Liquidity effects on travel and tourism stocks following global financial crises

1. Introduction

The global financial crises (2007-2009) referred to by the media as the credit crunch, is a major cause of the current recession that the world is faced with. In a time of recession we would expect the tourism industry to suffer significantly. When money is tight, business and leisure travel are dramatically reduced for all consumers due to company profits and individuals' disposable income falling to considerably low levels. However, according to the United Nations World Tourism Organization the key trends in 2010 appear to contradict the traditional view that tourism falls during times of financial crises. This is due to the fact that international tourism arrivals increased by 6.6 percent from 2009-2010. In addition, tourism receipts reached US$ 919billion worldwide in 2010, up from US$ 851 billion in 2009.

An additional aftermath of the financial crisis on tourism apart from the increase in tourism arrivals there was a change in travelling behaviour, perceptions and attitudes of the travellers with the need of different tourism products (Alegre and Pou, 2016;Bronner and Hoog, 2016; De Vital and Kyaw, 2016). The direct response of the destinations was to develop the pertinent products in the 'form' of multifaceted activities with dynamic experiences as required by the various market segments (Lopes, Abrantes and Kastenholz, 2014).

Given the contradiction between conventional financial theory and the evidence provided by the United Nations World Tourism Organization stated above and in more detail in Section 2 of the manuscript, along with the lack of empirical literature in this very important issue, we feel that a comprehensive analysis of the tourism industry around the financial crises period is a vital piece of research that should be undertaken. We have attempted to bridge

this gap in the literature by examining the market liquidity effects of the Dow Jones Travel and Tourism Index before and after the financial crises.

Our findings show a significant increase in the liquidity of the travel and tourism stocks after the financial crises. In addition, we show that the increase in liquidity is maintained over three-month post financial crises trading. Therefore, as the increase in liquidity spans over a three month period, we can say that there is a long-term improvement in the liquidity of the travel and tourism firms after the financial crises.

The remainder of the paper is organized in the following way. The next section provides a review on the previous literature concerning travel and tourism during periods of financial turbulence. Section 3 describes the data and the methodology. Section 4 presents the analysis of both the short-term and long-term effects of trading before and after the financial crises for travel and tourism index stocks. Finally, Section 5 concludes the paper.

2. Literature Review

2.1 Tourism in economic turbulence

As a result of the global financial crises demand changed for various products and services in the Travel and Tourism industry (see among others, Papatheodou and Pappas, 2017, Smeral, 2010). The economic recession especially in the USA and Europe had a significant impact on the tourism industry consumption habits because of lower income and high rates of unemployment (De Vital and Kyaw, 2016). The immediate aftermath was that travelling habits became more short-haul, intra-regional and domestic (World Tourism Organization and International Labour Organization, 2013; Atul, 2008). The interrelation of economic down turn and the impact on tourism was the discussion in a vast number of research papers

(see among others, Alegre and Pou, 2016; De Vita and Kyaw, 2016; Bronner and Hoog, 2016; Alegre, Mateo, Pou, 2013;Culiuc, 2014; Papatheodorou, Rosselló, and Xiao, 2010; Ritchie, Molinar and Frechtling, 2010). The financial crisis creates opportunities for research especially on the behavior of consumers as a result of the new financial regulations that have been put in place (Sheldon,and Dwyer, 2010).

Additionally, companies must readjust their strategies to accommodate both theirs and the consumers' requirements according to the new economic situation (Brooner and Hoog, 2016). Bernini and Carbolic (2016) find that tourism as a consumption good varies in terms of the way it can be acquired and experienced. At the same time, tourism suppliers produce products that offer what is primarily needed by the various consumer groups (Liasidou, 2013). Undoubtedly, tourism is becoming an activity to the majority of the people in advanced economies basically because of the plethora of opportunities in the tourism marketplace. Nowadays, holidays can be easily booked online (Ukpadi and Karjaluoto, 2017) and at the same time there is a choice of various transportation modes with the most notable example to be the appearance of the Low Cost Carriers (Liasidou, 2017;Alderighi et al, 2012). Additionally, there is a variety of choices in the accommodation sector at any price range and service quality (Xiang et al, 2015).

Historically, tourism was referred to the Grand Tour as the privilege of the members of aristocracy. The boom of the tourism industry happened after the end of the Second World War with the phenomenon of mass tourism. Thus, tourism became an activity affordable to most people in Europe and the USA. The emerging economies namely the BRICS (Brazil, Russia, India, China and South Africa) contribute to the tourism industry both in supply and demand, with travelers to seek through tourism activities authenticity that create memorable experiences. Dolnicar, Yanamandram, and Cliff (2012) discover that holidays are positively

associated with quality of life. Bernini and Carbolic (2016) find that tourism as a consumption good varies in terms of the way it can be acquired and experienced. At the same time, tourism suppliers produce products that offer what is primarily needed by the various consumer groups (Liasidou, 2013). The next part considers the methods of the study.

3. Methods

3.1 Data

We analyze the 26 companies are listed on the Dow Jones Travel and Tourism Index before and after the financial crises. The 26 companies in our data sample are shown in Table 1. We only analyze 26 companies because they are the largest travel and tourism companies in the world that dominate the industry, reflected by their inclusion in the Dow Jones Travel and Tourism Index. The financial crisis consists of 186 event days (30 percent of working days) between 1st January 2007 and 30th April 2009. Therefore in our event study the pre (post) financial crises date is before (after) the 1st January 2007 (30th April 2009). Our final dataset consists of companies that satisfied the following criteria:

a) The company is not involved in a merger that immediately preceded its event date.

b) The company has available historical data on the Dow Jones for a period of 90 days before and after the event date.

c) The common stock of a company does not exhibit a split in the period of 90 days before and after the event date.

Criteria (a)-(c) are applied to minimize the impact of alternative events that may occur during the same time period. Once the criteria are applied we yield a sample of all the 26 companies. For these companies, daily stock returns, daily trading volume and shares outstanding are obtained from the Dow Jones. Like previous market microstructure studies

(see among others Hegde and McDermott, 2003 and Gregoriou and Ioannidis, 2006) we obtain the number of analysts that follow the stocks from the Institutional Brokers' Estimates System International (I/B/E/S) database.

[INSERT TABLE 1 HERE]

For robustness we implement two alternative measures of liquidity costs, the relative and effective bid-ask spread. The relative spread is defined as the ask price minus the bid price, divided by the midprice (the average of the bid and ask prices). As Lee and Ready (1991) point out the problem with the relative spread is that it can be regarded as an inaccurate measure of liquidity because many trades occur at prices within the bid and ask price. Therefore, in order to obtain a more accurate measure of the market liquidity, we follow the methodology in Heflin and Shaw (2000) and Hegde and McDermott (2003) and compute the effective bid-ask spread. The effective bid-ask spread is computed as twice the absolute value of the difference between the transaction price and the midprice in effect at the time of the trade.

We begin our empirical estimates with the use of an event study surrounding the two event days concerning the pre and post financial crises trading of the 26 companies listed on the Dow Jones Travel and Tourism Index. We define the event (i.e. day 0) as the 1st January 2007 and the 30th April 2009 for the pre and post financial crises trading period. We use the traditional market model which was first established by Brown and Warner (1985) and was subsequently used by most previous research on event studies (see among others Hegde and McDermott, 2003;Denis et al, 2003;and Gregoriou and Ioannidis, 2006).

The market model involves a procedure with a value-weighted market index and market model parameters estimated over the time period 90 days before and after the event date in order to calculate excess returns around the event dates for each security. The excess returns obtained from the market model are aggregated through event time to obtain cumulative abnormal returns (CAR). We then aggregate the CARs across securities in order to compute the average cumulative abnormal return (ACAR).

One potential shortcoming of the market model is that the ACAR is computed assuming independent estimates for each firm. However, as Masse et al 2000, point out this method is problematic when the events are clustered, as they are in our study. The problem occurs because all 26 firms are exposed to the financial crises the same time period. This means that the abnormal returns calculated for each firm are unlikely to be independent. Instead there will be contemporaneous correlation of the returns across firms, resulting in t-statistics on average abnormal returns being biased away from zero (Brown and Warner, 1985). Beneish (1991) and Cable and Holland (2000) suggest that a solution to such a problem is to construct an equally-weighted portfolio of the 26 firms in our sample and to assess the average abnormal performance at the portfolio level.

The portfolio does not suffer from contemporaneous correlation which implies that we can use the central limit theorem to derive its sampling distribution and obtain reliable t-statistics for our study (Campbell et al, 1997). We compute the ACARs' at both the individual firm level and the portfolio level, the results are quantitatively similar, so we only report the individual firm results.

4. Empirical Results

4.1 Abnormal Returns of Tourism Industry after the Financial Crises

In order to investigate the impact of short-term effects of the financial crises on the Dow Jones Travel and Tourism Index firms, we compute abnormal returns and changes in liquidity around a five day event window, [-5, +5]. We utilize the standard event methodology outlined in the previous section of the paper for each stock in our sample for each event day. The results for the event window [-5, +5] are presented in Panel A of Table 2.

[INSERT TABLE 2 HERE]

Panel A indicates that stock returns of the Dow Jones Travel and Tourism Index firms are affected by the financial crises. Significant positive AARs (Average Abnormal Returns) persist over the 11 day event window, with the largest average return of 0.88 percent occurring on the first date after the financial crises (event day 1). The CAR from day -5 to +5 of 5.04 percent is distinguishable from zero with a t-statistic of 2.50. The short term abnormal returns results suggest that positive excess returns are gained by investors on the Dow Jones Travel and Tourism Index due to the financial crises.

If the financial crisis has improved the sustained liquidity of travel and tourism stocks then we would expect the abnormal returns witnessed in Panel A of Table 1 to persist over time. In order to test this hypothesis we compute the CAR of Dow Jones Travel and Tourism stocks over a three month event window [0, +90] after the financial crises period. The results are presented in Panel B of Table 2. We observe that there are significant CARs for up to 90 trading days following the financial crises. Therefore, from the results in Table 2 we can report evidence of permanent stock price increases in Dow Jones Travel and Tourism stocks after the financial crises.

4.2 Trading Volume Effects of Financial Crises on the Tourism Industry

To determine the possible presence of liquidity effects we proceed with the analysis of the impact of the financial crises on the trading volume of the Dow Jones Travel and Tourism Index. We test for the presence of abnormal trading volume in the event period by employing the following dummy variable panel fixed effects regression model.

$$Volume_{jt} = \alpha_j + \gamma t + \sum_{-5}^{+5} D_i \beta_i + \varepsilon_j \quad \text{for } j = 1,26 \quad \text{and } t = -90,+5 \qquad (1)$$

Where $Volume_{jt}$ is the logarithm of trading volume for stock j at day t. α_j captures the variation in trading volume across all the companies in our sample. γt captures the changes in trading volume per day that is common across all the companies in our sample. D_i are dummy variables for each trading day in the event window [-5, +5]. The coefficients of the eleven dummy variables, β_i capture the abnormal trading volume over the event window, [-5, +5]. ε_j is a random disturbance term with a mean of zero and a variance of σ^2, α_j, γ_t and β_i are parameters to be estimated. Equation (1) is estimated by a fixed effects panel estimator using the White (1980) heteroscedastic consistent covariance matrix. The results of equation (1) can be seen in Panel A of Table 3.

[INSERT TABLE 3 HERE]

The positive and significant sign of the eleven dummy variables confirms that there is a dramatic increase in trading volume in the tourism industry after the financial crises. For example, five days before the event (i.e. event day -5) the coefficient on the dummy, β_{-5} is

0.346 and significant with a t statistic of 2.93. The abnormal volume continues to increase and reaches its peak on the day of the event (i.e., event day 0). On this event day β_0 is 0.91 and highly significant with a t statistic of 3.76, indicating that trading volume has substantially risen for the travel and tourism industry post the financial crises.

Following the financial crises, the abnormal volume decreases from its peak but continues to be positive and significant throughout the post event period. The regression in equation (1) also passes the normality test, suggesting that the abnormal volume empirical estimates are not due to possible outliers in the data. In addition, α_j is significant showing that there are changes in trading volume across the 26 Dow Jones Travel and Tourism Index firms in our sample.

In order to analyze changes in the long term trading volume of Dow Jones Travel and Tourism Index stocks preceding the financial crises, we construct a Post/Pre ratio of standardized trading volume in the post-crises period [0, +90] to the standardized volume in the pre-crises period [0, -90]. The results of the long term changes in trading volume are reported in Panel B of Table 3. We can see that the mean (median) Post/Pre ratio of standardized trading volume is`2.28 (2.21) with a corresponding t statistic of 4.63. This finding suggests that after the global financial crisis there has been a permanent rise in trading volume of the Dow Jones Travel and Tourism Index.

In the preceding section of the paper we attempt to explain the increase in the stock prices and the significant increase in aggregate trading volume of Dow Jones Travel and Tourism stocks, after the global financial crises, with the use of the information cost / liquidity hypothesis.

4.3 Information Cost Liquidity Hypothesis

The information hypothesis was first established by Van Horne (1970) in the context of new listings on the NYSE, stating that listing signals good news about firms' future prospects. Since the work by Von Horne (1970), researchers such as Schleifer (1986), Dhillon and Johnson (1991), Beneish and Gardner (1995), Hegde and McDermott (2003) and Gregoriou and Ioannidis (2006) have examined whether information about the investment appeal of a stock is provided by news of listing changes. They all report significant improvement in stock performance after inclusion in the index.

From the previous section we discovered that there was an increase in trading volume when the 26 Dow Jones Travel and Tourism firms' were traded post the financial crises. As a result of the increase in trading volume, Dow Jones Travel and Tourism Index companies' may receive more attention by analysts and investors' resulting in lower bid-ask spreads and higher market liquidity.

If after the financial crises travel and tourism companies are followed by increased scrutiny by analysts and investors, the firms' information environment is richer and the trading will be more frequent, resulting in increased liquidity. In this section of the paper we analyze whether there are changes in the information environments and the liquidity of the Dow Jones Travel and Tourism firms post the financial crises.

If changes in the Dow Jones Travel and Tourism Index before and after the financial crises, are associated with changes in the information environment, the stock prices of the Dow Jones Travel and Tourism Index firms adjust to reflect changes in future levels of available information.

In order to evaluate changes in the information environment of the Dow Jones Travel and Tourism Index stocks before and after the financial crises, we analyze the analysts' coverage of the stocks in the pre-crises and post-crises period. To analyze the long-term changes in the information environment of the stocks following the financial crises, we construct a "Post/Pre ratio" of the number of analysts' that follow each stock in the post-crises period [0, +90] to the number of analysts' that follow the stock in the pre-crises period [0, -90]. The results of the analysts' coverage of the stocks are portrayed in Table 4.

From Table 3 we can see that the mean (median) Post / Pre ratio for the analysts coverage of Dow Jones Travel and Tourism Index stocks is 2.65 (2.99). The change is highly significant with a t statistic of 3.70. The results suggest that there is a significantly richer information environment for Dow Jones Travel and Tourism Index stocks once they are traded online.

[INSERT TABLE 4 HERE]

Given that Dow Jones Travel and Tourism Index firms operate in a richer information environment after the financial crises, we proceed by analyzing whether the increased information environment of the stocks results in increased market liquidity in the manner predicted by Schleifer (1986), Dhillon and Johnson (1991), Beneish and Gardner (1995) and Gregoriou and Ioannidis (2006).

In order to analyze the impact of the financial crises on the short term liquidity of Dow Jones Travel and Tourism Index stocks, we construct ratios of the daily average quoted, relative and effective bid-ask spreads over various time interval event windows in the pre and post financial crises period. The quoted bid-ask spread is constructed because this

measure of spread encapsulates the economic significance of the spread to the market-maker, (Branch and Feed, 1977). The relative bid-ask spread is computed as the ask price minus the bid price divided by the mid-price. However, as pointed out by Lee and Ready (1991) the relative bid-ask spread has two potential shortcomings. First, it overstates the trading costs of a stock because it fails to account for the tendancy of prices to rise following a purchase and fall following a sale. Second, it can be argued that the relative bid-ask spread is an inappropriate measure of stock liquidity due to the fact that trades frequently occur within the ask and bid prices.

In our dataset, for instance, approximately 30 percent of trades occur within the midprice. Therefore, in order to account for these two shortcomings we also compute the effective bid-ask spread, defined at twice the absolute value of the difference between trade price and the prevailing midprice. There is however a potential problem with the use of either the relative or the effective bid-ask spread. The problem is that both measures of bid-ask spread will automatically increase, due to the increase in the midprice after the financial crises, witnessed in Table 1. Therefore, for completeness we also compute the quoted bid ask spread defined as the ask price minus the bid price, pre and post the financial crises trading period of Dow Jones Travel and Tourism Index Stocks.

In order to provide a comparison of the liquidity of Dow Jones Travel and Tourism Index stocks pre and post the financial crises, we construct ratios of daily relative, effective and quoted bid-ask spreads over various event time intervals to their equivalents in the pre-crises period over trading days [0, -90]. The results of the changes in liquidity of Dow Jones Travel and Tourism Index Stocks pre and post financial crises trading can be seen in Table 5. There is clear evidence from Table 4 that spreads are significantly reduced after the financial crises. For example, in the [-5, +5] event window the mean and median quoted bid-ask spread ratios are 0.84 and highly significant. This indicates that spreads are significantly

reduced over the 11 trading day period centered on the first day post the financial crises. The results are robust across all liquidity measures.

The significant spread reductions over the longer event time intervals such as, [0, +60] and [0, +90] indicate that the reduction in trading costs is permanent. This implies that the improvement in liquidity of the Dow Jones Travel and Tourism Index Stocks as a result of the financial crises is permanent.

[INSERT TABLE 5HERE]

4.4 Multivariate Analysis of Long-Term Changes in Market Liquidity

It is possible that the univariate analysis undertaken thus far in the study is based on factors unrelated to the impact of the financial crises to the Dow Jones Travel and Tourism Index. To control for these external factors and improve the power of the econometric analysis, we perform multivariate analysis of the bid-ask spread. The multivariate analysis is undertaken in the form of a panel fixed effects estimator. Gregoriou et al, (2005) report that the bid-ask spread increases with return volatility and decreases with stock price and trading volume, in the London Stock Exchange. We estimate the following log-linear fixed effects model where the regression parameters represent elasticities:

$$Liquidity_{jt} = \alpha_j + \beta_1 D_t + \beta_2 Volume_{jt} + \beta_3 (Volume_{jt} * D_t) + \beta_4 \Pr ice_{jt} + \beta_5 StDev_{jt} + \varepsilon_{jt}$$

$$\text{for } j = 1,2.....,26 \text{ and } t = 1,2. \qquad (2)$$

Where t=1 corresponds to in the pre-crises trading of Dow Jones Travel and Tourism Index Stocks, [0, -90], and t=2 corresponds to the post-crises trading period, [0, +90]. The dependant variable, $Liquidity_{jt}$ corresponds to either the quoted, relative or effective bid-ask spread for stock j at time period t. $Volume, \Pr ice$ and $StDev$ represent the traded volume in shares, closing price and return volatility for stock j at time period t. The dummy variable, D_t is equal to 1 in the post-crises time period and is equal to 0, otherwise. α_j captures the time-invariant unobserved stock-specific fixed effects. The fixed-effect is accounting for differences in the initial level of liquidity of each security in our sample. We are mainly concerned with the change in the dummy variable, β_1, and the change in the slope of trading volume as a result of trading post the financial crises, β_3. All variables apart from the dummy, D_t, are expressed as natural logarithms.

The fixed effects panel estimator, displayed in equation (2) can be estimated with the use of Ordinary Least Squares (OLS). The problem of OLS is that it does not account for the presence of endogeneity trading volume, stock price and return volatility. In order to capture endogeneity and we use the Generalized Method of Moments (GMM) panel estimator. The GMM estimator established by Arellano and Bond (1991) uses internal instruments for each time period to deal with endogeneity.

For equation (2) if $E\left(e_{it}e_{iz}\right)=0$ holds for $z \neq t$ across all the securities then it represents the following moment conditions:

$E\left(y_{i,t-z}\Delta e_{it}\right)=0$ for $z \geq 1; \quad t=1,2.$

If the explanatory variables in equation (2) are weakly exogenous then we also have the following additional moment conditions:

$E\left(X_{i,t-z}\Delta e_{it}\right)=0$ for $z \geq 1; \quad t=1,2.$

The single equation GMM panel estimator generally specifies a dynamic panel model in first differences and exploits the above moment conditions. Therefore, the lagged (one time period or more) levels of endogenous and weakly endogenous variables of the model become appropriate instruments for addressing endogeneity. The single GMM panel estimator provides consistent coefficient estimates.

The panel estimation of equation (2) with the use of GMM is displayed in Table 6. The first thing to report is that the panel passes all the relevant diagnostic tests. The fixed effect of the panel is significant with a p-value of zero, suggesting that the differences in the initial levels of liquidity of the stocks in our sample are successful captured by the panel estimator. The test for first order residual serial correlation is insignificant, suggesting that the panel does not suffer from autocorrelation. The residuals of the panel are also normally distributed signalling that the results of the panel are not due to outliers in the data. Finally the results of the Sargan test confirm the validity of the instruments in the GMM model.

The R^2 indicates that 67 percent of the variation in market liquidity is accounted for in the model. The variables Price, Volume and Stdev have the predicted signs and are highly significant. A more important result is that the parameter β_1 is statistically significant whereas, the parameter β_3 is insignificant. The significance of D_t shows that the effective bid-ask spread decreases on average by 10.15 percent in the post-crises period, after controlling for the impact of trading volume, share prices and volatility. Volatility has a positive and significant sign which agrees with the market microstructure literature. Essentially this implies that as market makers are faced with greater risk they increase their compensation for providing a financial market for the trade to occur. Also the coefficient estimates on the trading volume $\left(Volume_{jt}\right)$ is significant. This implies that a one percent increase in mean trading volume $\left(Volume_{jt}\right)$ is associated with a decrease of 8.12 percent in

the average effective bid-ask spread in the pre-crises period. The insignificance in the $\left(Volume_{jt} * D_t\right)$ interaction term signals that this increase in trading volume is maintained in the post-crises period.

[INSERT TABLE 6 HERE]

From our findings we observe that after the financial crises, there was a significant permanent increase in the trading volume and the stock price liquidity of Dow Jones Travel and Tourism Index Stocks. This finding holds in both a univariate and multivariate framework even when the impact of share prices, trading volume and volatility of the stocks has been accounted for.

The above analysis reveals that the financial crisis even the negative consequences that caused on the economic and social life, the tourism industry was not severely affected. Admittedly, households' budgets were restrained however, there was not a restriction on tourism spending because people continue going for holidays (Alegre et al, 2013). The results provide a useful insight for the Governments, firms and employees that in case of an economic turbulence the tourism industry remains unaffected.

5. Conclusion

The financial crises in the banking sector between 2007-2009 has resulted in a global the financial crises on the travel and tourism industry, by examining the Dow Jones Travel and Tourism Index stocks before and after the financial crises.

Our empirical findings reveal that there is a long-term enhancement in liquidity of Dow Jones Travel and Tourism Index stocks, post financial crises trading that persists over a three-month trading interval. We also find permanent increases in the stock price and trading volume of Dow Jones Travel and Tourism Index stocks after the financial crises. Furthermore, we observe a significant increase in analyst coverage for Dow Jones Travel and Tourism Index shares after the financial crises. This result in significant decreases in bid-ask spreads in the post-crises period, after controlling for the impact of stock prices, trading volume and volatility of returns.

Managerial implications

The research results add on the existing tourism literature and can be useful to tourism practitioners and are extremely striking because they go against the principles of financial theory. In a period of financial crises, we would expect significant declines in travel and tourism. This is because the failure of business and less disposable income for individuals should result in dramatic decreases for both business and leisure travellers. In our opinion our results should change the perspective in which travel and tourism should be viewed. It is no longer a luxury item but more a necessity to stimulate business and happiness for firms and individuals respectively, in times of financial turmoil. Given the lack of literature analysing tourism during the financial crises, we believe the findings in our paper cannot be ignored.

In particular, destinations should prioritise tourism as a remedy in case of a financial crisis and to be the industry of focus for economic recovery. As mentioned above, people even in tight economic conditions are travelling with a plethora of choices suited to all budgets. The industry has undergone a metamorphosis over the last decades and offered a plethora of products and activities. Additionally, tourism is considered as a vital and an essential activity and this should be considered so as tourism destinations and suppliers to be proactive and response strategically with more products and services for the future (Alegre et al, 2016). Governments should frame contractive policies and strategies in order to ensure the economic viability of the tourism industry that impacts positively the social life. An important aspect is the focus on quality tourism products that provide constructive experiences (Lopes et al, 2014). Quality impacts positively customers' satisfaction and become loyal to destinations and firms (Kim, 2017).

Finally, the results of the study are insightful to the firms that investments in the tourism industry provide high returns because of current trends with an increased number of travellers. The permanent rise in liquidity of Dow Jones Travel and Tourism Index stocks could result in increase in firm value. This is because it may be less costly for them to borrow, issue capital or issue public equity after the increase in liquidity resulting from online trading. Extensions that focus on valuation of Dow Jones Travel and Tourism Index firms after the introduction of online trading are promising avenues for future research. Also we could compare the impact of the tourism industry pre and post Brexit.

References

Alderighi, M., Cento, A., Nijkamp, P., and Rietveld, P. (2012). Competition in the European aviation market: The entry of low-cost airlines. *Journal of Transport Geography*, 27, 223–233.

Alegre J., Mateo S., Pou L. (2013). Tourism participation and expenditure by Spanish households: The effects of the economic crisis and unemployment. *Tourism Management*, 39, 37–49.

Alegre,J and Pou, L. (2016), US household tourism expenditure and the Great Recession *Tourism Economics,* Vol 22, Issue 3, 608 – 620.

Arellano, M and Bond, S. Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, (1991), 58(2), 277-297.

Atkins A.B. and E.A. Dyl. (1997). Transactions Costs and Holding Periods for Common Stocks**.** *Journal of Finance*, 1, 309-325.

Atul, S. (2008). US Economy, Recession and its impact on the US Tourism, Hotel and Restaurant Business: A Brief Review. *Journal of Hospitality Financial Management*, no. 16(2) ,article 8.

Baker, M. (2005), Luxury and tailor made holidays, Travel and Tourism Analyst, Mintel International Group Ltd: Chicago.

Beneish, M. D. (1991). Stock Prices and the Dissemination of Analysts Recommendations. *Journal of Business* 64, 393-416.

Beneish, M. D. and Gardner, J. C. (1995). Information Costs and Liquidity Effects from Changes in the Dow Jones Industrial Average. *Journal of Financial and Quantitative*

Analysis 30, 135-157.

Bernini, C and Cracolici, F M. (2016). Is Participation in the Tourism Market an Opportunity for Everyone? Some Evidence from Italy. *Tourism Economics*, 22 (1), 57 – 79.

Blundell, R. and S. R. Bond. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models, *Journal of Econometrics*, 87, 115-143.

Bodosca, S, Gheorghe, G and Nistoreanu, P. (2014), Tourist Consumption Behaviour Before and After the Crisis From 2008. *Procedia Economics and Finance,* 16 , 77 – 87.

Branch, B. and W. Freed. (1977). Bid-ask spreads on the AMEX and the big board. *Journal of Finance.* 32, 159-163.

Bronner, F and Hoog, R. (2016). Crisis Resistance of Tourist Demand: The Importance of Quality of Life. *Journal of Travel Research*, 55 (2), 190–204.

Bronner, F and Hoog, R.(2012). Economizing strategies during an economic crisis. *Annals of Tourism Research*, 39 (2),1048–1069.

Brown, S. and Warner, J. (1985). Using Daily Stock Returns: The Case for Event Studies. *Journal of Financial Economics*, 14, 3-31.

Brun, A and Castelli, C. (2013). The nature of luxury: a consumer perspective. *International Journal of Retail and Distribution Management*, 41 (11/12),823-847.

Cable, J. and K. Holland. (2000). Robust vs. OLS estimation of the market model: implications for event studies, *Economics Letters,* 69, 385-391.

Cambridge Dictionary. n.d, Luxury, Retrieved on May 21, 2017 from http://dictionary.cambridge.org/dictionary/english/luxury.

Campbell, J. Lo, A.W. and A.C. MacKinlay. (1997). The Econometrics of Financial Markets, *Princeton University Press, Princeton, NJ.*

Canziani,B, Watchravesringkan, K and Yurchisin, J. (2016). A model for managing service encounters for neo-luxury consumers. *Worldwide Hospitality and Tourism Themes*, 8 (1), 41 -52.

Culiuc, A. (2014). Determinants of International Tourism, IMF Working paper, Retrieved 18 May,2018 from http://www.imf.org/external/ns/search.aspx?NewQuery=tourismandsubmit=.

Danziger, P. 2005, Let Them Eat Cake: Marketing Luxury to the Masses - as Well as the Classes. Kaplan Publishing:USA.

De Vita, G. and Kyaw, K.S. (2016). Tourism Specialization, Absorptive Capacity. and Economic Growth. *Journal of Travel Research,* 56 (4), 423–435.

Denis. D.k. J.J. Mcconnell. A.V. Ovtchinnikov. and Y. Yu. (2003). SandP 500 Index Additions and Earnings Expectations. *Journal of Finance,* LVIII, 1821-1840.

Dhillon, U. and Johnson H. (1991), Changes in the Standard and Poor's 500 List, *Journal of Business* 64, 75-85.

Gregoriou. A. and C. Ioannidis. (2006). Information Costs and Liquidity Effects from changes in the FTSE 100 List. *European Journal of Finance,* 12, 347-360.

Gregoriou. A. C. Ioannidis. and L. Skerratt. (2005). Information Asymmetry and the Bid-

Ask Spread: Evidence from the UK. *Journal of Business Finance and Accounting,* 32, 1801-1826.

Heflin. F. and K.W. Shaw. (2000). Blockholder Ownership and Market Liquidity, *Journal of Financial and Quantitative Analysis,* 35, 621-633.

Hegde, S.P. and J.B. McDermott. (2003). The Liquidity effects of revisions to the SandP 500 index: an empirical analysis. *Journal of Financial Markets,* 6, 413-459.

Hwang, J and Hyun, S. (2017). First-class airline travellers' perception of luxury goods and its effect on loyalty formation. *Current Issues in Tourism*, 20 (5), 497-520.

Kim,J. (2017). The Impact of Memorable Tourism Experiences on Loyalty Behaviors: The Mediating Effects of Destination Image and Satisfaction, *Journal of Travel Research*,57(7), 856–870.

Lee, C. M. and M. J, Ready. (1991). Inferring trade direction from intraday data. *Journal of Finance,* 46, 733-746.

Liasidou, S. (2013). Decision making for tourism destinations: the airline strategies influences', *Tourism Geographies: An International Journal of Tourism Space, Place and Environment,* 15(3), 511-528.

Liasidou, S. (2017). Drafting a realistic tourism policy: the airlines' strategic influence, *Tourism Review*, 72 (1), 28-4.

Lopes, R, Abrantes, J and Kastenholz. (2014). Innovation, tourism and social networks, *Revista Turismo Desenvolvimento*, N.º 21/22, 151-154.

Masse. I. R, Hanrahan. J. Kushner. and F. Martinello. (2000). The Effects of Additions to or Deletions from the TSE 300 Index on Canadian Share Prices. *Canadian Journal of Economics,* 33, 341-359.

Miller,K W and Mills, M.K. (2012). Contribution clarity by examine brand luxury in the

fashion market. *Journal of Business Research*,65 (2), 183- 207.

Oxford Dictionaries, n.d, Luxury, Retrieved on May 21, 2017 from https://en.oxforddictionaries.com/definition/luxury.

Papatheodorou, A and Pappas, N. (2017). Economic recession, job vulnerability, and tourism decision making:A qualitative comparative analysis. *Journal of Travel Research*, 56 (5), 663-677.

Papatheodorou, A, Rosselló, J and Xiao,H (2010). Global Economic Crisis and Tourism: Consequences and Perspectives. *Journal of Travel Research,* 49 (1), 39 – 45.

Ritchie, B., C.M. Amaya Molinar, and D.C. Frechtling (2010). Impact of the Economic Crisis on Global Tourism. Foundations of the Crisis: A North American Perspective. *Journal of Travel Research*, 49 (1): 5-15.

Sheldon, P., and L. Dwyer (2010). The Global Financial Crisis and Tourism: Perspectives of the Academy. *Journal of Travel Research*, 49 (1): 3-4.

Shleifer, A. (1986). Do Demand Curves for Stocks Slope Down? *Journal of Finance* 41, 579-590.

Smeral, E. (2010). Impacts of the World Recession and Economic Crisis on Tourism: Forecasts and Potential Risks, *Journal of Travel Research*, 49 (1): 31-38.

Smith, J.B and Colgate, M, (2007). Customer value creation: a practical framework, *The Journal of Marketing Theory and Practice*, 15(1), 7-23.

Tsang, N. and Ap, J.(2007). Tourists' perceptions of relational quality service attributes: a cross-cultural study, *Journal of Travel Research*, 45 (3), 355-363.

Ukpadi, D and Karjaluoto. H (2017). Consumers' acceptance of information and communications technology in tourism: A review. *Telematics and Informatics*, 34, 618-644.

United Nations World Tourism Organization. (2010). International Tourism on Track for a Rebound after an Exceptionally Challenging, Retrieved May 20, 2017 http://www.unwto.org/media/news/en/press_det.php?id=5361.

Von Horne, J.C. (1970). New Listings and their Price Behavior. *Journal of Finance,* 24, 783-794.

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test of heteroskedasticity. *Econometrica* 48, 817-838.

World Tourism Organization and International Labour Organization. (2013). Economic Crisis, International Tourism Decline and its Impact on the Poor, UNWTO, Madrid.

Xiang, Z, Magnini, V, and Fesenmaier, D. (2015). Information technology and consumer behavior in travel and tourism: Insights from travel planning using the internet', *Journal Of Retailing And Consumer Services*, 22, 244-249

Table 1: List of the companies in our data sample

Number	Company Name
1	Expedia
2	Travelocity
3	Price Line Group
4	American Express Travel
5	Carlson Wagonlit Travel
6	HRG North America
7	AAA Travel
8	BCD Travel
9	HRG North America
10	Corporate Travel Management
11	Travel and Transport
12	Altour
13	Direct Travel
14	World Travel Incorporation
15	Omega World Travel
16	JTB Americas Group
17	World Travel Holding
18	ATG Travel
19	Vision Travel Solutions
20	Adelman Travel Group
21	Travizon
22	Worldview Travel
23	cheapcarribbean.com
24	Fox World Travel
25	Shorts Travel Management
26	Travel Planners International

Table 2. Abnormal Returns around Dow Jones Travel and Tourism Index Financial Crises Trading.

The sample consists of 26 Dow Jones Travel and Tourism Index firms that were available to be traded before and after the financial crises. Average Abnormal returns (AAR) are computed using the market model and the standard event study methodology. The estimation window for computing the market model parameters is the event time interval [-90, 90]. AAR is tested for significance using a t-statistic.

Panel A. Short Term Abnormal Returns

Event Day	**AAR (%)**	**T test H_0: AAR=0**
-5	0.14	2.30**
-4	0.31	2.25**
-3	0.36	2.18**
-2	0.62	2.65**
-1	0.86	2.63**
0	0.42	3.24**
+1	0.88	3.01**
+2	0.64	2.67**
+3	0.39	2.20**
+4	0.30	2.16**
+5	0.12	2.09**
[-5, +5]	5.04	2.50**

Panel B. Long Term Abnormal Returns

Event Day	**AAR (%)**	**T test H_0: AAR=0**
[0, +10]	0.72	2.22**
[0, +20]	0.65	2.13**
[0, +30]	0.55	2.21**
[0, +60]	0.43	2.13**
[0, +90]	0.31	2.16**

** Significant at 5% level.

Table 3. Trading Volume around Dow Jones Travel and Tourism Index Financial Crises Trading.

Panel A. Short Term Abnormal Trading Volume.

The following panel fixed effects regression model is estimated to investigate the changes in trading volume surrounding the dates of the financial crises on 26 firms listed on the Dow Jones Travel and Tourism Index.

$$Volume_{jt} = \alpha_j + \gamma t + \sum_{-5}^{+5} D_i \beta_i + \varepsilon_j \quad \text{for } j = 1,26 \quad \text{and } t = -90,+5$$

Where $Volume_{jt}$ is the logarithm of trading volume for stock j at day t. α_j captures the variation in trading volume across all the companies in our sample. γt captures the changes in trading volume per day that is common across all the companies in our sample. D_i are dummy variables for each trading day in the event window [-5, +5]. The coefficients of the eleven dummy variables, β_i capture the abnormal trading volume over the event window, [-5, +5]. ε_j is a random disturbance term with a mean of zero and a variance of σ^2, α_j, γ_t and β_i are parameters to be estimated. NORM (2) is the p-value for the Jarque-Bera normality test.

Parameter	**Estimate**	**T statistic**
α_j	0.125	2.63**
γt	0.0034	2.23**
β_{-5}	0.346	2.93**
β_{-4}	0.476	2.83**
β_{-3}	0.584	2.26**
β_{-2}	0.672	2.23**
β_{-1}	0.836	2.92**
β_0	0.91	3.76**
β_{+1}	0.84	2.32**
β_{+2}	0.632	2.82**
β_{+3}	0.532	2.76**
β_{+4}	0.493	2.01**
β_{+5}	0.282	2.90**
Adjusted $R^2 = 0.65$		
NORM (2) = 0.47		

**Significant at the 5% level.

Panel B. Long Term Trading Impact of Trading Volume on Dow Jones Travel and Tourism Index Financial Crises Trading

The sample consists of 26 Dow Jones Travel and Tourism Index firms that were traded before and after the financial crises. Standardized trading volume is defined as daily trading volume in shares divided by the total Dow Jones trading for the same day. Standardized trading volumes are computed for the pre-financial crises period [0, -90] and the post financial crises period [0, +90]. The t statistic is constructed to test the null hypothesis that the standardized trading volume is unchanged in the pre-financial crises period as compared with the post-financial crises period.

Variable	**Standardized Trading Volume**
Mean (Pre-internet)	0.00657%
Mean (Post-internet)	0.0150%
Median (Pre-internet)	0.00652%
Median (Post-internet)	0.0144%
Mean (Post/Pre Ratio)	2.28
Median (Pre/Post Ratio)	2.21
T Test	4.63**

** Significant at 5% level.

Table 4. Long Term impact on Analyst Coverage of Dow Jones Travel and Tourism Index Stocks Pre-Post Financial Crises Trading.

The sample consists of 26 Dow Jones Travel and Tourism Index firms that were traded before and after the financial crises. The number of analysts following the stock is the number of earning estimates as reported in the I/B/E/S summary data file. The number of analysts are computed for each stock for the pre financial crises period [0, -90] and the post financial crises period [0, +90]. The t statistic is constructed to test the null hypothesis that the number of analysts following each stock is unchanged in the pre-financial crises period as compared with the post-financial crises period.

Variable	**Analyst Coverage**
Mean (Pre-internet)	1.2
Mean (Post-internet)	3.2
Median (Pre-internet)	1
Median (Post-internet)	3
Mean (Post/Pre Ratio)	2.65
Median (Pre/Post Ratio)	2.99
T Test	3.70**

** Significant at 5% level.

Table 5 Short and Long Term Effects of Dow Jones Travel and Tourism Index Financial Crises Trading on Stock Market Liquidity

Stock market liquidity is measured by the quoted, relative and effective bid-ask spreads of 26 Dow Jones Travel and Tourism Index firms after the financial crises. Quoted bid-ask spread is defined as the ask price minus the bid price. Relative bid-ask spread is defined as the ask price minus the bid price divided by the quoted midprice. Effective bid-ask spread is defined as is defined as twice the absolute value of the difference between the transaction price and the midprice in effect at the time of the trade. All spread ratios are computed as the ratio of the average bid-ask spread of each individual stock over the indicated event time period to the average bid-ask spread measure over the pre-financial crises trading period of Dow Jones Travel and Tourism Index Stocks, [0, -90]. The null hypothesis that the mean of the reported ratio is equal to one is tested using a standard t statistic.

Event Time Interval	**Quoted Spread (%), Mean (Median)**	**Relative Spread (%), Mean (Median)**	**Effective Spread (%), Mean (Median)**
[0, 0]	0.85 (0.86)	0.81 (0.80)	0.82 (0.81)
T Test	-4.15**	-4.23**	-4.19**
[-1, +1]	0.84 (0.84)	0.82 (0.81)	0.83 (0.82)
T Test	-4.01**	-4.04**	-3.99**
[-2, +2]	0.85 (0.86)	0.81 (0.80)	0.82 (0.81)
T Test	-4.31**	-4.29**	-4.25**
[-3, +3]	0.86 (0.86)	0.82 (0.81)	0.83 (0.82)
T Test	-3.87**	-3.99**	-3.95**
[-4, +4]	0.85 (0.86)	0.81 (0.81)	0.82 (0.82)
T Test	-4.13**	-4.09**	-4.04**
[-5, +5]	0.84 (0.84)	0.82 (0.81)	0.83 (0.83)
T Test	-3.90**	-3.92**	-3.87**
[0, +10]	0.88 (0.87)	0.84 (0.84)	0.85 (0.84)
T Test	-3.84**	-3.82**	-3.80**
[0, +30]	0.89 (0.88)	0.86 (0.85)	0.87 (0.88)
T Test	-3.76**	-3.70**	-3.72**
[0, +60]	0.93 (0.92)	0.90 (0.89)	0.91 (0.90)
T Test	-2.31**	-2.22**	-2.24**
[0, +90]	0.96 (0.95)	0.94 (0.93)	0.95 (0.94)
T Test	-2.06**	-2.02**	-2.00**

** Significant at 5% level.

Table 6. A multivariate analysis of the long-term impact on stock market liquidity.

The sample consists of 26 Dow Jones Travel and Tourism Index firms that were traded before and after the financial crises. A log-linear Panel regression model estimated with the use of Arellano and Bond (1991) GMM estimator is used. The Panel is used to determine whether the average market liquidity of the stocks improves following the financial crises after controlling for average stock price, trading volume and volatility of stock returns. In addition, β_3 tests if the slope coefficient on trading volume has changed following the financial crises. The Panel model has the following specification:

$$Liquidity_{jt} = \alpha_j + \beta_1 D_t + \beta_2 Volume_{jt} + \beta_3 (Volume_{jt} * D_t) + \beta_4 \Pr ice_{jt} + \beta_5 StDev_{jt} + \varepsilon_{jt}$$

$$\text{for } j = 1, 2....., 26 \text{ and } t = 1, 2.$$

Where t=1 corresponds to in the pre-financial crises trading of Dow Jones Travel and Tourism Index Stocks, [0, -90], and t=2 corresponds to the post-financial crises trading period, [0, +90]. The dependant variable, $Liquidity_{jt}$ corresponds to either the quoted, relative or effective bid ask spread for stock j at time period t. Quoted bid-ask spread is defined as the ask price minus the bid price. Relative bid-ask spread is defined as the ask price minus the bid price divided by the quoted midprice. Effective bid-ask spread is defined as is defined as twice the absolute value of the difference between the transaction price and the midprice in effect at the time of the trade. $Volume, \Pr ice$ and $StDev$ represent the traded volume in shares, closing price and return volatility for stock j at time period t. The dummy variable, D_t is equal to 1 in the post-financial crises time period and is equal to 0, otherwise. All the variables apart from D_t are expressed as natural logarithms. α_j captures the time-invariant unobserved stock-specific fixed effects. AR(1) is the first order Lagrange Multiplier test performed on the first difference of the residuals because of the transformations involved. Sargan tests follow a χ^2 distribution with r degress of freedom under the null hypothesis of valid instruments. NORM (2) is the p-value for the Jarque-Bera normality test. The endogenous explanatory variables (all variables apart from D_t) in the panel are GMM instrumented setting $z \geq 1$. [.] are p values and (.) are t statistics.

Variables	**Quoted Bid-Ask Spread**	**Relative Bid-Ask Spread**	**Effective Bid-Ask Spread**
Constant	-0.886 (-10.23)**	-0.923 (-11.24)**	-0.925 (-11.26)**
D	-9.15 (-11.52)**	-9.63 (-12.98)**	-10.15 (-13.63)**
Volume	-7.31 (-8.93)**	-7.16 (-8.97)**	-8.12 (-8.94)**
(Volume*D)	0.024 (1.04)	0.025 (1.05)	0.026 (1.03)
Price	-2.361 (-70.21)**	-2.357 (-70.23)**	-2.350 (-70.33)**
StDev	0.782 (17.23)**	0.791 (18.21)**	0.790 (18.26)**
α_i	[0.00]	[0.00]	[0.00]
R^2	0.571	0.574	0.670
NORM (2)	[0.231]	[0.234]	[0.237]
AR(1)	[0.421]	[0.424]	[0.427]
Sargan $\chi^2(r)$	[0.458]	[0.510]	[0.513]

** Significant at the 5% level.