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Does government efficiency mitigate the effect of natural disasters on tourist arrivals

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Does government efficiency mitigate the effect of natural disasters on tourist arrivals?

Global tourism suffered its worst year in 2020 due to the widespread of COVID-19, and tourism industry related professionals are looking for efficient measures to help tourism recover. Government efficiency was mentioned as an important factor for inbound tourism, however, its mitigating effect on the performance of inbound tourism in the context of natural disasters has not been empirically researched. This study attempts to address the gap through the analysis of a panel dataset of 158 countries from 2002 to 2018. The results illustrate the mitigating effect of government efficiency on the negative impact of natural disasters on inbound tourist arrivals. On one hand, government efficiency can be a pull factor for attracting inbound tourist arrivals in the condition of natural disasters; on the other hand, government efficiency can assist in reducing the negative impact of natural disasters on inbound tourist arrivals through its moderating effect. Based on the findings, we provide practical implications for destination marketing organizations and policy makers.

Keywords: government efficiency; natural disaster; mitigating effect; inbound tourism

1. Introduction

Owing to their increasing number, natural disasters are frequently studied and mentioned in tourism research (Rosselló, Becken & Santana-Gallego, 2020). In 2019, at least 396 major natural disasters occurred worldwide, affecting 95 million people and causing US$130 billion economic loss (Centre for Research on the Epidemiology of Disasters, 2020). More importantly, natural disasters result in drastic decreases in international trip bookings (Walters, Mair & Ritchie, 2015). In susceptible environments, natural disasters are inevitable and may occur anywhere (Faulkner, 2001). Especially, the ongoing COVID-19 has dragged into a disaster turbulence in 2020, and caused the loss on tourism industry among various countries (UNWTO, 2020a). After the unprecedented 73% drop in international tourism recorded in 2020 under the impact of the COVID-19 pandemic, International tourism further weakens in the first quarter of 2021 with a drop of 85% over the same period of 2019 predicted by UNWTO, resulting in a loss of some 260 million international arrivals when comparing to pre-pandemic levels (UNWTO,2021). However, considering the situation in 2020, the effective intervention and measures to address the spread of COVID-19 caused China to be the only major economy with positive economic growth and takes the lead in the global recovery in 2020 (IMF, 2020). Therefore, we put forward the question that does government efficiency mitigate the effect of natural disasters on tourist arrivals?

For the past two decades, many studies have attempted to discover effective disaster recovery factors to mitigate the negative impacts of natural disasters on tourism (Horng & Tsai, 2010; Hystad & Keller, 2008). Existing literature has investigated how physical reconstruction (Ritchie & Jiang, 2019), business continuity (Tyler & Sadiq, 2019), communication and media management (Tsai & Chen, 2010), destination images (Hsu & Song, 2013), and marketing approaches (Aliperti, Rizzi & Frey, 2018) assisted in tourism mitigation and recovery. However, most studies focused on micro

factors, and little effort has been made to discuss how macro factors affect the negative impacts of natural disasters on inbound tourist arrivals.

Recently, some studies that focused on international tourism have identified political factors at country level as critical macro factors that enhances growth performance of tourism (Crompton, 1979; Uysal & Jurowski, 1994). For instance, government-related factors, such as political stability (Chasapopoulos, Butter, & Mihaylov, 2014; Habibi, 2017), political freedom (Demir & Gozgor, 2018; Gholipour, Tajaddini, & Al-mulali, 2014; Saha, Su, & Campbell, 2016), government efficiency (Detotto, Giannoni, & Goavec, 2021) have been demonstrated positively impact tourism development. However, it is still a question that needs to be addressed empirically that whether government efficiency can play a positive role in mitigating the damage of disasters on tourism following the disasters.

To address the research gap and to response to the call for exploring the relationship between government measures and tourism disaster management by Ritchie and Jiang (2019) ,this study attempts to examine the moderating effect of government efficiency on the negative impact of natural disasters on inbound tourism by adopting panel data techniques and several robustness checks on a basis of the unbalanced panel data of 158 countries over the period of 2002–2018.The results provide additional knowledge on the role of government efficiency in disaster mitigation management.

2. Literature Review

2.1 Mitigating the negative impact of natural disasters on tourism

Tourism is one of the most vulnerable industry in light of disasters (Rosselló et al., 2020). Natural disasters, such as earthquakes, tsunamis, and storms, result in physical destruction (e.g., deaths,

infrastructure destruction, scenic attraction damages) and psychological harm, including grief, anxiety, and fear for the residents and potential tourists (Huang, Tseng & Petrick, 2008; CRED, 2020). During the last decade, many studies analysed the post-disaster tourism mitigation and recovery measures from the aspects of physical construction, business continuity, media communication, destination image and reputation, and tourist behaviours (Mair, Ritchie & Walters 2016; Ritchie & Jiang, 2019). For instance, some studies argued that a country can improve the capacity in natural disaster mitigation with better construction standards and resiliently designed infrastructures, such as buildings, roads, and public facilities (Bosher, 2014). Tyler and Sadiq (2019) investigated the relationship between community-level mitigation activities and local business continuity by conducting semi-structured interviews with business owners and government officials after Hurricane Irma. Their results indicated that, to a certain extent, businesses can enjoy the benefits of disaster mitigation and recovery if the local community had participated in the Community Rating System program, which was a disaster reduction program (e.g., providing information on disaster protection measures and working with businesses on disaster recovery planning).

While physical reconstruction is crucial, media communication is another effective measure for disaster mitigation of affected areas if it provides accurate and timely information for potential tourists, which can correct the negative destination image, and restore the confidence of tourists for visits. Examining the 2004 Indian Ocean Tsunami, Pearlman and Melnik (2008) found the disaster reduction and market recovery strategy for Maldives was effective. Seeking to rebuild confidence and correct misperceptions of risk and uncertainty immediately following the disaster, messages disseminated to customers and stakeholders were united and instant through an elaborated communication strategy in the case of Maldives. Walters et al. (2015) conducted a

quantitative study to understand the perceptual and behavioural responses of tourists following the 2011 Queensland Floods, and they suggested countries that suffer natural disasters should mitigate the negative impacts by restricting the disaster areas to the exact location of the affected areas through media reports and recommending areas not affected by the natural disasters as alternative destinations.

Although previous literatures have provided a great many measures to protect tourism industry against disasters, however, it should be noticed that the outbreak of COVID-19 in 2020 has left the international and domestic tourism industries paralyzed for a such a long period, and the consequences of different mitigating measures varied across countries (Khalid, Okafor & Burzynska, 2021). Although the infrastructures such as accommodations, transportation and communications were not damaged during the pandemic, the damage control measures following the outbreak of the virus, the cognition of the disaster management efficiency, and the fear and perception of the risk of destination countries influenced the travel decisions of tourists. By far, the disaster is still on-going, and it is still an unknown question that when the disaster will be over. Therefore, there is a need to further explore the disaster mitigation and tourism recovery measures for tourism industry when it faces a disaster like COVID-19. To our knowledge, current literatures mainly focus on micro factors that may assist in disaster mitigation and tourism recovery; however, the role of macro factors (e.g., government efficiency) has not been investigated. Moreover, previous literature studying tourism mitigation and recovery measures were mainly based on a single disaster occurrence in a country (Haque & Haque, 2018; Smith & Henderson, 2008), and the mitigation measures have not been tested on a basis of global data (Ritchie & Jiang, 2019). Hence, to fill the research gap, knowledge about the effect of macro factors on the negative impact of natural disasters on inbound tourism requires further expanded.

2.2 Macro factors in tourism

Macro factors are powerful exterior forces that influence the performance of an industry and the development of an economy (Porter, 1985). Generally, macro factors are comprised of four forces: economic, socio-cultural, technology, and political. They have been researched in studies of different industries (De Vita, 2014; Gnatzy & Moser 2012; Yang, Lin & Han, 2010). For example, Brunnhofer, Gabriella, Schöggl, Stern and Posch (2020) investigated the driving forces that impacted the business model transformation of the pulp and paper industry in Europe. Their findings indicated that macro factors were vital to the success of international business.

In the tourism industry, macro factors are important forces affecting the tourism demands (Gholipour, Tajaddini & Nguyen 2016; Rehman Khan, Qianli, SongBo, Zaman & Zhang, 2017; Vietze, 2012). Munro and Yeoman (2005) employed an economic model to forecast the volume of Scottish tourism and found that the economic performance of a source market country impacted tourist spending, which further influenced tourism demands. Gholipour et al. (2016) demonstrated that the happiness level of a country, as well as other cultural and heritage factors, is a positive and significant attribute that attracts international tourists. For the COVID-19, the medical technology (COVID-19 vaccine) is now being expected as an important way to restore tourists' confidence and help inbound tourism recover for many countries (UNWTO, 2020b).

Furthermore, many studies have examined the effect of political factors. Political stability is always associated with safety and security issues for a country, and it is one of the most critical factors that tourists may consider in planning travel destinations (Habibi, 2017; Hanon & Wang, 2020). Lepp and Gibson (2003) identified political insecurity and political and religious dogma as perception risks that may influence the likelihood of visiting. They examined the risk perception differences between different types of tourists and provided risk management strategies, including

perception control and market segmentation. More recently, political freedom (freedoms for expressing opinions or beliefs and participating in the political process) was introduced in an empirical analysis to test whether it influenced inbound tourism (Saha et al., 2016). The authors argued that the increase of civil liberty in one country will lead to the increase of the volume of inbound tourists.

3 The mitigating effect of government efficiency

Given the importance of political factors, some literatures have identified the positive roles of the government policies, which includes advancing the economic growth of the destination (Rios-Morales, Gamberger, Jenkins, & Smuc, 2011), promoting tourism investment, drive the construction of related infrastructure (De, 2012), attracting foreign investment, enhancing and stabilizing the confidence of international investors (Oh & Oetzel, 2011), attracting international rescue and economic support (Strömberg, 2007), increasing the income of tourism enterprises (Carvalho, Marquez, & Diaz-Mendez, 2018) and strengthening the competitiveness of destinations (Lee, 2015; Kubickova & Martin, 2020). Moreover, a few recent studies empirically corroborated that government policies can mitigate the negative effect of natural disasters on tourism industry. For example, in an investigation of the effect of the support of government on hospitality industry in Egypt, Salem, Elbaz, MSc and Ghazi (2021) provided empirically evidence that government policies (providing grants, subsidies, fiscal assistance and loans and supporting tourism industry with disaster management equipment and technology) can mitigate the detrimental influence of the epidemic.

As such, government policies can be a key factor to reduce the harmful effects of disasters, however, it should be mentioned that the effectiveness of government policies are influenced by the way government formulate and implement the policies. A recent study concerning government

policies and the outlook of tourism recovery amid a pandemic showed that government efficacy may induce an optimistic view of economic recovery through social trust (Fong, Law & Ye, 2021), which is consistent with the statement of The World Bank (2014) that a government with well performance in a disaster may increase public confidence in economy recovery. Although the positive relationship between government efficacy and tourism recovery is projected from the subjective view, whether government efficiency can mitigate the negative impacts of natural disasters has not been tested through the hard data.

Based on the review of previous literatures, we proposed that a country with an effective government can counteract the negative impact of natural disasters on tourism from the supply aspect. First, an efficient government can reduce the physical loss through efficient policies and measures. For instance, an efficient government can resume normal tourism operations rapidly by prioritizing and leading resource mobilization to recover physical infrastructure damaged by natural disasters (Lee & Hyun, 2016). Besides, a efficient government can create a stable and supportive environment for business continuity for private sectors and investors through subsidies and tax reduction or other economic rebound policies following a disaster (Fombrun & Shanley, 1990; Lee & Hyun, 2016). Additionally, an efficient government can maintain a safe and secure post-disaster tourism environment (safe from crimes), which is critical to the image of the affected country and the demand of inbound visits (Detotto et al., 2021; Ghaderi, Saboori & Khoshkam, 2017; Kubickova & Martin, 2020; Liu, Cheng & OuYang, 2019).

We also argue that a country with an efficient government can mitigate the negative impacts of natural disasters on inbound tourists from the demand aspect. First, an efficient government can address tourists' risk perceptions by implementing effective measures to reduce the constant damage of natural disasters (Hystad & Keller, 2008). Second, an efficient government can create a

positive image, which will enhance tourists' perception that the government of the affected destination is capable to speed up post-disaster recovery (Liu et al., 2019; Williams & Baláž, 2015). Third, by correcting false and exaggerated information of security issues, increasing information transparency, and providing more objective, informative, instant, and consistent information of the affected areas for the public following natural disasters (Hystad & Keller, 2008; Lee & Hyun, 2016), an efficient government can win the trust of potential tourists. Last, an efficient government is credible and it will commit itself to protect the safety of the tourists. To justify our hypothesis, this study aims to investigate the relationship among natural disasters, government efficiency and inbound tourism performance.

3. Methodology

3.1 Baseline model

Based on the above discussion, we developed the following model:

$$IT = f(NDS, GOV, CON)$$

where IT is the performance of inbound tourism, NDS is the severity of natural disaster, GOV indicates government efficiency, and CON represents the control variables.

3.2 Data and Variables

We used the annual data of 158 countries from 2002 to 2018 compiled from three main sources: the United Nations World Tourism Organization (UNWTO), the Emergency Events Database (EM-DAT) provided by the Centre for Research on the Epidemiology of Disasters (CRED), and the World Bank's Worldwide Governance Indicators (WGI) Database. Our sample were selected

based on the availability of the corresponding data.

Dependent Variable

The dependent variable is the performance of inbound tourism. We followed Chang, Khamkaew, and McAleer (2012) and Friedman and Gürce (2020) and used the data of inbound tourist arrivals as the proxy for inbound tourism (IT). The data of tourist arrivals were obtained from UNWTO. The dataset from UNWTO had missing values because the members of UNWTO use different statistical systems and varying definitions for inbound tourist arrivals. Following Yang, Liu, and Li (2019), we selected two data statistics, the statistics of international arrivals of non-resident tourist at national borders (by country of residence and nationality) and the international arrivals of non-resident visitors at national borders (by country of residence and nationality). We used the second statistic when the first one is not available.

Independent Variables

To test the effect of government efficiency on inbound tourism in the context of natural disaster, we considered two independent variables: the natural disaster severity and government efficiency. The data of natural disasters were retrieved from the Emergency Events Database (EM-DAT), provided by the Centre for Research on the Epidemiology of Disasters (CRED). A disaster event should fulfil at least one of the following criterions to be recorded into EM-DAT: First, 10 or more people deaths. Second, 100 or more people affected. Third, the disaster event is declared as a state of emergency by a country, or an appeal for international assistance (EM-DAT). This study covers six types of natural disasters, including geophysical, meteorological, hydrological, climatological, biological, and extra-terrestrial, which are 9,892 disasters in total. EM-DAT has a record of more than 22,000 global major disasters, and natural disasters are measured using four common

indicators: occurrence of events, total deaths, total damage in U.S. dollars, and total number of people affected. Table 1 summarizes the global value of the four indicators from 2002 to 2018. The number of fatalities will trigger the physical and psychological perception risks for tourists, which further influence the evaluation of the severity of the natural disasters and impact tourists' travel demand (Lehto, Douglas & Park, 2008; Fareed, Meo, Zulfiqar, Shahzad & Wang, 2018). The number of fatalities is commonly used as a proxy for NDS (Rosselló, et al., 2020), which aligns with this study. Furthermore, Damage in US$ and Affected People may be influenced by other independent variables except NDS, which may lead to multicollinearity problem. In addition, considering the statistical standard of Damage in US$ and Affected People are different across countries which leads to measurement bias; hence the death number is more reliable for measuring natural disaster severity from the perspective of tourists. Therefore, we used yearly total deaths at a country caused by natural disasters for calculation.

<insert table 1. here>

For the other independent variable, we used government effectiveness (GE) to denote government efficiency. The data of government effectiveness were retrieved from the Worldwide Governance Indicators (WGI) database provided by the World Bank. GE is defined as "perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (Kaufmann, Kraay, & Mastruzzi, 2010). Based on our previous discussion, providing disaster resistance public infrastructures, designing effective policies and measures to reduce the damage of disasters and assist in recovery with effective policy implementation are important measures to reduce the detrimental impacts of natural disasters and

maintain the operation of inbound tourism industry in case of disasters. Therefore, GE was introduced for analysis (Kubickova & Martin, 2020; Liu et al., 2019). GE is measured on a scale from -2.5 to 2.5, with higher values showing higher levels of GE. Since GE had negative values, we added three to each value of GE to transform GE into positive values, and finally treated GE into logarithm forms.

Control Variables

Some commonly used economic and non-economic variables were introduced as control variables in our models to account for important features of a given country. Following previous literatures (Etzo, Massidda & Piras, 2014; Martins, Gan & Ferreira-Lopes, 2017; Seetaram, 2012; Zhang, Li & Wu, 2017), economic development level, population size, and travel cost were selected as control variables. In this study, GDP per capita (GPP) of was introduced as the proxy for the level of economic development of a country, since it is a pull force for tourists (Yang et al., 2019; Rosselló et al., 2020; Gozgor, Lau, Zeng & Lin, 2019;). The Population (POP) was controlled for the country size, because POP is a key factor associated with the severity caused by natural disasters(Gierlach, Belsher, & Beutler, 2010; Rosselló et al., 2020). We considered the exchange rate of as the proxy for travel cost (EX), since potential currency depreciation of a destination country may become a motivator for international tourists (De Vita, 2014; Seetaram, Forsyth & Dwyer, 2016; Gozgor et al., 2019; Morley, Rosselló, & Santana-Gallego, 2014). When one U.S. dollar can exchange for more destination country's currency, tourists may have more motivation to travel to the destination country, considering that the exchange rate between the currency of tourist origin country and U.S dollar is stable. The data were obtained from the World Bank's World Development Indicators. Following Gozgor et al. (2019), we transformed all values of the

variables into logarithm forms.

3.3 Model specifications

Panel data model estimation was employed to test the relationship between the dependent variable and explanatory variables. Such an analysis method enables regression analysis with dimensions of time and individual country. Combining these dimensions prepares the data better for extracting more information and variability (Baltagi, 2008). Many studies have applied panel data techniques to study natural disasters (Granvorka & Strobl, 2013; Kahn, 2005; Rosselló et al., 2020) and government efficiency (Detotto et al., 2021; Gani & Scrimgeour, 2016; Tang, 2018). Three types of common panel analytic models are constant coefficients models, random effects models, and fixed effects models. In particular, the fixed effects model is preferred when the Chi-square statistic of the Hausman test is significant. The estimation is written in the following equation:

$$\mathrm{LnIT_{it}} = \beta_0 + \beta_1 LnNDS_{it} + \beta_2 LnGOV_{it} + \beta_3 LnEX_{it} + \beta_4 LnPOP_{it} + \beta_5 LnGPP_{it} + \lambda_i + \lambda_t + u_{it} \quad (1)$$

where i=1,…, N represents the destination country, t=1,…, t is the year, Ln is the natural logarithm, λ_i and λ_t represent the individual effect and time effect respectively, and u_{it} is the error term. Inbound Tourism (IT) represents the inbound tourist arrivals of a destination country. Natural disaster severity (NDS) is measured by the total deaths caused by natural disasters in a destination country, government effectiveness denotes government efficiency (GOV) of a destination country, and EX, POP, and GPP are the exchange rate, population, and GDP per capita for a destination country, respectively.

For the purpose of understanding whether government efficiency can moderate the negative impact of natural disasters on inbound tourism, an interactive term between GOV and NDS was introduced. The second equation is as follows:

$$\mathrm{LnIT_{it}} = \beta_0 + \beta_1 LnNDS_{it} + \beta_2 LnGOV_{it} + \beta_3 LnNDS_{it} * LnGOV_{it} + \beta_4 LnEX_{it} + \beta_5 LnPOP_{it} + \beta_6 LnGPP_{it} + \lambda_i + \lambda_t + u_{it} \quad (2)$$

4. Results

Table 2 presents the descriptive statistics of all variables in log-transformed. Table 3 presents the panel regression results. We measured both fixed and random effects, and finally reported the results of fixed effect models according to the results of Hausman test, which is used for determining which model is more suitable for this study. Based on the arguments of Owusu-Gyapong (1986) and Cardellichio (1990), most researches in economics after 1980s have made choice between the Random effects model and Fixed effects model estimator on a basis of Hausman test. Specially, the researcher reports the FE estimator if the Hausman test rejects null hypothesis (Wooldridge, 2005). The results of Hausman test in this paper showed that the p-value of random effect models were not significant, hence, this study finally adopted fixed effects method for all models. Moreover, using fixed effects methods can mitigate the omitted variable bias, since the unobservable individual and time difference are considered in a panel data set (Wooldridge, 2005). Models 1-4 display the results of fixed effects models step by step, and the full model is model 4.

<insert table 2. here>

Model 1 tests the impact of control variables. As expected, the GDP per capita, population, and exchange rate all had a positive effect on inbound tourist arrivals. The coefficient for economic development, population and exchange rate are 0.61, 1 and 0.1 respectively. The positive relationships between control variables and inbound tourist flows are consistent with previous findings (Gozgor et al., 2019; Ghalia, Fidrmuc, Samargandi & Sohag, 2019; Gholipour et al., 2014; Seo, Park, & Yu, 2009).

Model 2 examines the effects of the severity of natural disasters on inbound tourism. The result indicates that fatalities of natural disasters have a negative and significant impact on inbound tourist arrivals (β= -0.015, $p<0.05$).

Model 3 examines the impact of government efficiency on inbound tourism. The findings suggest that GOV has a positive and significant effect (β= 0.636, $p<0.01$) on IT, with other variables being stable and significant. The results imply that the improvement in government efficiency will lead the increase of inbound tourist arrivals. This is in line with our prediction that government efficiency can play a role in attracting inbound tourist arrivals in the context of natural disasters.

Model 4 tests the effect of the interaction between GOV and NDS. The interaction between government efficiency and total deaths in natural disasters is positive and statistically significant (β= 0.032, $p<0.1$), which indicates that the negative impact of natural disasters on inbound tourism can be mitigated by government efficiency. That is, the influences of total deaths in natural disasters on the number of inbound tourists decreases as the government effectiveness increases. The model is stable with GDP per capita, population, and exchange rate being controlled.

<insert table3. Here>

5. Robustness checks

We verified our results by running robustness checks (Table 4). First, Model 5 tests the random effect of Model 4. The results show that the main effect of GOV on inbound tourist arrivals is still positive and significant, and so is the moderation effect of GOV on NDS.

Second, we considered regulatory quality (RQ) as a different proxy for government efficiency, which measures perceptions of the country's ability to formulate and implement effective policies and regulations that support private sector development (Kaufmann et al., 2010). The WGI was again used as the data source; regulatory quality was measured on a scale from -2.5 to +2.5, with high scores denoting high levels of regulatory quality of a formal institution. We employ the fixed effects model (Model 6) for the robustness test, and the significance of government efficiency is unchanged and stable as expected.

Third, we examined the lagged effects of government efficiency (Model 7). Lagged variable is introduced as a valid instrumental variable to treat the endogeneity issue of the model (Elhorst, 2010; Guizzardi & Mazzocchi, 2010; Yang & Fik, 2014). GOV was treated in one period lagged, since tourists may rely on the level of government efficiency of a previous period to make travel decisions. Thus, the previous period of government efficiency level may impact the inbound tourist arrivals of the next period. As shown in Model 7, the main effect and the moderation effect are stable and significant.

Fourth, following Lv (2020), we applied the estimation method of dynamic panel generalized method of moments (GMM) for a robustness check (Model 8), and introduced the lagged dependent variable (LnIT-1) as an instrument variable. The results supported that the main effect of government efficiency on tourist arrivals ($\beta=0.782$, $p<0.1$) and the mitigating role of government efficiency on the negative impacts of natural disaster ($\beta=0.029$, $p< 0.1$).

Finally, following Daude and Stein (2007), we grouped RQ and GE by aggregating them into one indicator (Syn) to measure the government efficiency of a destination, since RQ and GE capture the similar dimension of government performance, which reflects the capability of government to formulate and implement sound policies. As shown in model 9, the main effect and the moderation effect of government efficiency are stable and significant.

<insert table 4. Here>

6. Discussion

The results suggest that government efficiency has a significant and positive impact on inbound tourist arrivals considering the context of natural disasters. This result is partly consistent with the findings of Detotto et al. (2021), where government efficiency is found positively but not significantly associated with tourist behaviour. Although the Detotto et al.'s (2021) research is interested in the effect of governance on tourism performance in the normal condition, we mainly investigate the role of government efficiency on the relationship between inbound tourist arrivals and natural disasters severity.

Second, the results provide evidence that a country with strong government efficiency weakens the negative impact of natural disasters on inbound tourist arrivals, and it is the first time the mitigating effect of government efficiency on the negative impact of natural disasters on inbound tourism is empirically demonstrated on a global scale. So far, Kahn (2005) provided evidence that institutional quality performance has negative correlation with the deaths number of a country. However, Kahn (2005) did not consider the influence of natural disasters on inbound tourism. Briefly speaking, for an affected destination with strong government efficiency, a variety of

efficient approaches can be adopted by the government to mitigate the damage of natural disasters, including reducing the fatalities of local communities, rapidly rebuilding the physical infrastructure, coordinating the cooperation with different stakeholders in natural disaster management, providing subsidizes and tax-reduction policies, correcting misleading information about affected areas and reducing tourists' concerns about potential risks (Hystad & Keller, 2008; Lee & Hyun, 2016). With the trust that government efficiency can play a positive role in maintaining the attractiveness for the affected areas, many tourists are still willing to stick to their travel schedules (Liu et al., 2019).

7. Conclusion

Exploring a wider range of measures to mitigate the negative impact of natural disaster on inbound tourism is significant for the countries that rely on tourism industry (Ritchie & Jiang, 2019; Tsai & Chen, 2010). Although previous studies provide fruitful insights on micro factors in tourism recovery studies (Mckercher & Pine, 2006; Pearlman & Melnik, 2008; Ritchie & Jiang, 2019; Tsai & Chen, 2010; Tyler & Sadiq, 2019), the effect of macro factors, especially government efficiency, on the relationship between natural disasters and inbound tourism has not been studied systematically. To fill this gap, this study evaluates the effect of government efficiency on the negative impact of natural disasters on inbound tourist arrivals. By integrating the global data of international tourist arrivals, natural disasters, and government efficiency indicators into an unbalanced panel data set, covering 158 countries between 2002 and 2018, this study demonstrates the primary and mitigating effects of government efficiency. The results show a positive relationship between government efficiency and inbound tourist arrivals and illustrate the moderating role of government efficiency on the negative impact of natural disasters on inbound tourism.

401

402 7.1 Theoretical Contributions

403 There are three theoretical contributions of this study. First, while earlier studies focused on the
404 micro factors that influence the recovery of tourism following a disaster, our study provides more
405 insight about the effects of macro factors (government efficiency) in examining the relationship
406 between natural disasters and inbound tourism. This study, as such, enriches the literature of
407 disaster mitigation and tourism recovery.

408 Second, the main effect of government efficiency in enhancing the growth of inbound tourists
409 after natural disasters is empirically researched with panel data. Our finding is consistent with
410 previous studies that government performance is an important pull factor for tourists, but most
411 studies were interested in the influence of country political stability on the demand of inbound
412 tourism (Chasapopoulos et al., 2014; Hanon & Wang, 2020; Tatoglu & Gul, 2019). Other studies
413 that centered on the relationship between governance and tourism development did not take
414 consideration of natural disasters (Detotto et al., 2021; Tang, 2018). Moreover, different from most
415 studies that mainly explored a specific destination or country or a single event on natural disaster
416 and tourism, our study explores the relationships among natural disasters, inbound tourism, and
417 government efficiency by using data involving 158 countries globally. The finding enriches the
418 knowledge of inbound tourism research by identifying government efficiency as an important pull
419 factor for inbound tourists based on the push and pull model (Crompton, 1979; Zhang et al., 2017).
420 The results advance the push and pull theory for international tourism by confirming the significant
421 role of government efficiency in attracting inbound tourists.

422 Third, the moderating effect of government efficiency on the impact of natural disasters on
423 inbound tourist arrivals is confirmed for the first time with various robustness tests. As far as we
424 know, only Liu et al. (2019) empirically identified that GOV could alleviate the impact of disaster

risk exposure and vulnerability on a country's competitiveness level in tourism. However, they relied on disaster risk and tourism competitiveness data in a single year for their analysis; without integrating the real occurred disasters and tourist arrivals data, the true picture may not be effectively revealed. Moving forward, our study provides more persuasive empirical evidence of the moderating effect of government efficiency on the negative impact of natural disasters on inbound tourist arrivals through panel data analysis with various robustness checks. The findings enhance current knowledge on the role of government efficiency in disaster mitigation and tourism recovery for inbound tourism.

7.2 Managerial Implications

The findings of our study suggest several managerial implications. First, policy makers and DMOs should recognize the positive influence of macro factors in disaster mitigation and tourism recovery process and consider employing these factors to counteract and reduce the negative impact of natural disasters. For example, the government should improve administrative efficiency to restore the order of market supply for the disaster affected areas. Second, the policy makers of destination countries, especially those with economies heavily depending on tourism industry, should improve the efficiency of government at each level in coping with the negative effect of natural disasters. Finally, it is also advisable for destinations to integrate the information of government efficiency into disaster communication strategies, and build up an image of efficient disaster management and deliver this message through overseas promotion and advertisements. For instance, when mitigating the devastating impact of the COVID-19 pandemic on inbound tourism, countries should pay more attention to enhance government efficiency, including adopting efficient policies and measures to ensure the safety of the residents and tourists as the priority,

prioritizing preventive measures against the spreading of the pandemic, propagating the secure social order, the stable supply of basics public services, the residents' confidence in the government, and tourists' positive comments towards the tourism recovery for the potential tourists who live overseas.

7.3 Limitations and Future Research

This study has the following limitations. First, the inbound tourism data did not classify the different motives of travel. Improvements in future studies may be achieved by discriminating the types of tourism based on travel motives. Second, the mitigating effect of government efficiency is only confirmed based on the data of international tourism. Future studies may check the role of government efficiency in mitigating the devastating effect of natural disasters on domestic tourism. In addition, future research may study how to improve government efficiency in the context of natural disasters.

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Table 1. Magnitudes of natural disasters (2002-2018)

Year	Occurrence of Events	Total Deaths	Damage in US$	Affected People
2002	527	22,436	52,350,748	669,000,000
2003	438	113,623	69,664,682	250,000,000
2004	421	245,279	135,000,000	169,000,000
2005	497	92,976	216,000,000	150,000,000
2006	504	29,551	34,326,282	137,000,000
2007	465	23,227	73,777,833	211,000,000
2008	408	239,209	191,000,000	212,000,000
2009	425	18,740	44,599,942	162,000,000
2010	460	313,832	127,000,000	268,000,000
2011	385	49,195	364,000,000	237,000,000
2012	389	11,617	163,000,000	132,000,000
2013	367	22,354	120,000,000	99,750,042
2014	351	14,506	95,697,588	120,000,000
2015	427	29,034	73,723,360	246,000,000
2016	378	10,405	158,000,000	385,000,000
2017	392	13,182	327,000,000	106,000,000
2018	343	13,396	131,000,000	72,348,772

Source: Centre for Research on the Epidemiology of Disasters (CRED)

704 Table 2 Descriptive statistics

Variables	Measurement	Mean	SD	Min	Max	Source
IT	Inbound Tourist arrivals (per person)	13.7	2.25	6.7	18.9	UNWTO
NDS	Total deaths of natural disasters (Per person)	1.75	2.26	0	12.3	EM-DAT
GOV	Government efficiency	1.07	0.30	-0.31	1.69	WGI
GPP	GDP per capita (in US$)	8.53	1.44	4.73	11.45	WDI
POP	Number of Population (Per inhabitant)	15.37	2.43	9.17	21.05	WDI
EX	Official Exchange rate (local currency units relative to the U.S. dollar)	3.03	2.51	0.05	10.62	WDI

Note: All variables are displayed in log-terms.

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707 Table 3 Panel-data estimation results

Dependent Variable	Inbound tourist Arrivals			
Variables	Model 1 FE	Model 2 FE	Model 3 FE	Model 4 FE
LnNDS		-0.015**	-0.014**	-0.045**
LnGOV			0.636***	0.579***
LnGPP	0.611***	0.610***	0.579***	0.580***
LnPOP	1.005***	0.984***	1.100***	1.090***
LnEX	0.105***	0.106***	0.107***	0.109***
LnNDS*LnGOV				0.032*
Year	Controlled	Controlled	Controlled	Controlled
Country	Controlled	Controlled	Controlled	Controlled
Hausman Test (p-value)	***	***	***	***
No. Of Observations	2170	2170	2152	2152
R2	0.469	0.472	0.483	0.484
Adjusted R2	0.431	0.433	0.445	0.446

Notes: *** stands for a 1% significance level; ** for 5% and * for 10%.

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709

710 Table 4 Robustness checks.

Dependent Variable	**Inbound tourist Arrivals**				
Variables	Model 5 RE	Model 6 FE	Model 7 FE	Model 8 GMM	Model 9 FE
LnIT-1				0.428 ***	
LnNDS	-0.048**	-0.041**	-0.053***	-0.039*	-0.046**
LnGOV-1			0.228***		
LnGOV	0.645***			0.782*	
LnRQ		0.570***			
LnSyn					0.748***
LnGPP	0.660***	0.571***	0.607***	0.001**	0.566***
LnPOP	0.680***	1.101***	1.030***	1.588***	1.124***
LnEX	0.086***	0.093***	0.11***	0.038	0.099***
LnNDS*LnGOV-1			0.039**		
LnNDS*LnGOV	0.032*			0.029*	
LnNDS*LnRQ		0.029*			
LnNDS*LnSyn					0.023*
No. of Observations	2152	2152	2142	1866	2152
R2	0.553	0.489	0.479		0.493
Adjusted R2	0.552	0.451	0.44		0.455
Hausman Test (p-value)		***	***		***
AR (1) test p-value				0.013	
AR (2) test p-value				0.151	
Sargan statistic p-value				0.128	

Notes: *** stands for .01 significance level; ** stands for .05 significance level; *stands for .1 significance level. RE = random effect; FE = fixed effect; GMM = generalized method of moments

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