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Abstract: A large body of research has documented the impact of tourism seasonality on hotels' operational and financial performance, further affecting hotels' competitive advantage and survival probabilities. Several studies have included the seasonality measures in the models to evaluate hotels' exit risk. However, the empirical findings are ambiguous, probably because the overall seasonality and different measures were used in those studies. Against this background, this study explores the impact of tourism seasonality on hotel firms' exit risk, by controlling for financial ratios, the main factors influencing the exit risk, and using two measures of tourism seasonality by market segment, namely, the leisure, business, and conference tourism. The primary hypotheses are: (1) The different seasonal patterns of tourism demand in the market segments mitigate the impact of the overall seasonality on hotels' exit risk, and (2) Seasonality measures of various tourism segments affect the exit risk in different manners. The case study is the Norwegian hotel industry with 4,622 hotel-years in the period between 2008 and 2018. The empirical results suggest the failure to reject the hypotheses, regardless of the measures of tourism seasonality, indicating the robustness of our findings.

Keywords: tourism seasonality; hotel; bankruptcy; duration analysis; Norway

1. Introduction

Tourism seasonality is defined as demand variations on a regular time horizon and frequencies, as a result of climate and institutional characteristics (Lundtorp, Rassing, & Wanhill, 1999; Cuccia & Rizzo, 2011; Tkaczynski, Rundle-Thiele, & Prebensen, 2015; Martín Martín, et al., 2017; Li et al., 2018) and other factors, such as business cycles, travel costs, and socio-demographic characteristics (Nadal, Font, & Rossello, 2004; Xie & Tveteraas, 2020). Seasonal overtourism has long been recognized as one of the overriding issues influencing the sustainable development of tourism worldwide (Cuccia & Rizzo, 2011). Sustainability contains three elements, namely economic growth, social inclusion, and environmental protection (Pegg, Patterson, & Gariddo, 2012), which are all affected by tourism seasonality. For example, researchers have documented that tourism seasonality generally has a negative impact on tourism growth and regional economic development (Cuccia & Rizzo, 2011; Pegg, Patterson, & Gariddo, 2012). At the hotel level, a high level of seasonal fluctuations of tourism demand would hurt operational and financial performance and reduce hotels' competitive advantage and efficiency. An extreme variance of average annual occupancy in the tourist destination increases the exit risk and further leads to business failure of hotels (Lado-Sestayo, Vivel-Búa, and Otero-Gonzále, 2016; Falk and Hagsten, 2018; Vivel-Búa, Lado-Sestayo, & Otero-González, 2019).

Economic sustainability is a critical and fundamental factor influencing the tourism industry's development (Martín Martín, et al., 2017). An unprofitable industry cannot survive in a long-term perspective. A profitable tourism firm generally has high motivation and capacity to address environmental issues caused by overtourism. Hospitality firms with desirable financial results are better able to allocate resources to environmental activities, resulting in good environmental performance (Jackson, Singh, and Parsa, 2015). In contrast, tourism firms facing exit risk are less likely to be eco-friendly. As such, financial performance is a critical factor for sustainable tourism. Promotional campaigns and marketing strategies to mitigate tourism seasonality by attracting tourists in off-peak seasons may improve firm performance and competitive advantage. Additionally, policies with a target of sustainable tourism should avoid hurting firm performance for policies to be effective in the long run.

Tourism seasonality affects hotels' exit risk through its impact on operational and financial performance. Under-utilization of capital assets in off-peak seasons is an obstacle to operational performance (Baum, 1999). Tourism seasonality affected elements of operational performance, such as occupancy, average daily rate, and revenues per available room. Reduced tourism seasonality may improve hotel firms' operating performance. Organizational performance, such as competitive advantage, is a consequence of financial performance. Hotel capacity designed to meet peak demand is not sufficiently utilized in off-peak seasons, resulting in poor financial performance. Georgantzas (2003) found that alleviating tourism seasonality enhances hotel profitability. However, few studies on the seasonality and bankruptcy nexus have been based on a standard accounting model, which relies on financial ratios, representing various aspects of profitability and capital structure, to predict bankruptcy.

Another issue that is rarely discussed in the literature is whether seasonality by tourism segment affects the exit risk in various matters. The pattern of tourism seasonality varies across tourism segments due to different determinants of tourism demand. The leisure travel market is more subject to climate and institutional characteristics, suggesting a stable seasonality pattern over long periods (Cannas, 2012). However, tourists for business and conferences are more sensitive to the economic factors and business cycles. Xie and Tveteraas's, (2020) empirical findings show that the leisure travel market segment has a

much larger income elasticity and is more sensitive to changes in the exchange rate than the business and conference travel segments. In general, private households for vocation are more price-sensitive than businesses regarding travel decisions (Brons et al., 2002).

Different drive forces of individual tourism market segments lead to heterogeneity in their demand variations, which may amplify or mitigate the overall seasonal pattern in tourist attractions (Garín-Muñoz, 2009). Consequently, there are two empirical issues needed to be addressed. First, in the case where the overall seasonality is mitigated, the overall seasonality may not correlate with hotels' survival probability. As such, the mixed evidence of the impact of seasonality on hotels' exit risk in the literature (Lado-Sestayo, Vivel-Búa, and Otero-Gonzále, 2016; Falk and Hagsten, 2018) may occur due to the aggregate measure. Second, heterogeneity in the demand variations of the individual tourism market segments may cause their different impact on the probability of insolvency. Including seasonality measures for tourism segments can uncover the relative importance of segments, which is one of the essential inputs when evaluating the remedies for seasonality. This coincides with Oklevik et al.'s (2019) proposition that segmenting the markets by tourists' price receptions, net income, length of stay, activities, and spending can efficiently reduce the negative consequences of tourism seasonality.

In this study, we are to investigate the impact of tourism seasonality on hotels' survival probabilities, using a standard accounting model inclusive of financial ratios as control variables. Considering the different seasonality patterns of various market segments, we further evaluate the impact on the exit risk of the overall tourism seasonality and the seasonality of tourism market segments distinguished by travel purposes such as leisure, business, and conference and course (referred to as "conference", hereafter). Norwegian tourism is a useful case study to fulfill our research purpose as Norway is particularly marked by seasonal variations due to its geographical location. The sample period expands from 2008 to 2018. In 2018, the number of tourists traveling around Norway is 14.7 million, about three times the population of Norway, indicating the importance of the tourism industry and the potential negative impact of demand variations. The hotel market is however competitive. During the sample period, there are 104 bankruptcies. The empirical question is whether seasonality and financial ratios explain the business failure in the Norwegian hotel industry.

The article is organized as follows: In Section 2 we describe the Norwegian tourism industry, followed by Section 3 with the data presentation and research methods. After this, Section 4 reports and interprets the empirical results and Section 5 discusses the empirical findings and their implications. The study concludes with a summary and implications in Section 6.

2. Background

Norway is well-known for the spectacular sceneries in different seasons. Many tourists associate Norway with fjords, midnight sun, northern lights, and exciting city life, culture, and history (Innovation Norway, 2018). The Norwegian fjords were added to the UNESCO World Heritage list in 2004. Recently, the Disney animation movie "Frozen" and the TV series "Vikings" have successfully promoted Norway as an exotic destination with key features, such as snow, mountain, Vikings, and fjords (Metcalf et al., 2015; Prebensen, 2017).

However, tourism demand for Norwegian attractiveness primarily concentrates in summer with targets for the popular summer attractions (Tkaczynski, Rundle-Thiele, &

Prebensen, 2015; Oklevik et al., 2019). In response to various issues triggered by seasonal overtourism, Innovation Norway has been cooperating with cruise and air communication companies and local travel agencies to promote winter activities in the global market.[1] For fjord areas, the government has been pursuing campaigns for year-round tourism, especially the leisure market segment, following the growing wintertime interest (Oklevik et al., 2019).

The market segments of businesses and conferences depend on the economic activities and business cycles. As the oil industry dominates the Norwegian economy, the economic activities are sensitive to oil price changes. The oil price collapse as of mid-2013 has had a tremendously negative impact on economic activities, which further reduced the travel for businesses and conferences. The less active economy caused further depreciation of the Norwegian currency. However, the weakened currency improved the price competitiveness compared to other destinations. It became cheaper for inbound tourists, while it was more expensive for Norwegians to travel abroad. The different responses of various tourism market segments to the economic factors indicate their various patterns of demand variations.

According to Statistics Norway (2019), overnight hotel guest stays in Norway increased from 18.2 million to 25.48 million between 2008 and 2018, a growth of 39.8%.[2] In 2018, the share of tourist overnight stays by travel purpose is 50.8% for leisure travel, 37.2% for business travel, and 12.0% for conference travel. These statistical analyses suggest a constant upward trend in the leisure tourism segment. Between 2008 and 2018, overnight stays of tourists for leisure increased 54.9%; the counterpart is 31.0% for business tourists and 16.2% for leisure travel. This coincides with Xie and Tveteraas's (2020) findings that the weakened Norwegian currency due to the oil price collapse has increased the attractiveness of Norway international for leisure tourists.

[1] Innovation Norway represents the Norwegian government and regional authorities in stimulating the profitable development of the tourism industry and other economic sectors in the national market and global market as well.

[2] The number of hotel guests increased from 11.7 million to 14.7 million between 2008 and 2018. The average number of overnight stays is 1.56 in 2008 and 1.73 in 2018.

Table 1. Guest overnight stays by tourism segment.

Year	Total	Leisure tourism		Business tourism		Conference tourism	
2008	18.22	8.36	(45.86%)	7.24	(39.72%)	2.63	(14.42%)
2009	17.65	8.36	(47.33%)	6.86	(38.85%)	2.44	(13.82%)
2010	18.39	8.91	(48.44%)	6.97	(37.91%)	2.51	(13.65%)
2011	19.20	9.38	(48.86%)	7.27	(37.88%)	2.55	(13.27%)
2012	19.80	9.57	(48.32%)	7.64	(38.59%)	2.59	(13.09%)
2013	19.67	9.40	(47.77%)	7.69	(39.07%)	2.59	(13.16%)
2014	20.32	9.80	(48.24%)	7.93	(39.01%)	2.59	(12.74%)
2015	21.54	11.09	(51.48%)	7.75	(35.97%)	2.70	(12.55%)
2016	22.48	11.78	(52.38%)	7.86	(34.97%)	2.84	(12.65%)
2017	23.13	11.79	(50.98%)	8.51	(36.80%)	2.83	(12.22%)
2018	25.48	12.94	(50.80%)	9.48	(37.22%)	3.05	(11.98%)

Notes: Market shares by year and tourism segment are in brackets.

Although the market size of tourism is large for Norway, relative to the population, the overdependence on oil and the 2008 financial crisis have made the hotel industry increasingly competitive. Between 2008 and 2018, there are 104 bankruptcies. In terms of the percentage of failed hotels out of the number of active hotels, 2009 saw the greatest bankruptcy cases, with a value of 4.52%. Afterward, the share of failed hotels had a downward trend until 2015 due to the oil price fall probably.

Table 2. Active hotels and bankruptcies by year.

Year	Number of Active hotels	Bankruptcies	
		Number	Share
2008	477	0	0.00 %
2009	465	21	4.52 %
2010	473	13	2.75 %
2011	482	14	2.90 %
2012	495	10	2.02 %
2013	509	6	1.18 %
2014	530	7	1.32 %
2015	541	13	2.40 %
2016	564	8	1.42 %
2017	588	7	1.19 %
2018	544	5	0.92 %
Sum		104	

Figure 1 illustrates the average monthly overnight tourist stays by travel purpose. For leisure travel, the peak season is from June to August, which accounts for 46.1% of annual leisure tourist overnight stays. For the conferences and business sectors, the period from June to August only accounts for 20.34% and 27.5%, respectively. While there is no obvious peak season for business travels, the peak season for the conference segment is from September to November. This is related to drive forces behind individual tourism segments. Many of the international leisure tourists visit Norway's most popular attractions in summer since their travel dates are subject to their holiday calendars and the Norwegian climate conditions (Tkaczynski, Rundle-Thiele, & Prebensen, 2015; Prebensen, 2017). The peak season from June to August for leisure tourists is echoed by the off-peak in the same period for travel for business and conferences. Except for the peak season, the degree of fluctuations of tourist arrivals for conferences is close to the one of leisure tourists, which are both more stable than the leisure segment.

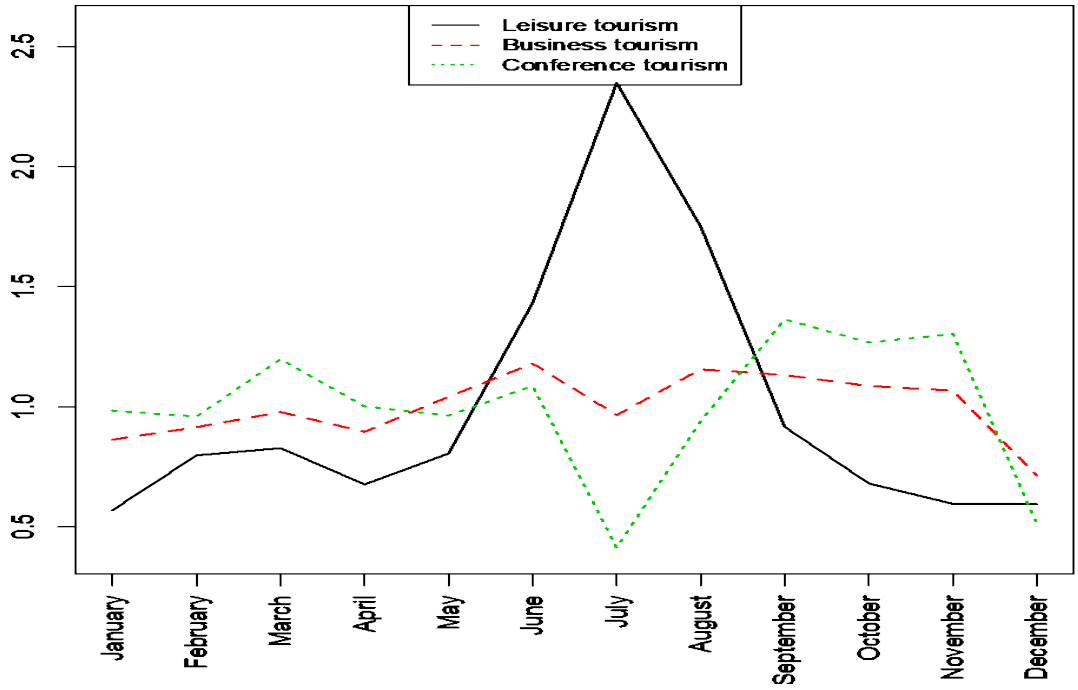

Fig. 1. Average monthly amount of guest hotel overnight stays (divided by average annual value), by tourism segment.

3. Data and Methods

3.1. Data

Every Norwegian-registered hotel firm is required to submit their annual financial reports to the Brønnøysund Register Center,[3] which provided hotel firms' accounting data from 2008 to 2018, for a total of 4,622 firm-years. The data on monthly hotel guest overnight stays by province for the same period are from Statistics Norway (2019). Combining the calculated seasonality measures by province and year with the annual accounting variables yields the dataset for the empirical analysis.

[3] The Brønnøysund Register Center is a Norwegian government agency with the responsibility of collecting the register data such as firms' balance sheets, income statements, and other firm-specific information.

3.2. Measuring Seasonality

Researchers have applied various approaches to measure tourism seasonality. Of them, the Gini index is the most common measure in tourism literature (Fernández-Morales, Cisneros-Martínez, & McCabe, 2016; Falk and Hagsten, 2018; Duro and Turrión-Prats, 2019). The Gini index accounts for the skewness of the distribution and is less affected by extreme values (Cisneros-Martínez & Fernández-Morales, 2015); however, the Gini index gives more weights to observations near the mean (Duro and Turrión-Prats, 2019). Another measure is the coefficient of variations (CV), which is incentive to the place where demand variations happen (Turrión-Prats and Duro, 2018). Lado-Sestayo, Vivel-Búa, and Otero-Gonzále (2016) applied variance of average annual occupancy in the tourist destination as a proxy of seasonality and tested the impact of seasonality on hotel firms' survival probabilities. Recently, Falk and Hagsten (2018) and Sainaghi and Mauri (2018) used the Gini index to examine the impacts of seasonal demand on hotel operational and organizational performance. In this study, we used both the Gini and CV measures to represent seasonal demand changes for tourism market segments and evaluated whether the impact of seasonality on hotels' survival probabilities depends on the measure of seasonality.

The Gini index ($Gini_{p,t}$) for the hotel guest overnight stays for a particular province (p) in a given year (t) is calculated by the formula:

$$Gini_{p,t} = 1 + \frac{1}{n} - \frac{2}{n}\sum_{k=1}^{n} w_k S_{p,t,k} \quad (1)$$

where n is the number of observations (= 12 for our monthly data). $S_{p,t,k}$ ($S_{p,t,1}$, $S_{p,t,2}\ldots S_{p,t,12}$) is the monthly share of hotel guest overnight stays for p province in year t. The monthly shares are ranked in decreasing order according to their values. The weights, w_k(= 1, 2, 3…), are assigned to the ordered monthly shares.

The coefficient of variations (CV) is defined as the ratio of the standard deviation (*SD*) to the mean of the hotel guest overnight stays for p province in year t:

$$CV_{p,t} = \frac{SD_{p,t}}{Mean_{p,t}} \quad (2)$$

To illustrate the change in seasonal concentration over years, we plotted the Gini and CV seasonality indices in Figure 2. For each tourism segment, the magnitude of Gini is much greater than the corresponding CV. For each of the two measures, the leisure tourism segment has the greatest seasonal demand, followed by the leisure segment and the business segment, in line with the changes in average monthly amounts of guest hotel overnight stays by travel purpose (see Figure 1). The leisure segment is more seasonal compared to the business and conference segments since holiday travel is more subject to institutional patterns such as school or calendar holidays. Regardless of the measure of seasonality, the leisure tourism segment experienced the greatest demand fluctuations, while conference tourism has the smallest market share and the moderate level of demand fluctuations. For the business segment, the moderate market size is accompanied by the most stable demand. The

empirical question is whether the relative importance of the tourism segments and their seasonal patterns cause their different impacts on the exit risk.

Fig 2. further shows the degree of seasonality for the leisure segment has been mitigated in recent years. However, this segment has the highest level of seasonal demand variations during the sample period. In contrast, the business and leisure segments have become more volatile, with a record in 2017 for the two measures of seasonality.

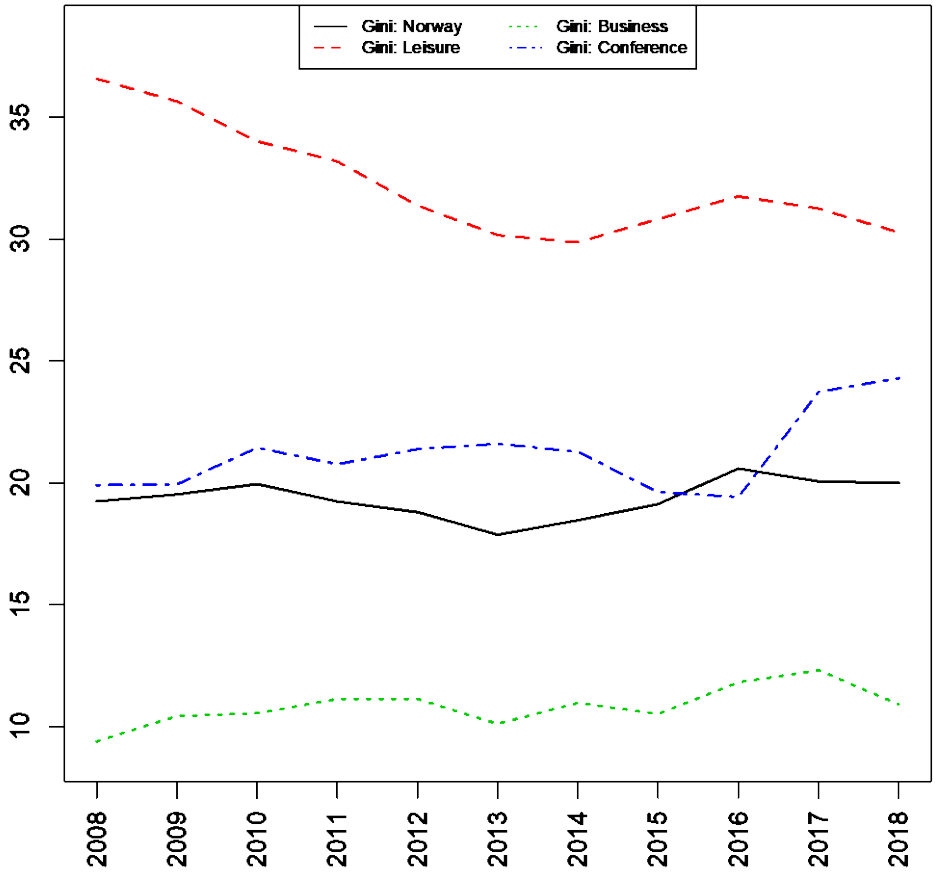

Fig. 2. Gini seasonality index and coefficient of variation (CV), by tourism segment.

3.3. Bankruptcies Versus Seasonality

Figure 3 illustrates the number of failed hotels again the measures of seasonality by tourism segment for both the Gini index and CV. The plots inform an initial idea about the correlation between seasonality and the exit risk. For either the Gini index or CV, demand variations in the leisure segment have a positive correlation with the number of bankruptcies; the opposite is true for the conference segment. It seems there is no correlation between the demand changes in the business segment and bankruptcy. The empirical issue is how to separate the impact of seasonality on the exit risk after controlling for other factors such as financial ratios, which, together with seasonality, jointly affect the survival probabilities of hotels.

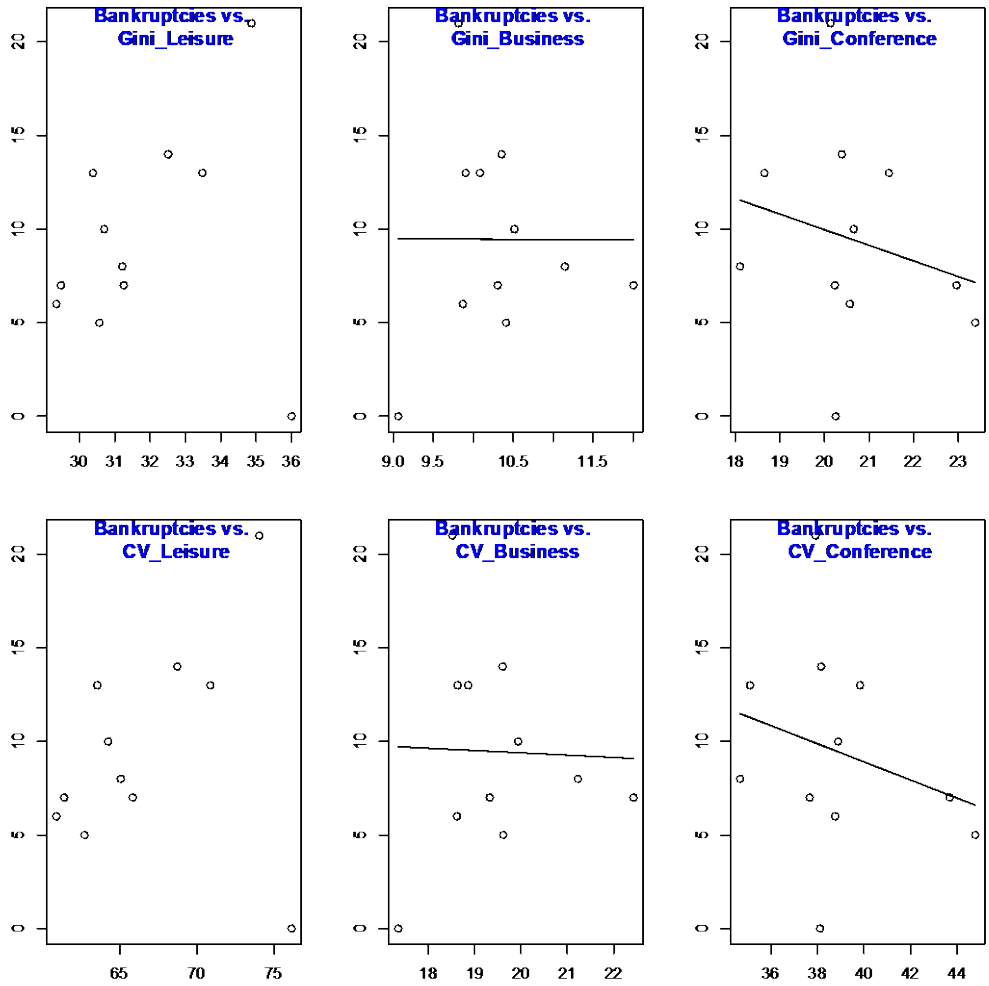

Fig. 3. Seasonality and bankruptcies.

Notes: The y axis represents the number of bankruptcies; the x axis represents the Gini or CV seasonality index by tourism segment; the solid line in each plot is the fitted curve and suggesting the correlation between seasonality and bankruptcies.

3.4. Econometric Model

In this study, we applied a duration analysis approach to fulfill the research purpose. The duration analysis comprises a survival function and a model for estimating the hazard rate on the explanatory variables. As shown later, the hazard rate takes account of all available information over time. This gives the hazard model advantage compared to other single period and static models (Shumway, 2001).

Duration analysis starts with the probability of survival of a spell at each time point (year). The survival function is in the form:

$$S(t) = Pr\,(T \geq t) \tag{3}$$

where $S(t)$ is the probability of a hotel survival not shorter than t.

From the survival function, we derive the hazard rate, an estimate of the instantaneous rate at which a hotel goes bankrupt after *t* years, conditional on that it has survived until *t*. The hazard rate is given by:

$$\lambda(t) = lim_{\Delta t \to \infty} \frac{P(t \le T \le t+\Delta t | T \ge t)}{\Delta t} = \frac{F(t+\Delta t)-F(t)}{\Delta t S(t)} = \frac{f(t)}{S(t)} \quad (4)$$

where $F(t)$ and $f(t)$ denote the cumulative distribution function and the probability density function of the spell, respectively.

After deriving the hazard rates, we are to explore how covariates affect the hazard rate (and survival). If a covariate increases the hazard rate, this covariate therefore has a negative impact on duration. Among different models, the Cox proportional hazard model (Cox, 1992) is the most widely used approach to evaluate the impact of the covariates on hazard rates, since the Cox model assumes a proportional relationship between the baseline hazard and the unique effect of a covariate. This makes it unnecessary to specify the baseline hazard. The Cox model is given as:

$$\lambda(t_i) = exp\ (\boldsymbol{X}_i'\boldsymbol{a})\lambda_0(t_i) \quad (5)$$

where $\boldsymbol{X}$ is a vector of covariates; $\boldsymbol{a}$ is the parameter matrix; $\lambda_0(t_i)$ is the baseline hazard rate.

Following the seminal work of Altman (1968), we use financial ratios as the potential determinants of bankruptcy and define the model specification as:

$$\log(\lambda_i) = a_1 WC/TA_i + a_2 RE/TA_i + a_3 EBIT/TA_i + a_4 ME/TL_i + a_5 S/TA_i + a_6 Age_i + a_7 NumberFirms_i + \sum b_k Seasonality_k + U_i, \quad (6)$$

where *WC/TA* = working capital to total assets; *RE/TA* = retained earnings to total assets; *EBIT/TA* = earnings before interest and taxes to total assets; *ME/TA* = market value equity to total liabilities; *S/TA* = sales to total assets. *Age* represents firm age in the logarithmic scale and *U* is the error term. Several regressions are estimated depending on the measures of *Seasonality*.

Due to data availability, we use book value equity as a proxy of market value equity to calculate *ME/TA*. Additionally, firm age (*Age*) is included in the model to capture the difference in the exit risk for the young and older hotels. Young firms need to build up capital or cumulative earnings, generating uncertainty in the process and then facing a high exit rate (Golombek and Raknerud, 2018). The number of firms (*Firms*) measures the level of competition for the province *p* where firm i is located.

The exponential of a parameter represents the ratio of the hazard rate (in response to one unit-change in the corresponding covariate) to the baseline hazard. For example, the exponential of a_j of one variable X_j is:

$$exp\ (a_j) = \frac{exp\ (a_{j\sim}X_{j\sim} + a_j(X_j+1))}{exp\ (a_{j\sim}X_{j\sim} + a_jX_j)} \quad (7)$$

where $X_{j\sim}$ and $a_{j\sim}$ represent the vector of all covariates except for X_j and the vector of all coefficients except for a_j, respectively. The denominator of (7) is the baseline hazard rate, while the nominator is the new hazard rate following changes in X_j.

The definitions of variables used in the Cox model and their descriptive statistics are presented in Table 3. For the whole sample, *WC*/*TA* (and hence working capital) is negative, indicating lower liquidity of the hospitality industry and in line with high financial leverage (the inverse of ME/TL, which is about 0.33).

Table 3. Variable descriptions and summary statistics.

Variable	Definition	Mean	SD
WC/TA	Working capital / total assets	-0.028	0.295
RE/TA	Retained earnings /total assets	-0.009	0.352
EBIT/TA	Earnings before interest and taxes / total assets	0.030	0.223
ME/TL	Market equity / total liabilities	0.331	0.472
S/TA	Sales / total assets	2.454	1.860
Age	Firm age in the logarithmic scale	2.820	0.691
Firms	Number of firms in the logarithmic scale	4.235	0.561
Gini-Overall	Gini index for all tourists, in percentage points	19.02	7.039
Gini- Leisure	Gini index for leisure segment, in percentage points	31.71	9.709
Gini-Business	Gini index for business segment, in percentage points	10.36	2.613
Gini-Conference	Gini index for conference segment, in percentage points	20.63	4.309
CV-Overall	CV for all tourists, in percentage points	36.87	14.69
CV-Leisure	CV for leisure segment, in percentage points	66.46	22.17
CV-Business	CV for business segment, in percentage points	19.54	5.078
CV-Conference	CV for conference segment, in percentage points	38.91	8.646

Table 4 presents the pairwise correlation between the variables incorporated in the model specification. As shown in the top left part of the table, the correlation coefficients of the financial ratios are generally smaller than 0.5, with the exception of two coefficients, which are slightly greater than 0.5. A low correlation between the financial ratios indicates that those variables reflect the overall financial status and performance from different angles. The bottom right part shows correlations between the two seasonality measures for the three tourism segments and the whole market as well. For a particular segment (and the whole market), the coefficient of correlation between the Gini and CV indicators is very high, although their values are substantially different, as shown in Figure 2. For the Gini index, the coefficients of correlation between the three segments range between 0.24 and 0.34; for CV, the values range between 0.22 and 0.38. The low degree of the positive correlation between seasonality of the individual segments indicates a lower level of seasonality in the whole market.

Table 4. Correlation matrix of variables.

	WC/TA	RE/TA	EBIT/TA	ME/TL	S/TA	Age	Firms	Gini_ Overall	Gini_ Vocation	Gini_ Business	Gini_ Conferences	CV_ Overall	CV_ Leisure	CV_ Business	CV_ Conference
WC/TA	1														
RE/TA	0.42	1													
EBIT/TA	0.31	0.41	1												
ME/TL	0.51	0.58	0.24	1											
S/TA	-0.13	-0.09	-0.02	-0.08	1										
Age	0.06	0.14	0.13	0.16	-0.16	1									
Firms	0.02	0.01	0.04	-0.03	0.05	0.02	1								
Gini_Overall	0.05	0.03	0.02	0.04	-0.17	-0.04	-0.11	1							
Gini_Vocation	0.06	0.05	0.03	0.06	-0.14	-0.03	-0.12	0.88	1						
Gini_Business	0.01	-0.02	-0.01	-0.01	-0.06	-0.08	-0.30	0.45	0.24	1					
Gini_Conferences	0.03	-0.01	-0.02	0.00	-0.03	-0.10	-0.30	0.32	0.27	0.34	1				
CV_Overall	0.05	0.03	0.02	0.04	-0.17	-0.05	-0.14	1.00	0.89	0.45	0.32	1			
CV_Leisure	0.06	0.04	0.03	0.05	-0.13	-0.04	-0.13	0.83	0.98	0.23	0.26	0.85	1		
CV_Business	0.01	-0.02	-0.01	-0.01	-0.06	-0.07	-0.32	0.44	0.23	0.99	0.35	0.44	0.22	1	
CV_Conference	0.03	-0.01	-0.02	0.00	-0.03	-0.10	-0.31	0.31	0.25	0.37	0.99	0.31	0.24	0.38	1

4. Results

This section starts with the test results for mean differences of variables for the active hotels and failed hotels and the estimation results of the survival function.

4.1. Univariate t–Tests

Table 5 displays the results of mean difference testing for financial ratios and firm age of active hotels and bankruptcies. The *t*-static values imply that all the mean differences are significant, indicating the heterogeneity of active hotels and bankruptcies. Except for *S/TA*, all financial ratios for active hotels are greater than another, the failed hotels, indicating that good financial performance and liquidity probably reduce the exit risk. Failed hotels have a

greater *S*/*TA* than active firms, which may attribute to their small size of total assets. The average age of the active hotels is much longer than the failed hotels (2.84 versus 1.6, in the logarithmic scale). Operational experience and cumulated earnings of the hotels with long history successfully extend longevity.

Table 5. T-test results of mean difference.

Variable	Active firms	Failed firms	Difference	
WC/TA	-0.022	-0.326	0.304	***
RE/TA	-0.0005	-0.456	0.456	***
EBIT/TA	0.035	-0.277	0.312	***
ME/TL	0.338	-0.085	0.424	***
S/TA	2.433	3.643	-1.211	***
Age	2.842	1.599	1.244	***

Notes: The symbols ***, **, and * indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

4.2. Estimation of the Survival Function

The fundamental element of the hazard rate in the Cox model is the survival function, which is modeled as a sequence of conditional probabilities that hotels will survive beyond year *t*, given they have already existed in the market for *t* years. Like other datasets used in duration analysis, our dataset contains censored observations. Some hotels were established before the sample period and some hotels are still in the market after the sample period. For censored data, the Kaplan-Meier method is commonly used to estimate the robust probabilities of the survival function. The value of the survival function is one in the base year, then falls as some hotels went bankrupt. Figure 4 presents the estimated survival curve.

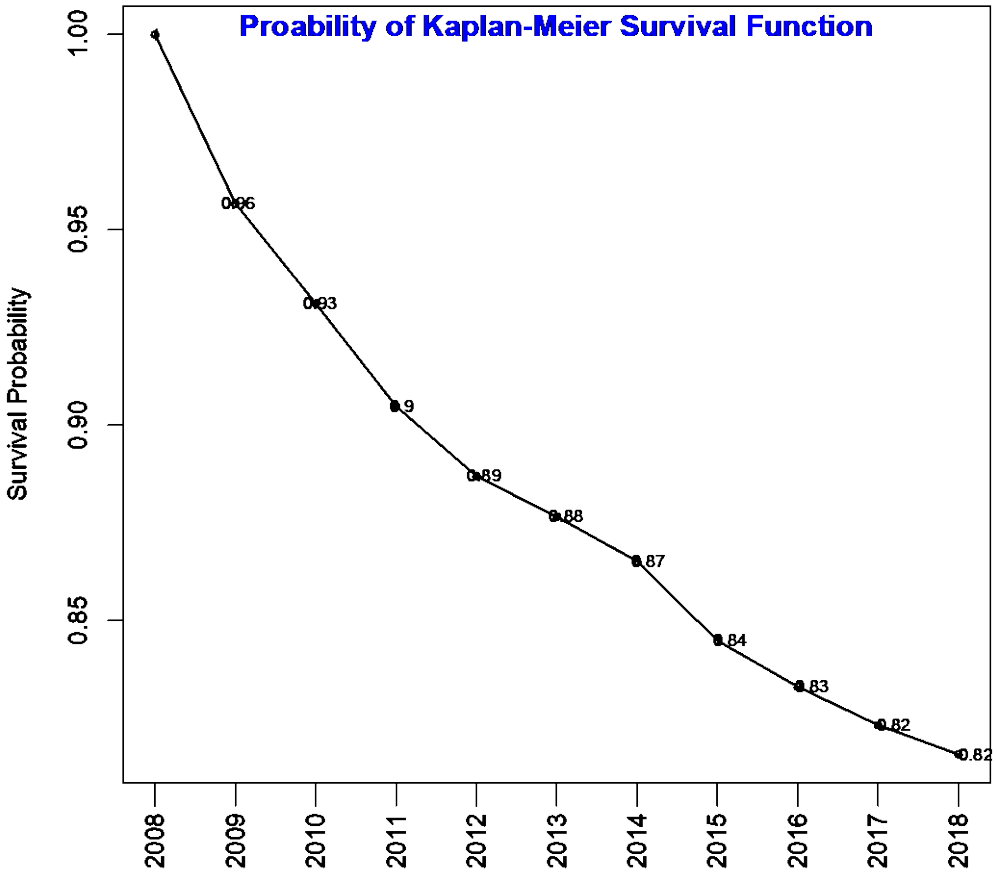

Fig. 4. Empirical Kaplan-Meier survival function for Norwegian hotels.

Inspection of Figure 4 shows that the survival probability starts with 100% since there was no bankruptcy case in 2008. Afterward, the value of the survival function falls as some hotels went bankrupt. The value drops sharply to 90% in 2011 and since then the estimated curve is relatively flat. This is also evidenced at the end of the sample period where the probability of survival is still 82% in 2018. In the later period, 2015 saw the greatest reduction in the survival probability (about 3%), which may attribute to the Norwegian economic recession due to the oil price fall.

4.3. Estimation of the Cox Model

Tables 6 reports the estimation results of the Cox model. Regressions 1 and 3 are the estimation results for the overall Gini and CV seasonality indicators, respectively, Regression 2 for the specification using the separate Gini indicators by the tourism segment, and regression 4 for the separate CV indicators. For all the four regressions, both the loglikelihood test results and the Wald test results indicate the joint significance of all the explanatory variables. As noted above, if the coefficient in the Cox regressions is positive (i.e., the corresponding exponential greater than 1), changes in the variable raise the hazard rate, holding the influence of all other variables constant. Hence, the reported significance

levels are for the null hypothesis that the reported parameter is zero, and equally, the corresponding exponential of the parameter is one.

Table 6. Estimation results of the Cox model.

	Regression 1		Regression 2		Regression 3		Regression 4	
Variable	Estimate		Estimate		Estimate		Estimate	
WC/TA	-0.144		-0.216		-0.143		-0.222	
	[0.328]		[0.329]		[0.328]		[0.330]	
RE/TA	-0.829	***	-0.800	***	-0.825	***	-0.789	***
	[0.265]		[0.272]		[0.264]		[0.271]	
EBIT/TA	-0.174		-0.096		-0.173		-0.093	
	[0.343]		[0.354]		[0.343]		[0.354]	
ME/TL	-1.636	***	-1.691	***	-1.643	***	-1.714	***
	[0.555]		[0.558]		[0.556]		[0.559]	
S/TA	0.021		0.008		0.021		0.008	
	[0.043]		[0.043]		[0.043]		[0.043]	
Age	-1.623	***	-1.643	***	-1.623	***	-1.644	***
	[0.124]		[0.126]		[0.124]		[0.126]	
Firms	0.126		0.277		0.128		0.283	
	[0.164]		[0.181]		[0.165]		[0.183]	
Gini-Overall	0.013							
	[0.016]							
Gini- Leisure			-0.004					
			[0.011]					
Gini-Business			0.090	**				
			[0.043]					
Gini-Conference			0.007					
			[0.028]					
CV-Overall					0.006			
					[0.008]			
CV- Leisure							-0.002	
							[0.005]	
CV-Business							0.049	**
							[0.022]	
CV-Conference							-0.001	
							[0.014]	
R_square	0.061		0.062		0.061		0.062	
LR test	365	***	370	***	365	***	370	***
Wald test	382	***	376	***	382	***	375	***

Notes: The symbols ***, **, and * indicate significance at the 0.01, 0.05 and 0.10 levels, respectively. Standard errors are in brackets.

In Regressions 1 and 3, the coefficient of the overall seasonality is insignificant, supporting the hypothesis that the seasonality for the whole market does not affect the exit risk of hotels, regardless of the measures of seasonality. As shown in Table 1 and Figure 1, the two primary tourism segments, the leisure and business markets, have roughly opposite patterns of seasonality. The peak season for the leisure market is exactly the off-peak season for the business market. The differences in tourism seasonality between the two tourism segments mitigate the overall seasonal fluctuations, resulting in the lack of a connection between the overall seasonality and hotels' success or failure.

In Regression 2 with the separate Gini measures for the individual tourism segments, *Gini-Leisure* and *Gini-Conferences* are not significant, while *Gini-Business* is significant. Even the leisure market is the largest segment, the lack of the impact of its seasonality on the

exit risk may attribute to its predictable seasonal pattern. The drive forces behind the demand variations in leisure tourism are climate and institutional characteristics, which do not differ significantly over years. As such, the seasonal pattern of the demand in the leisure segment is relatively predictable. Operating strategies in response to the predictable seasonality may mitigate the negative impact of the seasonality on hotel performance. The null impact of the seasonality in the conferences market segment is probably due to the small market share of this segment. Among the three segments, the business segment stays in the second position and owns a moderate level of demand variation. This segment is more sensitive to the economic activities and business cycles, resulting in a less predictable seasonality. The less predictable seasonable demand and high spending of the business segment explain the positive and significant coefficient of *Gini-Business*. The exponential of the coefficient of *Gini-Business* is about 1.094, indicating that the baseline hazard rate increases by 9.4%, in response to a 1% increase in the Gini seasonal concentration indicator of the business segment.

In Regression 4 with the separate CVs for the individual tourism segments, only *CV-Business* is significant, the same as the results of Regression 2. The coefficient of *CV-Business* is 0.049, with the corresponding exponential at the value of 1.050. A 1% increase in the CV of the tourist arrivals in the business segment would raise the baseline hazard rate by 5%. The impact of *CV-Business* on the exit risk is about half the impact of *Gini-Business*. However, the mean of *CV-Business* is two times the mean of *Gini-Business*. Thus, taking their means into account, *CV-Business* and *Gini-Business* have a similar role in the business success or failure of hotels.

For financial ratios, the estimation results of the four regression do not differ much. *RE*/*TA* and *ME*/*TL* are significant and negative, indicating that better retained earnings and lower financial leverage reduce the exit risk of hotels. The coefficient of *EBIT*/*TA* is insignificant, indicating that the cumulated profitability (*RE*/*TA*) is a more relevant predictor than the current profitability when predicting the bankruptcy. As we used the equity to calculate *ME*/*TL*, a high *ME*/*TL* means lower financial leverage, which implies a lower probability of insolvency. The size of working capital relative to total assets (*WC*/*TA*) is not associated with the probability of bankruptcy of hotels. The insignificant coefficient of *S*/*TA* is consistent with the statistic feature of the variable. As shown in Table 5, the failed hotels even have higher sales relative to total assets than the active hotels. One possible explanation is that the total assets of failed hotels are relatively small.

The coefficient of *Age* is significant in the four regressions. A relatively young hotel could not build up its cumulative earnings and not have a good connection with financial institutions. Thus, like firms in other industries, young hotels are more likely to be classified as bankruptcy than their counterpart, the older hotels. A great number of hotels (*Firms*) in a region do not influence the probability of insolvency of hotels in that region. While the number of hotels is an indicator of the level of competition, profitability is probability higher for hotels within the clusters due to the spillover effect of knowledge, management, innovative activities, and market size. The two opposite impacts of clustering on financial performance lead to an insignificant impact of *Firms* in the regression.

5. Discussion

Tourism seasonality reflects the variations of tourist arrivals due to natural attractions, institutional systems, economic development, and business cycles. It is well recognized that tourism seasonality influences sustainable tourism worldwide. Many studies have investigated the negative effects of seasonality on sustainable tourism development in terms

of both environment and culture. In addition, a large body of research has evaluated the impact of tourism seasonality on hotels' operational and financial performance, which further affects hotels' competitive advantage and exit risk. Financial performance and competitive advantage are the key factors influencing the sustainable development of the tourism industry since hotels with poor financial performance or facing exit risk have lower motivation and limited capacity to engage in sustainable practices.

The duration analysis is a useful tool to estimate the determinants of the exit risk. The duration analysis comprises the survival function and a Cox proportional model for estimating the impact on the hazard ratio of seasonality and other financial ratios, which are the potential determinants of bankruptcy (Altman, 1968). This paper contributes to the hotel bankruptcy literature by working on seasonality by the tourism segment rather than the overall tourism seasonality. To the best of the authors' knowledge, few studies have separated the overall tourism seasonality to seasonal demand changes by tourism segment. This is a relevant issue, as the different patterns of seasonal demand by the tourism segment may offset each other in the aggregate measure, resulting in the ambiguous empirical findings regarding the impact of the seasonality on bankruptcies in the previous studies. Additionally, the different impacts of demand variations by the tourism segments provide implications for governments, the hotel industry, and individual hotels to take appropriate strategies to mitigate the negative impact of seasonality on financial performance, competitive advantage, and hotels' longevity.

For our case study, the data analysis first suggests that the leisure tourism segment has the greatest degree of demand fluctuations, followed by the segments of businesses and conferences. In addition, the peak season of the leisure segment echoes by the off-peak for both the segments of conferences and businesses, indicating the smoothed seasonal variations of the whole market. Heterogeneity between the tourism segments further reflects in the measures of seasonality. For either the Gini index or CV, the leisure segment has the greatest value among the three segments over years. During the sample period, the seasonal patterns of the three tourism segments differ from each other. Above all, the differences in monthly variations and annual seasonality measures of the three tourism segments indicate their different roles in hotel' survival probabilities.

The key findings of the estimation results of the Cox model are as follows. First, the overall seasonality of the tourism market does not influence the exit risk, regardless of the measures. The complementary seasonality patterns of different tourism segments lead to a less volatile seasonality at the level of the whole market, which explains the insignificant impact of the overall seasonality in this study and the previous studies (Lado-Sestayo, Vivel-Búa, and Otero-Gonzále, 2016; Vivel-Búa, Lado-Sestayo, & Otero-González, 2019). Second, the impact of seasonality on hotels' survival varies across tourism segments. While demand fluctuations in the leisure segment and the conferences segment do not raise the probability of insolvency, seasonal changes in the business segment do increase this probability. Compared to the leisure segment, the business segment has high spending and is more sensitive to the economic activities and business cycles. The less predictable seasonal pattern and the essential contribution to hotels make the business segment's seasonality a good predictor of bankruptcy. Although the conference tourism shares a similar seasonal pattern as the business tourism, its relatively small market size explains the insignificant estimate of the seasonal measures of this segment. Third, hotels with great cumulative earnings and low financial leverage are less like to exit from the industry. The two financial ratios may also capture the impacts of liquidity and current profit on the survival probabilities since both working capital and EBIT are insignificant. In addition, young hotels are more likely to be classified as bankruptcy than the older hotels, due to low

cumulative earnings, among other reasons. For a particular region, the number of firms does not influence the probability of insolvency. This is not out of expectation, considering that the number of hotels indicates the level of competition on the one hand and the positive clustering effect on the other hand.

6. Conclusions

In this study, we explored the impact of seasonality by the tourism segment on hotels' exit risk, using a case study of the Norwegian hotel industry with 4,622 hotel-years between 2008 and 2018. The negative impact of tourism seasonality on hotels' survival probabilities indicates the need to improve operational activities throughout the year. The different impacts of the seasonal demand of tourism segments on the exit risk make it necessary to consider the segment features when making remedies for seasonality, such as pricing strategies in response to the seasonal demand, market diversification, and new attractions and events. This is in line with Fernández-Morales, Cisneros-Martínez, and McCabe's (2016) proposition that the seasonal variations in tourism demand are subject to travel purposes and destinations, which then determine the possibility of using marketing efforts to reduce the effects generated by seasonality. Policymakers and the hotel industry need to take remedy solutions to the seasonality by considering the tourism segments regarding the seasonal patterns (and their drive forces), spending, and responses to price changes. The identified efficient tourism segment mix can effectively minimize the negative impact of the tourism seasonality on operational and financial performance, which consequently prolongs the lifetime of hotels and further motivate them to take intensive sustainable practices.

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