10 Appendix

10.1 Estimations with multiple error distributions (BRENT)

Table 11: APGARCH Estimates - Normal errors

	Dependent variable:							
	BRENT	WTI	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
c	0.0001	0.00003	0.0001	0.0001	0.0001	−0.00003	0.00004	0.00000
	(0.0003)	(0.0003)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.00000)
ϕ	−0.049***	−0.193		−0.206		−0.968***	0.073***	0.377*
	(0.015)	(0.475)		(0.401)		(0.036)	(0.015)	(0.217)
ω	0.0001***	0.0001***	0.00001***	0.00001***	0.00004***	0.00000***	0.00001***	0.00000***
	(0.00002)	(0.00002)	(0.00000)	(0.00000)	(0.00001)	(0.00000)	(0.00000)	(0.00000)
α	0.048***	0.046***	0.149***	0.084***	0.126***	0.265***	0.070***	0.114***
	(0.005)	(0.005)	(0.010)	(0.009)	(0.010)	(0.015)	(0.008)	(0.008)
γ	0.386***	0.565***	−0.136***	−0.278***	−0.308***	−0.123***	−0.051	−0.008
	(0.083)	(0.096)	(0.030)	(0.055)	(0.043)	(0.023)	(0.042)	(0.029)
β	0.957***	0.957***	0.866***	0.917***	0.879***	0.776***	0.930***	0.890***
	(0.004)	(0.004)	(0.009)	(0.008)	(0.011)	(0.012)	(0.008)	(0.007)
δ	1.143***	1.090***	1.464***	1.494***	1.308***	1.642***	1.405***	2.000***
	(0.189)	(0.145)	(0.127)	(0.162)	(0.135)	(0.106)	(0.177)	(0.097)
Observations	4,955	4,955	4,955	4,955	4,955	4,955	4,955	4,955
AIC	−5.004	−4.841	−7.554	−7.525	−6.701	−9.559	−7.511	−7.753
BIC	−4.994	−4.829	−7.540	−7.508	−6.687	−9.542	−7.497	−7.736
$Q(36)$	28.231	31.215	56.329**	31.922	43.269	49.005*	52.588**	33.547
$Q^2(36)$	656***	1540.3***	36.686	31.483	34.484	35.166	8.8647	13.179
ARCH(36)	33.709	97.402***	36.517	31.183	33.308	34.832	8.1768	12.847

Note: *p<0.1; **p<0.05; ***p<0.01

Table 12: APGARCH Estimates - Skewed normal errors

	Dependent variable:							
	BRENT	WTI	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
c	−0.00003	−0.0002	0.0001	0.0001*	0.0001	−0.00000	0.0001	0.00000
	(0.0003)	(0.0003)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.00000)
ϕ	−0.051***	−0.137				−0.969***	0.071***	0.871***
	(0.014)	(0.447)				(0.074)	(0.015)	(0.022)
ω	0.0001***	0.0001***	0.00001***	0.00000***	0.00004***	0.00000***	0.00001***	0.00000***
	(0.00002)	(0.00003)	(0.00000)	(0.00000)	(0.00001)	(0.00000)	(0.00000)	(0.00000)
α	0.046***	0.046***	0.147***	0.078***	0.122***	0.263***	0.070***	0.116***
	(0.004)	(0.004)	(0.010)	(0.008)	(0.010)	(0.015)	(0.008)	(0.009)
γ	0.410***	0.601***	−0.134***	−0.279***	−0.304***	−0.120***	−0.049	−0.007
	(0.084)	(0.097)	(0.030)	(0.057)	(0.044)	(0.023)	(0.041)	(0.028)
β	0.959***	0.958***	0.867***	0.922***	0.883***	0.779***	0.930***	0.890***
	(0.004)	(0.004)	(0.009)	(0.008)	(0.010)	(0.012)	(0.008)	(0.007)
δ	1.080***	1.033***	1.467***	1.533***	1.321***	1.644***	1.436***	2.000***
	(0.182)	(0.138)	(0.127)	(0.164)	(0.136)	(0.106)	(0.175)	(0.117)
skew	0.920***	0.902***	1.040***	1.126***	1.064***	1.029***	1.056***	1.114***
	(0.016)	(0.016)	(0.016)	(0.020)	(0.019)	(0.014)	(0.018)	(0.014)
Observations	4,955	4,955	4,955	4,955	4,955	4,955	4,955	4,955
AIC.	−4.981	−4.814	−7.554	−7.533	−6.704	−9.559	−7.513	−7.768
BIC	−4.969	−4.801	−7.540	−7.517	−6.688	−9.541	−7.497	−7.751
$Q(36)$	30.008	40.577	56.886**	33.096	44.117	49.494*	53.377**	34.585
$Q^2(36)$	1016.8***	2160.7***	36.846	33.766	34.699	35.149	8.7195	12.535
ARCH(36)	35.943	106.88***	36.687	32.921	33.443	34.777	8.1464	12.205

Note: *p<0.1; **p<0.05; ***p<0.01

Table 13: APGARCH Estimates - Student-t errors

	Dependent variable:							
	BRENT	WTI	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
c	0.0003	0.00002	−0.00000	−0.00002	0.00001	−0.00000	−0.00002	0.00000
	(0.0002)	(0.0001)	(0.00000)	(0.0001)	(0.0001)	(0.00000)	(0.0001)	(0.00000)
ϕ	−0.057***	0.968	0.989***	−0.329	0.153	0.993***	0.076***	0.026***
	(0.015)	(0.691)	(0.007)	(0.359)	(0.348)	(0.003)	(0.014)	(0.004)
ω	0.0001***	0.0001***	0.00001***	0.00001***	0.0001***	0.00003***	0.00001***	0.001**
	(0.00002)	(0.00003)	(0.00000)	(0.00000)	(0.00001)	(0.00001)	(0.00000)	(0.0004)
α	0.046***	0.043***	0.155***	0.087***	0.113***	0.308***	0.093***	0.359***
	(0.005)	(0.005)	(0.014)	(0.011)	(0.011)	(0.032)	(0.010)	(0.045)
γ	0.417***	0.574***	−0.142***	−0.316***	−0.298***	−0.104***	−0.089*	0.082
	(0.093)	(0.151)	(0.040)	(0.070)	(0.052)	(0.036)	(0.047)	(0.061)
β	0.961***	0.962***	0.876***	0.910***	0.896***	0.798***	0.913***	0.893***
	(0.004)	(0.004)	(0.011)	(0.011)	(0.010)	(0.017)	(0.010)	(0.009)
δ	1.055***	1.079***	1.367***	1.473***	1.213***	1.078***	1.343***	0.511***
	(0.189)	(0.176)	(0.152)	(0.189)	(0.142)	(0.113)	(0.172)	(0.041)
shape	7.159***	7.365***	4.863***	7.670***	8.059***	2.934***	7.573***	2.016***
	(0.715)	(0.747)	(0.357)	(0.781)	(0.849)	(0.146)	(0.750)	(0.004)
Observations	4,955	4,955	4,955	4,955	4,955	4,955	4,955	4,955
AIC	−5.069	−4.935	−7.625	−7.559	−6.736	−9.779	−7.562	−8.247
BIC	−5.053	−4.917	−7.612	−7.541	−6.718	−9.762	−7.546	−8.228
$Q(36)$	63.904***	42.742	42.162	33.763	45.799	57.235**	51.716**	12.012
$Q^2(36)$	11.213	1413.3***	35.647	28.23	29.902	21.8	7.9357	0.0112
ARCH(36)	49.245*	205.32***	44.671	28.334	36.612	21.451	7.8375	0.0408

Note: *p<0.1; **p<0.05; ***p<0.01

Table 14: APGARCH Estimates - Skewed Student-t errors

	Dependent variable:							
	BRENT	WTI	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
c	0.00005	−0.00001	0.00000	0.0001	0.0001	0.00000	0.00000	0.0001***
	(0.0003)	(0.00002)	(0.00000)	(0.0001)	(0.0002)	(0.00000)	(0.0001)	(0.00001)
ϕ	−0.059***	0.964***	0.989***	−0.326	0.141	0.994***	0.076***	−0.029***
	(0.014)	(0.123)	(0.006)	(0.307)	(0.354)	(0.003)	(0.014)	(0.009)
ω	0.0001***	0.0001***	0.00001***	0.00001***	0.00005***	0.00003***	0.00001***	0.001**
	(0.00003)	(0.00003)	(0.00000)	(0.00000)	(0.00001)	(0.00001)	(0.00000)	(0.0004)
α	0.045***	0.043***	0.155***	0.086***	0.112***	0.309***	0.092***	0.391***
	(0.005)	(0.005)	(0.014)	(0.011)	(0.011)	(0.032)	(0.010)	(0.059)
γ	0.445***	0.630***	−0.142***	−0.331***	−0.295***	−0.106***	−0.090*	0.049
	(0.094)	(0.132)	(0.040)	(0.072)	(0.052)	(0.036)	(0.047)	(0.058)
β	0.962***	0.962***	0.876***	0.911***	0.897***	0.798***	0.913***	0.892***
	(0.004)	(0.004)	(0.011)	(0.011)	(0.010)	(0.016)	(0.010)	(0.009)
δ	0.993***	1.024***	1.382***	1.457***	1.228***	1.077***	1.347***	0.554***
	(0.183)	(0.159)	(0.153)	(0.185)	(0.142)	(0.113)	(0.172)	(0.050)
skew	0.933***	0.915***	1.043***	1.109***	1.049***	1.024***	1.021***	1.020***
	(0.018)	(0.018)	(0.019)	(0.023)	(0.021)	(0.018)	(0.020)	(0.009)
shape	7.272***	7.599***	4.888***	7.920***	8.148***	2.936***	7.564***	2.017***
	(0.739)	(0.788)	(0.360)	(0.828)	(0.867)	(0.146)	(0.749)	(0.005)
Observations	4,955	4,955	4,955	4,955	4,955	4,955	4,955	4,955
AIC	−5.065	−4.936	−7.626	−7.564	−6.737	−9.779	−7.562	−8.244
BIC	−5.048	−4.916	−7.611	−7.545	−6.717	−9.761	−7.545	−8.225
$Q(36)$	93.373***	64.827***	42.217	34.707	47.154	57.172**	51.958**	15.85
$Q^2(36)$	6.414	1427.3***	36.35	28.59	30.288	20.669	7.9609	0.0299
ARCH(36)	57.928**	206.64***	44.636	28.666	36.743	20.35	7.8462	0.6374

Note: *p<0.1; **p<0.05; ***p<0.01

Table 15: APGARCH Estimates - GED errors

	Dependent variable:							
	BRENT	WTI	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
c	0.001*	0.00003	−0.00000	−0.00000	0.00001	0.00000	−0.00003	0.0002***
	(0.0005)	(0.0001)	(0.00000)	(0.0001)	(0.0001)	(0.00000)	(0.0001)	(0.00000)
ϕ	−0.371***	0.967	0.992***	−0.353	−0.026*	0.382***	0.071***	0.029***
	(0.045)	(1.151)	(0.007)	(0.261)	(0.014)	(0.012)	(0.014)	(0.00005)
ω	0.00005***	0.0001***	0.00001***	0.00001***	0.0001***	0.00001***	0.00001***	0.00000***
	(0.00002)	(0.00003)	(0.00000)	(0.00000)	(0.00001)	(0.00000)	(0.00000)	(0.000)
α	0.047***	0.044***	0.153***	0.087***	0.117***	0.260***	0.084***	0.049***
	(0.006)	(0.005)	(0.014)	(0.011)	(0.011)	(0.021)	(0.010)	(0.0001)
γ	0.354***	0.572***	−0.131***	−0.290***	−0.301***	−0.123***	−0.069	0.040***
	(0.090)	(0.152)	(0.039)	(0.066)	(0.052)	(0.036)	(0.046)	(0.0001)
β	0.958***	0.960***	0.871***	0.911***	0.891***	0.794***	0.919***	0.730***
	(0.005)	(0.005)	(0.011)	(0.011)	(0.011)	(0.016)	(0.010)	(0.0001)
δ	1.182***	1.092***	1.399***	1.472***	1.231***	1.249***	1.373***	2.000***
	(0.216)	(0.183)	(0.157)	(0.190)	(0.146)	(0.117)	(0.182)	(0.00005)
shape	1.391***	1.366***	1.192***	1.437***	1.418***	1.000***	1.396***	3.977***
	(0.039)	(0.040)	(0.033)	(0.040)	(0.040)	(0.026)	(0.037)	(0.00003)
Observations	4,955	4,955	4,955	4,955	4,955	4,955	4,955	4,955
AIC	−5.064	−4.916	−7.628	−7.555	−6.733	−9.774	−7.547	3.044
BIC	−5.047	−4.898	−7.615	−7.536	−6.717	−9.756	−7.536	3.062
Pending $Q(36)$	41.593	32.466	58.304**	36.925	45.766	53.939**	60.964***	44.695
Pending $Q^2(36)$	12.633	219.13***	41.424	26.255	44.444	1.7181	10.063	0.86
Pending ARCH(36)	37.710	91.207***	45.900	28.723	37.666	22.991	8.292	0.20677

Note: *p<0.1; **p<0.05; ***p<0.01

Table 16: APGARCH Estimates - Skewed GED errors

	Dependent variable:							
	BRENT	WTI	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
c	0.0002	−0.00005	0.00000	0.0002	0.0001	0.00000	0.00003	0.00000
	(0.001)	(0.0003)	(0.00000)	(0.0001)	(0.0001)	(0.00000)	(0.0001)	(0.00001)
ϕ	−0.377***	−0.039***	0.991***	−0.372	−0.028**	0.991***	0.070***	−0.0004
	(0.043)	(0.014)	(0.012)	(0.380)	(0.014)	(0.009)	(0.014)	(0.001)
ω	0.0001***	0.0001***	0.00001***	0.00001***	0.0001***	0.00001***	0.00001***	0.00000***
	(0.00002)	(0.00003)	(0.00000)	(0.00000)	(0.00001)	(0.00000)	(0.00000)	(0.00000)
α	0.046***	0.044***	0.152***	0.084***	0.115***	0.259***	0.083***	0.152***
	(0.005)	(0.005)	(0.014)	(0.011)	(0.011)	(0.021)	(0.010)	(0.015)
γ	0.380***	0.568***	−0.134***	−0.307***	−0.303***	−0.124***	−0.070	0.085***
	(0.091)	(0.109)	(0.040)	(0.069)	(0.052)	(0.035)	(0.046)	(0.031)
β	0.960***	0.960***	0.871***	0.914***	0.893***	0.794***	0.920***	0.844***
	(0.005)	(0.004)	(0.011)	(0.011)	(0.011)	(0.016)	(0.010)	(0.017)
δ	1.125***	1.062***	1.409***	1.471***	1.238***	1.249***	1.389***	1.979***
	(0.207)	(0.162)	(0.155)	(0.187)	(0.146)	(0.117)	(0.183)	(0.210)
skew	0.936***	0.929***	1.027***	1.101***	1.037***	0.997***	1.035***	1.001***
	(0.017)	(0.017)	(0.016)	(0.020)	(0.018)	(0.008)	(0.018)	(0.001)
shape	1.403***	1.403***	1.195***	1.463***	1.428***	1.000***	1.399***	1.000
	(0.040)	(0.040)	(0.033)	(0.040)	(0.041)	(0.026)	(0.037)	
Observations	4,955	4,955	4,955	4,955	4,955	4,955	4,955	4,955
AIC	−5.053	−4.909	−7.629	−7.560	−6.733	−9.773	−7.547	−8.243
BIC	−5.035	−4.896	−7.614	−7.540	−6.716	−9.755	−7.535	−8.231
$Q(36)$	41.593	32.466	58.304**	36.925	45.766	53.939**	60.964***	44.695
$Q^2(36)$	12.633	219.13***	41.424	26.255	44.444	1.7181	10.063	0.86
ARCH(36)	37.710	91.207***	45.900	28.723	37.666	22.991	8.292	0.20677

Note: *p<0.1; **p<0.05; ***p<0.01

10.2 Copula parameter estimates with multiple error distributions (BRENT)

Table 17: Copula models dependence parameter estimates - Normal errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.2^{***}	-0.19^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.05^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-202.09	-181.88	-153.58	-73.47	-153.83	-12.77
Student-t						
ρ	-0.2^{***}	-0.19^{***}	-0.18^{***}	-0.13^{***}	-0.18^{*}	-0.05^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	15.23	17.83	26.43	19.49	13.69	30
AIC	-220.18	-194.90	-158.95	-83.85	-178.27	-7.22
Rotated Clayton						
α	-0.19^{***}	-0.19^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.04^{***}
	(0.018)	(0.018)	(0.017)	(0.018)	(0.017)	(0.145)
AIC	-119.9	-116.53	-115.41	-52.72	-104.74	-6.65
Rotated Gumbel						
δ	-1.14^{***}	-1.13^{***}	-1.10^{***}	-1.07^{***}	-1.11^{***}	-1.03^{***}
	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.008)
AIC	-218.63	-181.43	-119.14	-70.64	-149.42	-9.69
Frank						
δ	-1.22^{***}	-1.17^{***}	-1.07^{***}	-0.76^{***}	-1.12^{***}	-0.28^{***}
	(0.087)	(0.087)	(0.086)	(0.086)	(0.087)	(0.085)
AIC	-195.18	-179.34	-150.10	-75.9	-162.9	-8.94
Plackett						
δ	0.54^{***}	0.55^{***}	0.59^{***}	0.68^{***}	0.57^{***}	0.87^{***}
	(0.022)	(0.023)	(0.025)	(0.028)	(0.024)	(0.037)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955

Note: *p<0.1; **p<0.05; ***p<0.01

Table 18: Copula models goodness of fit tests - Normal Errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	1.07^{**}	0.74^{**}	0.56^{**}	0.05	0.32^{*}	0.00
Student-t	1.69	3.20	2.55	0.74	1.20	4.21
Rotated Clayton	0.19	0.56	5.56^{***}	0.05	0.72	0.09^{*}
Rotated Gumbel	0.45	1.76^{**}	6.93^{***}	0.31	1.18^{**}	0.07^{*}
Frank	0.67^{**}	0.59^{***}	0.15	0.15^{**}	0.71^{***}	0.000
Plackett	0.06^{***}	0.03^{*}	0.04^{***}	0.03^{**}	0.03^{**}	0.03^{*}

Note: *p<0.1; **p<0.05; ***p<0.01

Table 19: Copula models dependence parameter estimates - Skewed normal errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.2^{***}	-0.19^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.05^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-201.02	-179.64	-153.45	-73.65	-154.00	-12.71
Student-t						
ρ	-0.2^{***}	-0.19^{***}	-0.18^{***}	-0.13^{***}	-0.18^{*}	-0.05^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	15.05	16.72	26.33	19.2	13.68	30
AIC	-219.61	-195.23	-158.81	-84.43	-178.40	-6.87
Rotated Clayton						
α	-0.19^{***}	-0.19^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.04^{***}
	(0.018)	(0.018)	(0.010)	(0.018)	(0.017)	(0.145)
AIC	-118.77	-115.3	-120.07	-53.54	-105.22	-6.55
Rotated Gumbel						
δ	-1.14^{***}	-1.13^{***}	-1.10^{***}	-1.07^{***}	-1.11^{***}	-1.03^{***}
	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.008)
AIC	-218.18	-180.92	-119.05	-70.37	-149.47	-9.58
Frank						
δ	-1.22^{***}	-1.17^{***}	-1.07^{***}	-0.76^{***}	-1.12^{***}	-0.28^{***}
	(0.087)	(0.087)	(0.086)	(0.086)	(0.087)	(0.085)
AIC	-194.86	-179.33	-150.20	-76.16	-163.39	-8.83
Plackett						
δ	0.54^{***}	0.55^{***}	0.59^{***}	0.68^{***}	0.57^{***}	0.87^{***}
	(0.022)	(0.023)	(0.025)	(0.028)	(0.024)	(0.037)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 20: Copula models goodness of fit tests - Skewed normal Errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	1.06^{**}	0.77^{**}	0.55^{**}	0.04	0.32	0.00
Student-t	1.73	2.15	2.52	0.77	1.09	4.58
Rotated Clayton	0.1876	0.41	5.08^{***}	0.05	0.63	0.10^{*}
Rotated Gumbel	0.3674	1.37^{**}	6.91^{***}	0.10	1.221^{*}	0.08
Frank	0.68^{***}	0.63^{**}	0.16	0.16^{**}	0.70^{***}	0.000
Plackett	0.06^{***}	0.03^{*}	0.04^{***}	0.03^{**}	0.03^{*}	0.03^{*}
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 21: Copula models dependence parameter estimates - Student-t errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.2^{***}	-0.19^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.05^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-188.99	-184.51	-156.74	-64.48	-153.56	-10.70
Student-t						
ρ	-0.2^{***}	-0.2^{***}	-0.18^{***}	-0.12^{***}	-0.18^{*}	-0.05^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	13.89	17.19	24.8	16.58	12.61	30
AIC	-211.98	-198.83	-162.85	-80.77	-183.06	-13.89
Rotated Clayton						
α	-0.18^{***}	-0.19^{***}	-0.19^{***}	-0.11^{***}	-0.18^{***}	-0.05^{***}
	(0.018)	(0.018)	(0.017)	(0.017)	(0.017)	(0.145)
AIC	-110.12	-120.43	-121.70	-46.83	-109.60	-8.00
Rotated Gumbel						
δ	-1.13^{***}	-1.13^{***}	-1.10^{***}	-1.07^{***}	-1.11^{***}	-1.03^{***}
	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)
AIC	-207.91	-182.3	-120.22	-63.42	-148.97	-8.99
Frank						
δ	-1.2^{***}	-1.17^{***}	-1.07^{***}	-0.74^{***}	-1.12^{***}	-0.28^{***}
	(0.087)	(0.087)	(0.086)	(0.086)	(0.087)	(0.085)
AIC	-186.69	-180.61	-151.44	-70.56	-163.05	-9.02
Plackett						
δ	0.55^{***}	0.55^{***}	0.58^{***}	0.69^{***}	0.57^{***}	0.87^{***}
	(0.023)	(0.023)	(0.024)	(0.029)	(0.024)	(0.037)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955

Note: *p<0.1; **p<0.05; ***p<0.01

Table 22: Copula models goodness of fit tests - Student-t errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	0.84^{*}	0.76^{**}	0.55^{*}	0.01	0.18	0.01
Student-t	1.55	2.64	1.21	0.44	0.24	3.48
Rotated Clayton	0.21	0.68^{*}	6.30^{***}	0.05	0.29	0.03
Rotated Gumbel	0.17	2.55^{**}	7.31^{***}	0.29	1.84^{**}	1.11^{**}
Frank	0.71^{***}	0.61^{**}	0.21^{*}	0.18^{**}	0.75^{***}	0.01
Plackett	0.06^{***}	0.03^{*}	0.04^{***}	0.03^{**}	0.03^{*}	0.02

Note: *p<0.1; **p<0.05; ***p<0.01

Table 23: Copula models dependence parameter estimates - Skewed Student-t errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.19^{***}	-0.19^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.05^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-187.92	-184.70	-157.29	-64.72	-154.51	-11.37
Student-t						
ρ	-0.2^{***}	-0.2^{***}	-0.18^{***}	-0.12^{***}	-0.18^{*}	-0.05^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	13.81	17.01	24.3	16.64	12.7	29.11
AIC	-211.34	-199.36	-163.68	-80.86	-183.33	-15.91
Rotated Clayton						
α	-0.18^{***}	-0.19^{***}	-0.19^{***}	-0.11^{***}	-0.18^{***}	-0.05^{***}
	(0.018)	(0.018)	(0.017)	(0.017)	(0.017)	(0.145)
AIC	-108.63	-120.98	-123.83	-47.04	-111.25	-9.04
Rotated Gumbel						
δ	-1.13^{***}	-1.13^{***}	-1.10^{***}	-1.07^{***}	-1.11^{***}	-1.03^{***}
	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)
AIC	-207.56	-182.32	-120.40	-63.68	-149.01	-9.04
Frank						
δ	-1.19^{***}	-1.18^{***}	-1.07^{***}	-0.74^{***}	-1.12^{***}	-0.29^{***}
	(0.087)	(0.087)	(0.086)	(0.086)	(0.087)	(0.085)
AIC	-186.20	-180.94	-151.40	-70.66	-163.31	-9.64
Plackett						
δ	0.55^{***}	0.55^{***}	0.58^{***}	0.69^{***}	0.57^{***}	0.87^{***}
	(0.023)	(0.023)	(0.025)	(0.029)	(0.024)	(0.036)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955

Note: *p<0.1; **p<0.05; ***p<0.01

Table 24: Copula models goodness of fit tests - Skewed Student-t errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	0.82^{**}	0.77^{**}	0.54^{*}	0.00	0.2	0.03
Student-t	1.72	2.69	0.55	0.54	0.31	3.88
Rotated Clayton	0.24	0.87	5.74^{***}	0.05	0.33	0.02
Rotated Gumbel	0.13	2.71^{***}	5.10^{***}	0.29	2.07^{**}	1.27^{***}
Frank	0.72^{***}	0.64^{***}	0.21^{**}	0.18^{***}	0.74^{***}	0.01
Plackett	0.06^{***}	0.03^{*}	0.04^{***}	0.03^{**}	0.03^{*}	0.02

Note: *p<0.1; **p<0.05; ***p<0.01

Table 25: Copula models dependence parameter estimates - GED errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.2^{***}	-0.19^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.01^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-192.30	-182.74	-151.74	-72.78	-157.51	1.52
Student-t						
ρ	-0.2^{***}	-0.19^{***}	-0.18^{***}	-0.13^{***}	-0.18^{*}	-0.01^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	13.94	18.64	20.45	20.09	12.87	15.94
AIC	-215.20	-194.59	-162.63	-82.78	-185.42	-16.45
Rotated Clayton						
α	-0.19^{***}	-0.19^{***}	-0.19^{***}	-0.12^{***}	-0.18^{***}	-0.02^{***}
	(0.018)	(0.018)	(0.017)	(0.018)	(0.017)	(0.015)
AIC	-112.80	-114.11	-117.48	-48.60	-112.44	0.60
Rotated Gumbel						
δ	-1.14^{***}	-1.13^{***}	-1.10^{***}	-1.08^{***}	-1.12^{***}	-1.01^{***}
	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.007)
AIC	-212.54	-183.48	-119.62	-71.02	-152.13	-0.64
Frank						
δ	-1.2^{***}	-1.17^{***}	-1.06^{***}	-0.77^{***}	-1.12^{***}	-0.11^{***}
	(0.087)	(0.087)	(0.086)	(0.086)	(0.087)	(0.085)
AIC	-187.90	-180.69	-148.78	-77.39	-164.18	0.31
Plackett						
δ	0.54^{***}	0.55^{***}	0.58^{***}	0.69^{***}	0.57^{***}	0.94^{***}
	(0.023)	(0.023)	(0.025)	(0.028)	(0.024)	(0.04)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955

Note: *p<0.1; **p<0.05; ***p<0.01

Table 26: Copula models goodness of fit tests - GED errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	0.91^{***}	0.76^{**}	0.70^{**}	0.04	0.26	1.26^{***}
Student-t	1.27	3.18	2.95	0.73	0.27	7.84^{***}
Rotated Clayton	0.14	0.50	5.15^{***}	0.03	0.70	0.69^{*}
Rotated Gumbel	0.15	1.20^{**}	6.90^{***}	0.11	2.10^{**}	2.41
Frank	0.7^{***}	0.55^{***}	0.21^{*}	0.16^{**}	0.72^{***}	0.00
Plackett	0.06^{***}	0.03^{*}	0.04^{***}	0.03^{**}	0.03^{**}	0.04^{**}

Note: *p<0.1; **p<0.05; ***p<0.01

Table 27: Copula models dependence parameter estimates - Skewed GED errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.2^{***}	-0.19^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.05^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-191.51	-183.12	-152.22	-69.76	-157.40	-12.78
Student-t						
ρ	-0.2^{***}	-0.2^{***}	-0.18^{***}	-0.13^{***}	-0.18^{*}	-0.05^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	14.03	18.44	20.57	18.73	12.96	30
AIC	-213.97	-195.22	-162.89	-81.87	-184.84	-7.22
Rotated Clayton						
α	-0.18^{***}	-0.19^{***}	-0.19^{***}	-0.11^{***}	-0.18^{***}	-0.04^{***}
	(0.018)	(0.018)	(0.017)	(0.017)	(0.017)	(0.015)
AIC	-111.46	-114.71	-117.66	-45.59	-112.31	-4.75
Rotated Gumbel						
δ	-1.14^{***}	-1.13^{***}	-1.10^{***}	-1.07^{***}	-1.12^{***}	-1.03^{***}
	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)
AIC	-212.14	-183.79	-120.00	-69.65	-151.83	-4.75
Frank						
δ	-1.2^{***}	-1.18^{***}	-1.06^{***}	-0.76^{***}	-1.12^{***}	-0.28^{***}
	(0.087)	(0.087)	(0.086)	(0.086)	(0.087)	(0.085)
AIC	-187.20	-181.51	-149.20	-75.84	-164.30	-9.01
Plackett						
δ	0.55^{***}	0.55^{***}	0.59^{***}	0.68^{***}	0.57^{***}	0.87^{***}
	(0.023)	(0.023)	(0.025)	(0.028)	(0.024)	(0.037)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955

Note: *p<0.1; **p<0.05; ***p<0.01

Table 28: Copula models goodness of fit tests - Skewed GED errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	0.91^{**}	0.77^{**}	0.70^{***}	0.01	0.26	0.00
Student-t	1.39	3.24	2.71	0.81	0.36	4.81
Rotated Clayton	0.16	0.59	5.06^{***}	0.04	0.73	0.21
Rotated Gumbel	0.13	1.14^{*}	6.83^{***}	0.03	2.10^{***}	0.00
Frank	0.69^{***}	0.59^{***}	0.22^{**}	0.17	0.72^{***}	0.00
Plackett	0.06^{***}	0.03^{*}	0.04^{***}	0.03^{**}	0.03^{**}	0.03^{*}

Note: *p<0.1; **p<0.05; ***p<0.01

10.3 Copula parameter estimates with multiple error distributions (WTI)

Table 29: Copula models dependence parameter estimates - Normal errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.21^{***}	-0.21^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.05^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-229.81	-219.37	-157.06	-73.26	-162.78	-12.88
Student-t						
ρ	-0.22^{***}	-0.21^{***}	-0.18^{***}	-0.13^{***}	-0.19^{*}	-0.05^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	12.45	20.04	22.8	17.26	12.78	30
AIC	-256.55	-229.95	-164.38	-86.06	-190.70	-7.92
Rotated Clayton						
α	-0.2^{***}	-0.2^{***}	-0.19^{***}	-0.12^{***}	-0.19^{***}	-0.04^{***}
	(0.019)	(0.018)	(0.017)	(0.017)	(0.017)	(0.151)
AIC	-129.95	-135.75	-123.04	-49.72	-116.96	-3.9
Rotated Gumbel						
δ	-1.15^{***}	-1.14^{***}	-1.11^{***}	-1.08^{***}	-1.12^{***}	-1.03^{***}
	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.009)
AIC	-257.95	-214.38	-123.83	-73.91	-157.17	-11.91
Frank						
δ	-1.32^{***}	-1.29^{***}	-1.11^{***}	-0.75^{***}	-1.15^{***}	-0.28^{***}
	(0.088)	(0.087)	(0.087)	(0.087)	(0.087)	(0.085)
AIC	-219.37	-217.41	-161.10	-72.64	-171.84	-8.79
Plackett						
δ	0.51^{***}	0.53^{***}	0.57^{***}	0.68^{***}	0.56^{***}	0.87^{***}
	(0.021)	(0.022)	(0.024)	(0.028)	(0.023)	(0.037)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 30: Copula models goodness of fit tests - Normal Errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	1.25^{**}	1.23^{**}	0.56^{**}	0.03	0.25^{*}	0.00
Student-t	6.30^{*}	0.64	1.86	5.92^{*}	2.71	4.46
Rotated Clayton	0.10	2.14^{**}	2.36^{**}	0.01	1.20	0.39^{*}
Rotated Gumbel	0.07	3.67^{***}	5.80^{***}	0.11	2.52^{**}	0.00
Frank	1.82^{***}	0.39^{**}	0.34^{**}	0.31^{**}	0.80^{**}	0.000
Plackett	0.07^{***}	0.03^{**}	0.04^{**}	0.03^{*}	0.02	0.03^{*}
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 31: Copula models dependence parameter estimates - Skewed normal errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.21^{***}	-0.21^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.05^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-228.62	-215.78	-156.67	-73.10	-161.82	-12.59
Student-t						
ρ	-0.22^{***}	-0.21^{***}	-0.18^{***}	-0.13^{***}	-0.19^{*}	-0.05^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	15.05	18.58	22.36	17.2	12.92	30
AIC	-219.61	-228.93	-164.24	-86.00	-188.95	-7.57
Rotated Clayton						
α	-0.2^{***}	-0.2^{***}	-0.19^{***}	-0.12^{***}	-0.19^{***}	-0.04^{***}
	(0.019)	(0.018)	(0.018)	(0.017)	(0.017)	(0.015)
AIC	-128.65	-133.17	-122.87	-49.79	-114.98	-3.83
Rotated Gumbel						
δ	-1.15^{***}	-1.14^{***}	-1.11^{***}	-1.08^{***}	-1.12^{***}	-1.03^{***}
	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.008)
AIC	-128.65	-213.13	-123.56	-73.56	-156.60	-11.64
Frank						
δ	-1.32^{***}	-1.28^{***}	-1.11^{***}	-0.75^{***}	-1.15^{***}	-0.28^{***}
	(0.087)	(0.087)	(0.087)	(0.087)	(0.087)	(0.085)
AIC	-225.55	-216.60	-161.15	-72.64	-171.67	-8.43
Plackett						
δ	0.51^{***}	0.53^{***}	0.57^{***}	0.68^{***}	0.56^{***}	0.87^{***}
	(0.021)	(0.022)	(0.024)	(0.028)	(0.023)	(0.037)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955

Note: *p<0.1; **p<0.05; ***p<0.01

Table 32: Copula models goodness of fit tests - Skewed normal Errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	1.26^{***}	1.42^{**}	0.57^{**}	0.03	0.27	0.00
Student-t	5.86^{**}	0.37	1.76	6.10^{*}	3.21	4.54
Rotated Clayton	0.10	1.56^{**}	2.31^{**}	0.01	1.08	0.43
Rotated Gumbel	0.038	2.60^{**}	5.62^{***}	0.10	2.07^{***}	0.00
Frank	1.82^{***}	0.43^{**}	0.35^{*}	0.31^{***}	0.78^{***}	0.00
Plackett	0.07^{***}	0.03^{**}	0.04^{***}	0.03^{**}	0.02	0.03^{*}

Note: *p<0.1; **p<0.05; ***p<0.01

Table 33: Copula models dependence parameter estimates - Student-t errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.21^{***}	-0.21^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.06^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-224.81	-220.12	-152.09	-66.63	-154.26	-13.19
Student-t						
ρ	-0.22^{***}	-0.21^{***}	-0.18^{***}	-0.12^{***}	-0.18^{*}	-0.05^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	13.59	19.74	22.52	15.85	13.21	29.84
AIC	-246.54	-231.30	-159.50	-83.20	-180.44	-17.14
Rotated Clayton						
α	-0.2^{***}	-0.2^{***}	-0.19^{***}	-0.11^{***}	-0.18^{***}	-0.04^{***}
	(0.020)	(0.017)	(0.017)	(0.017)	(0.017)	(0.148)
AIC	-126.28	-135.46	-116.84	-44.74	-104.35	-6.28
Rotated Gumbel						
δ	-1.15^{***}	-1.14^{***}	-1.11^{***}	-1.07^{***}	-1.12^{***}	-1.03^{***}
	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.008)
AIC	-249.97	-214.77	-121.12	-67.60	-152.54	-16.98
Frank						
δ	-1.3^{***}	-1.29^{***}	-1.1^{***}	-0.74^{***}	-1.13^{***}	-0.3^{***}
	(0.087)	(0.087)	(0.087)	(0.086)	(0.087)	(0.086)
AIC	-218.14	-217.39	-158.32	-70.11	-167.80	-9.99
Plackett						
δ	0.53^{***}	0.53^{***}	0.57^{***}	0.68^{***}	0.56^{***}	0.86^{***}
	(0.022)	(0.022)	(0.024)	(0.028)	(0.023)	(0.036)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 34: Copula models goodness of fit tests - Student-t errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	1.14^{**}	1.31^{***}	0.51^{**}	0.00	0.22^{*}	0.01
Student-t	8.41^{**}	0.18	4.87	4.97^{*}	4.23	3.29
Rotated Clayton	0.20	3.47^{***}	2.67^{***}	0.01	0.76	0.00
Rotated Gumbel	0.26	3.73^{***}	4.13^{***}	0.06	1.01^{**}	0.53^{**}
Frank	1.54^{***}	0.38^{**}	0.40^{**}	0.32^{***}	0.81^{***}	0.01
Plackett	0.07^{***}	0.03^{**}	0.04^{**}	0.03^{*}	0.02	0.02
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 35: Copula models dependence parameter estimates - Skewed Student-t errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.21^{***}	-0.21^{***}	-0.17^{***}	-0.12^{***}	-0.18^{***}	-0.06^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-222.96	-219.19	-150.81	-66.21	-153.81	-13.63
Student-t						
ρ	-0.21^{***}	-0.21^{***}	-0.18^{***}	-0.12^{***}	-0.18^{*}	-0.06^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	13.5	19.43	22.19	15.63	13.05	28.72
AIC	-244.96	-230.79	-158.41	-83.35	-180.69	-18.08
Rotated Clayton						
α	-0.2^{***}	-0.2^{***}	-0.19^{***}	-0.11^{***}	-0.18^{***}	-0.05^{***}
	(0.019)	(0.017)	(0.017)	(0.017)	(0.017)	(0.145)
AIC	-124.74	-230.79	-115.89	-44.36	-105.30	-6.94
Rotated Gumbel						
δ	-1.15^{***}	-1.14^{***}	-1.11^{***}	-1.07^{***}	-1.12^{***}	-1.03^{***}
	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)
AIC	-248.54	-214.26	-120.34	-67.43	-151.77	-17.52
Frank						
δ	-1.29^{***}	-1.29^{***}	-1.1^{***}	-0.74^{***}	-1.12^{***}	-0.3^{***}
	(0.087)	(0.087)	(0.087)	(0.086)	(0.087)	(0.086)
AIC	-217.37	-217.30	-157.70	-70.18	-167.28	-9.97
Plackett						
δ	0.52^{***}	0.53^{***}	0.58^{***}	0.68^{***}	0.56^{***}	0.86^{***}
	(0.021)	(0.022)	(0.024)	(0.028)	(0.023)	(0.036)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955

Note: *p<0.1; **p<0.05; ***p<0.01

Table 36: Copula models goodness of fit tests - Skewed Student-t errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	1.11^{**}	1.32^{***}	0.51^{**}	0.00	0.20	0.01
Student-t	8.84^{***}	0.18	4.84	4.93^{*}	4.45	3.50
Rotated Clayton	0.19	3.14	2.53^{**}	0.01	0.66^{*}	0.00
Rotated Gumbel	0.22	3.58^{***}	3.93^{***}	0.04	1.24^{*}	0.89^{***}
Frank	1.56^{***}	0.40^{***}	0.40^{***}	0.33^{***}	0.82^{***}	0.01
Plackett	0.07^{***}	0.03^{**}	0.04^{***}	0.03^{*}	0.02	0.02

Note: *p<0.1; **p<0.05; ***p<0.01

Table 37: Copula models dependence parameter estimates - GED errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.21^{***}	-0.21^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.03^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-228.24	-220.10	-151.62	-71.50	-155.63	-2.39
Student-t						
ρ	-0.22^{***}	-0.21^{***}	-0.18^{***}	-0.12^{***}	-0.18^{*}	-0.03^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	13.84	19.63	21.68	16.91	14.24	17.17
AIC	-248.92	-231.42	-59.93	-85.36	-177.47	-17.28
Rotated Clayton						
α	-0.2^{***}	-0.2^{***}	-0.19^{***}	-0.12^{***}	-0.18^{***}	-0.02^{***}
	(0.019)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
AIC	-128.39	-135.97	-118.71	-48.33	-102.69	-0.31
Rotated Gumbel						
δ	-1.15^{***}	-1.14^{***}	-1.11^{***}	-1.08^{***}	-1.12^{***}	-1.02^{***}
	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)
AIC	-252.56	-214.90	-120.44	-71.50	-152.80	-10.96
Frank						
δ	-1.3^{***}	-1.29^{***}	-1.1^{***}	-0.75^{***}	-1.13^{***}	-0.2^{***}
	(0.087)	(0.087)	(0.087)	(0.086)	(0.087)	(0.086)
AIC	-220.58	-217.43	-158.31	-72.68	-168.45	-3.32
Plackett						
δ	0.51^{***}	0.53^{***}	0.58^{***}	0.68^{***}	0.56^{***}	0.90^{***}
	(0.021)	(0.022)	(0.024)	(0.028)	(0.023)	(0.038)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955

Note: *p<0.1; **p<0.05; ***p<0.01

Table 38: Copula models goodness of fit tests - GED errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	1.75^{***}	1.31^{**}	0.52^{*}	0.02	0.33	0.64^{***}
Student-t	8.35^{**}	0.14	4.36	4.16^{*}	4.88^{*}	1.81
Rotated Clayton	0.18	3.01^{***}	0.02	0.03	0.93^{*}	1.92^{**}
Rotated Gumbel	0.26	4.01^{**}	0.40^{*}	0.11	0.89^{**}	0.00
Frank	1.52^{***}	0.38^{**}	0.31^{***}	0.16^{**}	0.67^{***}	0.01^{*}
Plackett	0.07^{***}	0.03^{**}	0.04^{**}	0.03^{*}	0.02	0.04^{***}

Note: *p<0.1; **p<0.05; ***p<0.01

Table 39: Copula models dependence parameter estimates - Skewed GED errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula						
ρ	-0.21^{***}	-0.21^{***}	-0.18^{***}	-0.12^{***}	-0.18^{***}	-0.06^{***}
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
AIC	-216.85	-220.45	-154.51	-68.93	-160.49	-14.41
Student-t						
ρ	-0.21^{***}	-0.2^{***}	-0.18^{***}	-0.12^{***}	-0.19^{*}	-0.06^{***}
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)
ν	11.63	18.44	21.02	16.13	11.89	30
AIC	-250.85	-195.22	-163.81	-84.62	-184.84	-9.76
Rotated Clayton						
α	-0.2^{***}	-0.2^{***}	-0.19^{***}	-0.11^{***}	-0.19^{***}	-0.04^{***}
	(0.019)	(0.018)	(0.017)	(0.017)	(0.017)	(0.015)
AIC	-121.38	-134.81	-122.14	-45.16	-114.16	-3.71
Rotated Gumbel						
δ	-1.15^{***}	-1.14^{***}	-1.11^{***}	-1.07^{***}	-1.12^{***}	-1.03^{***}
	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.008)
AIC	-248.64	-214.43	-122.31	-70.36	-158.34	-14.62
Frank						
δ	-1.3^{***}	-1.29^{***}	-1.1^{***}	-0.75^{***}	-1.15^{***}	-0.31^{***}
	(0.087)	(0.087)	(0.087)	(0.087)	(0.087)	(0.085)
AIC	-217.70	-217.71	-160.16	-72.18	-171.50	-10.76
Plackett						
δ	0.52^{***}	0.53^{***}	0.57^{***}	0.68^{***}	0.56^{***}	0.86^{***}
	(0.021)	(0.022)	(0.024)	(0.028)	(0.023)	(0.036)
AIC	(0.014)	(0.015)	(0.011)	(0.000)	(0.085)	(0.016)
Observations	4,955	4,955	4,955	4,955	4,955	4,955

Note: *p<0.1; **p<0.05; ***p<0.01

Table 40: Copula models goodness of fit tests - Skewed GED errors

	Dependent variable:					
	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
Gaussian Copula	2.43^{***}	1.16^{**}	0.60^{**}	0.00	0.16	0.00
Student-t	1.14	0.50	1.15	4.74	0.23	3.89
Rotated Clayton	0.22	2.69^{***}	2.08^{**}	0.01	1.20^{*}	0.40^{*}
Rotated Gumbel	0.00	3.76^{***}	5.77^{***}	0.02	1.97^{**}	0.00
Frank	1.68^{***}	0.35^{*}	0.36^{**}	0.33^{***}	0.87^{***}	0.00
Plackett	0.07^{***}	0.03^{**}	0.04^{***}	0.03^{*}	0.02	0.02

Note: *p<0.1; **p<0.05; ***p<0.01

10.4 Marginal distribution results in different periods

Table 41: APGARCH Marginal Distribution Estimates - 2000 to 2004

	Dependent variable:							
	BRENT	WTI	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
c	0.001	0.0001	0.00000	0.0003	0.00003	−0.00002	0.0001	0.001***
	(0.001)	(0.0001)	(0.00001)	(0.0002)	(0.00002)	(0.00003)	(0.0001)	(0.0001)
ϕ	0.253	0.902***	1.000***	0.639***	0.941***		−0.137	−0.113***
	(0.297)	(0.053)	(0.044)	(0.021)	(0.037)		(0.167)	(0.010)
ω	0.0003*	0.0002*	0.00001***	0.0003**	0.00000**	0.0001**	0.00001*	0.0003
	(0.0001)	(0.0001)	(0.00000)	(0.0001)	(0.00000)	(0.00003)	(0.00000)	(0.0004)
α	0.042***	0.029**	0.205***	0.107***	0.143***	0.217***	0.110***	0.211***
	(0.013)	(0.013)	(0.036)	(0.027)	(0.033)	(0.050)	(0.023)	(0.041)
γ	0.066	0.233	−0.164**	−0.442***	−0.206***	−0.245***	−0.102	0.055
	(0.207)	(0.403)	(0.079)	(0.165)	(0.071)	(0.088)	(0.086)	(0.160)
β	0.950***	0.952***	0.803***	0.867***	0.852***	0.837***	0.896***	0.935***
	(0.016)	(0.019)	(0.031)	(0.040)	(0.032)	(0.036)	(0.022)	(0.011)
δ	1.130*	1.268	1.488***	0.962***	2.000***	0.929***	1.507***	0.555***
	(0.626)	(0.778)	(0.384)	(0.308)	(0.400)	(0.218)	(0.430)	(0.091)
skew		0.928***	0.999***	1.111***	1.034***	1.028***	1.054***	1.044***
		(0.037)	(0.038)	(0.048)	(0.043)	(0.037)	(0.042)	(0.020)
shape	5.617***	5.545***	3.931***	8.506***	7.343***	3.058***	5.851***	2.023***
	(0.926)	(0.915)	(0.490)	(1.896)	(1.469)	(0.325)	(1.012)	(0.012)
Observations	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202
$Q(36)$	142.43***	31.53	33.23	29.98	33.42	36.33	29.82	31.32
$Q^2(36)$	22.14	1427.3***	16.65	11.59	29.94	32.03	29.97	0.34
ARCH(36)	33.30	25.20	16.89	30.37	30.42	27.01	25.45	2.52

Note: *p<0.1; **p<0.05; ***p<0.01

Table 42: APGARCH Marginal Distribution Estimates - 2004 to 2007

	Dependent variable:							
	BRENT	WTI	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
c	0.001	0.0004	-0.0005	-0.0001^{***}	-0.001^{***}	-0.00003^{**}	-0.0002	-0.00000
	(0.001)	(0.001)	(0.0003)	(0.00001)	(0.0002)	(0.00002)	(0.0002)	(0.00000)
ϕ	-0.281	-0.039	-0.838^{***}	0.080^{***}	0.413^{***}	0.202^{***}	0.653^{***}	0.663^{***}
	(0.297)	(0.037)	(0.035)	(0.002)	(0.025)	(0.016)	(0.186)	(0.003)
ω	0.00002^{*}	0.00001	0.00000	0.121^{***}	0.001^{**}	0.001	0.00000	0.002
	(0.00001)	(0.00001)	(0.00000)	(0.036)	(0.001)	(0.001)	(0.00000)	(0.002)
α	0.018	0.016	0.307^{***}	0.110^{***}	0.134^{***}	0.456^{**}	0.076^{***}	0.579^{***}
	(0.023)	(0.016)	(0.104)	(0.030)	(0.029)	(0.215)	(0.027)	(0.155)
γ	0.978	0.992	0.062	-0.648^{***}	-0.380^{**}	-0.180^{*}	-0.090	0.367^{***}
	(1.144)	(0.608)	(0.079)	(0.183)	(0.168)	(0.101)	(0.127)	(0.134)
β	0.918^{***}	0.934^{***}	0.819^{***}	0.659^{***}	0.862^{***}	0.724^{***}	0.919^{***}	0.774^{***}
	(0.032)	(0.029)	(0.037)	(0.083)	(0.031)	(0.051)	(0.023)	(0.042)
δ	2.000^{**}	2.000^{**}	1.891^{***}	0.126^{**}	0.682^{***}	0.655^{**}	2.000^{***}	0.394^{***}
	(0.908)	(0.978)	(0.526)	(0.060)	(0.255)	(0.300)	(0.659)	(0.077)
skew		0.955^{***}	1.106^{***}	1.230^{***}	1.187^{***}	1.066^{***}	0.985^{***}	1.000^{***}
		(0.049)	(0.049)	(0.069)	(0.064)	(0.039)	(0.052)	(0.018)
shape	10.000^{***}	10.000^{***}	2.888^{***}	8.176^{***}	6.366^{***}	2.267^{***}	8.799^{***}	2.018^{***}
	(2.348)	(2.568)	(0.409)	(2.028)	(1.336)	(0.553)	(2.921)	(0.019)
Observations	742	742	742	742	742	742	742	742
$Q(36)$	21.7	28.39	24.41	25.87	21.19	20.49	47.23	0.003
$Q^2(36)$	50.46^{*}	38.06	35.32	36.49	0.66	3.08	32.69	0.01
ARCH(36)	49.24^{*}	39.47	33.56	28.62	34.50	2.97	32.81	65.98

Note: *p<0.1; **p<0.05; ***p<0.01

Table 43: APGARCH Marginal Distribution Estimates - 2007 to 2011

	Dependent variable:							
	BRENT	WTI	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
c	0.001	0.001	−0.0002	−0.0001	−0.00004	−0.0002**	−0.0001***	−0.0004***
	(0.001)	(0.001)	(0.0003)	(0.0001)	(0.00005)	(0.0001)	(0.00003)	(0.00001)
ϕ	0.114	0.543***	0.871***	−0.354***	0.495***	−0.357***	0.532***	−0.186***
	(0.469)	(0.093)	(0.032)	(0.006)	(0.047)	(0.060)	(0.017)	(0.002)
ω	0.0001*	0.00004**	0.0002***	0.001***	0.00002***	0.00001*	0.004**	0.039***
	(0.00004)	(0.00002)	(0.0001)	(0.0004)	(0.00001)	(0.00001)	(0.002)	(0.015)
α	0.069***	0.081***	0.159***	0.156***	0.128***	0.607***	0.121	0.417***
	(0.021)	(0.023)	(0.033)	(0.031)	(0.031)	(0.175)	(0.108)	(0.156)
γ	0.421*	0.374*	−0.275**	−0.528***	−0.555***	−0.029	−0.065	0.019
	(0.223)	(0.216)	(0.117)	(0.126)	(0.175)	(0.069)	(0.149)	(0.158)
β	0.928***	0.913***	0.835***	0.852***	0.827***	0.684***	0.865***	0.738***
	(0.023)	(0.027)	(0.038)	(0.024)	(0.037)	(0.042)	(0.045)	(0.070)
δ	1.337**	1.577***	1.125***	0.632*	1.665***	1.371***	0.448	0.306**
	(0.622)	(0.584)	(0.400)	(0.347)	(0.370)	(0.372)	(1.081)	(0.125)
skew		0.946***	0.999***	1.118***	1.050***	1.021***	1.003***	0.958***
		(0.048)	(0.043)	(0.049)	(0.052)	(0.037)	(0.042)	(0.021)
shape	10.000***	10.000***	7.500***	6.636***	10.000***	2.693***	5.418***	2.007***
	(2.470)	(2.511)	(1.838)	(1.602)	(2.720)	(0.331)	(1.133)	(0.002)
Observations	930	930	930	930	930	930	930	930
$Q(36)$	27.84	22.24	15.25	19.17	28.61	41.15	21.87	28.24
$Q^2(36)$	45.71	55.79**	27.90	49.94	32.10	32.08	0.40	5.05
ARCH(36)	41.42	56.28**	26.00	39.92	31.03	20.00	8.71	58.62***

Note: *p<0.1; **p<0.05; ***p<0.01

Table 44: APGARCH Marginal Distribution Estimates - 2011 to 2014

	Dependent variable:							
	BRENT	WTI	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
c	−0.0001	−0.0004	0.0001	0.0001	0.0003*	−0.0001***	0.0001	−0.00000
	(0.0003)	(0.0004)	(0.0001)	(0.0002)	(0.0002)	(0.00003)	(0.0001)	(0.00001)
ϕ	0.213	−0.032	0.018	0.897***		−0.329***	0.864***	
	(0.299)	(0.032)	(0.060)	(0.033)		(0.011)	(0.121)	
ω	0.00001	0.00001*	0.0001*	0.00000**	0.0002**	0.0003***	0.00000	0.00001
	(0.00001)	(0.00000)	(0.0001)	(0.00000)	(0.0001)	(0.0001)	(0.00000)	(0.002)
α	0.042**	0.043***	0.052***	0.033*	0.098***	0.303*	0.045*	0.322***
	(0.018)	(0.016)	(0.015)	(0.019)	(0.021)	(0.160)	(0.024)	(0.082)
γ	0.391	0.390*	−0.549**	−0.768	−0.516**	−0.109	−0.466	−0.163
	(0.238)	(0.214)	(0.247)	(0.537)	(0.208)	(0.144)	(0.305)	(0.193)
β	0.954***	0.946***	0.945***	0.956***	0.914***	0.753***	0.952***	0.938***
	(0.016)	(0.017)	(0.017)	(0.009)	(0.017)	(0.061)	(0.016)	(0.019)
δ	1.565**	1.802***	0.910**	1.584***	0.934**	0.917	1.616***	0.492***
	(0.674)	(0.652)	(0.417)	(0.396)	(0.419)	(0.893)	(0.432)	(0.111)
skew		0.907***	1.076***	1.069***	0.994***	0.971***	1.083***	0.996***
		(0.039)	(0.046)	(0.048)	(0.040)	(0.028)	(0.051)	(0.018)
shape	5.319***	5.808***	7.350***	9.877***	5.331***	2.634***	9.450***	2.003***
	(0.888)	(1.064)	(1.863)	(2.947)	(0.970)	(0.360)	(2.763)	(0.0004)
Observations	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
$Q(36)$	84.99***	25.42	47.57*	32.92	74.73***	22.44	60.05***	29.58
$Q^2(36)$	58.34**	40.26	0.59	42.11	3.62	20.75	54.75**	0.18
ARCH(36)	37.97	206.64***	22.11	37.13	23.67	19.86	33.99	869***

Note: *p<0.1; **p<0.05; ***p<0.01

Table 45: APGARCH Marginal Distribution Estimates - 2014 to 2018

	Dependent variable:							
	BRENT	WTI	COP/USD	MXN/USD	BRL/USD	PEN/USD	CLP/USD	UYU/USD
c	0.0003	0.0003	0.001*	0.001*	0.001***	0.0003***	0.0001	−0.00000
	(0.001)	(0.001)	(0.001)	(0.0003)	(0.0001)	(0.0001)	(0.0002)	(0.00000)
ϕ	−0.117	−0.183	−0.863***	0.670***	−0.822***	0.488***		0.009
	(0.269)	(0.371)	(0.042)	(0.073)	(0.009)	(0.060)		(0.022)
ω	0.00000	0.003**	0.00000	0.0001**	0.0004***	0.0001***	0.00001	0.0003**
	(0.00000)	(0.001)	(0.00000)	(0.00002)	(0.00001)	(0.00002)	(0.00001)	(0.0001)
α	0.018	0.038***	0.060**	0.095***	0.011***	0.226***	0.027**	0.341***
	(0.014)	(0.005)	(0.027)	(0.030)	(0.001)	(0.041)	(0.011)	(0.103)
γ	1.000***	0.983	−0.166	−0.419**	−1.000***	−0.103	−0.259	−0.147
	(0.369)		(0.130)	(0.202)	(0.0004)	(0.086)	(0.245)	(0.114)
β	0.969***	0.962***	0.930***	0.794***	0.992***	0.790***	0.966***	0.745***
	(0.008)	(0.008)	(0.028)	(0.064)	(0.0004)	(0.037)	(0.013)	(0.064)
δ	1.878	0.433	2.000**	1.596***	0.376***	1.159***	1.334*	1.064***
		(0.348)	(0.806)	(0.474)	(0.011)	(0.300)	(0.707)	(0.364)
skew		0.935***	1.012***	1.087***	1.050***	1.041***	0.988***	1.028***
		(0.040)	(0.041)	(0.048)	(0.042)	(0.042)	(0.048)	(0.035)
shape	4.294***	5.490***	7.182***	6.951***	7.440***	4.569***	10.000***	2.586***
	(0.530)	(0.790)	(1.609)	(1.369)	(1.335)	(0.658)	(2.107)	(0.294)
Observations	1,076	1,076	1,076	1,076	1,076	1,076	1,076	1,076
$Q(36)$	84.99***	137.18***	47.57*	32.92	74.73***	22.44	60.05***	29.58
$Q^2(36)$	7.73	17.83	39.00	22.54	5.10	20.73	194.20***	33.78
ARCH(36)	394.41***	44.71	38.5	21.52	929.49***	27.65	27.25	43.51

Note: *p<0.1; **p<0.05; ***p<0.01