

Supplemental Information
for
HEDGING RISK WITH DERIVATIVES
IN THE RAIN-SENSITIVE HOSPITALITY INDUSTRY
Franzoni Simona¹ and Pelizzari Cristian²

Table 1: Mean and standard deviation of sales and EBIT for all the hotels of the group investigated in each year of the decade 2005 – 2014.

Year	Sales (euros)		EBIT (euros)	
	Mean	St. dev.	Mean	St. dev.
2005	1,845,142.44	870,454.26	160,507.88	191,913.22
2006	1,920,728.72	943,302.34	190,617.64	180,906.81
2007	2,096,994.96	1,004,061.12	255,891.00	218,078.12
2008	2,195,423.64	1,224,655.81	122,461.44	221,591.28
2009	2,101,227.00	1,110,476.67	79,608.96	259,594.27
2010	2,144,444.28	1,194,759.70	84,137.36	285,135.39
2011	2,364,617.40	1,417,132.48	175,988.88	210,576.98
2012	2,438,655.52	1,440,061.55	133,454.36	202,239.90
2013	2,601,950.96	1,405,048.98	237,148.64	253,572.65
2014	2,588,608.24	1,486,201.66	244,758.08	276,551.37

¹Associate Professor of Business Administration and Accounting Studies, University of Brescia – Department of Economics and Management, (simona.franzoni@unibs.it).

²Assistant Professor of Mathematical Methods of Economics, Finance and Actuarial Sciences, University of Brescia – Department of Economics and Management, (cristian.pelizzari@unibs.it). Corresponding author. Tel. +39-030-2988516.

Table 2: Mean and standard deviation of the six ratios analyzed for each hotel of the group investigated over the decade 2005 – 2014.

No.	<i>GOPM</i> (%)		<i>ROS</i> (%)		<i>AT</i>		<i>ROA</i> (%)		<i>ROE</i> (%)		<i>APOD</i>	
	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.
1	29.94	2.58	15.12	3.25	0.29	0.07	4.47	1.81	4.12	2.91	6.30	1.41
2	2.46	1.79	1.83	1.76	<i>n.a.</i>	<i>n.a.</i>	12.90	11.65	-10.08	72.47	0.96	1.37
3	33.13	33.45	-5.34	11.30	0.24	0.11	-1.01	3.17	-9.08	13.18	4.08	4.74
4	2.40	1.69	1.35	1.81	2.80	0.36	5.94	8.34	19.88	50.83	2.35	5.10
5	33.08	7.42	8.54	3.33	0.81	0.26	7.32	4.52	4.43	14.88	2.67	0.69
6	7.80	6.22	1.90	6.93	0.80	0.23	2.08	4.85	-6.78	10.17	1.69	2.89
7	26.27	4.51	16.32	6.17	0.23	0.05	3.94	2.27	4.98	4.72	5.82	1.29
8	30.39	5.73	13.19	6.89	0.33	0.06	4.72	3.21	1.10	13.54	6.99	3.84
9	10.33	5.16	2.19	5.58	0.70	0.07	-4.05	24.95	-4.05	24.95	-1.33	13.89
10	9.06	2.46	4.04	1.74	1.34	0.09	5.43	2.21	9.55	8.45	3.20	1.11
11	29.56	7.14	15.78	7.26	0.50	0.12	10.27	6.63	6.45	5.64	0.67	0.63
12	12.65	2.45	5.98	2.05	0.58	0.35	3.47	2.29	0.71	1.23	5.66	2.94
13	18.50	1.88	3.29	1.76	0.55	0.06	1.86	1.13	0.78	0.39	2.57	0.73
14	16.50	4.60	7.15	5.36	0.19	0.09	1.54	1.52	-6.56	16.02	20.50	8.10
15	19.73	4.68	7.46	7.27	0.35	0.14	4.25	4.74	3.04	4.71	4.87	2.38
16	10.02	8.09	-4.55	5.98	0.15	0.02	-0.62	0.83	-0.99	1.05	13.50	36.10
17	26.45	5.19	14.80	5.55	0.48	0.07	6.82	2.09	9.47	7.52	2.98	0.71
18	22.12	4.36	10.59	4.07	0.39	0.07	4.13	1.48	2.95	4.68	6.75	1.85
19	31.25	3.61	14.99	2.87	0.23	0.09	3.42	1.36	-10.28	40.72	8.76	1.37
20	26.10	6.58	10.70	7.59	0.54	0.15	6.29	5.64	3.41	6.29	1.95	1.63
21	15.62	10.00	9.99	7.33	1.54	1.87	12.28	18.20	12.86	27.08	13.91	21.26
22	32.95	3.51	18.81	4.83	0.58	0.08	10.74	2.38	8.47	1.84	0.70	0.54
23	22.36	9.10	3.83	13.75	0.26	0.21	3.05	5.43	1.84	5.24	6.05	3.92
24	23.62	10.05	1.93	7.23	0.15	0.07	1.52	3.06	2.71	7.43	6.61	4.24
25	29.00	6.29	7.83	6.05	0.23	0.11	1.92	1.76	-7.93	14.99	6.39	3.38

Table 3: Coordinates, longitude and latitude, of the points belonging to the grid covering the area of Lake Garda, Italy used to extract rainfall data.

Label	Longitude (degrees east)	Latitude (degrees north)
1	10.125	45.125
2	10.125	45.125
3	10.125	45.125
4	10.125	45.125
5	10.375	45.375
6	10.375	45.375
7	10.375	45.375
8	10.375	45.375
9	10.625	45.625
10	10.625	45.625
11	10.625	45.625
12	10.625	45.625
13	10.875	45.875
14	10.875	45.875
15	10.875	45.875
16	10.875	45.875

Table 4: Value of $RATIO_{1,1,y}$, $y = 2005, \dots, 2014$, i.e. $GOPM$ of hotel 1, calculated for each year of the decade 2005 – 2014 and corresponding business scenario label.

Year, y	$GOPM$ (%), $RATIO_{1,1,y}$	Business scenario label corresponding to $RATIO_{1,1,y}$,
		$BSL_{1,1,y}$
2005	36.17	3
2006	31.50	3
2007	30.77	2
2008	28.27	1
2009	30.65	3
2010	29.64	2
2011	28.68	2
2012	27.99	1
2013	27.37	1
2014	28.33	2

Table 5: Business scenario value of $RATIO_{1,1,y}$, $y = 2005, \dots, 2014$, i.e. $GOPM$ of hotel 1, calculated for each year of the decade 2005 – 2014.

Year, y	$GOPM$ (%), $RATIO_{1,1,y}$	Business scenario label corresponding to $RATIO_{1,1,y}$,	Weight of $RATIO_{1,1,y}$,	Business scenario value of $RATIO_{1,1,y}$,
		$BSL_{1,1,y}$	W_1	$W_1 \times BSL_{1,1,y}$
2005	36.17	3	0.30	0.90
2006	31.50	3	0.30	0.90
2007	30.77	2	0.30	0.60
2008	28.27	1	0.30	0.30
2009	30.65	3	0.30	0.90
2010	29.64	2	0.30	0.60
2011	28.68	2	0.30	0.60
2012	27.99	1	0.30	0.30
2013	27.37	1	0.30	0.30
2014	28.33	2	0.30	0.60

Table 6: Weighted average of business scenario labels and business scenario label of hotel 1 for each year of the decade 2005 – 2014.

Year, y	Business scenario values of						Weighted average of business scenario labels, $WABS_{L1,y}$	Business scenario label, $BSL_{1,y}$
	$GOPM$	ROS	AT	ROA	ROE	$APOD$		
2005	0.90	0.60	0.15	0.60	0.45	0.30	3.00	3
2006	0.90	0.40	0.15	0.60	0.45	0.30	2.80	3
2007	0.60	0.60	0.15	0.60	0.30	0.20	2.45	3
2008	0.30	0.60	0.05	0.40	0.15	0.10	1.60	2
2009	0.90	0.40	0.05	0.40	0.30	0.10	2.15	2
2010	0.60	0.40	0.05	0.20	0.15	0.10	1.50	1
2011	0.60	0.20	0.10	0.20	0.15	0.20	1.45	1
2012	0.30	0.20	0.10	0.20	0.30	0.20	1.30	1
2013	0.30	0.20	0.10	0.40	0.30	0.20	1.50	1
2014	0.60	0.40	0.10	0.40	0.45	0.30	2.25	2

Table 7: Pearson’s chi-squared and Kolmogorov-Smirnov goodness-of-fit test results.

Year ^a	Weibull		Gamma		Lognormal	
	C2 ^b	KS ^c	C2 ^b	KS ^c	C2 ^b	KS ^c
2005	0	0	0	3	0	5
2006	0	0	0	0	0	0
2007	0	0	0	0	0	1
2008	0	0	0	3	0	4
2009	0	0	0	0	0	0
2010	0	0	0	1	0	2
2011	0	1	0	2	0	5
2012	0	0	0	0	0	8
2013	0	0	0	1	0	1
2014	0	3	0	3	0	5

^a Rainfall data cover the 122 days from June to September of each year from 2005 to 2014.

Each day includes the rainfall data of the 16 points belonging to the grid covering the area of Lake Garda, Italy (see Section 4.1).

^b C2 stands for Pearson’s chi-squared goodness-of-fit test, and represents the number (days) of rejection of the null hypothesis that the set of 16 rainfall data come from a Weibull distribution (first column C2), or from a gamma distribution (second column C2), or from a lognormal distribution (third column C2).

^c KS stands for Kolmogorov-Smirnov goodness-of-fit test. It is analogous (see note ^b) to the Pearson’s chi-squared goodness-of-fit test in columns C2.