it}-s_{it}$ + Monetary	long / N=9	median U #U<1 or (t>1.282)	1.017 4(3)	1.107 3(3)	1.280 3(2)	1.514 3(2)
$\hat{F}_{it}-s_{it}$ + PPP	long / N=9	median U #U<1 or (t>1.282)	1.004 4(2)	0.994 6(3)	0.959 5(4)	0.940 5(4)
$\hat{F}_{it}-s_{it}$	early / N=17	median U #U<1 or (t>1.282)	1.011 4(2)	1.046 4(3)	1.011 7(4)	1.020 8(2)
$\hat{F}_{it}-s_{it}$ + Taylor	early / N=17	median U #U<1 or (t>1.282)	1.021 5(2)	1.082 3(1)	1.049 6(3)	1.004 8(2)
$\hat{F}_{it}-s_{it}$ + Monetary	early / N=17	median U #U<1 or (t>1.282)	1.006 7(5)	1.014 7(5)	1.086 5(5)	1.211 5(5)
$\hat{F}_{it}-s_{it}$ + PPP	early / N=17	median U #U<1 or (t>1.282)	1.003 5(2)	0.975 10(3)	0.993 10(3)	1.075 5(1)
$\hat{F}_{it}-s_{it}$	late / N=10	median U #U<1 or (t>1.282)	1.024 3(3)	1.047 3(3)	1.059 2(1)	1.172 2(1)
$\hat{F}_{it}-s_{it}$ + Taylor	late / N=10	median U #U<1 or (t>1.282)	1.022 3(2)	1.062 3(2)	1.112 2(1)	1.185 2(1)
$\hat{F}_{it}-s_{it}$ + Monetary	late / N=10	median U #U<1 or (t>1.282)	1.006 4(2)	1.021 4(2)	1.122 4(2)	1.384 2(2)
$\hat{F}_{it}-s_{it}$ + PPP	late / N=10	median U #U<1 or (t>1.282)	1.018 3(3)	1.022 3(3)	0.918 7(2)	0.763 9(4)

Table A. 2: Results with Principal Components Estimation (continued)**B. Results for $\hat{F}_{it-s_{it}}$ Varying Number of Factors r**

<u>No. of Factors (r)</u>	<u>Sample/ No. Currencies</u>	<u>Statistic</u>	<u>Horizon h</u>			
			<u>1</u>	<u>4</u>	<u>8</u>	<u>12</u>
1	long / N=9	median U #U<1 or (t>1.282)	1.010 1(1)	1.053 3(1)	1.116 2(1)	1.102 2(0)
2	long / N=9	median U #U<1 or (t>1.282)	1.018 4(2)	1.046 3(2)	1.045 3(2)	1.064 1(1)
3	long / N=9	median U #U<1 or (t>1.282)	1.004 2(0)	1.045 2(1)	1.085 1(1)	1.087 0(0)
1	early / N=17	median U #U<1 or (t>1.282)	1.007 5(2)	1.013 6(3)	1.035 8(3)	1.110 7(2)
2	early / N=17	median U #U<1 or (t>1.282)	1.011 4(2)	1.046 4(3)	1.011 7(4)	1.020 8(2)
3	early / N=17	median U #U<1 or (t>1.282)	1.015 4(1)	1.061 4(1)	1.084 5(0)	1.049 6(0)
1	late / N=10	median U #U<1 or (t>1.282)	1.026 1(1)	1.064 1(0)	1.070 3(0)	1.143 2(1)
2	late / N=10	median U #U<1 or (t>1.282)	1.024 3(3)	1.047 3(3)	1.059 2(1)	1.172 2(1)
3	late / N=10	median U #U<1 or (t>1.282)	1.020 2(1)	1.078 2(2)	1.120 3(0)	1.166 1(0)