Supplementary Appendix

Measuring crisis risk using conditional copulas:

An empirical analysis of the 2008 shipping crisis

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Model specification

Table S.1: *Breusch-Godfrey LM test for serial correlation*

	BDI		BY	
Lag order i	$R^2(T-i)$	p-value	$R^2(T-i)$	p-value
1	1.9016	0.1679	0.9536	0.3288
2	4.5134	0.1047	1.0290	0.5978
3	4.8462	0.1834	3.9002	0.2724
4	5.0064	0.2866	4.8940	0.2984
5	5.2203	0.3896	6.4361	0.2661
6	5.5996	0.4695	6.5238	0.3671
7	5.5872	0.5887	7.3678	0.3916
8	8.3976	0.3956	7.4262	0.4914
9	8.1596	0.5181	8.2786	0.5063
10	10.1376	0.4285	8.4146	0.5884
11	10.0653	0.5245	8.3828	0.6787
12	10.0133	0.6148	8.4250	0.7511

This table presents the Breusch-Godfrey LM statistics for serial correlation of Breusch-Godfrey test for different lag orders using standardized residuals of the quasi maximum likelihood estimation of Equations (1) and (4), see Breusch (1978) and Godfrey (1978).

**Table S.2:** *ARCH LM test of standardized residuals of risk factors*

	BDI		BY	
Lag order i	ARCH LM	p-value	ARCH LM	p-value
1	2.9632	0.0852	0.0347	0.8522
2	3.3365	0.1886	0.0673	0.9669
3	3.2848	0.3498	0.1523	0.9849
4	4.3279	0.3634	0.2858	0.9907
5	4.6761	0.4567	0.6976	0.9831
6	4.6664	0.5873	2.8896	0.8226
7	11.9495	0.1022	2.9006	0.8940
8	12.0159	0.1505	3.1498	0.9246
9	16.2480	0.0619	5.6143	0.7778
10	17.7567	0.0592	5.6390	0.8446
11	17.9274	0.0833	6.2409	0.8568
12	18.0998	0.1127	6.6754	0.8783

This table presents the ARCH LM statistics of ARCH test (see Engle, 1982) for different lag orders using standardized residuals of the quasi maximum likelihood estimation of Equations (1) and (4). The null hypothesis is no ARCH up to the selected lag. * indicates the rejection of H_0 at the 5% level.

Table S.3: *Distribution tests of standardized residuals*

|	BDI		BY	
	KS test	AD test	KS test	AD test
5%-level test statistic	0.0368	0.4068	0.0562	1.1484
5%-level critical value	0.0925	2.4931	0.0925	2.4931
p-value	0.9256	0.8418	0.4969	0.2879

This table presents the test statistics of Kolmogorov-Smirnov test (KS) as well as Anderson-Darling test (AD) using standardized residuals of the quasi maximum likelihood estimation of Equations (1) and (4). The null hypothesis is that the data is t-distributed.
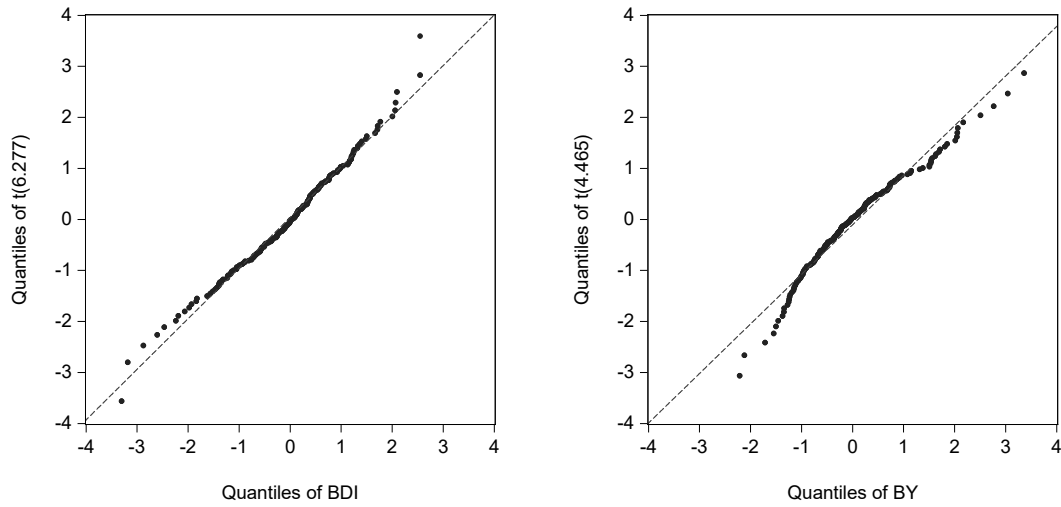
(a) QQ-plot of BDI residual quantiles versus Student's t quantiles

(b) QQ-plot of BY residual quantiles versus Student's t quantiles

Figure S.1: *QQ-plots of standardized residuals*
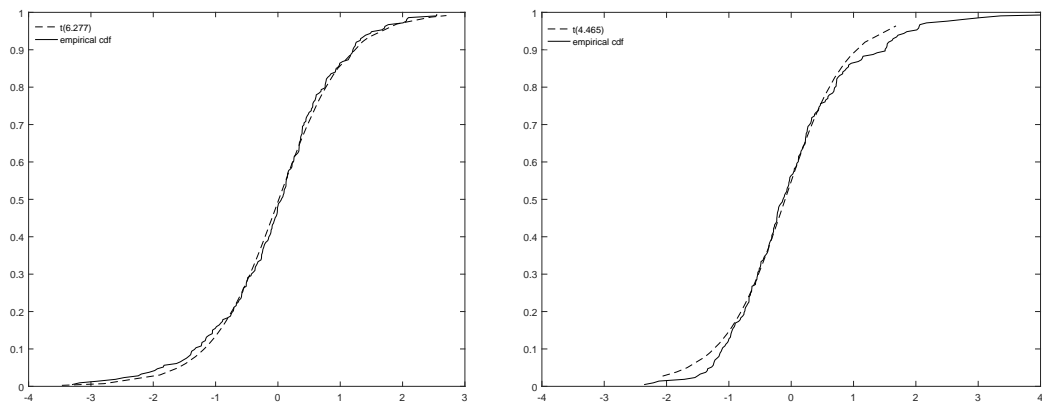
(a) Empirical vs. theoretical distribution: BDI

(b) Empirical vs. theoretical distribution: BY

Figure S.2: *Marginal distribution plots: empirical vs. theoretical distribution*

Model estimates

<div align="center"><i>Table S.4:</i> <i>ML-estimates</i></div>

Model		(1)		(2)		(3)		(4)	
Conditioning factors		unconditional		$\Delta^3_{OFR,t-3}$		$\Delta^3_{MSCI,t-3}$		$\Delta^3_{OFR,t-3}$ & $\Delta^3_{MSCI,t-3}$	
Parameter		Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Mean equation (VAR(4))									
BDI	$\beta_{BDI,0}$	0.0155	0.0105	0.0102	0.0109	0.0127	0.0108	0.0091	0.0107
	$\beta_{BDI1,1}$	-0.2549	0.1999	-0.2744	0.1942	-0.2510	0.2034	-0.2404	0.1895
	$\beta_{BDI1,2}$	-0.1114	0.2084	-0.1650	0.2034	-0.1197	0.2069	-0.2066	0.1898
	$\beta_{BDI1,3}$	0.1023	0.1778	0.0676	0.1754	0.1358	0.1842	-0.0131	0.1803
	$\beta_{BDI1,4}$	-0.1442	0.2115	-0.1576	0.2036	-0.1028	0.2156	-0.0485	0.1987
	$\beta_{BDI2,1}$	0.0727	0.0735	0.0524	0.0722	0.0775	0.0710	0.0454	0.0685
	$\beta_{BDI2,2}$	-0.0665	0.0792	-0.0785	0.0756	-0.0685	0.0779	-0.0714	0.0734
	$\beta_{BDI2,3}$	-0.0263	0.0684	-0.0368	0.0707	-0.0134	0.0678	-0.0397	0.0673
	$\beta_{BDI2,4}$	-0.1393**	0.0624	-0.1167*	0.0664	-0.1443**	0.0629	-0.0700	0.0615
	$\beta_{BDI,S}$			0.5652	0.3976			0.4979	0.3751
	$\beta_{BDI,D}$					0.0931	0.1606	0.0801	0.1520
BY	$\beta_{BY,0}$	-0.0062*	0.0034	-0.0066*	0.0035	-0.0077**	0.0035	-0.0088**	0.0037
	$\beta_{BY1,1}$	0.1711***	0.0620	0.1490**	0.0621	0.1048*	0.0635	0.1198*	0.0650
	$\beta_{BY1,2}$	-0.0597	0.0509	-0.1658***	0.0547	-0.0615	0.0521	-0.2201***	0.0611
	$\beta_{BY1,3}$	0.0765	0.0630	0.0410	0.0636	0.0790	0.0616	0.0943	0.0674
	$\beta_{BY1,4}$	0.0854	0.0594	0.0629	0.0612	0.1316**	0.0647	0.1434**	0.0696
	$\beta_{BY2,1}$	0.0121	0.0198	0.0046	0.0215	0.0147	0.0202	-0.0045	0.0196
	$\beta_{BY2,2}$	-0.0513***	0.0199	-0.0458**	0.0204	-0.0403*	0.0213	-0.0461**	0.0203
	$\beta_{BY2,3}$	0.0460**	0.0206	0.0428**	0.0205	0.0253	0.0225	0.0441**	0.0211
	$\beta_{BY2,4}$	-0.0239	0.0176	-0.0187	0.0196	-0.0166	0.0201	-0.0249	0.0194
	$\beta_{BY,S}$			0.2350**	0.1157			0.3039***	0.1170
	$\beta_{BY,D}$					0.1252**	0.0512	0.1388***	0.0515
Regime dependent variances									
BDI	$\sigma^2_{BDI,1}$	0.0175***	0.0041	0.0177***	0.0045	0.0173***	0.0043	0.0157***	0.0036
	$\sigma^2_{BDI,2}$	0.2314*	0.1349	0.1991*	0.1164	0.2278	0.1521	0.2655*	0.1600
	$\sigma^2_{BDI,3}$	0.0662***	0.0186	0.0719***	0.0226	0.0670***	0.0195	0.0717***	0.0216
BY	$\sigma^2_{BY,1}$	0.0024***	0.0009	0.0025***	0.0007	0.0023***	0.0008	0.0025***	0.0006
	$\sigma^2_{BY,2}$	0.0236	0.0202	0.0134	0.0115	0.0199	0.0175	0.0127	0.0106
	$\sigma^2_{BY,3}$	0.0024*	0.0013	0.0020**	0.0010	0.0060**	0.0028	0.0018**	0.0008
	$\sigma^2_{BY,4}$	0.0094*	0.0053	0.0087**	0.0041			0.0081**	0.0034
Degrees of freedom of marginal distributions									
BDI	ν_{BDI}	5.8676**	3.4475	4.7052**	2.0721	5.6456*	3.3070	4.8725**	2.1510
BY	ν_{BY}	3.5746***	1.3435	3.7679***	1.2911	3.6940**	1.4430	4.5053***	1.6717
Dependence parameters									
	$\kappa_{\lambda,0}$	-10.5407	5584.8240	-3.5940	3.1455	-4.3028	8.4333	-8.7145***	2.4857
	$\kappa_{\lambda,OFR}$			1.0143	1.0834			3.0656***	0.8046
	$\kappa_{\lambda,MSCI}$					-0.6248	2.3461	-1.9092***	0.4836
	θ	0.6816	0.9786	0.0662	0.6716	0.4278	0.7975	0.1801	0.4851
LL		395.7373		400.6630		397.1869		411.8413	

This table presents the maximum-likelihood model estimates specified in Equations (1), (4), (7), and (8) over the sample period from 05/1997 to 12/2014. LL is the log-likelihood. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. Figures in [ ] are standard errors.

Robustness results

Table S.5: *ML-estimates for out-of-sample analysis*

	Model	05/1997-12/2005		05/1997-06/2006		05/1997-12/2006	
	Parameter	Estimate	SE	Estimate	SE	Estimate	SE
		Mean equation (VAR(4))					
BDI	$\beta_{BDI,0}$	0.0012	0.0116	0.0015	0.0118	0.0065	0.0103
	$\beta_{BDI1,1}$	-0.3040	0.2267	-0.3508	0.2368	-0.3454	0.2252
	$\beta_{BDI1,2}$	0.1514	0.1872	0.1019	0.1871	0.1548	0.1657
	$\beta_{BDI1,3}$	-0.5411***	0.1971	-0.5195**	0.2234	-0.4862**	0.2130
	$\beta_{BDI1,4}$	-0.1006	0.2280	-0.0265	0.2007	0.0293	0.1966
	$\beta_{BDI2,1}$	0.2168**	0.0873	0.2319***	0.0822	0.2040***	0.0779
	$\beta_{BDI2,2}$	0.0178	0.0885	-0.0140	0.0912	-0.0268	0.0823
	$\beta_{BDI2,3}$	0.0202	0.0825	0.0370	0.0829	0.0283	0.0789
	$\beta_{BDI2,4}$	0.0813	0.0760	0.0622	0.0757	0.0280	0.0715
	$\beta_{BDI,S}$	-0.6206	1.0406	-0.2095	1.0693	0.4010	1.0080
	$\beta_{BDI,D}$	-0.0917	0.1708	-0.0955	0.1699	-0.0812	0.1422
BY	$\beta_{BY,0}$	-0.0032	0.0042	-0.0039	0.0042	-0.0041	0.0040
	$\beta_{BY1,1}$	0.0588	0.0880	0.0856	0.0949	0.0802	0.0902
	$\beta_{BY1,2}$	0.0139	0.0730	-0.0330	0.0698	0.0092	0.0597
	$\beta_{BY1,3}$	-0.0356	0.0852	-0.0176	0.0843	-0.0121	0.0814
	$\beta_{BY1,4}$	0.1731**	0.0821	0.1689**	0.0725	0.1577**	0.0712
	$\beta_{BY2,1}$	0.0403	0.0375	0.0419	0.0330	0.0304	0.0321
	$\beta_{BY2,2}$	-0.0220	0.0348	-0.0239	0.0329	-0.0369	0.0314
	$\beta_{BY2,3}$	-0.0089	0.0377	-0.0007	0.0357	-0.0103	0.0345
	$\beta_{BY2,4}$	0.0007	0.0389	-0.0034	0.0349	-0.0136	0.0308
	$\beta_{BY,S}$	-0.7351*	0.3980	-0.4862	0.3838	-0.2317	0.3483
	$\beta_{BY,D}$	0.1043	0.0681	0.1028	0.0635	0.0978*	0.0571
		Regime dependent variances					
BDI	σ^2_{BDI}	0.0288	0.0548	0.0282	0.0496	0.0245	0.0386
BY	σ^2_{BY}	0.0049	0.0090	0.0034	0.0031	0.0041	0.0052
		Degrees of freedom of marginal distributions					
BDI	ν_{BDI}	2.4417**	1.1518	2.4912**	1.2253	2.5371**	1.2291
BY	ν_{BY}	2.4309**	1.0832	2.7403**	1.1366	2.5345**	0.9838
		Dependence parameters					
	$\kappa_{\lambda,0}$	-3.2630	5.4896	-7.2007*	4.3096	-9.0487*	5.4559
	$\kappa_{\lambda,OFR}$	0.4076	1.8492	1.8879	1.8249	3.5713*	2.0304
	$\kappa_{\lambda,MSCI}$	1.1016	2.3418	-3.5709**	1.6620	-4.0662**	1.9695
	θ	0.2805	1.3312	0.1469	0.7270	0.3789	0.7012
LL		255.6001		273.6609		291.1435	

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.
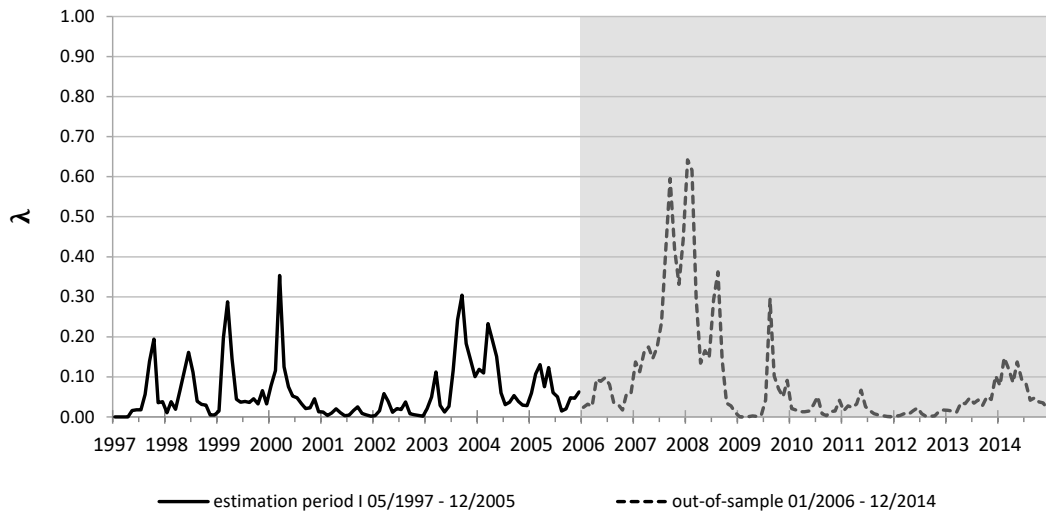
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Figure S.3: *Out-of-sample estimation of shipping crisis risk starting in 01/2006*
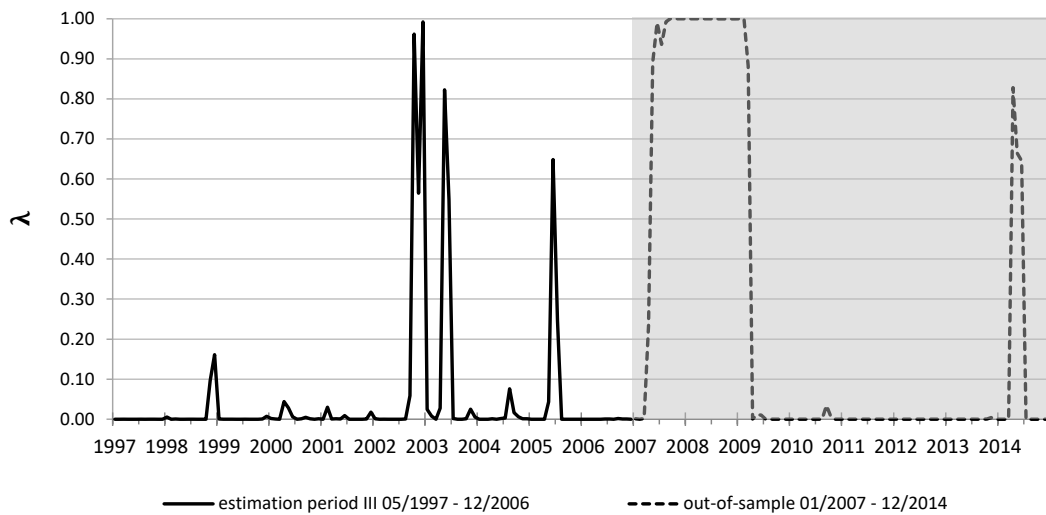

Figure S.4: *Out-of-sample estimation of shipping crisis risk starting in 01/2007*

Table S.6: *ML-estimates for alternative copula model I*

	Model	Full mtF-copula		Mirrored Frank copula		Mirrored Gumbel copula	
	Parameter	Estimate	SE	Estimate	SE	Estimate	SE
		Mean equation (VAR(4))					
BDI	$\beta_{BDI,0}$	0.0096	0.0108	0.0095	0.0113	0.0089	0.0107
	$\beta_{BDI1,1}$	-0.2363	0.2035	-0.2656	0.2071	-0.2428	0.1893
	$\beta_{BDI1,2}$	-0.2013	0.1906	-0.1484	0.2051	-0.2265	0.1908
	$\beta_{BDI1,3}$	-0.0137	0.1814	0.0231	0.1890	0.0102	0.1795
	$\beta_{BDI1,4}$	-0.0334	0.2014	-0.1095	0.2107	-0.0628	0.2035
	$\beta_{BDI2,1}$	0.0339	0.0689	0.0268	0.0704	0.0483	0.0684
	$\beta_{BDI2,2}$	-0.0753	0.0738	-0.0907	0.0767	-0.0758	0.0740
	$\beta_{BDI2,3}$	-0.0426	0.0683	-0.0351	0.0695	-0.0330	0.0673
	$\beta_{BDI2,4}$	-0.0662	0.0644	-0.1102	0.0676	-0.0776	0.0618
	$\beta_{BDI,S}$	0.5431	0.3870	0.5610	0.3777	0.5142	0.3712
	$\beta_{BDI,D}$	0.0704	0.1581	0.0880	0.1624	0.0690	0.1536
BY	$\beta_{BY,0}$	-0.0089**	0.0037	-0.0089**	0.0035	-0.0089**	0.0036
	$\beta_{BY1,1}$	0.1160*	0.0656	0.1065*	0.0609	0.1179*	0.0639
	$\beta_{BY1,2}$	-0.2091***	0.0605	-0.1542***	0.0548	-0.2132***	0.0600
	$\beta_{BY1,3}$	0.0979	0.0683	0.1075	0.0650	0.0970	0.0669
	$\beta_{BY1,4}$	0.1477**	0.0705	0.1229*	0.0655	0.1357**	0.0692
	$\beta_{BY2,1}$	0.0006	0.0199	0.0106	0.0185	-0.0015	0.0192
	$\beta_{BY2,2}$	-0.0436**	0.0207	-0.0372*	0.0201	-0.0450**	0.0200
	$\beta_{BY2,3}$	0.0469**	0.0214	0.0482**	0.0202	0.0466**	0.0212
	$\beta_{BY2,4}$	-0.0259	0.0194	-0.0260	0.0194	-0.0269	0.0190
	$\beta_{BY,S}$	0.2686**	0.1164	0.2208**	0.1058	0.2950**	0.1145
	$\beta_{BY,D}$	0.1383***	0.0518	0.1302***	0.0501	0.1345***	0.0514
		Regime dependent variances					
BDI	$\sigma^2_{BDI,1}$	0.0158***	0.0036	0.0170***	0.0042	0.0158***	0.0035
	$\sigma^2_{BDI,2}$	0.2645*	0.1561	0.2481	0.1620	0.2481*	0.1434
	$\sigma^2_{BDI,3}$	0.0714***	0.0216	0.0698***	0.0211	0.0706***	0.0209
BY	$\sigma^2_{BY,1}$	0.0025***	0.0006	0.0024***	0.0006	0.0025***	0.0006
	$\sigma^2_{BY,2}$	0.0134	0.0115	0.0157	0.0134	0.0121	0.0099
	$\sigma^2_{BY,3}$	0.0018**	0.0008	0.0018**	0.0009	0.0018**	0.0008
	$\sigma^2_{BY,4}$	0.0081**	0.0035	0.0080**	0.0035	0.0082**	0.0035
		Degrees of freedom of marginal distributions					
BDI	ν_{BDI}	4.8994**	2.1943	5.1898*	2.7071	4.9397**	2.1700
BY	ν_{BY}	4.4059***	1.6169	4.0961***	1.3840	4.3836***	1.5844
		Dependence parameters					
	$\kappa_{\lambda,0}$	-7.9089***	2.7801			-7.0151***	2.4223
	$\kappa_{\lambda,OFR}$	2.7160***	0.8591			2.4422***	0.7868
	$\kappa_{\lambda,MSCI}$	-1.7664***	0.5234			-1.5460***	0.4775
	$\kappa_{\theta,0}$	0.1631	0.5039	0.4095	0.4567		
	$\kappa_{\theta,OFR}$	0.4217	0.6512	1.1172***	0.4305		
	$\kappa_{\theta,MSCI}$	0.1435	0.6509	-0.3585	0.5299		
LL		411.5345		405.6909		410.3677	

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table S.7: *ML-estimates for alternative copula model II*

	Model	Mirrored Clayton copula		Mirrored *t*-copula	
	Parameter	Estimate	SE	Estimate	SE
		Mean equation (VAR(4))			
BDI	$\beta_{BDI,0}$	0.0093	0.0108	0.0106	0.0110
	$\beta_{BDI1,1}$	-0.2763	0.1911	-0.2973	0.2001
	$\beta_{BDI1,2}$	-0.1909	0.1899	-0.2223	0.1945
	$\beta_{BDI1,3}$	0.0191	0.1796	0.0539	0.1818
	$\beta_{BDI1,4}$	-0.0650	0.2005	-0.0221	0.1986
	$\beta_{BDI2,1}$	0.0564	0.0687	0.0048	0.0625
	$\beta_{BDI2,2}$	-0.0717	0.0736	-0.1043	0.0703
	$\beta_{BDI2,3}$	-0.0240	0.0677	-0.0704	0.0656
	$\beta_{BDI2,4}$	-0.0817	0.0645	-0.0947	0.0613
	$\beta_{BDI,OFR}$	0.5920	0.3920	0.6818*	0.3729
	$\beta_{BDI,MSCI}$	0.0724	0.1536	0.1539	0.1493
BY	$\beta_{BY,0}$	-0.0086**	0.0037	-0.0094***	0.0035
	$\beta_{BY1,1}$	0.1193*	0.0633	0.0887	0.0600
	$\beta_{BY1,2}$	-0.2049***	0.0594	-0.1504***	0.0548
	$\beta_{BY1,3}$	0.0989	0.0654	0.1072	0.0653
	$\beta_{BY1,4}$	0.1421**	0.0670	0.0995	0.0662
	$\beta_{BY2,1}$	0.0029	0.0192	0.0149	0.0180
	$\beta_{BY2,2}$	-0.0454**	0.0196	-0.0367**	0.0178
	$\beta_{BY2,3}$	0.0508**	0.0204	0.0622***	0.0197
	$\beta_{BY2,4}$	-0.0327*	0.0196	-0.0399**	0.0181
	$\beta_{BY,OFR}$	0.2512**	0.1075	0.2503**	0.1106
	$\beta_{BY,MSCI}$	0.1272**	0.0495	0.1577***	0.0490
		Regime dependent variances			
BDI	$\sigma^2_{BDI,1}$	0.0160***	0.0036	0.0190***	0.0057
	$\sigma^2_{BDI,2}$	0.2237*	0.1350	0.3763	0.2465
	$\sigma^2_{BDI,3}$	0.0730***	0.0217	0.0601***	0.0193
BY	$\sigma^2_{BY,1}$	0.0026***	0.0007	0.0023***	0.0005
	$\sigma^2_{BY,2}$	0.0130	0.0120	0.0163	0.0118
	$\sigma^2_{BY,3}$	0.0019**	0.0008	0.0017**	0.0007
	$\sigma^2_{BY,4}$	0.0086**	0.0039	0.0082**	0.0037
		Degrees of freedom of marginal distributions			
BDI	ν_{BDI}	4.8887**	2.1001	4.4304**	2.0262
BY	ν_{BY}	4.0568***	1.4192	4.2535***	1.4314
		Dependence parameters			
	$\kappa_{\lambda,0}$	-8.5192***	3.0151		
	$\kappa_{\lambda,OFR}$	2.9683***	0.9584		
	$\kappa_{\lambda,MSCI}$	-2.0096***	0.5978		
	$\kappa_{\eta,0}$			5.1910**	2.5384
	$\kappa_{\eta,OFR}$			1.1029	1.1197
	$\kappa_{\eta,MSCI}$			-2.9582**	1.1586
	$\kappa_{\rho,0}$			-0.1141	0.1748
	$\kappa_{\rho,OFR}$			-0.3421**	0.1509
	$\kappa_{\rho,MSCI}$			0.2819	0.1970
LL		410.5393		411.4954	

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table S.8: *ML-estimates for VAR(0)-model*

	Parameter	Estimate	SE
		VAR(0)	
	Parameter	Estimate	SE
		Mean equation	
BDI	$\beta_{BDI,0}$	0.0076	0.0084
	$\beta_{BDI,S}$	0.3513	0.3449
	$\beta_{BDI,D}$	0.0432	0.0977
BY	$\beta_{BY,0}$	-0.0050	0.0033
	$\beta_{BY,S}$	0.3662***	0.0985
	$\beta_{BY,D}$	0.0841**	0.0420
		Regime dependent variances	
BDI	$\sigma^2_{BDI,1}$	0.0073***	0.0016
	$\sigma^2_{BDI,2}$	0.0298***	0.0083
	$\sigma^2_{BDI,3}$	0.3560	0.2773
	$\sigma^2_{BDI,4}$	0.0702***	0.0167
BY	$\sigma^2_{BY,1}$	0.0010***	0.0003
	$\sigma^2_{BY,2}$	0.0053***	0.0018
	$\sigma^2_{BY,3}$	0.0017***	0.0005
	$\sigma^2_{BY,4}$	0.0270	0.0301
	$\sigma^2_{BY,5}$	0.0051***	0.0016
		Degrees of freedom of marginal distributions	
BDI	ν_{BDI}	6.2356*	3.3616
BY	ν_{BY}	4.6882***	1.6926
		Dependence parameters	
	$\kappa_{\lambda,0}$	-21.2556	14.7061
	$\kappa_{\lambda,OFR}$	5.9239*	3.4393
	$\kappa_{\lambda,MSCI}$	-4.2514	2.8217
	θ	0.0505	0.4451
LL		416.7284	

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table S.9: *ML-estimates with lag 1 for different window widths*

	Window	1 month		2 months		3 months		6 months	
	Parameter	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
		Mean equation (VAR(4))							
BDI	$\beta_{BDI,0}$	0.0047	0.0095	0.0081	0.0107	0.0066	0.0110	0.0084	0.0118
	$\beta_{BDI1,1}$	-0.3162	0.2272	-0.3399	0.2353	-0.3460	0.2123	-0.2978	0.1973
	$\beta_{BDI1,2}$	-0.0759	0.1832	-0.1967	0.1996	-0.2256	0.2013	-0.1730	0.1984
	$\beta_{BDI1,3}$	-0.1748	0.1716	0.0338	0.1792	0.0130	0.1934	0.0628	0.1808
	$\beta_{BDI1,4}$	-0.1582	0.1760	-0.2077	0.1939	-0.2186	0.1928	-0.1857	0.2035
	$\beta_{BDI2,1}$	0.0055	0.0638	0.0018	0.0728	0.0195	0.0716	0.0336	0.0715
	$\beta_{BDI2,2}$	-0.0922	0.0644	-0.0733	0.0688	-0.0786	0.0699	-0.0789	0.0745
	$\beta_{BDI2,3}$	-0.1009	0.0618	-0.0432	0.0638	-0.0420	0.0682	-0.0433	0.0692
	$\beta_{BDI2,4}$	-0.1096*	0.0569	-0.1573**	0.0627	-0.1445**	0.0638	-0.1411**	0.0652
	$\beta_{BDI,S}$	3.8401***	0.9362	1.6127***	0.5328	1.1105***	0.3693	0.3635**	0.1850
	$\beta_{BDI,D}$	0.0113	0.2835	-0.1065	0.2187	-0.0648	0.1833	0.0121	0.1016
BY	$\beta_{BY,0}$	-0.0063*	0.0035	-0.0075**	0.0035	-0.0086**	0.0035	-0.0099***	0.0035
	$\beta_{BY1,1}$	0.1489**	0.0759	0.1548**	0.0723	0.1690**	0.0688	0.1527**	0.0645
	$\beta_{BY1,2}$	-0.1464***	0.0564	-0.0744	0.0611	-0.0752	0.0602	-0.1028*	0.0564
	$\beta_{BY1,3}$	0.0017	0.0628	0.0397	0.0646	0.0855	0.0638	0.0764	0.0607
	$\beta_{BY1,4}$	0.0578	0.0600	0.0662	0.0588	0.0663	0.0599	0.0906	0.0616
	$\beta_{BY2,1}$	-0.0064	0.0203	-0.0056	0.0200	0.0012	0.0210	-0.0004	0.0194
	$\beta_{BY2,2}$	-0.0507**	0.0205	-0.0457**	0.0211	-0.0462**	0.0211	-0.0459**	0.0197
	$\beta_{BY2,3}$	0.0394*	0.0215	0.0300	0.0227	0.0349	0.0218	0.0343	0.0209
	$\beta_{BY2,4}$	-0.0157	0.0215	-0.0331*	0.0191	-0.0357*	0.0186	-0.0380**	0.0179
	$\beta_{BY,S}$	0.7179**	0.2970	0.4972***	0.1579	0.3088***	0.1205	0.1549**	0.0614
	$\beta_{BY,D}$	-0.0285	0.0931	0.0536	0.0653	0.0824	0.0505	0.0653**	0.0298
		Regime dependent variances							
BDI	$\sigma^2_{BDI,1}$	0.0158***	0.0048	0.0171***	0.0051	0.0173***	0.0048	0.0178***	0.0047
	$\sigma^2_{BDI,2}$	0.2743	0.1836	0.2361	0.1779	0.2020	0.1349	0.1905*	0.1073
	$\sigma^2_{BDI,3}$	0.0796***	0.0303	0.0704***	0.0251	0.0710***	0.0247	0.0697***	0.0223
BY	$\sigma^2_{BY,1}$	0.0026***	0.0007	0.0024***	0.0006	0.0023***	0.0006	-0.0024***	0.0007
	$\sigma^2_{BY,2}$	0.0135	0.0101	0.0177	0.0161	0.0117	0.0103	-0.0099	0.0085
	$\sigma^2_{BY,3}$	0.0026*	0.0014	0.0026**	0.0013	0.0024**	0.0012	0.0023**	0.0011
	$\sigma^2_{BY,4}$	0.0091**	0.0044	0.0082**	0.0038	0.0082**	0.0038	0.0083**	0.0039
		Degrees of freedom of marginal distributions							
BDI	ν_{BDI}	3.9882**	1.6211	4.4244**	2.1139	4.4876**	2.0339	4.7932**	2.2532
BY	ν_{BY}	3.8459***	1.3898	3.7871***	1.2562	3.8728***	1.3392	3.7779***	1.2657
		Dependence parameters							
	$\kappa_{\lambda,0}$	-8.1139**	3.9595	-13.2584	9.8829	-4.0619	5.0626	-3.9900	4.5620
	$\kappa_{\lambda,OFR}$	2.4764**	1.2366	2.0798	2.6907	0.6329	1.2698	0.9694	1.3608
	$\kappa_{\lambda,MSCI}$	4.8262**	2.1166	-3.2806	2.0994	-0.7555	1.1972	-0.6985	1.1292
	θ	0.2766	0.4926	0.5008	0.4708	0.2550	0.6836	0.1325	0.6491
LL		409.9050		407.2617		405.8993		405.0983	

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table S.10: *ML-estimates with lag 2 for different window widths*

	Window	1 month		2 months		3 months		6 months	
	Parameter	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
				Mean equation (VAR(4))					
BDI	$\beta_{BDI,0}$	0.0096	0.0108	0.0078	0.0112	0.0091	0.0115	0.0081	0.0123
	$\beta_{BDI1,1}$	-0.3376*	0.2016	-0.3037	0.1983	-0.2557	0.1963	-0.2718	0.2024
	$\beta_{BDI1,2}$	-0.2616	0.2043	-0.2564	0.2101	-0.2314	0.1983	-0.2062	0.2062
	$\beta_{BDI1,3}$	0.0790	0.1770	0.0152	0.1961	-0.0193	0.1973	0.0767	0.1841
	$\beta_{BDI1,4}$	-0.1439	0.1967	-0.1881	0.1983	-0.1767	0.2080	-0.1405	0.2057
	$\beta_{BDI2,1}$	0.0476	0.0671	0.0304	0.0717	0.0457	0.0696	0.0569	0.0717
	$\beta_{BDI2,2}$	-0.0464	0.0698	-0.0841	0.0720	-0.0793	0.0736	-0.0593	0.0769
	$\beta_{BDI2,3}$	-0.0266	0.0652	-0.0270	0.0682	-0.0277	0.0683	-0.0190	0.0676
	$\beta_{BDI2,4}$	-0.1349**	0.0619	-0.1355**	0.0632	-0.1120*	0.0639	-0.1501**	0.0656
	$\beta_{BDI,S}$	2.3148**	1.0591	1.2757**	0.5389	0.7418*	0.3895	0.2110	0.1907
	$\beta_{BDI,D}$	-0.1196	0.2983	-0.0792	0.2209	-0.0727	0.1798	0.0408	0.1003
BY	$\beta_{BY,0}$	-0.0092***	0.0034	-0.0091***	0.0034	-0.0094***	0.0035	-0.0125***	0.0034
	$\beta_{BY1,1}$	0.0997	0.0617	0.1248**	0.0628	0.1241**	0.0624	0.0961*	0.0578
	$\beta_{BY1,2}$	-0.0359	0.0641	-0.0527	0.0620	-0.1054*	0.0628	-0.1264**	0.0550
	$\beta_{BY1,3}$	0.0038	0.0564	0.1201*	0.0647	0.1205*	0.0651	0.0588	0.0556
	$\beta_{BY1,4}$	0.0829	0.0550	0.0696	0.0601	0.1327**	0.0677	0.0925*	0.0540
	$\beta_{BY2,1}$	0.0072	0.0179	0.0080	0.0196	0.0049	0.0200	0.0088	0.0185
	$\beta_{BY2,2}$	-0.0280	0.0192	-0.0418**	0.0204	-0.0443**	0.0208	-0.0487**	0.0190
	$\beta_{BY2,3}$	0.0248	0.0214	0.0384*	0.0211	0.0472**	0.0208	0.0305	0.0197
	$\beta_{BY2,4}$	-0.0262	0.0181	-0.0348*	0.0190	-0.0247	0.0196	-0.0472***	0.0173
	$\beta_{BY,S}$	0.5903*	0.3047	0.3558**	0.1787	0.1934*	0.1083	0.1543**	0.0607
	$\beta_{BY,D}$	0.2281**	0.0890	0.1724***	0.0607	0.1547***	0.0522	0.1209***	0.0270
				Regime dependent variances					
BDI	$\sigma^2_{BDI,1}$	0.0199**	0.0085	0.0181***	0.0049	0.0180***	0.0051	0.0186***	0.0049
	$\sigma^2_{BDI,2}$	0.3189**	0.1609	0.1930*	0.1169	0.1986*	0.1176	-0.1780*	0.0999
	$\sigma^2_{BDI,3}$	0.0798**	0.0358	0.0717***	0.0238	0.0746***	0.0251	0.0698***	0.0216
BY	$\sigma^2_{BY,1}$	0.0025***	0.0009	0.0023***	0.0006	0.0023***	0.0005	0.0024***	0.0009
	$\sigma^2_{BY,2}$	0.0116	0.0078	0.0105	0.0081	0.0111	0.0082	0.0108	0.0099
	$\sigma^2_{BY,3}$	0.0061**	0.0029	0.0021**	0.0011	0.0018**	0.0008	0.0037**	0.0017
	$\sigma^2_{BY,4}$			0.0082**	0.0036	0.0078**	0.0031	0.0123	0.0088
				Degrees of freedom of marginal distributions					
BDI	ν_{BDI}	3.7315**	1.6359	4.3727**	1.7541	4.2926**	1.7171	4.8148**	2.2614
BY	ν_{BY}	3.2586***	1.0010	3.8380***	1.2190	4.3792***	1.4594	3.3882***	1.0907
				Dependence parameters					
	$\kappa_{\lambda,0}$	-13.6420**	5.8569	-4.3098	3.5700	-4.1867	2.7547	-3.9216	4.1069
	$\kappa_{\lambda,OFR}$	4.7096***	1.6980	1.1706	1.1185	1.2660	0.9630	1.0605	1.3254
	$\kappa_{\lambda,MSCI}$	0.6169	1.1014	-0.7299	0.9244	-0.7197	0.5491	-0.9261	0.8865
	θ	0.3331	0.4733	0.1324	0.5690	0.0168	0.5566	-0.0355	0.6366
LL		408.6816		406.7486		406.4683		408.1542	

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table S.11: *ML-estimates with lag 3 for different window widths*

	Window	1 month		2 months		3 months		6 months	
	Parameter	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
				Mean equation (VAR(4))					
BDI	$\beta_{BDI,0}$	0.0063	0.0108	0.0094	0.0113	0.0091	0.0107	0.0092	0.0120
	$\beta_{BDI1,1}$	-0.3606**	0.1865	-0.2396	0.1934	-0.2404	0.1895	-0.2766	0.2072
	$\beta_{BDI1,2}$	-0.1433	0.2065	-0.1589	0.2014	-0.2066	0.1898	-0.1966	0.2135
	$\beta_{BDI1,3}$	-0.0471	0.2023	0.0150	0.1950	-0.0131	0.1803	0.1131	0.1787
	$\beta_{BDI1,4}$	-0.1679	0.1897	-0.1187	0.2124	-0.0485	0.1987	-0.1602	0.2117
	$\beta_{BDI2,1}$	0.0481	0.0703	0.0601	0.0698	0.0454	0.0685	0.0537	0.0738
	$\beta_{BDI2,2}$	-0.1028	0.0733	-0.0795	0.0734	-0.0714	0.0734	-0.0803	0.0773
	$\beta_{BDI2,3}$	-0.0261	0.0675	-0.0400	0.0687	-0.0397	0.0673	-0.0254	0.0684
	$\beta_{BDI2,4}$	-0.1292**	0.0631	-0.0817	0.0620	-0.0700	0.0615	-0.1524***	0.0690
	$\beta_{BDI,S}$	2.2445**	0.9605	0.4688	0.5087	0.4979	0.3751	0.1790	0.1901
	$\beta_{BDI,D}$	0.1455	0.3176	0.0386	0.2239	0.0801	0.1520	0.0532	0.1012
BY	$\beta_{BY,0}$	-0.0064*	0.0037	-0.0068*	0.0037	-0.0088**	0.0037	-0.0102***	0.0035
	$\beta_{BY1,1}$	0.1318**	0.0650	0.1292**	0.0657	0.1198*	0.0650	0.1202*	0.0635
	$\beta_{BY1,2}$	-0.1292**	0.0554	-0.1678***	0.0588	-0.2201***	0.0611	-0.1435**	0.0562
	$\beta_{BY1,3}$	0.0975	0.0765	0.1199*	0.0727	0.0943	0.0674	0.0897	0.0618
	$\beta_{BY1,4}$	0.0825	0.0626	0.1340*	0.0749	0.1434**	0.0696	0.1004	0.0613
	$\beta_{BY2,1}$	0.0072	0.0206	0.0014	0.0208	-0.0045	0.0196	0.0067	0.0203
	$\beta_{BY2,2}$	-0.0461**	0.0202	-0.0474**	0.0208	-0.0461**	0.0203	-0.0479**	0.0190
	$\beta_{BY2,3}$	0.0465**	0.0216	0.0421**	0.0208	0.0441**	0.0211	0.0413**	0.0193
	$\beta_{BY2,4}$	-0.0180	0.0204	-0.0162	0.0196	-0.0249	0.0194	-0.0380**	0.0180
	$\beta_{BY,S}$	0.3484	0.3134	0.2713	0.1896	0.3039***	0.1170	0.1536**	0.0683
	$\beta_{BY,D}$	0.1168	0.0953	0.1237*	0.0705	0.1388***	0.0515	0.0799***	0.0288
				Regime dependent variances					
BDI	$\sigma^2_{BDI,1}$	0.0166***	0.0045	0.0164***	0.0041	0.0157***	0.0036	0.0182***	0.0046
	$\sigma^2_{BDI,2}$	0.2196	0.1361	0.2689	0.1739	0.2655*	0.1600	0.1768*	0.1071
	$\sigma^2_{BDI,3}$	0.0716***	0.0243	0.0706***	0.0215	0.0717***	0.0216	0.0666***	0.0197
BY	$\sigma^2_{BY,1}$	0.0025***	0.0007	0.0025***	0.0006	0.0025***	0.0006	0.0023***	0.0006
	$\sigma^2_{BY,2}$	-0.0144	0.0110	0.0158	0.0122	0.0127	0.0106	0.0100	0.0064
	$\sigma^2_{BY,3}$	0.0022**	0.0011	0.0020**	0.0009	0.0018**	0.0008	0.0020**	0.0009
	$\sigma^2_{BY,4}$	0.0087**	0.0042	0.0079**	0.0034	0.0081**	0.0034	0.0084**	0.0039
				Degrees of freedom of marginal distributions					
BDI	ν_{BDI}	4.8226*	2.4964	5.0038**	2.5184	4.8725**	2.1510	5.1832**	2.6398
BY	ν_{BY}	3.8829***	1.3895	4.4440***	1.6664	4.5053***	1.6717	3.9261***	1.3413
				Dependence parameters					
	$\kappa_{\lambda,0}$	-6.4273**	2.8368	-11.1467***	3.5759	-8.7145***	2.4857	-3.8933	4.8130
	$\kappa_{\lambda,OFR}$	0.8971	1.0017	3.4687***	1.1105	3.0656***	0.8046	1.0531	1.4716
	$\kappa_{\lambda,MSCI}$	-2.1783***	0.7246	-2.7401***	0.7734	-1.9092***	0.4836	-0.8467	0.9740
	θ	0.3756	0.4763	0.2725	0.4794	0.1801	0.4851	0.0516	0.6894
LL		403.5029		405.9568		411.8413		406.8099	

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table S.12: *ML-estimates with lag 6 for different window widths*

	Window	1 month		2 months		3 months		6 months	
	Parameter	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
		Mean equation (VAR(4))							
BDI	$\beta_{BDI,0}$	0.0128	0.0126	0.0120	0.0121	0.0116	0.0116	0.0074	0.0116
	$\beta_{BDI1,1}$	-0.2860	0.2015	-0.2111	0.1974	-0.2728	0.2039	-0.2715	0.1982
	$\beta_{BDI1,2}$	-0.2890	0.2067	-0.1758	0.2068	-0.1517	0.2064	-0.2442	0.2012
	$\beta_{BDI1,3}$	0.2585	0.1898	0.1273	0.1764	0.1228	0.1858	0.1636	0.1756
	$\beta_{BDI1,4}$	0.0082	0.2116	-0.1382	0.1944	-0.1441	0.2094	-0.1834	0.2010
	$\beta_{BDI2,1}$	0.0416	0.0752	0.0089	0.0723	0.0633	0.0736	0.0768	0.0665
	$\beta_{BDI2,2}$	-0.1102	0.0735	-0.1201	0.0742	-0.0736	0.0774	-0.1225	0.0667
	$\beta_{BDI2,3}$	-0.0792	0.0733	-0.0242	0.0702	-0.0347	0.0693	-0.0020	0.0625
	$\beta_{BDI2,4}$	-0.2212***	0.0607	-0.1473**	0.0663	-0.1342**	0.0652	-0.1559**	0.0614
	$\beta_{BDI,S}$	0.4111	0.9322	0.4022	0.5062	0.2492	0.3921	-0.0877	0.1836
	$\beta_{BDI,D}$	-0.0020	0.2706	-0.0828	0.1626	0.0096	0.1513	0.1719	0.1049
BY	$\beta_{BY,0}$	-0.0060*	0.0034	-0.0081**	0.0036	-0.0087**	0.0034	-0.0109***	0.0035
	$\beta_{BY1,1}$	0.0926	0.0595	0.1343**	0.0623	0.1441**	0.0635	0.0972	0.0602
	$\beta_{BY1,2}$	-0.0477	0.0504	-0.1149**	0.0532	-0.1087**	0.0551	-0.1230**	0.0571
	$\beta_{BY1,3}$	0.0595	0.0591	0.0100	0.0611	0.0494	0.0620	0.0934	0.0584
	$\beta_{BY1,4}$	0.1117*	0.0590	0.0345	0.0554	0.0611	0.0611	0.0095	0.0620
	$\beta_{BY2,1}$	0.0186	0.0169	-0.0024	0.0194	0.0085	0.0204	0.0245	0.0185
	$\beta_{BY2,2}$	-0.0475**	0.0204	-0.0482**	0.0202	-0.0433**	0.0196	-0.0664***	0.0163
	$\beta_{BY2,3}$	0.0089	0.0221	0.0214	0.0206	0.0371*	0.0201	0.0507***	0.0195
	$\beta_{BY2,4}$	-0.0463***	0.0156	-0.0211	0.0185	-0.0275	0.0186	-0.0180	0.0177
	$\beta_{BY,S}$	0.1353	0.3810	0.3036*	0.1756	0.2164*	0.1301	0.1154	0.0761
	$\beta_{BY,D}$	0.0027	0.0759	0.0877*	0.0508	0.0895**	0.0385	0.0962***	0.0234
		Regime dependent variances							
BDI	$\sigma^2_{BDI,1}$	0.0198***	0.0044	0.0178***	0.0042	0.0187***	0.0048	0.0197***	0.0063
	$\sigma^2_{BDI,2}$	0.2287**	0.1115	0.2096*	0.1244	0.1779*	0.0984	0.1838***	0.0895
	$\sigma^2_{BDI,3}$	0.0616***	0.0163	0.0662***	0.0180	0.0688***	0.0207	0.0680***	0.0238
BY	$\sigma^2_{BY,1}$	0.0028**	0.0013	0.0029**	0.0014	0.0024***	0.0007	0.0024***	0.0006
	$\sigma^2_{BY,2}$	0.0204	0.0186	0.0079*	0.0046	0.0101	0.0085	0.0165	0.0112
	$\sigma^2_{BY,3}$	0.0070*	0.0042			0.0024**	0.0012	0.0017**	0.0008
	$\sigma^2_{BY,4}$					0.0086**	0.0042	0.0078**	0.0035
		Degrees of freedom of marginal distributions							
BDI	ν_{BDI}	6.1842*	3.6055	5.8413*	3.3868	4.8871**	2.3041	4.3891**	2.0395
BY	ν_{BY}	3.0292***	0.9825	3.0958***	1.0380	3.6872***	1.2341	3.9931***	1.2575
		Dependence parameters							
	$\kappa_{\lambda,0}$	-6.0082***	1.5577	-7.5347***	2.8092	-4.0879	4.0246	-4.3173**	1.7726
	$\kappa_{\lambda,OFR}$	2.7186***	0.5976	2.3082***	0.7500	1.3194	1.4761	1.0285*	0.5431
	$\kappa_{\lambda,MSCI}$	-0.0590	0.8036	4.5666***	1.5724	0.8395	1.4737	-1.9759***	0.5424
	θ	-0.0141	0.4985	0.1678	0.4928	0.1012	0.6488	-0.0183	0.5194
LL		401.8605		401.2247		402.1440		420.7452	

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.
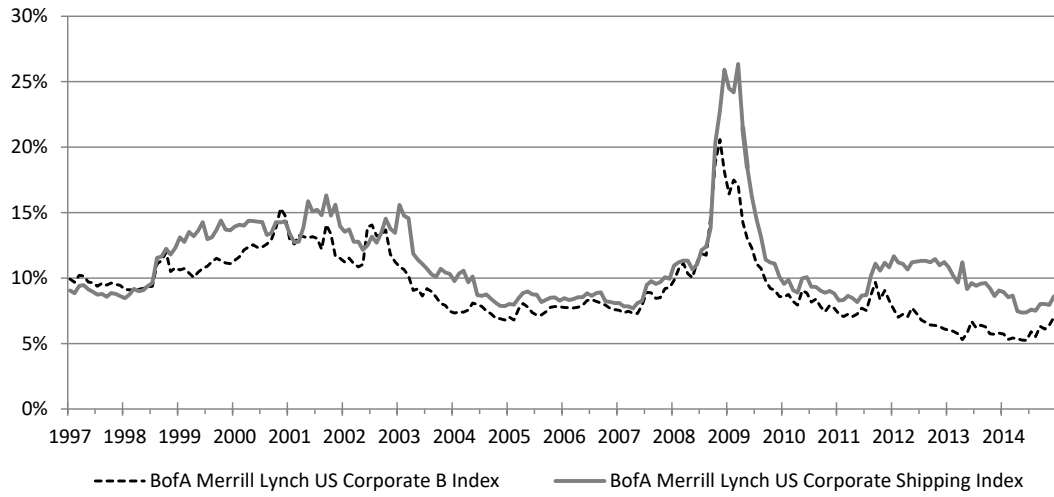
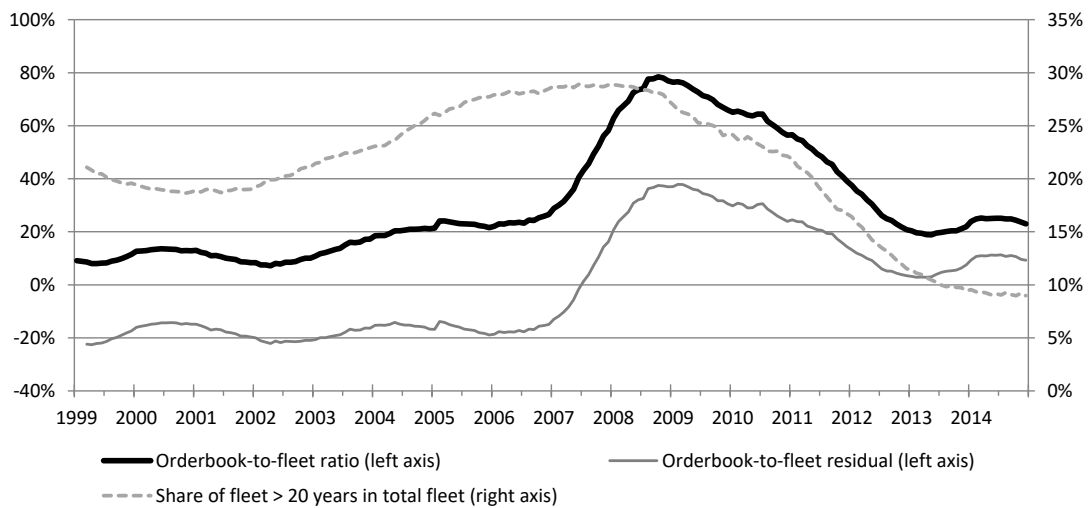**Figure S.5:** *Effective yields of US corporate bond (B) index and US high-yield shipping bond index*

Figure S.6: *Adjustment of orderbook-to-fleet ratio*

Table S.13: *ML-estimates using shipping bond yield as risk factor for cost of capital*

Model		(1)		(2)		(3)		(4)	
Conditioning factors		unconditional		$\Delta^3_{OFR,t-3}$		$\Delta^3_{MSCI,t-3}$		$\Delta^3_{OFR,t-3}$ & $\Delta^3_{MSCI,t-3}$	
	Parameter	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
		Mean equation (VAR(4))							
BDI	$\beta_{BDI,0}$	0.0098	0.0092	0.0085	0.0093	0.0091	0.0096	0.0083	0.0093
	$\beta_{BDI1,1}$	0.0354	0.1593	0.0383	0.1564	0.0210	0.1596	0.0449	0.1555
	$\beta_{BDI1,2}$	-0.0207	0.1778	-0.0435	0.1747	-0.0056	0.1743	-0.0276	0.1732
	$\beta_{BDI1,3}$	-0.0648	0.1826	-0.0713	0.1785	-0.1325	0.2021	-0.1047	0.1873
	$\beta_{BDI1,4}$	-0.1798	0.1533	-0.1843	0.1542	-0.1625	0.1556	-0.2027	0.1546
	$\beta_{BDI2,1}$	0.0513	0.0751	0.0143	0.0753	0.0685	0.0746	0.0081	0.0768
	$\beta_{BDI2,2}$	-0.0500	0.0751	-0.0593	0.0739	-0.0500	0.0754	-0.0532	0.0721
	$\beta_{BDI2,3}$	-0.0031	0.0701	-0.0256	0.0705	0.0720	0.0660	-0.0254	0.0653
	$\beta_{BDI2,4}$	-0.1173*	0.0699	-0.1121	0.0745	-0.1668**	0.0664	-0.0967	0.0718
	$\beta_{BDI,S}$			0.4139	0.4515			0.4186	0.4281
	$\beta_{BDI,D}$					0.0180	0.1086	0.0072	0.1099
BY	$\beta_{SY,0}$	0.0003	0.0033	-0.0003	0.0033	-0.0015	0.0034	-0.0029	0.0035
	$\beta_{SY1,1}$	-0.0216	0.0652	-0.0025	0.0656	-0.0527	0.0630	-0.0347	0.0634
	$\beta_{SY1,2}$	0.0262	0.0615	0.0091	0.0609	0.0450	0.0562	0.0244	0.0580
	$\beta_{SY1,3}$	0.0874	0.0605	0.0869	0.0587	0.1056*	0.0608	0.1335**	0.0635
	$\beta_{SY1,4}$	0.0791	0.0616	0.0771	0.0618	0.1632**	0.0714	0.1131*	0.0660
	$\beta_{SY2,1}$	0.0266	0.0181	0.0152	0.0178	0.0343**	0.0172	0.0182	0.0172
	$\beta_{SY2,2}$	-0.0190	0.0189	-0.0245	0.0188	-0.0199	0.0171	-0.0174	0.0178
	$\beta_{SY2,3}$	0.0110	0.0182	0.0054	0.0189	0.0243	0.0162	-0.0016	0.0165
	$\beta_{SY2,4}$	-0.0035	0.0187	-0.0095	0.0178	-0.0269	0.0173	-0.0165	0.0178
	$\beta_{SY,S}$			0.1359	0.1052			0.1635	0.1015
	$\beta_{SY,D}$					0.0797	0.0513	0.1052*	0.0562
		Regime dependent variances							
BDI	$\sigma^2_{BDI,1}$	0.0076***	0.0016	0.0073***	0.0016	0.0080***	0.0018	0.0073***	0.0017
	$\sigma^2_{BDI,2}$	0.0302***	0.0094	0.0324***	0.0092	0.0309***	0.0093	0.0321***	0.0097
	$\sigma^2_{BDI,3}$	0.2263*	0.1325	0.2339*	0.1373	0.3136	0.2131	0.2357**	0.1150
	$\sigma^2_{BDI,4}$	0.0677***	0.0146	0.0654***	0.0155	0.0654***	0.0137	0.0657***	0.0158
BY	$\sigma^2_{SY,1}$	0.0021***	0.0007	0.0020***	0.0006	0.0020***	0.0007	0.0020***	0.0007
	$\sigma^2_{SY,2}$	0.0076**	0.0038	0.0074**	0.0035	0.0085*	0.0045	0.0077**	0.0037
	$\sigma^2_{SY,3}$	0.0020***	0.0006	0.0019***	0.0006	0.0022***	0.0008	0.0019***	0.0006
	$\sigma^2_{SY,4}$	0.0237	0.0225	0.0190	0.0170	0.0212	0.0162	0.0225	0.0235
	$\sigma^2_{SY,5}$	0.0032***	0.0010	0.0033***	0.0010	0.0032***	0.0011	0.0034***	0.0011
		Degrees of freedom of marginal distributions							
BDI	ν_{BDI}	7.4801	4.6703	7.4682	4.8696	7.9032	5.1956	7.1420	4.5336
BY	ν_{BY}	4.2081***	1.5933	4.3435***	1.6161	3.7979***	1.3582	4.0169***	1.4552
		Dependence parameters							
	$\kappa_{\lambda,0}$	-2.4073*	1.2587	-3.8369	2.5209	-3.7670**	1.5405	-3.3357	2.0498
	$\kappa_{\lambda,OFR}$			1.3878	0.8954			1.1438	0.7078
	$\kappa_{\lambda,MSCI}$					-1.8238***	0.6128	-0.8417	0.6369
	θ	0.2384	0.7514	0.5057	0.5425	0.1168	0.5429	0.2972	0.6363
LL		411.0356		416.0192		419.1870		421.3496	

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table S.14: *ML-estimates for alternative conditioning variables*

Conditioning factors		$\Delta^3_{OFR,t-3}$ & $\Delta^3_{EX,t-2}$		$\Delta^3_{\eta OFR,t-3}$ & $\Delta^3_{MSCI,t-3}$	
		Mean equation (VAR(4))			
BDI	$\beta_{BDI,0}$	0.0047	0.0112	0.0133	0.0119
	$\beta_{BDI1,1}$	-0.3008	0.1949	-0.2671	0.2397
	$\beta_{BDI1,2}$	-0.1875	0.1837	-0.2931	0.2118
	$\beta_{BDI1,3}$	0.0633	0.1765	0.0953	0.1942
	$\beta_{BDI1,4}$	-0.2476	0.2122	-0.1614	0.2456
	$\beta_{BDI2,1}$	0.0694	0.0725	0.0676	0.0745
	$\beta_{BDI2,2}$	-0.0898	0.0737	-0.0896	0.0837
	$\beta_{BDI2,3}$	-0.0327	0.0591	-0.0500	0.0735
	$\beta_{BDI2,4}$	-0.1374**	0.0692	-0.0772	0.0629
	$\beta_{BDI,S}$	0.2297	0.3894	0.3738	0.3867
	$\beta_{BDI,D}$	0.2455*	0.1297	0.0874	0.1859
BY	$\beta_{BY,0}$	-0.0072**	0.0035	-0.0101**	0.0044
	$\beta_{BY1,1}$	0.1452**	0.0615	0.1804**	0.0725
	$\beta_{BY1,2}$	-0.1787***	0.0549	-0.3021***	0.0732
	$\beta_{BY1,3}$	0.0353	0.0638	0.1526*	0.0783
	$\beta_{BY1,4}$	0.0648	0.0618	0.0781	0.0836
	$\beta_{BY2,1}$	0.0096	0.0201	-0.0098	0.0206
	$\beta_{BY2,2}$	-0.0457**	0.0206	-0.0456**	0.0216
	$\beta_{BY2,3}$	0.0451**	0.0201	0.0480**	0.0224
	$\beta_{BY2,4}$	-0.0262	0.0205	-0.0352*	0.0198
	$\beta_{BY,S}$	0.1992	0.1216	0.3727**	0.1451
	$\beta_{BY,D}$	0.0216	0.0454	0.1261**	0.0567
		Regime dependent variances			
BDI	$\sigma^2_{BDI,1}$	0.0185***	0.0061	0.0177***	0.0050
	$\sigma^2_{BDI,2}$	0.2745	0.1907	0.2761	0.1796
	$\sigma^2_{BDI,3}$	0.0734***	0.0266	0.0707***	0.0238
BY	$\sigma^2_{BY,1}$	0.0024***	0.0007	0.0026***	0.0005
	$\sigma^2_{BY,2}$	0.0213	0.0224	0.0116	0.0092
	$\sigma^2_{BY,3}$	0.0021*	0.0011	0.0013**	0.0005
	$\sigma^2_{BY,4}$	0.0091**	0.0045	0.0080**	0.0033
		Degrees of freedom of marginal distributions			
BDI	ν_{BDI}	4.2586**	2.0127	4.6547*	2.4039
BY	ν_{BY}	3.6237***	1.1901	5.1878**	2.0927
		Dependence parameters			
	$\kappa_{\lambda,0}$	-9.8813***	3.2779	-10.1675***	2.8758
	$\kappa_{\lambda,OFR}$	2.8675***	0.9052	3.5158***	0.8912
	$\kappa_{\lambda,MSCI}$	-4.0351***	1.1700	-2.1820***	0.5321
	θ	0.2657	0.4739	0.2929	0.5209
LL		410.2178		341.6893	

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. [1] Sample period 03/1999 - 12/2014.

References

Breusch, T. S. (1978). Testing for autocorrelation in dynamic linear models. *Australian Economic Papers* **17**(31): 334–355.

Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of united kingdom inflation. *Econometrica: Journal of the Econometric Society* **50**(4): 987–1007.

Godfrey, L. G. (1978). Testing against general autoregressive and moving average error models when the regressors include lagged dependent variables. *Econometrica: Journal of the Econometric Society* **46**(6): 1293–1301.