BANK OF ENGLAND

Appendix to Staff Working Paper No. 537
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A Additional Tables and Figures

Table A.I. Descriptive Statistics of Individual Returns

The table reports descriptive statistics for individual equity markets. Panel A shows results for the equity returns measured measured in local currency; Panel B shows results for equity returns measured measured in US dollars; and Panel C reports results for the depreciation rates of the US dollar against the foreign currency. The sample of 42 country indices runs from November 1983 to September 2011. AC(1) is the first-order autocorrelation.

Panel (a): International Equity Returns—Local Currency

	Mean	Median	Std. Dev.	Skewness	Kurtosis	AC(1)
Australia	12.24	17.57	16.85	-2.08	19.19	0.02
Austria	9.88	9.77	24.69	-0.24	5.86	0.22
Belgium	11.42	15.94	19.71	-0.88	8.20	0.23
Brazil	21.81	24.98	29.60	-0.43	5.15	0.01
Bulgaria	-12.76	-5.64	34.10	-1.09	7.09	0.39
Canada	10.05	13.61	15.73	-0.77	6.02	0.12
Czech Republic	13.34	13.30	25.35	-0.22	4.31	0.05
Denmark	10.46	16.36	19.09	-0.32	3.68	0.04
Egypt	22.79	7.98	33.02	0.44	4.55	0.23
Finland	13.23	10.00	32.13	0.20	4.27	0.22
France	11.41	19.35	20.21	-0.28	3.75	0.12
Germany	9.96	17.67	22.00	-0.58	4.78	0.08
Greece	12.77	7.34	36.26	1.26	8.08	0.14
Hong Kong	17.73	16.06	27.79	-0.31	6.99	0.07
Hungary	20.58	22.64	34.66	0.28	7.25	0.11
India	15.58	14.85	28.44	-0.04	3.25	0.08
Indonesia	27.03	21.52	43.33	2.54	21.31	0.08
Ireland	4.65	10.80	21.97	-0.47	4.06	0.18
Israel	9.30	19.82	22.80	-0.21	3.86	0.07
Italy	10.80	10.11	23.44	0.42	4.10	0.07
Japan	3.67	5.82	19.92	-0.10	3.99	0.09
Korea	13.32	4.11	32.02	0.88	6.69	0.06
Kuwait	2.83	6.08	26.23	-0.05	3.02	0.31
Malaysia	12.74	14.01	26.66	0.45	6.57	0.09
Mexico	30.19	31.50	27.77	0.17	4.04	0.04
Netherlands	11.18	15.87	18.74	-0.72	4.95	0.09
New Zealand	6.63	7.42	19.05	0.38	5.67	-0.11
Norway	12.80	21.06	24.30	-0.80	4.79	0.13
Philippines	14.13	13.62	29.01	0.30	4.50	0.14
Poland	26.12	14.51	47.31	3.24	28.67	0.11
Portugal	5.97	3.82	20.85	0.18	4.56	0.15
Russia	28.75	31.99	55.64	0.24	5.23	0.16
Singapore	8.45	11.13	24.32	-0.67	8.16	0.10
South Africa	16.15	16.65	20.30	-0.54	5.14	-0.03
Spain	15.75	19.23	22.70	-0.22	4.76	0.14
Sweden	14.91	17.47	24.34	0.03	5.08	0.11
Switzerland	10.44	15.45	17.06	-0.70	5.12	0.16
Taiwan	11.99	4.33	35.15	0.46	4.90	0.10
Thailand	15.08	15.02	36.61	0.40	5.48	0.02
Ukraine	-10.59	1.90	43.19	-0.06	3.43	0.31
United Kingdom	11.11	15.84	16.17	-0.79	5.95	0.04
United States	10.73	15.39	15.60	-0.74	5.13	0.08

Table A.I. (continued)

Panel (b): International Equity Returns—US dollar

	Mean	Median	Std. Dev.	Skewness	Kurtosis	AC(1)
Australia	13.83	15.42	23.37	-1.17	9.31	0.03
Austria	12.66	13.51	27.11	-0.25	6.25	0.19
Belgium	14.02	17.65	21.89	-0.74	8.74	0.21
Brazil	21.45	25.58	39.27	-0.27	4.27	0.07
Bulgaria	-9.30	0.77	38.98	-1.16	6.61	0.41
Canada	11.37	14.59	19.63	-0.66	5.91	0.12
Czech Republic	17.08	19.58	29.72	-0.28	4.20	0.11
Denmark	12.73	16.27	20.67	-0.35	4.47	0.02
Egypt	19.59	10.58	33.51	0.50	5.10	0.26
Finland	12.92	7.86	32.62	0.12	4.01	0.18
France	13.56	15.30	21.93	-0.29	3.75	0.08
Germany	12.48	15.80	23.76	-0.41	4.37	0.05
Greece	10.41	7.54	37.58	0.98	7.62	0.12
Hong Kong	17.74	16.19	27.82	-0.30	6.93	0.07
Hungary	18.48	26.25	38.87	-0.30	5.53	0.12
India	13.88	16.21	31.12	0.08	3.64	0.11
Indonesia	23.37	17.19	50.66	1.67	12.92	0.14
Ireland	4.98	14.77	22.86	-0.64	4.68	0.12
Israel	8.50	17.06	24.54	-0.21	3.74	0.09
Italy	11.70	11.30	25.50	0.19	3.82	0.08
Japan	8.20	6.98	22.66	0.28	3.66	0.10
Korea	13.81	0.52	38.59	1.01	8.37	0.02
Kuwait	4.01	-0.40	27.39	-0.17	3.10	0.34
Malaysia	12.38	11.90	29.17	0.54	8.73	0.14
Mexico	23.81	27.39	31.82	-0.46	4.60	0.11
Netherlands	13.47	17.33	19.65	-0.80	5.09	0.04
New Zealand	8.21	12.87	23.39	-0.05	4.19	-0.01
Norway	14.39	18.58	27.12	-0.72	4.98	0.10
Philippines	11.89	9.68	32.03	0.36	5.19	0.19
Poland	23.76	23.29	49.82	2.30	20.53	0.11
Portugal	5.96	5.96	23.17	0.00	4.52	0.12
Russia	29.33	31.99	56.58	0.22	4.99	0.16
Singapore	10.72	10.72	26.28	-0.54	7.20	0.09
South Africa	15.38	16.73	28.02	-0.51	4.10	0.00
Spain	17.02	15.15	24.97	-0.12	4.28	0.11
Sweden	15.86	18.91	26.05	-0.24	4.00	0.11
Switzerland	13.71	14.98	18.14	-0.23	3.80	0.09
Taiwan	12.37	9.11	37.01	0.44	4.47	0.11
Thailand	15.06	18.20	38.63	0.10	4.92	0.06
Ukraine	-16.74	-31.43	47.94	-0.10	3.76	0.40
United Kingdom	11.63	9.81	18.39	-0.22	4.21	0.07
United States	10.73	15.39	15.60	-0.74	5.13	0.08

Table A.I. (continued)

Panel (c): Depreciation Rates

	Mean	Median	Std. Dev.	Skewness	Kurtosis	AC(1)
Australia	1.59	2.83	11.79	-0.42	4.71	0.08
Austria	2.78	2.00	11.33	0.06	3.31	0.03
Belgium	2.60	3.23	11.27	-0.04	3.53	0.03
Brazil	-0.36	-4.91	20.38	-3.21	32.99	-0.02
Bulgaria	3.46	3.45	10.96	0.06	3.73	-0.05
Canada	1.32	0.43	6.99	0.09	6.91	-0.01
Czech Republic	3.74	4.61	12.57	-0.05	3.07	0.06
Denmark	2.26	2.78	11.03	-0.03	3.29	0.04
Egypt	-3.20	-0.15	5.58	-5.86	55.70	0.26
Finland	-0.31	2.44	11.45	-0.45	4.22	0.12
France	2.15	3.76	11.02	-0.03	3.42	0.04
Germany	2.52	2.59	11.26	0.01	3.26	0.04
Greece	-2.36	-2.21	10.70	-0.35	4.71	0.09
Hong Kong	0.01	-0.03	0.54	0.44	8.32	-0.20
Hungary	-2.10	-3.99	12.85	-0.25	5.05	0.10
India	-1.71	-0.25	6.07	0.14	7.43	0.15
Indonesia	-3.66	-2.78	23.00	-1.76	35.91	0.15
Ireland	0.33	2.72	10.61	-0.36	3.76	0.07
Israel	-0.80	-0.28	6.95	-0.35	5.40	0.03
Italy	0.90	1.99	11.11	-0.20	3.90	0.08
Japan	4.52	-0.05	11.47	0.45	4.96	0.02
Korea	0.49	0.30	13.25	-1.31	22.40	-0.05
Kuwait	1.18	0.40	3.59	-1.07	9.28	0.00
Malaysia	-0.36	0.00	10.54	-0.78	40.29	0.10
Mexico	-6.38	-2.90	11.19	-2.92	29.76	0.13
Netherlands	2.30	2.13	11.31	-0.06	3.43	0.04
New Zealand	1.58	1.99	11.38	-0.19	6.03	0.06
Norway	1.59	1.96	10.95	-0.30	3.96	0.02
Philippines	-2.24	-0.24	8.85	-0.89	9.04	0.08
Poland	-2.36	-2.80	12.93	-0.15	4.26	0.14
Portugal	-0.01	0.94	10.77	-0.23	3.97	0.06
Russia	0.57	0.00	4.35	0.51	21.26	0.26
Singapore	2.27	2.26	5.40	-0.02	6.28	0.06
South Africa	-0.77	-2.00	16.05	-0.18	3.72	0.05
Spain	1.27	1.35	11.25	-0.24	3.95	0.04
Sweden	0.95	1.92	11.66	-0.69	7.05	0.13
Switzerland	3.26	1.91	12.07	0.12	3.62	0.03
Taiwan	0.37	-0.29	5.34	0.29	6.63	0.15
Thailand	-0.02	0.44	10.47	-1.34	32.73	0.18
Ukraine	-6.15	-0.17	13.01	-3.48	19.96	0.33
United Kingdom	0.52	-0.50	10.56	-0.09	5.42	0.09

Table A.II. Descriptive Statistics of Factors

The table presents descriptive statistics for the monthly factors described in the main text: the excess return on the MSCI world portfolio (World), the global FX volatility innovations (Vol^{FX}); the global equity volatility innovations (Vol^{EQ}); the Fama-French factors including the US size and value factors (Size^{US}, and Value^{US}, respectively); and the US momentum factor (Mom^{US}). Numbers in brackets show t-statistics for the null that the mean return on the factor is zero. AC(1) is the first-order autocorrelation.

	World	Vol^{FX}	Vol^{EQ}	Size^{US}	Value^{US}	Mom^{US}	Size^{G}	Value^{G}	Mom^{G}
Mean	5.811	-0.000	0.000	-0.453	3.648	7.814	0.921	4.563	7.247
	[1.973]	[-0.000]	[0.000]	[-0.228]	[1.852]	[2.530]	[0.556]	[2.505]	[2.302]
Median	9.593	-24.999	-51.392	-2.820	3.000	9.540	0.720	3.960	9.360
Std. Dev.	15.560	36.176	86.012	10.481	10.395	16.295	7.634	8.398	14.400
Skew	-0.642	1.846	3.354	0.458	0.230	-1.278	-0.255	0.444	-0.953
Kurtosis	4.583	11.453	22.589	9.285	5.409	11.567	6.257	7.721	9.368
Sharpe	0.373	-0.000	0.000	-0.043	0.351	0.480	0.121	0.543	0.503
AC(1)	0.117	-0.091	-0.038	-0.029	0.148	0.066	-0.010	0.310	0.179

Table A.III. Fama-MacBeth cross-sectional regressions

The table reports coefficients from Fama-MacBeth regressions of mean portfolio returns on betas to pairs of risk factors. The analysis uses the five portfolios from each of our sorting variables (dividend yields, term spreads and momentum) simultaneously, giving 15 cross-sectional observations. In every specification of the model the first factor is the MSCI World excess return (World) while the choice of the second factor varies across models. Shanken (1992) t-statistics are reported in brackets. The final rows of the table give a χ^2 test of the null that the pricing errors are zero and a set of associated p-values.

	Model 1	Model 2	Model 3	Model 4	Model 5
World	-0.0039	-0.0151	-0.0016	-0.0065	0.0116
	[-0.4735]	[-1.3129]	[-0.1913]	[-0.6926]	[1.0615]
Vol^{FX}	-0.0710				
	[-2.2431]				
Vol^{EQ}		-0.1650			
		[-2.8750]			
Size^{US}			0.0153		
			[1.9028]		
Value^{US}				0.0223	
				[2.4563]	
Mom^{US}					0.0297
					[3.1466]
R^2	0.4519	0.7818	0.4085	0.4811	0.7272
J-stat	28.0878	14.0478	39.0921	30.3972	23.5047
p-value	[0.0088]	[0.3705]	[0.0002]	[0.0041]	[0.0360]

Table A.IV. Fama-MacBeth time-series regressions

The table reports factor betas, t-statistics and R^2 for the first-step time-series regressions in the Fama-MacBeth analysis. The five portfolios are generated by sorting countries on dividend yields. In every specification of the model the first factor is the MSCI World excess return (World) while the choice of the second factor varies across models. Only the loadings and t-statistics for the second factor are reported.

Panel (a): Dividend Yield portfolios

	P1	P2	P3	P4	P5
Vol^{FX}	-5.879	-2.716	-6.155	-6.015	-5.836
	[-2.087]	[-1.131]	[-2.770]	[-2.468]	[-2.530]
	0.071	0.085	0.075	0.051	0.057
Vol^{EQ}	-2.885	-2.602	-2.473	-4.191	-4.182
	[-1.478]	[-2.473]	[-2.106]	[-4.365]	[-4.510]
	0.073	0.099	0.069	0.083	0.086
Size^{US}	0.306	0.343	0.267	0.286	0.309
	[2.638]	[4.687]	[3.153]	[4.422]	[4.230]
	0.088	0.141	0.093	0.077	0.088
Value^{US}	0.185	0.071	0.129	0.213	0.189
	[1.994]	[0.815]	[1.584]	[2.753]	[2.342]
	0.069	0.083	0.059	0.053	0.055
Mom^{US}	-0.093	0.010	0.018	0.038	0.077
	[-1.317]	[0.181]	[0.347]	[0.749]	[1.483]
	0.065	0.081	0.050	0.030	0.045

Table A.IV. (continued)

The table reports factor betas, t-statistics and R^2 for the first-step time-series regressions in the Fama-MacBeth analysis. The five portfolios are generated by sorting countries on term spreads. In every specification of the model the first factor is the MSCI World excess return (World) while the choice of the second factor varies across models. Only the loadings and t-statistics for the second factor are reported.

Panel (b): Term Spread portfolios

	P1	P2	P3	P4	P5
Vol^{FX}	-6.500	-1.911	-5.085	-2.753	-5.471
	[-2.165]	[-0.797]	[-2.105]	[-1.337]	[-1.983]
	0.051	0.057	0.041	0.110	0.033
Vol^{EQ}	-3.183	-2.158	-1.769	-2.122	-2.834
	[-1.979]	[-1.934]	[-1.281]	[-2.516]	[-2.123]
	0.054	0.069	0.034	0.118	0.037
Size^{US}	0.320	0.222	0.226	0.209	0.282
	[3.789]	[2.960]	[2.692]	[2.671]	[2.746]
	0.076	0.083	0.055	0.130	0.050
Value^{US}	0.231	0.170	0.153	0.240	0.163
	[2.809]	[1.975]	[1.858]	[3.099]	[1.901]
	0.053	0.070	0.037	0.136	0.030
Mom^{US}	-0.038	0.083	0.008	0.056	-0.066
	[-0.665]	[1.545]	[0.137]	[1.068]	[-0.961]
	0.032	0.064	0.025	0.109	0.025

Table A.IV. (continued)

The table reports factor betas, t-statistics and R^2 for the first-step time-series regressions in the Fama-MacBeth analysis. The five portfolios are generated by sorting countries on momentum. In every specification of the model the first factor is the MSCI World excess return (World) while the choice of the second factor varies across models. Only the loadings and t-statistics for the second factor are reported.

Panel (c): Momentum portfolios

	P1	P2	P3	P4	P5
Vol^{FX}	-6.435	-5.294	-3.549	-4.842	-6.481
	[-2.314]	[-2.071]	[-1.574]	[-1.798]	[-2.567]
	0.087	0.076	0.031	0.046	0.069
Vol^{EQ}	-2.232	-1.736	-2.143	-3.977	-6.539
	[-1.255]	[-1.239]	[-1.772]	[-3.796]	[-4.790]
	0.080	0.068	0.037	0.075	0.133
Size^{US}	0.244	0.318	0.325	0.212	0.427
	[2.269]	[3.866]	[4.140]	[2.673]	[4.731]
	0.092	0.115	0.085	0.056	0.118
Value^{US}	0.163	0.156	0.117	0.258	0.092
	[1.704]	[1.734]	[1.421]	[2.995]	[1.024]
	0.080	0.072	0.031	0.064	0.055
Mom^{US}	-0.189	-0.044	0.006	0.111	0.177
	[-2.965]	[-0.645]	[0.105]	[2.021]	[3.017]
	0.100	0.061	0.024	0.047	0.078

Table A.V. Fama-MacBeth cross-sectional regressions using global Fama-French factors

The table reports coefficients from Fama-MacBeth regressions of mean portfolio returns on betas to pairs of risk factors. The analysis uses the five portfolios from each of our sorting variables (dividend yields, term spreads and momentum) simultaneously, giving 15 cross-sectional observations. In every specification of the model the first factor is the MSCI World excess return (World) while the second factor is one of the equity or FX volatility factors or one of the global Fama-French risk factors. Shanken (1992) t-statistics are reported in brackets. The final rows of the table give a χ^2 test of the null that the pricing errors are zero and a set of associated p-values.

	Model 1	Model 2	Model 3	Model 4
World	-0.0184	-0.0242	-0.0020	0.0006
	[-1.9495]	[-2.0982]	[-0.2817]	[0.0698]
Vol^{EQ}	-0.0923			
	[-1.7038]			
Size^{G}		0.0112		
		[2.0479]		
Value^{G}			0.0061	
			[1.1939]	
Mom^{G}				0.0186
				[2.9427]
R^2	0.5826	0.3626	0.0950	0.6821
J-stat	12.6059	16.4875	28.8320	17.6322
p-value	[0.4787]	[0.2238]	[0.0069]	[0.1720]

Table A.VI. GMM asset pricing model estimates using global Fama-French factors

The table reports coefficients from one-step GMM estimations of the two factor asset pricing model. The analysis uses the five portfolios from each of our sorting variables (dividend yields, term spreads and momentum) simultaneously, giving 15 cross-sectional observations. In every specification of the model the first factor is the MSCI World excess return (World) while the second factor is either global FX vol, global equity vol or one of the global Fama-French factors. The final two rows of the table give the GMM J-statistic and its p-value.

	Model 1		Model 2		Model 3		Model 4	
	$\hat{b}$	$\hat{\lambda}$	$\hat{b}$	$\hat{\lambda}$	$\hat{b}$	$\hat{\lambda}$	$\hat{b}$	$\hat{\lambda}$
World	-18.6277	-0.0184	-11.6009	-0.0242	-0.3270	-0.0020	2.9167	0.0006
	[-1.9031]	[-1.4368]	[-1.5454]	[-1.6338]	[-0.0880]	[-0.2832]	[0.5551]	[0.0668]
Vol^{EQ}	-3.1003	-0.0923						
	[-2.0228]	[-1.5845]						
Size^{G}			21.8575	0.0112				
			[1.6355]	[1.8002]				
Value^{G}					10.2994	0.0061		
					[1.1736]	[1.1526]		
Mom^{G}							11.5178	0.0186
							[2.7808]	[2.6549]
J-stat	10.9203		16.1777		25.8569		16.8018	
p-value	[0.6175]		[0.2397]		[0.0178]		[0.2085]	

Table A.VII. Turnover statistics

The table reports time-series mean, median and standard deviation for turnovers from the HML portfolios delivered by each of our three signals, i.e. dividend yields, term spreads and momentum. Turnover is defined as the total absolute change in the HML portfolio weights in a given month. The HML portfolio places equal positive weight on countries in portfolio 5 and equal negative weight on the countries in portfolio 1.

Signal	Mean	Median	Std. Devn.
Div Yield	0.459	0.500	0.346
Term spread	0.656	0.667	0.410
Mom	0.929	1.000	0.430

Table A.VIII. Transition probabilities

The table reports the probabilities of a country transiting between the five portfolios in our analysis, for each of our three signals, i.e. dividend yields, term spreads and momentum. Specifically, the cell in row i and column j of the table is the probability that a country currently in portfolio i will transit to portfolio j in the next month. Thus the sums of the cells across rows is unity.

Panel (a): Dividend yields

	P1	P2	P3	P4	P5
P1	0.887	0.101	0.006	0.004	0.002
P2	0.107	0.731	0.145	0.016	0.001
P3	0.006	0.146	0.731	0.108	0.008
P4	0.003	0.009	0.121	0.756	0.111
P5	0.001	0.003	0.008	0.106	0.882

Panel (b): Term spreads

	P1	P2	P3	P4	P5
P1	0.849	0.126	0.012	0.003	0.008
P2	0.128	0.641	0.188	0.035	0.009
P3	0.012	0.191	0.582	0.191	0.024
P4	0.005	0.032	0.192	0.638	0.133
P5	0.008	0.011	0.016	0.135	0.829

Panel (c): Momentum

	P1	P2	P3	P4	P5
P1	0.762	0.189	0.033	0.014	0.002
P2	0.191	0.527	0.234	0.040	0.008
P3	0.041	0.219	0.489	0.214	0.036
P4	0.011	0.042	0.229	0.529	0.189
P5	0.003	0.006	0.032	0.186	0.773

Table A.IX. Descriptive statistics of the combined portfolio

Panel (a) reports descriptive statistics for the monthly returns of a portfolio that combines the portfolios sorted by local-return momentum, dividend yields and term spreads. The holding period is one month. The sample of 42 country indices runs from November 1983 to September 2011. HML^{UEP} gives statistics for US-dollar returns on the portfolio that puts equal weights on the three portfolios described in the main text; HML^{EQ} is the return on the positions in local currency; and HML^{FX} is the FX component of the HML^{UEP} portfolio return. Numbers in brackets are t-statistics for the null that the mean return is zero. AC(1) is the first-order autocorrelation. Panel (b) presents the correlation matrix of the monthly returns to the three separate momentum, dividend yield and term spread HML portfolios.

Panel (a): Combined portfolio return statistics

	HML^{UEP}	HML^{EQ}	HML^{FX}
Mean	10.21	9.98	0.24
	(3.65)	(3.92)	(0.26)
Median	9.04	7.22	0.13
Std. Dev.	11.84	10.74	4.06
Skew	0.25	0.34	0.58
Kurtosis	6.29	6.37	8.28
Sharpe	0.86	0.93	0.06
AC(1)	0.18	0.19	0.09

Panel (b): Correlations between HML portfolio returns

	Div	Term	Mom
Div	1.000	0.013	0.400
Term	0.013	1.000	0.105
Mom	0.400	0.105	1.000

Table A.X. Maximum Drawdowns

The table shows the maximum drawdown (MDD) of the HML^{UEP} strategies constructed using different signals. The MDD is defined as the maximum peak-to-trough loss of the cumulative profit of a trading strategy. We form the HML^{UEP} strategies using dividend yields, term spreads, and momentum as signals. The combined strategy forms a portfolio that puts equal weights on the other three strategies. A positive value of MDD represents a loss, expressed in US-dollar terms. The equity return component of the MDD is calculated as the local-currency return of the strategy over the peak-to-trough period, whereas the FX return component is the domestic currency depreciation over the same period. That is, $MDD = -[(1 + r^{EQ})(1 + r^{FX}) - 1]$, where MDD is the maximum drawdown in US dollars, r^{EQ} is the local-currency equity return component, and r^{FX} is the depreciation of the domestic currency.

	Dividend Yield	Term Spread	Momentum	Combined strategy
MDD	40.6%	42.5%	41.8%	20.8%
Equity component	-27.5%	-27.5%	-43.9%	-21.1%
FX component	-18.0%	-20.7%	3.7%	0.3%
Peak	10/1998	07/1999	09/1998	11/1992
Trough	04/2000	07/2005	10/1999	05/1994

Table A.XI. GMM asset pricing model estimates for various equity volatility definitions

The table reports coefficients from one-step GMM estimations of the two factor asset pricing model. The analysis uses the five portfolios from each of our sorting variables (dividend yields, term spreads and momentum) simultaneously, giving 15 cross-sectional observations. In every specification of the model the first factor is the MSCI World excess return (World). The second factor is either the residual from estimation of an AR(1) process for the VIX (vixRes), the change in the VIX (ΔVIX) or the residual for an AR(1) process estimated for global equity volatility (residHybridVol). Pre-2001, equity vol is computed using the returns on the four major indices described earlier. From 2001 onwards, this equity vol measure is computed using daily returns on the entire set of MSCI country indices in our sample. Daily MSCI data are not available before 2001. The final two rows of the table give the GMM J-statistic and its p-value.

	Model 1		Model 2		Model 3	
	$\hat{b}$	$\hat{\lambda}$	$\hat{b}$	$\hat{\lambda}$	$\hat{b}$	$\hat{\lambda}$
World	2.4610	0.0008	10.3097	-0.0029	-18.0703	-0.0140
	[0.3266]	[0.1064]	[1.1524]	[-0.2986]	[-1.8387]	[-0.9127]
vixRes	0.0336	0.2529				
	[0.2884]	[0.2059]				
ΔVIX			0.1950	2.1774		
			[1.3757]	[1.2971]		
residHybridVol					-394.8928	-0.0017
					[-2.8107]	[-2.9525]
J-stat	30.0228		22.0199		9.9357	
p-value	[0.0047]		[0.0551]		[0.6992]	

Table A.XII. Bid-ask spread estimates by country

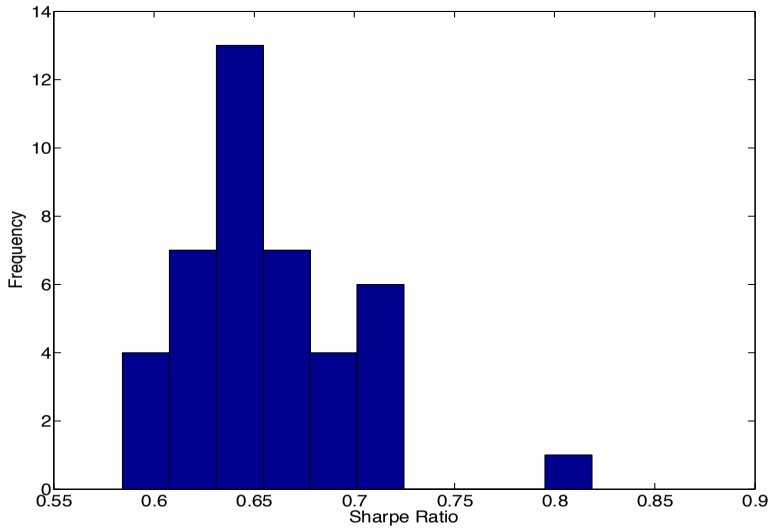
The table shows bid-ask spread estimates for each of our sample countries. These spreads were obtained from a global investment bank. For each country, the bank took a view as to which instrument (from available futures and ETFs) was most effective in gaining exposure to the stock market return. Based on this set of classifications, each country was placed in one of four transactions cost categories, shown below. Spreads are estimates as of mid-2014.

Countries	Spread estimate (bps)
USA, UK, Switzerland, Japan, Canada Germany, Italy, France, Netherlands, Spain	4
Australia, Sweden, Norway, Denmark, Belgium Finland, Hong Kong, Austria, India, Mexico, Korea Taiwan, Brazil, Israel	10
Portugal, New Zealand, Ireland, South Africa Singapore, Czech Republic, Greece, Malaysia Thailand, Russia	30
Indonesia, Poland, Hungary, Kuwait, Philippines Egypt, Bulgaria, Ukraine	70

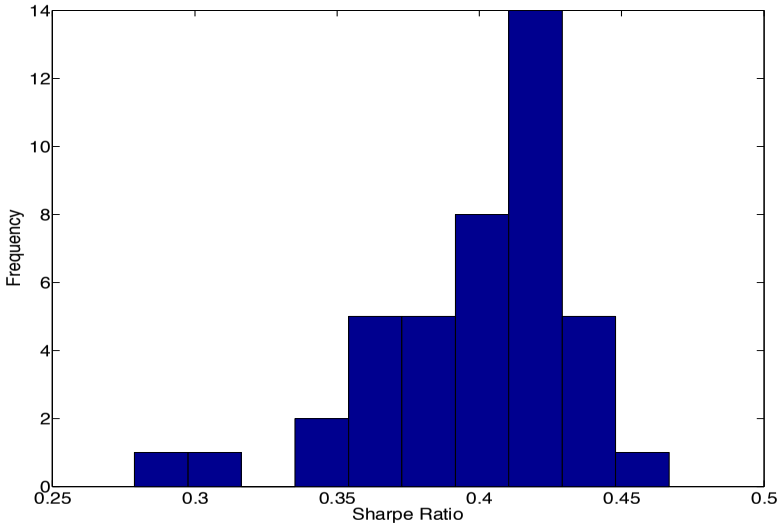
Figure A.1: Sharpe Ratios of International Equity Portfolio Returns: leave-one-out analysis

For each of our equity index forecasting methods (i.e. momentum, dividend yields and term spreads based on 5 portfolios), we leave out one country in turn and compute the Sharpe Ratio. Below is the histogram of Sharpe Ratios derived from this experiment.

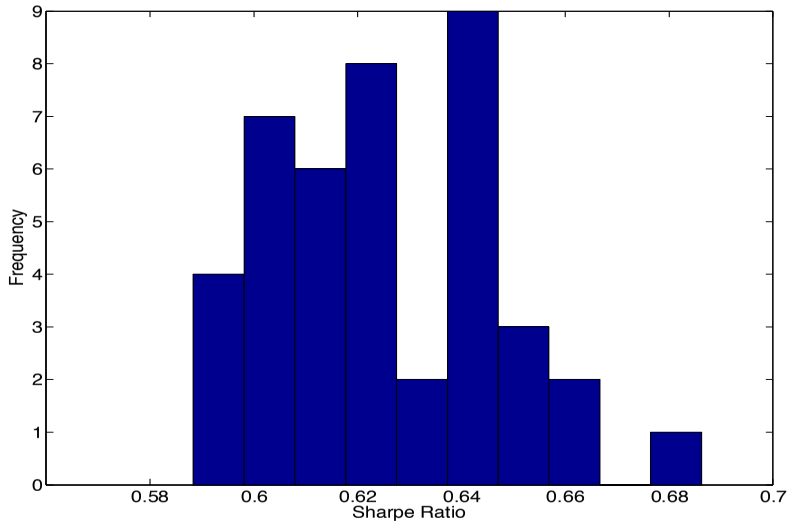
(a) Dividend yield



(b) Term spread



(c) Momentum



B Time-series Tests of UEP

An alternative method for evaluating the correlation between exchange rate returns and relative stock market returns is to run time-series regressions; this is an approach similar to the standard method for testing UIP as in Fama (1984). One could use the following regressions, based on Equation (6):

$$\Delta s_{t+1} = \alpha + \beta \left(r^{j}_{r,t+1} - r^{h}_{r,t+1} \right) + \varepsilon_{t+1}, \quad \text{or} \tag{B.1}$$

$$erx^{j,h}_{t+1} = \alpha + \gamma \left(r^{j}_{r,t+1} - r^{h}_{r,t+1} \right) + \varepsilon_{t+1} \tag{B.2}$$

where $\varepsilon_{t+1} = rp^{j}_{r,t+1} - rp^{h}_{r,t+1} + \eta_{t+1} + u_{t+1}$ with u_{t+1} being a linear combination of rational expectation forecast errors and $\gamma = \beta + 1$. Abstracting from Jensen's inequality issues, if FX moves completely offset differentials in local equity market returns, i.e. UEP holds, then $\alpha = 0, \beta = -1$ (or $\gamma = 0$) and $\varepsilon_{t+1} \sim iid$ white noise. On the other hand, Equation (B.2) also shows that if exchange rate changes do not eliminate equity market return differentials, then excess returns measured in domestic currency can be explained using equity return differentials in local currency.

Table B.I, which follows, present estimates from Equations (B.1)–(B.2), both for log returns and simple returns. In estimation of Equation (B.1), the slope coefficient β is very close to zero such that FX returns and equity return differentials are unrelated. One can decisively reject the null, implied by UEP, that the slope is -1. These results are corroborated by estimation of Equation (B.2), which shows that excess equity returns expressed in US dollars move approximately one-for-one with the equity return differential expressed in local currency.

It is important to emphasize that these regressions make use of *ex post*, realized stock market and FX returns to construct left and right hand side variables. Therefore, this

evidence does not necessarily imply the existence of profits originating from the violation of UEP in real time (i.e. using lagged information). Nevertheless, it tells us that even with the use of ex post information about stock market returns, there is no empirical support for the hypothesis that exchange rates eliminate differences in stock market returns across countries.

Table B.I. Time-series regressions for individual countries

The table shows average coefficients for the following three regressions: (1): $(\Delta S_{t+1})/S_t = \alpha + \beta(R^j_{r,t+1} - R^h_{r,t+1}) + \varepsilon_{t+1}$; (2): $\Delta s_{t+1} = \alpha + \beta(r^j_{r,t+1} - r^h_{r,t+1}) + \varepsilon_{t+1}$; (3): $ERX^{j,h}_{t+1} = \alpha + \gamma(R^j_{r,t+1} - R^h_{r,t+1}) + \varepsilon_{t+1}$; where $(\Delta S_{t+1})/S_t$ is the monthly depreciation rate of the domestic currency, $R^h_{r,t+1}$ and $R^j_{r,t+1}$ are the simple monthly returns on the domestic (US) and foreign equity market indices, respectively, and ε_{t+1} is an error term. We run separate time-series regressions for each country and then average the coefficients over countries. Pesaran and Smith (1995) show that this procedure leads to consistent estimates of the average coefficients of panel models. The sample runs from November 1983 to September 2011. Standard errors are reported in parentheses.

	Intercept	Slope	R^2
(1): $\frac{\Delta S_{t+1}}{S_t} = \alpha + \beta(R^j_{r,t+1} - R^h_{r,t+1}) + \varepsilon_{t+1}$	-0.0002	-0.0411	3.5%
	(0.0005)	(0.0177)	
(2): $\Delta s_{t+1} = \alpha + \beta(r^j_{r,t+1} - r^h_{r,t+1}) + \varepsilon_{t+1}$	-0.0009	-0.0383	3.8%
	(0.0005)	(0.0185)	
(3): $ERX^{j,h}_{t+1} = \alpha + \gamma(R^j_{r,t+1} - R^h_{r,t+1}) + \varepsilon_{t+1}$	-0.0002	0.9589	75.8%
	(0.0005)	(0.0177)	