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The effect of European and global uncertainty on stock returns of travel and leisure companies

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Abstract

This article aims to evaluate the impact of economic policy uncertainty (EPU) on the STOXX Europe 600 Travel & Leisure Price Index by utilizing a monthly data set for 20 years through 1997–2016. It is found that both the European and the global EPU have significant negative effects on the stock returns of travel and leisure companies. We demonstrate the significantly superior forecasting power of EPU measures on tourism and leisure stock returns, relative to a rather weak forecasting power of various macroeconomic variables.

Keywords

economic policy uncertainty, European economic policy uncertainty, global economic policy uncertainty, return, STOXX Europe 600 Travel & Lisure price index

Introduction

One major challenge in financial economics is to forecast stock returns in major industries, such as tourism and hospitality. Seminal studies, evolving from Sharpe (1964) capital asset pricing model (CAPM) until Fama and French (1992) multifactor model, cope with the pricing of capital markets

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systemic risks, reflecting macroeconomic and geopolitical risks of the economy. The stock predictability challenge remains crucial specifically for the tourism and hospitality companies, which are well known to reflect high sensitivity to systemic risks. Hence, there is a great motivation to forecast tourism and hospitality stock returns using a set of macroeconomic variables, that proxy for the systematic uncertainty in the economy.

Most of the studies in the literature, however, show that the macroeconomic variables are not capable of forecasting the returns of listed tourism and hospitality companies. According to Singal (2012), the financial economics literature is not able to document a strong contemporaneous relationship between hospitality industry returns and macroeconomic variables. Based on the limited explanatory power of traditional macroeconomic variables, recently, a limited number of studies analyze the role of uncertainty in tourism industry using a novel approach. According to this approach, due to the nature of policy decision-making and its implementation processes, economic policies generate uncertainties, which affect the decisions of firms and individuals (Zhang et al., 2015). Therefore, firms and individuals fundamentally question the ability and commitment of policy makers during high uncertainty periods (Istrefi and Piloiu, 2014). Moreover, increasing economic policy uncertainty (EPU) compels firms to hold more cash and thereby decrease their capital investments, while their cost of capital rises. In addition, individuals are likely to decrease or delay their consumption expenditures to be able to cope with the rising economic uncertainty.

The direct relation of EPU to the above economic transactions continuously motivates researchers to seek after new pricing factors in stock returns, highly sensitive to the EPU level. The EPU index developed by Baker et al. (2016) is based upon three grounds: (1) Newspaper coverage on EPU; (2) expected future tax code via analyzing tax code provisions expiring in upcoming years; and (3) dispersion among forecasters' predictions on economic variables. Since its introduction, EPU is used as a novel forecasting factor in several financial assets prices and returns—that is, as a determinant of gold prices (Bekiros et al., 2015); as a predictor of financial decisions of firms (Demir and Ersan, 2018; Gulen and Ion, 2016; Kang et al., 2014; Wang et al., 2014, 2017; Zhang et al., 2015); stock returns (Antonakakis et al., 2013; Ko and Lee, 2015); stock market volatility (Liu and Zhang, 2015); housing prices (Antonakakis et al., 2015); and the demand for tourism consumption (Gozgor and Ongan, 2016; Tsui et al., 2018).

This study examines how changes in uncertainty, proxied by European EPU (EEPU) and Global EPU (GEPU), affect STOXX Europe 600 Travel & Leisure Price Index (STOXX T&L) by utilizing a monthly data set for 20 years spanning from 1997 to 2016. To the best of our knowledge, in the first study examining EPU effect on tourism companies, Demir and Ersan (2018) examine how uncertainty (proxied by EPU developed by Baker et al., 2016) affects stock prices of listed tourism companies in Turkey for the time period of 2002–2013. They show that, in addition to the domestic uncertainty in Turkey, also the uncertainty in overall Europe has negative effects on tourism stock index returns in Turkey. In addition to uncertainty, consumer confidence index has a statistically significant impact on tourism companies' stock returns. Grechi et al. (2017) explore the effect of uncertainty measured by the Chicago board options exchange volatility index on the STOXX T&L price index from 2004 to 2014. The study results document that tourism stock performance is negatively affected by uncertainty. Again, there is a limited number of significant variables among the included macroeconomic variables. In some models, money supply and global economic activity have significant effects on tourism companies' performance.

In this study, we show that both EEPU and GEPU are crucial in forecasting stock returns of listed travel and leisure companies in Europe. Our findings are highly aligned with Demir and

Ersan (2018) and Grechi et al. (2017), who show that uncertainty is a major determinant in the performance of tourism companies. On the other hand, our study also has several differing aspects. First, Demir and Ersan (2018) take a country-based standpoint, analyzing the effects of domestic and external (European) uncertainty on Turkish tourism firms. The study provides an evidence on the potential relationship between economic uncertainty and tourism companies' performance. Through an examination of tourism industry in Eurozone with regard to economic uncertainty in both Europe and worldwide, we adopt a global approach. Thus, we suggest that a strong relationship is valid in a broad extent; and economic uncertainty is a strong explanatory factor in tourism industry performance. Second, large multinational firms listed in STOXX T&L index also exhibit different characteristics when compared to the examined Turkish firms in the referred study. Twenty-two European companies from five different countries have a total market capitalization of US$169 billion. Therefore, we show that the tested impact is evident for these companies, adding to the role of economic uncertainty. Third, the paper runs several robustness checks along with a quantile regression to examine the impacts of economic policy uncertainty on various quantiles of the index returns. These provide a deeper insight into the examined relationship. In addition to the scope of findings, the study suggests policy implications for a wider range of audience.

In terms of the macroeconomic variables, we find that only oil price has a negative and statistically significant effect on the stock prices of listed tourism companies in Europe while consumer confidence index has a significant effect on the stock prices. Moreover, 2007–2008 financial crisis has a negative effect on stock prices.

The remainder of this study is organized as follows. The next section presents the literature review. Section "Data, hypothesis development, and methodology" describes data, hypothesis development, and methodology. Section "Findings" presents and discusses the findings. Finally, the last section concludes the article.

Literature review

The literature considers the effects of various macroeconomic variables on hospitality stock returns. In one of the first studies of that literature, Barrows and Naka (1994) examine the impact of industrial production, money supply, domestic consumption, inflation rate, and interest rate on US hospitality stock returns. It is found that money supply, domestic consumption, and inflation rate have significant impact on hospitality stock returns. Wong and Song (2006) explore the relationship between monthly hospitality stock indices in the United States and macroeconomic variables for the time period of 1983–1999. They find that the main determinants of the forecast error variance in restaurant, lodging, and casino indices are their own lagged values and the other hospitality stock indices. The five macroeconomic variables, however, have a nonsubstantial impact on the forecasting error variance of the hospitality indices. Among the considered macroeconomic variables, interest rate is the major factor explaining a substantial part in the forecast error variance of the hospitality stock indices. Hence, the authors conclude that an essential predictor of hospitality stock indices series is the "shocks" within the system itself. Chen (2007) analyzes the impact of both macroeconomic and non-macro explanatory variables on hotel stock returns in China. He finds that a change in industrial production, import, discount rate, and yield spread significantly explain hotel-industry stock returns. In addition, he concludes that non-macro events such as financial crisis, political events, and terrorist attacks also play an important role in hotel returns forecasting.

Chen et al. (2010) focus on the impact of changes in monetary policy on the stock performance of listed hospitality firms in Hong Kong. They show that contracting monetary conditions lead to lower returns of hotels and tourism companies, whereas these companies perform better during expanding monetary periods. They also conclude that nonmacroeconomic variables (i.e. geopolitical, SARS outbreak, the takeover of Hong Kong in June 1997, and the 9/11 terrorist attacks) are important events that affect the stock prices of those companies. The weak explanatory power of macroeconomic variables is documented by this study as well. Among included eight macroeconomic variables, namely discount rate, money supply, unemployment rate, consumer price index, industrial production, yen–dollar exchange rate, oil price, and total trade, Chen et al. (2012) find that only discount rate, unemployment rate, and oil price could explain the hotel stock returns in Japan. Chen (2012) investigates the reaction of US hospitality stock prices to Federal-Reserve (FED) policy announcements. Airline, gambling, hotel, and travel and leisure stock indices are strongly affected from the unexpected policy changes, while the corresponding responses to the actual and expected component are statistically insignificant. Using data of hospitality firms (limited-service restaurants, full-service restaurants, noncasino hotels, and casino hotels) traded in organized US exchange in the period 1980–2009, Singal (2012) shows that the traditional macroeconomic variables are not able to explain stock returns. Once consumer sentiment, consumer confidence, and stock market return are included, the explanatory power of the model rises dramatically and contrary to traditional macroeconomic variables they all have statistically significant impact on stock returns of hospitality firms.

Chen (2013) explores the effects of demand and supply shocks on US hospitality (airline, gambling, hotel, restaurant and travel and leisure) index returns. It is suggested that both demand and supply shocks significantly affect US hospitality index returns. As regard to demand shocks, changes in corporate tax rate and changes in federal funds have a statistically significant effect on hospitality index returns. This implies that a decrease in corporate tax rate and/or an expanding monetary condition can increase the respected stock index performance. In terms of supply shocks, changes in oil price and wage rate have a negative impact on hospitality index returns. On the one hand, Al-Najjar (2014) finds corporate governance variables (board size and existence of nonexecutive directors in the board), solvency of the company, and Gross Domestic Product (GDP) growth, as the sole factors affecting stock prices of publicly listed tourism firms in five Middle Eastern countries in the period spanning from 2005 to 2010. On the other hand, tourism expenditures, tourism growth, and corruption are found to have no significant effect on the stock returns. Chen (2015) shows that consumer-confidence positively affects sales and stock returns in the Taiwanese hotel industry, while also documents limited support for the impact of macroeconomic variables on stock returns. Recently, Demir et al. (2017) investigate how stock prices of Turkish tourism companies are affected from the macroeconomic variables. They find that growth in the consumer confidence index and imports are the only variables which could Granger cause tourism companies' stock returns among eight macro factors in Turkey during the period between 2005 and 2013.

Data, hypothesis development, and methodology

Utilizing a 20-year monthly data set for the period of 1997–2016, we study the impact of EPU on STOXX T&L index performance. As of August 2017, STOXX T&L index reflects the behavior of 22 listed travel and leisure companies (such as Intercontinental Hotels, Carnival Cruise Lines, and Accor Hotels), and it is a relevant index available for the European area in terms of the travel and leisure sector (Grechi et al., 2017).

We incorporate the EPU in Europe as well as the EPU in the overall world (respectively, EEPU and GEPU, hereafter). Following an Ordinary Least Squares (OLS) estimation procedure, we examine the relationship between the EPU measures (EEPU and GEPU) and STOXX T&L returns, where we also consider additional potential determinants in the index returns. Specifically, following the literature, we control for the effects of inflation rates (INF) (Chen, 2007; Demir and Ersan, 2018), interest rates (INT) (Chen, 2007), oil prices (OIL) (Demir and Ersan, 2018; Grechi et al., 2017), M2 money supply (M2) (Chen, 2015; Demir et al., 2017; Grechi et al., 2017), production index of consumer goods and of manufacturing goods (IPC and IPM, respectively) (Chen, 2007; Chen, 2015; Demir et al., 2017), and consumer confidence index (CCI).

To proxy for the EPU, we employ the EPU index constructed by Baker et al. (2016). The EPU index has three grounds: (1) Newspaper coverage on EPU; (2) expected future tax code via analyzing tax code provisions expiring in upcoming years; and (3) dispersion among forecasters' predictions on economic variables. The relevant index representing the EEPU, namely European EPU index, is based on newspaper coverage only in the European countries, that is, number of newspaper articles containing the terms uncertain or uncertainty, economic, or economy. Nowadays, a country-based EPU index is available for 20 countries and thereby based on those indices, European EPU (EEPU) and global EPU (GEPU) are constructed. In this article, we use the EEPU index and GEPU index to examine the explanatory power of European and global uncertainty on listed European tourism companies' stock returns.

Greater EPU can affect listed tourism companies' stock returns through different channels. Tourism expenditures are highly negatively sensitive to economic conditions; therefore, increased uncertainty generates a decrease in the expenditures on tourism— hence, diminishing stock returns. According to Eugenio-Martin and Campos-Soria (2014), instability and uncertainty in an economy cause a decrease in consumption, which results in a decline and/or delay in tourism expenditures. Gozgor and Demir (2018) show that EPU leads to a decrease in outbound tourists. Ongoing economic uncertainty affects future travel plans and concurrently generates a sharp downturn in international tourist arrivals (Tsui et al., 2018), and this possible decrease in the number of tourists or tourism expenditures dampens the expected cash flows of tourism companies (Demir and Ersan, 2018). According to the discounted cash flow notion, as the expected future cash flows decrease, tourism companies' stock prices are negatively affected. Hence, tourism companies are reluctant to make new investments and to increase their capacities, and they prefer to hold more cash as a hedging instrument against future uncertainty. This reasoning generates our first hypothesis, H1.

H1: An increase in EEPU has a negative effect on STOXX T&L index performance.

In addition, to account for the worldwide EPU, we use the GEPU index developed by Davis (2016) following Baker et al. (2016). GEPU is the GDP weighted average of EPU values in the 19 countries.[1] As a robustness tool in the measurement of GEPU, we employ an alternative GEPU with an adjustment for purchasing power parity (PPP) that is also constructed by Davis (2016). Thus, our GEPU robustness checks are conducted using either the "standard" GEPU measure, denoted by GEPU1, or the GEPU adjusted for PPP (adjusted GDP weights), denoted by GEPU2. GEPU includes the uncertainty levels of countries such as China, United States, and Canada which are among the top 10 in terms of outbound tourism. Moreover, countries included in the calculation of GEPU account for two-thirds of global output (Davis, 2016). Higher level of uncertainty in those countries (GEPU) may imply smaller number of outbound tourists (Gozgor and Demir, 2018) which will also lead to decreases in the number of tourists visiting Europe. Thus, the performance

Table 1. Descriptive statistics.

	N	Mean	St. dev.	Min.	25%	Median	75%	Max.
RSTOXX T&L	240	0.004	0.058	−0.203	−0.03	0.013	0.041	0.184
GEPU1	240	0.024	0.214	−0.437	−0.115	0.002	0.109	1.188
GEPU2	240	0.026	0.217	−0.414	−0.125	0.001	0.117	1.128
EEPU	240	0.037	0.281	−0.554	−0.134	−0.001	0.15	1.918
INFLATION	240	0.001	0.004	−0.015	0	0.001	0.004	0.013
OIL	240	0.008	0.092	−0.267	−0.048	0.015	0.073	0.222
M2	240	0.005	0.007	−0.018	0.001	0.004	0.008	0.034
INTEREST	240	−0.008	0.182	−1.25	−0.046	−0.001	0.028	2
IPM	240	0.009	0.129	−0.285	−0.055	0.001	0.042	0.432
IPC	240	0.005	0.102	−0.258	−0.042	0.01	0.037	0.385
CCI	240	0.000	0.002	−0.005	−0.001	0.000	0.001	0.005

Note: Table presents descriptive statistics. Monthly data cover the time span of 1997–2016. RSTOXX T&L is the monthly return on STOXX T&L price index. GEPU1 is the monthly % change in global EPU index while GEPU2 is the same one adjusted for PPP; EEPU is the monthly % change in EEPU index all developed by Baker et al. (2016) and Davis (2016). INFLATION is the monthly inflation rate for the Euro area. OIL is the monthly % change in Europe Brent oil spot price. M2 is the monthly % change in M2 money supply in Euro area. INTEREST is the monthly % change in Euro area money market interest rates. IPM and IPC are monthly % changes in production indices of manufacturing goods and consumer goods, respectively. CCI is the monthly % change in consumer confidence index.
RSTOXX T&L: returns on STOXX Europe 600 Travel & Leisure; GEPU: global economic policy uncertainty; EEPU: European economic policy uncertainty.

of tourism companies in Europe is vulnerable to rises in GEPU and as a result, stock prices will also hit from the uncertainty. GEPU is considered to reflect the global condition of the economy, uncertainty, and policy-related matters as well as market participants' concern about the global uncertainty levels (Yu et al., 2018). As the world is becoming more and more integrated financially, European stock markets are attracting larger number of investors globally. Therefore, rising GEPU will generate negative effects for investors and potentially decrease the stock prices. Based on these arguments, we developed the second hypothesis as follows:

H2: An increase in GEPU has a negative effect on STOXX T&L index performance.

Table 1 presents the descriptive statistics on the study variables. The monthly returns on STOXX T&L (RSTOXX T&L) index are rather volatile, ranging from −20% to 18%. STOXX T&L monthly average return is 0.4% for the examined 20 years. Although monthly average change in classic GEPU, GEPU1, is 2.4%, the change in European EPU is 3.7%.

The unit root tests for the variables are presented in Online Appendix. Augmented Dickey–Fuller (ADF) (Dickey and Fuller, 1979) test and Phillips–Perron (PP) (Phillips and Perron, 1988) test reveal that time series of our main explanatory variables, EEPU and GEPU, as well as the control variables except inflation rates are not stationary. Thus, focusing on the STOXX T&L index monthly returns, we use inflation rates and compute and use the monthly percentage changes on EEPU and GEPU (%EEPU and %GEPU, respectively), interest rates (%INT), oil prices (%OIL), M2 money supply (%M2), and production index of consumer goods and manufacturing goods (%IPC and %IPM, respectively). Examining the effects of monthly percentage

changes, rather than the raw levels, on the STOXX T&L stock returns enables us to observe what happens when a higher (or lower) level of uncertainty than the previous period is realized.

Table 2 presents the correlation matrix of Pearson correlation coefficients among the employed variables. The correlation between STOXX T&L index returns and employed uncertainty variables, GEPU1 and EEPU, is negative (around -36%) and significant at 1% level. Correlation between the (GEPU1) and the EEPU is substantially high (78%), which is not surprising considering the fact that both variables are highly interrelated to each other. Two alternatives in the measurement of Global EPU, GEPU1 and GEPU2, produce close variations in the variables, reflected in very high correlation (97%). Correlations among explanatory variables are in general low except few couples, that is, between changes in oil prices and inflation (32%) and between changes in EEPU and changes in production indices (40%). However, variance inflation factor (VIF) values in all regressions do not exceed 1.25, suggesting that a multicollinearity problem does not exist.

We conduct OLS regression estimations using various models, to inquire the impact of changes in both EEPU and GEPU on STOXX T&L index returns. As a first model, we run a univariate regression presented in equation (1). Next, we incorporate the aforementioned control variables, depicted in equation (2). In a third model, we also consider for year fixed-effects, which enables us to examine the same relationship after excluding any time effects on STOXX T&L index returns. Finally, we replace time fixed effects with a dummy variable to represent 2007–2008 crisis, which equals one for the months in 2007 or 2008, and zero otherwise.[2] Models 3 and 4 estimate the specified regressions in equations (3) and (4), respectively

$$\text{RSTOXX T\&L}_t = \alpha_0 + \alpha_1 \text{EEPU}_t + \varepsilon_t \tag{1}$$

$$\begin{aligned}\text{RSTOXX T\&L}_t = {} & \alpha_0 + \alpha_1 \text{EEPU}_t + \alpha_2 \text{INFLATION}_t + \alpha_3 \text{OIL}_t + \alpha_4 M2_t + \alpha_5 \text{INTEREST}_t \\ & + \alpha_6 \text{IPM}_t + \varepsilon_t\end{aligned} \tag{2}$$

$$\begin{aligned}\text{RSTOXX T\&L}_t = {} & \alpha_0 + \alpha_1 \text{EEPU}_t + \alpha_2 \text{INFLATION}_t + \alpha_3 \text{OIL}_t + \alpha_4 M2_t + \alpha_5 \text{INTEREST}_t \\ & + \alpha_6 \text{IPM}_t + \text{Year.Fixed.Effects} + \varepsilon_t\end{aligned} \tag{3}$$

$$\begin{aligned}\text{RSTOXX T\&L}_t = {} & \alpha_0 + \alpha_1 \text{EEPU}_t + \alpha_2 \text{INFLATION}_t + \alpha_3 \text{OIL}_t + \alpha_4 M2_t + \alpha_5 \text{INTEREST}_t \\ & + \alpha_6 \text{IPM}_t + \alpha_7 \text{CRISIS.dummy}_t + \varepsilon_t\end{aligned} \tag{4}$$

where RSTOXX T&L$_t$ is the return on STOXX T&L index on month t; EEPU$_t$ is the change in EEPU at month t; INFLATION$_t$, OIL$_t$, $M2_t$, INTEREST$_t$ and IPM$_t$, are the month t values for the control variables explained in this section. Next, we run the same models in examining the impact of GEPU, where our main explanatory variable, EEPU$_t$ is replaced with GEPU$_t$, the change in GEPU at month t. We conduct Harvey-Collier (HC) (Harvey and Collier, 1977) linearity test on the regressions, approving the use of our linear models. Resulting HC values vary between 0.24 and 0.92, none being significant at 10% level. On the other hand, observing heteroscedasticity in the models, indicated by Breusch–Pagan test, we report White's heteroscedasticity robust standard errors in all analyses.

Findings

The regression analysis results, shedding important light on the association between the changes in the EPU level and RSTOXX T&L index, are presented in Tables 3 and 4. Although Table 3 reports

Table 2. Correlation matrix.

	RSTOXX T&L	GEPU1	GEPU2	EEPU	INFLATION	OIL	M2	INTEREST	IPM	IPC
RSTOXX T&L	1									
GEPU1	−0.367***	1								
GEPU2	−0.362***	0.974***	1							
EEPU	−0.359***	0.781***	0.708***	1						
INFLATION	0.009	−0.058	−0.075	0.024	1					
OIL	−0.098	−0.108*	−0.086	−0.032	0.323***	1				
M2	0.061	0.032	0.021	−0.01	0.185***	−0.134**	1			
INTEREST	−0.074	0.190***	0.184***	0.173***	0.029	0.069	−0.005	1		
IPM	−0.182***	0.287***	0.270***	0.407***	0.167**	0.048	0.029	0.004	1	
IPC	−0.190***	0.282***	0.268***	0.394***	0.116*	0.044	−0.033	0.018	0.982***	1
CCI	0.332***	−0.173***	−0.174***	−0.163**	0.002	0.143**	−0.069	0.129**	0.015	0.005

Note: Presents Pearson's correlation coefficients. RSTOXX T&L is the monthly return on STOXX T&L price index. GEPU1 is the monthly % change in global EPU index while GEPU2 is the same one adjusted for PPP; EEPU is the monthly % change in EEPU index all developed by Baker et al. (2016) and Davis (2016). INFLATION is the monthly inflation rate for the Euro area. OIL is the monthly % change in Europe Brent oil spot price. M2 is the monthly % change in M2 money supply in Euro area. INTEREST is the monthly % change in Euro area money market interest rates. IPM and IPC are monthly % changes in production indices of manufacturing goods and consumer goods, respectively. CCI is the monthly % change in consumer confidence index. Monthly data covers the time span of 1997-2016. *, **, and *** present significance at 10%, 5%, and 1% levels, respectively. The VIF for all variables is lower than 1.25 in the regressions.

VIF: variance inflation factor; RSTOXX T&L: returns on STOXX Europe 600 Travel & Leisure; GEPU: global economic policy uncertainty; EEPU: European economic policy uncertainty.

Table 3. Impact of EEPU on Stoxx T&L index returns.

	Model 1	Model 2	Model 3	Model 4
Constant	0.007**	0.005		0.008*
	(0.003)	(0.004)		(0.005)
EEPU	−0.074***	−0.071***	−0.065***	−0.068***
	(0.016)	(0.017)	(0.018)	(0.019)
INFLATION		0.856	1.136	0.983
		(0.875)	(0.879)	(0.863)
OIL		−0.076*	−0.093**	−0.083*
		(0.048)	(0.049)	(0.045)
M2		0.266	0.519	0.499
		(0.541)	(0.551)	(0.525)
INTEREST		−0.003	−0.001	−0.003
		(0.013)	(0.017)	(0.015)
IPM		−0.021	−0.031	−0.026
		(0.037)	(0.039)	(0.039)
CRISIS				−0.039***
				(0.013)
Time fixed effects	No	No	Yes	No
No of Obs.	240	240	240	240
Adjusted R^2	0.1253	0.1249	0.1542	0.1621
F-statistic	35.35***	6.684***	2.683***	7.607***

Note: The table presents the regression results of the relationship between EEPU and STOXX T&L index. The dependent variable, RSTOXX T&L is the monthly return on STOXX T&L price index. EEPU is the monthly % change in EEPU index, developed by Baker et al. (2016). INFLATION is the monthly inflation rate for the Euro area. OIL is the monthly % change in Europe Brent oil spot price. M2 is the monthly % change in M2 money supply in Euro area. INTEREST is the monthly % change in Euro area money market interest rates. IPM is the monthly % change in the production index of manufacturing goods. CRISIS is a dummy variable, being equal to 1 for the years, 2007 and 2008; 0 for the other years. Monthly data cover the time span of 1997–2016. *, **, and *** present significance at 10%, 5%, and 1% levels, respectively. Standard errors for each coefficient are reported in parentheses in the even numbered lines.

the impact of EPU specifically in Europe on RSTOXX T&L, Table 4 provides information on the effect of global economic uncertainty onR STOXX T&L.

As reflected from the first column of Table 3, EEPU has a negative effect on the index returns that is significant at 1% level. For instance, model 1 coefficients suggest that 10 percentage points increase in the monthly change in EEPU expectedly results in an approximate 0.74 percentage point decrease in RSTOXX T&L index. After controlling for the changes in various macroeconomic variables specified in model 2, the EEPU coefficient is still negative and highly statistically significant (-0.071, $p < 0.01$). As reported in the last two columns of Table 3, including year fixed effects (model 3, EEPU of -0.065; $p < 0.01$) or considering for the potential effects of 2007–2008 crisis (model 4, EEPU of -0.068; $p < 0.01$) does not alter the finding on the solid impact of the changes in European uncertainty on STOXX T&L index stock returns.

Although the effects of both the GEPU and EEPU are negative and statistically significant at 1% level in all models, GEPU has a greater impact in magnitude. According to the results of Table 4, 10 percentage points increase in the monthly change in GEPU expectedly results in an around 1 percentage point decrease in STOXX T&L index stock returns.

Table 4. Impact of global EPU on STOXX T&L index returns.

	Model 1	Model 2	Model 3	Model 4
Constant	0.007*	0.004		0.007
	(0.003)	(0.004)		(0.004)
GEPU1	−0.099***	−0.097***	−0.090***	−0.093***
	(0.021)	(0.023)	(0.023)	(0.023)
INFLATION		0.429	0.727	0.567
		(0.910)	(0.910)	(0.894)
OIL		−0.083*	−0.102**	−0.089*
		(0.049)	(0.051)	(0.046)
M2		0.565	0.813	0.787
		(0.518)	(0.545)	(0.504)
INTEREST		0.001	0.002	0.001
		(0.015)	(0.021)	(0.018)
IPM		−0.035	−0.043	−0.040
		(0.037)	(0.038)	(0.038)
CRISIS				−0.038***
				(0.014)
Time fixed effects	No	No	Yes	No
No of Obs.	240	240	240	240
Adjusted R^2	0.1314	0.1431	0.1681	0.1784
F-statistic	36.99***	7.622***	2.857***	8.385***

Note: The table presents the regression results of the relationship between GEPU and STOXX T&L index. The dependent variable, RSTOXX T&L is the monthly return on STOXX T&L price index. GEPU1 is the monthly % change in GEPU index, developed by Davis (2016) following Baker et al. (2016). INFLATION is the monthly inflation rate for the Euro area. OIL is the monthly % change in Europe Brent oil spot price. M2 is the monthly % change in M2 money supply in Euro area. INTEREST is the monthly % change in Euro area money market interest rates. IPM is the monthly % change in the production index of manufacturing goods. CRISIS is a dummy variable, being equal to 1 for the years, 2007 and 2008; 0 for the other years. Monthly data covers the time span of 1997–2016. *, ** and *** present significance at 10%, 5% and 1% levels, respectively. Standard errors for each coefficient are reported in parentheses in the even numbered lines.

Tables 3 and 4 also reflect that a rise in oil prices results in a decrease in index returns. In terms of the macroeconomic variables, only oil price has a negative and statistically significant effect on the stock prices of listed tourism companies in Europe (e.g. Table 3, model 3, OIL= -0.093; $p < 0.05$). High operating costs due to rising oil prices have a direct impact on the travel and leisure sectors. This finding is in line with Chen (2013) and Chen et al. (2012) who analyze the impact of oil prices on US hospitality index returns and Japanese hotel stock returns, respectively. Chen (2013) show that hospitality index returns are more sensitive to changes in oil price than the overall market return. More specifically, it is shown that oil price changes have the highest effect on airline, hotel, and travel and leisure index returns. In addition to oil prices, we report that 2007–2008 crisis has a negative impact on the index returns (e.g. Table 3, model 4, CRISIS = -0.039; $p < 0.01$). This final finding is in line with the large negative growth in service sector around 2007–2008 crisis (Rao and Reddy, 2015).

Changes in the level of EPU stand as a prominent factor in the RSTOXX T&L returns. The impact is robust in all models, even after controlling for additional macroeconomic variables. Changes in both European uncertainty and global uncertainty have a highly statistically significant effect on RSTOXX T&L index.

Moreover, the reported adjusted R^2 values support the fact that EPU is a powerful explanatory power in the index returns. This is observable from the univariate model, Table 4, model 1, with GEPU (Table 3, model 1, EEPU) being the independent variable has an adjusted R^2 value of 13.1% (12.5%). Incorporating various control variables including macro explanatory factors (model 2), year fixed effects (model 3), and a crisis dummy (model 4) results in a rather moderate increase in the overall explanatory power of models. For instance, for the case of Global EPU, note in Table 4 the rather low improvement in the adjusted R^2 values of models 2 to 4 (adjusted R^2 values of 14.3%, 16.8%, and 17.8%, respectively).

Next, we provide several robustness tests on the examined relations, documented in Table 5. The first robustness check GEPU2—an alternative calculation to GEPU1, considering the PPP adjustment for the GEPU—yields identical results. Also, replacing the production index of manufacturing goods with that of consumer goods does not alter the findings. Financial economics literature is not able to document a strong contemporaneous relationship between hospitality industry returns and macroeconomic variables (Singal, 2012). Our findings provide supportive evidence on the limited explanatory power of macro-economic variables. Based on this argument, we introduce consumer confidence index into the analysis. It is found that consumer confidence index has a positive and statistically significant effect on stock returns of tourism companies in Europe and the explanatory power of the model rises. This shows that consumer confidence index has an important role on stock returns (Demir and Ersan, 2018; Singal, 2012). Finally, using a first-order difference level of the variables provides very similar results to the percentage change variables. After applying variable differences, the coefficient of GEPU is even more intensive in absolute terms (−0.122).

We further examine the impacts of EPU on various quantiles of the index returns via quantile regressions. Figure 1 plots the univariate regression lines of EEPU (panel A) and GEPU (panel B) estimating each quantile of STOXX T&L index returns (19 quantiles from 5% to 95%). The observable differences in the slopes of regression lines are also reported in Table 6. The table presents coefficients of EEPU and GEPU in models stated in equations (1) and (2) in section "Literature review."[3] The coefficients of EPU variables monotonically increase with the applied quantile. For example, in the univariate model (model 1), coefficient of EEPU rises from −0.124 in the 5% quantile regression to −0.034 in the 95% quantile regression. Based on the same model, GEPU coefficient consistently increases with the quantiles (−0.150 in 5%, −0.122 in 10%, −0.105 in 50%, −0.045 in 90%, −0.039 in 95%). Applying multivariate model with the inclusion of control variables (model 2) yields identical pattern. This pattern implies that the negative impact of EPU on the RSTOXX T&L index is larger in magnitude for the lower return quantiles. Specifically, lower index returns are associated with larger impact of EPU. In other words, EPU effect in the index returns is more substantial in the months with low returns. This fact is promising and suggests that uncertainty is a major determinant in the times the sector performs poor.

Stock returns forecasting challenge is especially relevant to stock returns prediction of tourism and leisure industry—one of the most sensitive industries to systemic risk in the economy. We confirm that claim by estimating the impact of EEPU index on the European STOXX 600 index (the proxy for the European market portfolio). We observe a higher negative intensity effect of EEPU on the stock returns of tourism and leisure industry index, STOXX T&L, than on the entire market returns, STOXX (−0.057 till −0.063; $p < 0.01$, not presented in the paper).[4]

Therefore, the findings of this study could significantly assist the stock market investors in terms of forecasting the behavior of tourism index when EPU changes. The negative and highly

Table 5. Robustness checks on the impact of EPU on Stoxx T&L index returns.

	Model 1	Model 2	Model 3	Model 4	Model 5
GEPU1		−0.090***	−0.079***	−0.122***	
		(0.023)	(0.017)	(0.036)	
GEPU2	−0.085***				
	(0.021)				
EEPU					−0.076***
					(0.021)
INFLATION	0.625	0.665	0.640	0.26	0.807
	(0.924)	(0.897)	(0.938)	(1.527)	(1.453)
OIL	−0.094*	−0.102**	−0.117***	−0.175	−0.14
	(0.050)	(0.050)	(0.042)	(0.135)	(0.134)
M2	0.811	0.767	0.691	0.029*	0.024
	(0.551)	(0.557)	(0.541)	(0.015)	(0.015)
INTEREST	0	0.002	−0.014	3.697	2.544
	(0.023)	(0.021)	(0.020)	(4.653)	(4.279)
IPM	−0.047*		−0.059*	−0.051	−0.027
	(0.037)		(0.034)	(0.067)	(0.068)
IPC		−0.054			
		(0.050)			
CCI			10.09***		
			(2.711)		
Time fixed effects	Yes	Yes	Yes	Yes	Yes
No of Obs.	240	240	240	240	240
Adj. R^2	0.1616	0.1682	0.2156	0.1384	0.1288
F-statistic	2.772***	2.859***	3.433***	2.477***	2.365***

Notes: The table presents the regression results of the relationship between EPU and STOXX T&L index. Models replicate our base model presented by equation (3), in "Literature review" section, by altering various parts. First model replaces the Global EPU variable with the one that is adjusted for PPP. Model 2 replicates the analysis with IPM variable instead of IPC. Model 3 adds CCI as an additional control variable. Last two columns utilize first differenced levels of explanatory variables instead of taking the percentage change in these variables. For the first three models, variables are in % changes. The dependent variable, RSTOXX T&L is the monthly return on STOXX Europe 600 Travel & Leisure Price Index. GEPU1 is the monthly % change in global EPU index; and GEPU2 is GEPU1 adjusted to PPP; EEPU is the monthly % change in European EPU index, all developed by Baker et al. (2016) and Davis (2016). INFLATION is the monthly inflation rate for the Euro area. OIL is the monthly % change in Europe Brent oil spot price. M2 is the monthly % change in M2 money supply in Euro area. INTEREST is the monthly % change in Euro area money market interest rates. IPM and IPC are monthly % changes in the production index of manufacturing goods and consumer goods, respectively. CCI is the monthly % change in consumer confidence index. For the last two models, all stated variables are in first differenced, rather than % changes. Differenced M2 variable is in billion Euro. *, ** and *** present significance at 10%, 5% and 1% levels, respectively. Standard errors for each coefficient are reported in parentheses in the even numbered lines.

statistically significant coefficient of EPU measures on RSTOXX T&L index demonstrates that increasing EPU would probably decrease investor's returns on tourism and leisure industry. In light of diminish in the EPU, investors (acknowledging its negative effect on returns) expect stock return to increase—thereby, EPU decrease incentivizes investors to invest more in tourism industry stocks. Moreover, our findings also suggest that one beneficiary outcome that may arise when governments take the necessary steps to decrease uncertainty is the extra value added to the economy by a stronger travel and leisure sector.

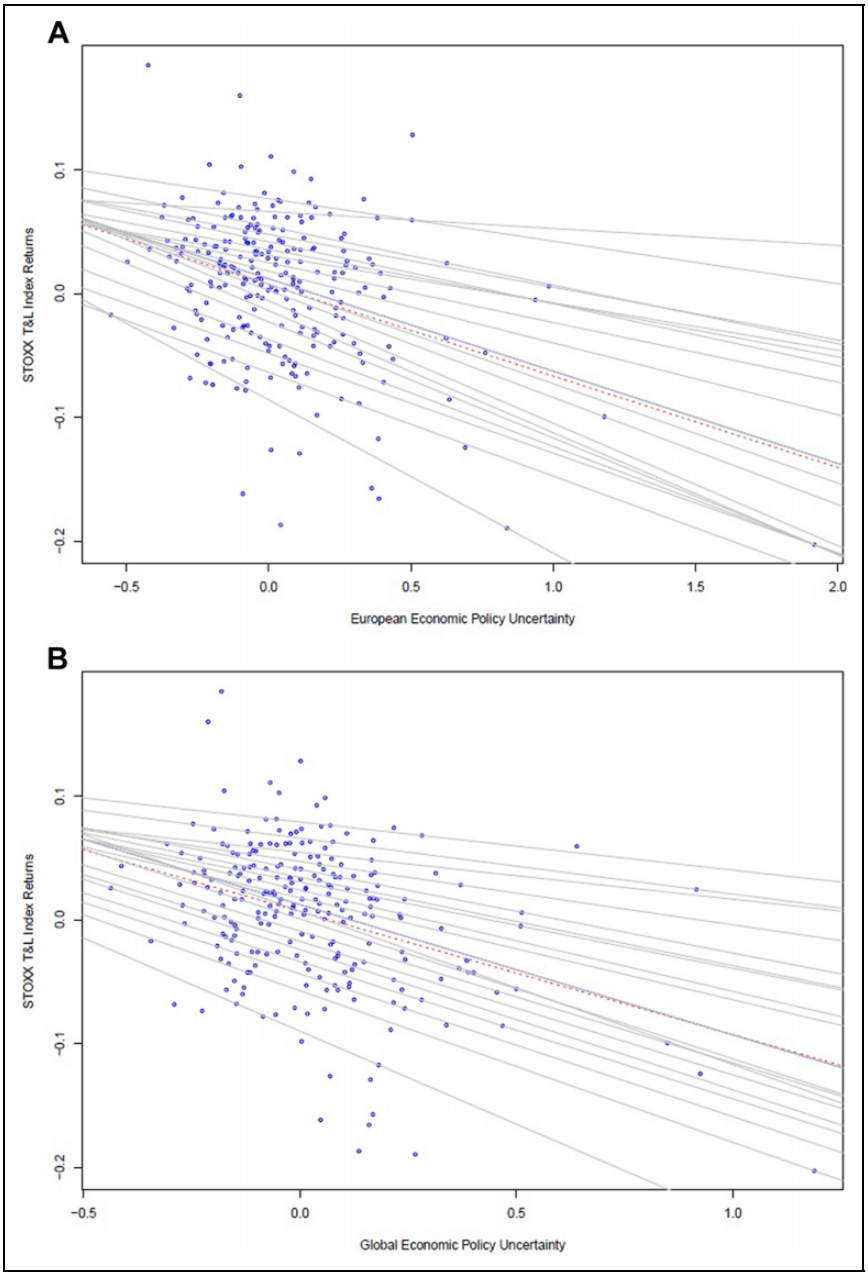

Figure 1. Quantile regression lines. The figure plots the regression lines for the univariate model where STOXX T&L index monthly returns is the dependent variable and monthly percentage changes in EEPU (GEPU) is the independent variable in panel A (panel B). RSTOXX T&L: returns on STOXX Europe 600 Travel & Leisure; GEPU: global economic policy uncertainty; EEPU: European economic policy uncertainty.

Table 6. Impact of EPU on the STOXX T&L index return quantiles.

		5%	10%	25%	50%	75%	90%	95%
EEPU	Model 1	−0.124	−0.084	−0.094	−0.074	−0.050	−0.014	−0.034
	Model 2	−0.108	−0.073	−0.090	−0.057	−0.049	−0.022	−0.033
GEPU	Model 1	−0.150	−0.122	−0.113	−0.105	−0.067	−0.045	−0.039
	Model 2	−0.118	−0.089	−0.111	−0.082	−0.075	−0.045	−0.066

Notes: The table presents the quantile regression results regarding the relationship between EPU and STOXX T&L index. GEPU is the monthly % change in global EPU index; EEPU is the monthly % change in EEPU index, developed by Baker et al. (2016) and Davis (2016). Model 1 and model 2 are the models presented by equations (1) and (2), in "Literature review" section. Each column reports coefficients of EEPU or GEPU from a separate quantile regression. For example, 5% is for EPU variable coefficients from 4 regressions (2 with EEPU and 2 with GEPU) where the dependent variable is 5% quantile of STOXX T&L index returns. For the sake of brevity, coefficients of other variables in Model 2 are not reported. All presented coefficients are significant at 1% level, in line with the earlier regressions.

Conclusion

A major challenge of financial economics is to forecast stock returns, based on relevant pricing factors representing stock returns' risks. The finance literature clearly demonstrates that the use of various classical macroeconomic factors often fails to predict stock returns with statistical significance. A novel pricing factor for tourism and leisure companies is the EPU index developed by Baker et al. (2016). The special construction of EPU measures is based upon concurrent ongoing measures of EPU in the media, taxation, and the variation in the forecasts of economic variables.

The high sensitivity of tourism and leisure index returns toward uncertainty suggests EPU measures as an ideal candidate for a new explanatory variable for stock returns. We examine the forecasting power of EPU and other macroeconomic variables on the European tourism and leisure industry index (STOXX T&L) monthly returns in the period of 1997–2016. The results clearly show a negative and highly statistically significant impact of concurrent EPU measures (both EEPU and GEPU) on the travel and leisure stock index. The results are robust to various GEPU measures and substitutional macroeconomic variables. In this sense, the study incentivizes investors to consider EPU indices as highly statistically significant variables, capturing relevant risk factors for the accurate forecasting of travel and leisure stocks' returns. In terms of the macroeconomic variables, we find that only oil price has a negative and statistically significant effect on the stock prices of listed tourism companies in Europe while consumer confidence index has a significant effect on the stock prices. Further studies can consider the impact of EPU on the performance of tourism and hospitality companies.

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Supplemental material

Supplemental material for this article is available online.

Notes

1. Australia, Brazil, Canada, Chile, China, France, Germany, India, Ireland, Italy, Japan, Mexico, the Netherlands, Russia, South Korea, Spain, Sweden, the United Kingdom, and the United States.
2. We replicate our analysis with a CRISIS dummy variable based on three alternative crisis period definitions: January 2007 to September 2008 and July 2007 to September 2008 (following Ryan, 2008 and Erkens et al., 2012); and July 2007 to December 2008 (following Beltratti and Stulz, 2012). Thus, CRISIS is equal to one for the months within a specified crisis period and zero otherwise. The results are qualitatively same.
3. The results are similar for the remaining two models presented in equations (3) and (4). For the sake of brevity, we do not include the results.
4. Detailed results are available upon request.

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