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# Tourism Dependence and Economic Vulnerability: Did Tourism-Dependent Countries Experience Greater Revenue Losses During COVID-19?

**Md Razaul Karim[1]***

[1] Faculty of Business and Management Science, Universiti Islam Antarabangsa Tuanku Syed Sirajuddin, Malaysia

* Corresponding author: Md Razaul Karim · razaulkarim992001@gmail.com

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## ABSTRACT

Tourism dependence is often assumed to magnify pandemic losses, but it is uncertain whether it predicts the percentage collapse in tourism receipts or the importance of lost tourism receipts within pre-pandemic exports. Using World Development Indicators for 125 countries and economies, this study distinguishes the proportional decline in international tourism receipts from the same loss normalized by pre-pandemic exports. Cross-sectional regression models use 2019 dependence, baseline receipts and prior revenue growth, with heteroskedasticity-robust inference and pre-period sensitivity checks. Average tourism-receipts losses in 2020 reached 63.8%. Dependence was not a statistically reliable predictor of proportional losses in the preferred model ($\beta = 0.079$, SE = 0.066, $p = .227$), a result robust to alternative measures and sample restrictions. In contrast, median foregone tourism receipts were equivalent to 1.98% of 2019 exports in the lowest-dependence quartile and 31.06% in the highest, an accounting difference, not a causal effect. The study advances tourism-vulnerability measurement by separating sector-specific shock severity from structural export exposure and identifies the limits of treating tourism reliance as a direct predictor of relative shock intensity.

KEYWORDS tourism dependence · economic vulnerability · COVID-19 · tourism receipts · export exposure

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## 01 Introduction

The COVID-19 crisis exposed the fragility of international tourism demand. Travel restrictions, health concerns, disrupted airline networks and border controls sharply reduced cross-border mobility, and international destinations faced an extraordinary contraction in visitor-related revenue. UN Tourism (2021) recorded a 74% decline in international tourist arrivals in 2020, while UNCTAD (2021) drew attention to the consequences for developing countries with substantial tourism sectors. Such headline statistics established the scale of the global disruption, but not every destination entered the pandemic with the same economic structure. A destination earning a small share of its export revenue from tourism and an economy earning most of its export revenue from visitors could suffer a similar percentage decline in tourism receipts and still face radically different risks to external earnings. Distinguishing these two dimensions is essential to interpreting the distribution of the shock.

Tourism dependence has consequently become a central theme in discussions of economic vulnerability, diversification and crisis preparedness. The basic logic appears simple: international visitor spending is externally generated and cannot be maintained when nonresident travel is suspended. Yet the claim that the most tourism-dependent countries lost more must specify the outcome. Is a more dependent economy

expected to experience a deeper proportional contraction in tourism receipts, a larger decline in the absolute dollar amount of receipts, or a larger tourism-receipts loss relative to its pre-pandemic exports? These are different quantities with different denominators. Confusing them can make an intuitively plausible statement appear more strongly supported than the evidence warrants (Briguglio et al., 2009; Dwyer et al., 2004; Romão, 2020).

Existing work provides important foundations. Crisis-management research describes preparedness, response, adjustment and recovery processes (Ritchie, 2004; Mair et al., 2016; Ritchie & Jiang, 2019). Research on tourism resilience recognizes that diversified economic capabilities, firm-level adaptation, institutional arrangements and alternative markets may alter the impact of external disturbances (Becken, 2013; Dahles & Susilowati, 2015; Jiang et al., 2019). The pandemic literature describes the magnitude and mechanisms of the global travel shock (Gössling et al., 2021; Sigala, 2020; Zenker & Kock, 2020). However, these perspectives do not imply automatically that pre-pandemic tourism-export dependence will be a strong predictor of the percentage by which tourism receipts themselves contract during a near-global suspension of mobility.

A second issue is the way specialization is measured. The World Development Indicators (WDI) series for international tourism receipts as a share of total exports is a ratio of receipts to exports of goods and services. It describes the place of international tourism in a country's external revenue structure. It does not measure total tourism value added, employment in tourism, or the share of gross domestic product generated by the sector (World Bank, 2026). A country with large domestic tourism and a small international tourism export share might be highly exposed at the local labor-market level even though its measured dependence is low. The empirical claims made here are deliberately restricted to the coverage of the available statistics.

Indonesia demonstrates the value of this distinction. Tourism policy has emphasized the contribution of foreign visitors to economic development and the role of destination investment and international access (Azizurrohman et al., 2021; Wang et al., 2026). Research on the Mandalika Special Economic Zone highlights local readiness and unequal benefits associated with tourism-oriented development (Azizurrohman et al., 2023; Yuli et al., 2025). Related work from Sekolah Tinggi Pariwisata Mataram considers community participation, destination resources and enterprise-level sustainability (Noviyanti et al., 2023; Gede et al., 2024; Martayadi & Siwantari, 2026). This body of work underscores why measuring tourism expansion alone cannot settle questions about the socioeconomic consequences of a shock. The present study places the Indonesian case in a systematically constructed international comparison without claiming that its aggregate outcomes reveal household or business-level losses.

We ask three research questions. First, was greater 2019 tourism-export dependence associated with a larger proportional contraction in international tourism receipts from 2019 to 2020? Second, do the results persist under alternative pre-pandemic dependence measures, adjustments for baseline receipt size and growth, log-ratio outcomes, and sample restrictions? Third, how different is the distribution of the 2020 shock when it is expressed as lost tourism receipts relative to total pre-pandemic exports rather than as the percentage loss of tourism receipts? These questions distinguish an association that must be estimated from an accounting relationship that can be calculated directly.

The study contributes to tourism crisis scholarship in four ways. It operationalizes shock severity separately from structural external-sector exposure; tests a widely repeated presumption with a transparent cross-sectional sample of 125 countries and economies; extends the test through pre-period and measurement sensitivities, including a pre-pandemic placebo; and develops a two-dimensional crisis scorecard. The central result is deliberately not presented as proof of no relationship. Rather, the estimates fail to establish a reliably positive link between dependence and proportional revenue collapse within the available sample, while the accounting exposure measure reveals much larger foregone tourism earnings relative to exports among the highly specialized economies. This contrast refines the debate about vulnerability and gives destination managers a more precise measurement vocabulary.

## 02 Literature Review and Hypothesis Development

### International tourism specialization and external vulnerability

Tourism-led development literature commonly evaluates the relationship between tourism and aggregate economic performance. Growth studies have reported associations between tourism activity and national or

regional growth, although model settings, identification and outcomes differ markedly (Balaguer & Cantavella-Jordá, 2002; Lee & Chang, 2008; Brida et al., 2016; Sequeira & Nunes, 2008b). Tourism can produce foreign exchange, employment opportunities, investment incentives and market access, but its benefits also depend on linkages, distribution and the domestic value retained from visitor expenditure (Britton, 1982; Dwyer et al., 2004; Faber & Gaubert, 2019). These qualifications matter for resilience: a sector can be valuable in normal times and a concentrated source of vulnerability when an external shock removes its principal market.

The distinction between vulnerability and resilience is conceptually consequential. Briguglio et al. (2009) distinguish structural exposure to shocks from the ability to withstand and recover from them. Exposure may be largely conditioned by an economic system's trading structure or size, whereas coping capacity depends on flexibility, institutions, policy and diversification. In a tourism economy, the pre-crisis share of receipts in exports is an indicator of concentration. The resulting percentage contraction of tourism receipts is instead a realized outcome. Observing a large contraction does not by itself demonstrate a failure of resilience, because the shock's magnitude, pandemic restrictions and destination-specific conditions may differ. Nor does a low tourism-export share guarantee low vulnerability for tourism workers and communities.

Economic resilience research is therefore relevant, but the present operationalization is narrower than regional employment-based concepts. Romão (2020) identifies how tourism specialization and broader industry configurations are associated with resilience across European regions; Scott et al. (2019) analyze tourism vulnerability to climate change, and Becken (2013) proposes a resilience framework for tourism sub-systems. These studies indicate that exposure interacts with adaptation capacity and institutional context. During an abrupt mobility shock, two countries with equally high tourism-export dependence might have different receipt losses because of source-market composition, tourism seasonality, the domestic versus international balance, and the timing and enforcement of travel restrictions.

Destination competitiveness offers a complementary perspective. Greater dependence may accompany sophisticated tourism infrastructure and strong international connectivity, but also concentration in a narrow visitor segment (Dwyer & Kim, 2003; Crouch, 2011). Similarly, tourism sector specialization can support foreign exchange earnings and threaten diversification when visitor demand is interrupted. Theoretical reasoning therefore points clearly to exposure but not to an unconditional or mechanically guaranteed relationship between dependence and the relative depth of the tourism receipts shock. A quantitative test must establish whether such a conditional severity gradient is visible in the data, rather than assume its existence.

## The pandemic as a common but uneven tourism shock

The global COVID-19 shock was unusual in its breadth and simultaneity. Nonpharmaceutical health measures restrained travel and interactions, while international flights and border procedures interrupted the infrastructure of mobility. The pandemic's relationship with tourism extended beyond traveler decisions to supply chains, personnel, accommodations and associated services (Gössling et al., 2021; Sigala, 2020). UN Tourism (2022) documents the collapse in arrivals and tourism-related export revenue, while UNCTAD (2021) highlights the potentially greater indirect consequences for developing economies. Aggregate pandemic statistics thus establish a common shock, though countries and visitor markets were affected in different ways and with different timing.

The literature on disasters and crises emphasizes that external events need not generate homogeneous outcomes. Ritchie (2004) and Ritchie and Jiang (2019) show how risk governance and crisis preparedness condition destination responses. Mair et al. (2016) identify the importance of destination recovery strategies; Jiang et al. (2019) focus on capabilities that enable organizational adjustment. Small-business evidence from Indonesia also illustrates the relevance of livelihood diversification and local embeddedness during successive crises (Dahles & Susilowati, 2015). These contributions caution against interpreting one macroeconomic ratio as a comprehensive account of crisis resilience.

This study deliberately isolates the first year of the pandemic. Outcomes are measured as receipts changes between 2019 and 2020, not as recovery after 2020. The design is consistent with the call by Zenker and Kock (2020) to move beyond descriptive pandemic comparisons and to make the tourism research question precise. It cannot measure the relative effectiveness of tourism stimulus measures or recovery strategies, because no comparable post-2020 observations are available in the supplied files. This temporal boundary prevents claims about long-run resilience and focuses attention on the initial external-revenue shock.

### Two dimensions of economic vulnerability

Let T_i,2019 denote international tourism receipts for country i in 2019 and X_i,2019 total exports of goods and services. Baseline tourism-export dependence is D_i = 100 × (T_i,2019/X_i,2019). Let L_i = 100 × [1 − (T_i,2020/T_i,2019)] denote the percentage decline in tourism receipts. L_i is the severity of the receipts contraction relative to the country's own pre-pandemic receipts; it can be compared across large and small destinations without placing undue weight on dollars. Whether D_i predicts L_i is an empirical question. A systematic positive gradient would imply that a more tourism-specialized external sector was associated with a deeper proportional tourism-revenue shock.

A second measure is E_i = D_i × L_i / 100. This equals 100 × [(T_i,2019 − T_i,2020)/X_i,2019] when the two tourism series share the same numerator convention. E_i expresses foregone tourism receipts in 2020 relative to the country's 2019 export total. It does not represent the observed fall in total exports, GDP, employment or welfare. It is also not an independent model output: because D_i enters its definition, a positive association between dependence and E_i is largely arithmetic. That does not make E_i uninformative, but it changes what can legitimately be inferred. The novel analytical value lies in jointly reporting an estimated severity gradient and a transparent accounting exposure measure, not in treating the accounting identity as evidence of a causal mechanism.

The conceptual argument yields one primary testable hypothesis and a separate accounting expectation. H1 proposes that greater pre-pandemic tourism-export dependence is positively associated with the proportional decline in international tourism receipts during 2020. A statistically weak or unstable association would imply that the uniformity and heterogeneity of travel restrictions and demand shocks are more important to proportional losses than the dependence ratio alone, although this study cannot identify those channels directly. Accounting expectation A1 is that economies with higher D_i will typically report higher E_i because a comparable proportional shock affects a larger fraction of their export base; this expectation is assessed descriptively and never treated as a separate causal hypothesis.

The discussion of potential mechanisms also involves the relationship between tourism earnings, visitor volume and economic value. Tourism-receipt outcomes should not be used as direct substitutes for value added or local welfare (Dwyer et al., 2004; Spenceley & Meyer, 2012; Yergeau, 2020). Similarly, evidence of international tourism's contribution to growth does not by itself establish resilience to travel restrictions (Dogru & Bulut, 2018; Brida et al., 2016). By selecting a tightly defined tourism-export metric, this study avoids making the broader claim that a decline in tourism receipts provides a complete measure of an economy's pandemic-induced welfare loss.

## 03 Methods

### Research design, statistical units and source files

The study uses an observational cross-sectional design supported by pre-pandemic annual data. Six World Development Indicators tourism-series CSV files supplied for the project were audited and matched on standardized three-letter economy code and calendar year. The main analysis uses international tourism receipts in current US dollars (ST.INT.RCPT.CD) and international tourism receipts as a percentage of total exports (ST.INT.RCPT.XP.ZS). International arrivals (ST.INT.ARVL), passenger-transport receipts (ST.INT.TRNR.CD), international departures (ST.INT.DPRT) and international tourism expenditures as a percentage of total imports (ST.INT.XPND.MP.ZS) are retained in the compiled dataset for supplementary descriptives and sensitivity analyses. All records are annual observations in the uploaded extract; monetary values are nominal and denominated in US dollars (World Bank, 2026).

The sampling frame contains ISO-coded countries and economies with tourism observations in 2015–2020. Noncountry aggregates are excluded by country-code screening. To estimate the primary 2020 receipts change, an economy must have strictly positive tourism receipts in both 2019 and 2020, and a nonmissing 2019 tourism-export share between 0 and 100. Of the 205 countries and economies represented in the broader screened panel, 129 have positive receipts in both years and 125 additionally meet the tourism-dependence criterion. These 125 units constitute the primary analytic sample. They are not a random sample of countries, and exclusion due to missing tourism data could affect external validity. No missing observation

was filled or inferred. The research period 2015–2020 supplies the pre-period comparisons and the shock year, with 2019 and 2020 defining the principal outcome.

**Table 1. World Bank tourism indicators and analytical roles**

| Series / measure | Operational definition | Role in this study |
|---|---|---|
| ST.INT.RCPT.CD | International tourism receipts, current US$ | Shock loss in 2020 versus 2019; receipt-size and growth controls |
| ST.INT.RCPT.XP.ZS | Tourism receipts divided by total exports, percent | 2019 dependence and pre-period alternative shares |
| ST.INT.ARVL | International tourist arrivals, reported count | Supplementary pre-pandemic destination-size control |
| ST.INT.TRNR.CD | Receipts from passenger transport items, current US$ | Restriction for transport composition consistency |
| ST.INT.DPRT | Outbound international tourism departures | Retained in compiled panel; not part of principal regression |
| ST.INT.XPND.MP.ZS | International tourism expenditures as % of imports | Supplementary import-reliance control |

Note. Definitions follow World Development Indicators metadata. Other WDI series are retained in the reproducibility dataset but are not all included in the main regression.

## Measures and empirical strategy

The dependent variable for the primary specification is percentage tourism-receipts loss in 2020: $L_i = 100(1 - T_{i,2020}/T_{i,2019})$. Positive values correspond to contraction; a value of 80 means receipts were 80% below their 2019 level. The key explanatory measure $D_i$ is the 2019 international-tourism receipts percentage of total exports. Because both quantities use 2019 receipts in their definitions, regression-to-the-mean behavior and common numerator movements are possible; the paper therefore tests pre-period dependence measures and pre-pandemic growth adjustments. The central relationship is a cross-country association, not a quasi-experiment: the pandemic was a common event, but baseline dependence was neither randomized nor plausibly exogenous to destination characteristics.

The principal adjusted model is $L_i = \alpha + \beta D_i + \gamma \ln(T_{i,2019}) + \delta g_{i,2018–2019} + \varepsilon_i$, where g is the pre-pandemic log growth of tourism receipts between 2018 and 2019. The slope β is reported in percentage points of 2020 tourism-receipts loss per one percentage-point increment in pre-pandemic tourism-export share. Baseline receipt size addresses part of the scale heterogeneity, and earlier growth addresses an observable difference in trajectories. The model is estimated using ordinary least squares with HC3 heteroskedasticity-robust standard errors, confidence intervals and exact p-values. Because the sample is cross-sectional, country-clustered standard errors would not be appropriate. The inference remains associational and conditional on the variables included.

The analysis proceeds through several checks. We first estimate unadjusted and log-size-adjusted models, then a model including pre-pandemic growth. We next use $\log(T_{i,2019}/T_{i,2020})$, which represents a continuously scaled shock, and two alternative dependence measures: the mean export share over 2017–2019 and the median over 2015–2019. Further checks add 2019 arrivals, the available tourism-import-share indicator, or average earlier receipt growth; restrict observations to values within central dependence or loss percentiles; require 2019 receipts of at least US$100 million; and omit cases with transport receipts exceeding 30% of total reported receipts. These variations assess sensitivity to measurement, leverage and coverage rather than provide new causal identification.

The pre-pandemic falsification-style exercise regresses the percentage change from 2018 to 2019 on dependence measured in 2017, controlling for 2018 receipt size. It asks whether a similar dependence–contraction association can be detected in an earlier, nonpandemic interval. This is an informative diagnostic but not a complete parallel-trends assessment. We also use a leave-one-out coefficient range and a robust M-estimation sensitivity analysis; a restricted permutation test for the preferred specification supplies a distribution-based check on the existence of a strong association. The results are interpreted as a set of converging diagnostics, not as independent confirmations of a single causal hypothesis.

## Accounting exposure and quartile comparison

The export-exposure calculation is based on $E_i = D_i \times L_i/100$. Countries are divided into four almost equally sized groups using quartiles of 2019 dependence. We compare each group's dependence distribution, tourism-receipts decline and accounting exposure. The summary uses medians to limit the influence of

skewed receipts and outlying changes, alongside mean declines. No significance test is used to establish the arithmetic relationship between D and E, because dependence enters E by construction. A separate Mann–Whitney rank test compares the distributions of percentage tourism-receipts losses between the lowest and highest dependence quartiles; as an exploratory, unadjusted test it does not supersede the principal regression and carries no causal interpretation.

The tourism-export share is sensitive to the denominator. A country can display a large share because tourism receipts are high, because other exports are small, or both. Conversely, a smaller share may coexist with considerable absolute tourism revenue and employment. WDI receipts definitions can vary across countries, including whether international passenger transport receipts are counted, and the shock-year values may have been compiled under uneven reporting capacity. Therefore the study reports the exact definitions, avoids GDP-equivalent interpretations, and treats the cross-country results as a descriptive benchmark for the first pandemic year (World Bank, 2026).

## 04 Results

### Sample composition and the distribution of revenue losses

All 125 sampled economies report lower international tourism receipts in 2020 than in 2019, with reductions ranging from 8.5% to 95.2%. The unweighted average decline is 63.8%, while the median is 66.7%. The 2019 tourism export-share distribution is strongly right-skewed: the sample mean is 19.3%, the median is 9.5%, and the upper quartile begins at approximately 24.8%. These figures show why a binary label such as “tourism dependent” can conceal a wide range of economic structures. More than half the economies fall below a 10% dependence share, while several small destinations and tourism-intensive territories have shares above 80%. The analysis preserves the continuous share whenever possible rather than collapsing countries into an arbitrary threshold.

For the same sample, the sum of reported international tourism receipts decreases from approximately US$1,224.6 billion in 2019 to US$455.3 billion in 2020. This aggregate total is specific to the 125 included units; it is not a world total, and its percentage fall differs from the unweighted country average. The summed loss is approximately US$769.3 billion, or 62.8% of the 2019 sum. It would be incorrect to interpret these nominal differences as changes in domestic value added. Table 2 documents the central dispersion measures, while Figure 1 plots the dependence–severity pattern country by country.

**Table 2. Summary statistics, matched country sample (N = 125)**

| Variable | Mean | Median | SD | Min / Max |
|---|---|---|---|---|
| Tourism dependence, 2019 (% exports) | 19.33 | 9.51 | 21.75 | 0.26 / 90.66 |
| Tourism receipts decline, 2020 (%) | 63.81 | 66.67 | 17.05 | 8.49 / 95.19 |
| Export-normalized receipts exposure (p.p.) | 12.70 | 6.34 | 15.22 | 0.23 / 70.07 |
| ln(receipts in 2019, current US$) | 21.53 | 21.62 | 1.92 | 16.16 / 26.20 |
| 2018–2019 log receipts growth | 0.054 | 0.036 | 0.170 | −0.345 / 0.826 |
| Tourism receipts, 2019 (sample total) | US$1,224.6 bn | — | — | — |
| Tourism receipts, 2020 (sample total) | US$455.3 bn | — | — | — |

Note. Values are calculated across the 125 included economies. SD = sample standard deviation. Exposure equals pre-pandemic tourism-export share × percentage receipts loss / 100. Monetary sums cover only the analytic sample; totals are not global.

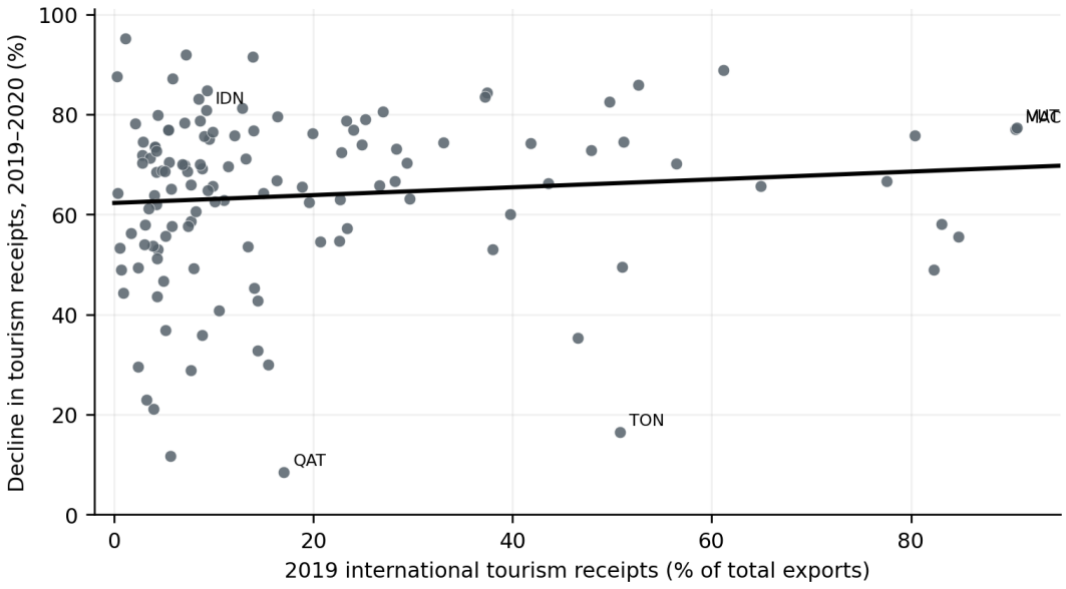


**Figure 1. Relationship between pre-pandemic tourism-export dependence and the 2020 percentage decline in receipts**

Note. Each marker is one country/economy. The solid line is the unadjusted least-squares association (not a causal effect). Country codes label selected examples.

A visual inspection offers little support for a tight linear relationship. Highly dependent economies exhibit wide variation in proportional 2020 loss. For example, 2019 tourism-export dependence exceeds 80% in Macao SAR, Vanuatu, the Maldives and Aruba, yet their losses range from roughly 49% in Aruba to 77% in Vanuatu and Macao. Lower-dependence countries also experience major contractions: Indonesia's tourism-export share is about 9.2%, while its recorded tourism receipts decline by 80.8%. Thus dependence reflects the importance of tourism in the export mix without accurately sorting countries by the intensity of the tourism revenue shock.

## Main regression tests of the severity hypothesis

The unadjusted slope relating dependence to proportional 2020 tourism-receipts loss is 0.078 (HC3 SE 0.065, p = .225). Adding the log of 2019 receipts produces a slope of 0.080 (SE 0.065, p = .221). The preferred specification with baseline receipts and 2018–2019 growth yields a coefficient of 0.079 percentage points (SE 0.066, 95% confidence interval −0.049 to 0.208, p = .227). In plain terms, a ten-percentage-point higher dependence ratio is associated with an estimated 0.79-percentage-point larger receipts contraction, but the confidence interval includes negative as well as positive values. The estimated association is small relative to the approximately 17-percentage-point standard deviation in observed losses.

The preferred model explains only about 1.7% of the variation in proportional receipt declines ($R^2$ = .017). This low explanatory power does not imply that the crisis was homogeneous; rather, the selected aggregate variables account for little of the across-country dispersion. On the log-ratio scale, the dependence slope is about 0.0017 (p = .418), again with substantial uncertainty. The two outcomes answer related but not identical questions: percentage change is intuitively transparent, whereas the log ratio places more weight on the scale of severe collapses. Neither provides evidence strong enough to support H1 at conventional statistical thresholds. We therefore do not reject the possibility of a modest positive association, but we cannot claim that tourism dependence reliably predicts the proportional depth of the 2020 tourism-revenue loss.

**Table 3. Association between 2019 tourism dependence and 2020 tourism-receipts losses**

| Model and outcome | N | Dependence β | Robust SE | 95% CI | p-value |
|---|---|---|---|---|---|
| Loss %, unadjusted | 125 | 0.078 | 0.065 | [−0.048, 0.205] | 0.225 |
| Loss %, + baseline size | 125 | 0.080 | 0.065 | [−0.048, 0.208] | 0.221 |

| Model and outcome | N | Dependence β | Robust SE | 95% CI | p-value |
|---|---|---|---|---|---|
| Loss %, + growth (preferred) | 125 | 0.079 | 0.066 | [−0.049, 0.208] | 0.227 |
| Log receipts loss, unadjusted | 125 | 0.0018 | 0.0020 | [−0.0020, 0.0057] | 0.358 |
| Log receipts loss, adjusted | 125 | 0.0017 | 0.0021 | [−0.0024, 0.0058] | 0.418 |

Note. HC3 heteroskedasticity-robust standard errors. Controls: 2019 log receipts and 2018–2019 log receipts growth (preferred). β in first three models is percentage-point loss per dependence percentage point; log-outcome β is in log units. p-values are two-sided.

## Revenue-loss exposure relative to pre-pandemic exports

The accounting picture is markedly different from the regression picture. The median country in the lowest tourism-dependence quartile loses the equivalent of 1.98% of its 2019 exports through the decline in reported tourism receipts. The corresponding median in the highest-dependence quartile is 31.06%. The average percentage contraction in tourism receipts is about 60.1% in the lowest group and 67.6% in the highest; the difference is modest compared with the much larger disparity in export-normalized foregone tourism earnings. This divergence is exactly why severity and external-sector exposure should be distinguished rather than summarized by a single statistic.

The exposure values are calculated as D × L/100, not observed independently in the World Bank data. For example, if tourism receipts supplied 50% of a country's export revenue before the crisis and those receipts declined by 70%, the foregone tourism receipts are equivalent to 35% of the previous year's exports. This does not mean total exports fell by 35%: merchandise and other service exports may have moved differently. The comparison is nonetheless relevant for economic concentration and foreign-exchange risk, because it identifies the share of the pre-crisis external revenue base attached to disappearing tourism income. Figure 2 makes that distinction explicit; Table 4 reports the quartile values.

**Table 4. Tourism specialization quartiles and the two vulnerability dimensions**

| 2019 dependence group | N | Median D (%) | Mean loss (%) | Median loss (%) | Median E (p.p.) |
|---|---|---|---|---|---|
| Q1: lowest | 32 | 3.34 | 60.09 | 61.55 | 1.98 |
| Q2 | 31 | 7.37 | 65.31 | 69.19 | 4.94 |
| Q3 | 31 | 14.94 | 62.36 | 65.46 | 10.43 |
| Q4: highest | 31 | 47.87 | 67.58 | 70.29 | 31.06 |

Note. D = tourism receipts as a percentage of 2019 exports; E = 2020 loss of tourism receipts as a percentage of 2019 exports, calculated from D × L/100. Exposure differences are accounting relationships, not estimated causal effects.

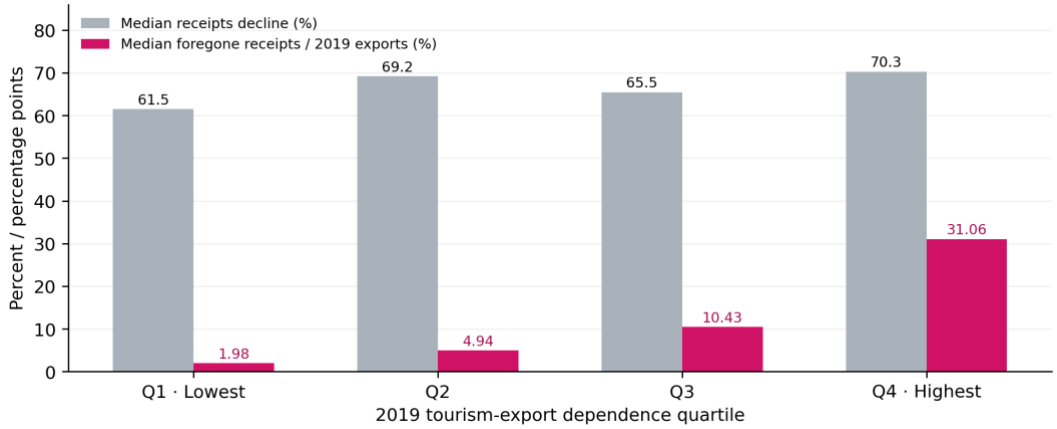


**Figure 2. Shock severity and export-normalized exposure across 2019 dependence quartiles**

Note. Gray bars indicate median tourism-receipts loss; pink bars indicate foregone tourism receipts relative to 2019 exports. Values correspond to Table 4. Exposure is an accounting ratio, not the observed change in total exports.

A country example illustrates the policy interpretation. Indonesia reports tourism receipts of approximately US$18.41 billion in 2019 and US$3.53 billion in 2020, a decline of 80.8%. Given its 2019 tourism-export share of about 9.20%, the lost receipts correspond to about 7.43% of pre-pandemic exports, not an 80.8% decline in all exports. By contrast, Vanuatu has an export share around 90.7% and a receipts decline around 77.3%, creating accounting exposure equivalent to about 70.1% of 2019 exports. The nearly

equal tourism-receipts shock severity masks a much larger difference in structural exposure. These numbers illustrate measured export concentration, not a full comparison of welfare, unemployment or subsequent economic recovery.

## Robustness, alternative operationalizations and pre-period evidence

Changing the dependence measure to its average over 2017–2019 produces a slope of 0.085 (p = .202), while using the 2015–2019 median yields 0.083 (p = .212). Adding a longer pre-pandemic growth history, 2019 arrivals or tourism-import share also leaves the slope positive but statistically uncertain. The same is true after trimming extreme outcome or dependence observations, restricting the sample to countries with more substantial 2019 tourism receipts, or examining the lower-passenger-transport subset. The coefficients are generally around 0.07–0.10 percentage points per one dependence percentage point, except for one more restrictive trimming specification, but their intervals continue to cross zero.

A leave-one-country-out exercise places the preferred dependence coefficient between about 0.064 and 0.104, suggesting no single country fully drives the point estimate. A robust M-estimator yields a coefficient near 0.075. The pre-pandemic placebo regression gives a 2017 tourism-dependence coefficient near 0.092 for 2018–2019 revenue loss (p = .328), which does not show a precisely estimated pre-pandemic association either. In the preferred model, an exploratory residual-permutation test produces p ≈ .267 (2,000 permutations). Although no diagnostic proves the null hypothesis, the pattern is consistent with a weak explanatory role for tourism-export dependence in predicting percentage receipt losses.

**Table 5. Sensitivity tests for proportional receipts loss**

| Alternative specification | N | Dependence slope | HC3 SE | p-value |
|---|---|---|---|---|
| 2017–2019 mean dependence | 125 | 0.085 | 0.067 | 0.202 |
| 2015–2019 median dependence | 125 | 0.083 | 0.067 | 0.212 |
| Pre-pandemic mean growth | 125 | 0.082 | 0.066 | 0.212 |
| Additional 2019 arrivals control | 113 | 0.097 | 0.075 | 0.195 |
| Additional imports control | 125 | 0.071 | 0.069 | 0.306 |
| Trim loss outcome tails (1%, 99%) | 121 | 0.084 | 0.064 | 0.192 |
| Trim dependence tails (5%, 95%) | 111 | 0.165 | 0.126 | 0.190 |
| 2019 transport share ≤30% | 107 | 0.086 | 0.068 | 0.209 |
| 2019 receipts ≥US$100 million | 116 | 0.084 | 0.064 | 0.191 |
| 2017 dependence / 2019 placebo loss | 125 | 0.092 | 0.094 | 0.328 |

Note. Main outcome is percentage loss of receipts during 2020; each specification includes log 2019 receipts and 2018–2019 log growth unless otherwise indicated. Placebo uses 2017 dependence and 2018 log receipts to predict 2018–2019 loss. Alternative pre-period dependence uses available 2015–2019 data. p-values are two-sided and exploratory.

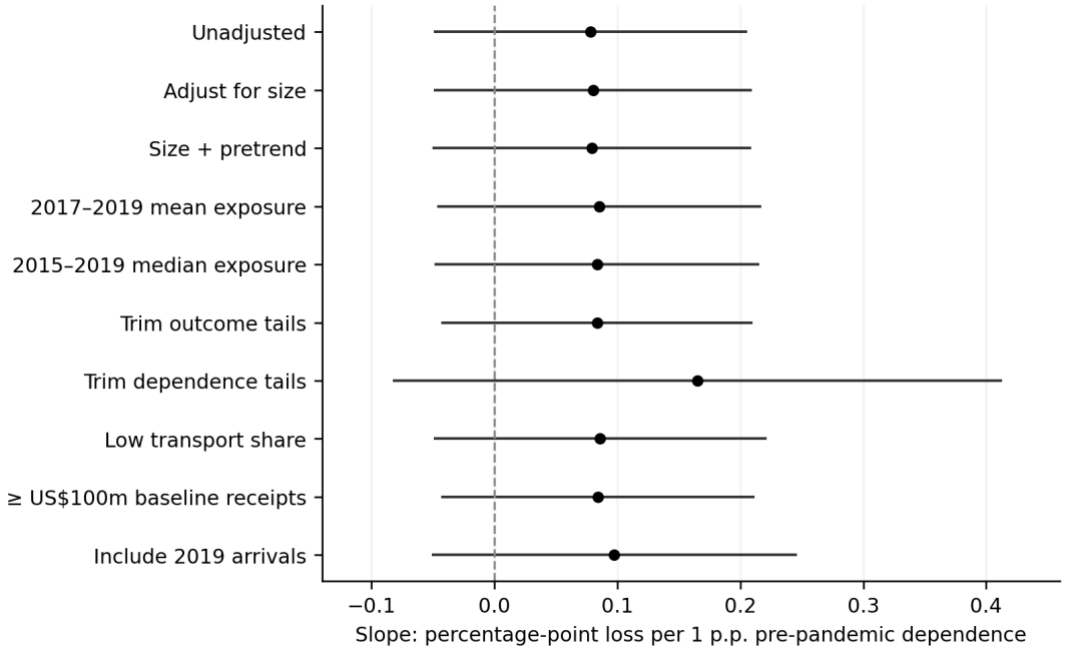


**Figure 3. Dependence slopes with HC3 95% confidence intervals across alternative models**

Note. Each point is the change in the 2020 percentage receipts loss (percentage points) per one percentage-point change in pre-pandemic tourism-export dependence. Specifications use different covariates and sample restrictions; none is a causal estimate.

At the descriptive level, the high- and low-dependence quartiles show different median proportional losses and an exploratory rank test detects a difference (two-sided $p \approx .037$). That comparison should not be elevated above the continuous-model evidence. It is sensitive to the placement of country observations into quartiles, does not adjust for receipts size or pre-pandemic trends, and is not evidence that a one-unit change in tourism-export dependence causes higher shock severity. Reporting both the quartile contrast and the uncertain regression coefficient is preferable to selecting the one result that supports a preferred narrative.

## 05 Discussion

### What tourism dependence predicts—and what it does not

The findings challenge a simplistic interpretation of tourism dependence. The broad proposition that internationally specialized tourism economies were economically exposed to pandemic-related losses is well motivated by the crisis literature and by the accounting magnitude of foregone receipts (Briguglio et al., 2009; Gössling et al., 2021; UNCTAD, 2021). But a separate empirical proposition—that they experienced *larger percentage declines in tourism receipts*—is not supported with statistical precision by these data. This matters because statements about vulnerability frequently slide from the first proposition to the second. External-sector specialization indicates the consequence of losing tourism income relative to an economy's export base, rather than reliably predicting the proportional collapse in that income.

The lack of a strong proportional severity gradient is not paradoxical. COVID-19 travel restrictions were a broad exogenous disruption for international tourism. Countries with vastly different pre-crisis export structures were still exposed to similar reductions in international mobility and hospitality demand. At the same time, differences in tourism geography, travel corridors, visitor source markets and policy timing could produce substantial variation among countries with a similar share of tourism in exports. Crisis frameworks emphasize the importance of preparedness and adjustment, but the current data do not include direct indicators of those mechanisms (Ritchie & Jiang, 2019; Jiang et al., 2019). We therefore avoid attributing the weak coefficient to any specific policy success or failure.

From a measurement standpoint, the main contribution is to disaggregate an umbrella term. "Tourism vulnerability" can signify the importance of tourism to foreign-exchange earnings, the probability and size of a demand shock, the difficulty of substituting other industries, or the capacity to recover. These concepts are

related but nonidentical. The present two-dimensional approach retains two observable components: realized sector-specific shock intensity and foregone receipts normalized by baseline exports. In contrast, resilience in the broader sense involves recovery paths, adaptive behavior and social outcomes (Becken, 2013; Dahles & Susilowati, 2015; Romão, 2020). By not labeling a 2020 receipts ratio as a complete resilience index, the study strengthens conceptual validity.

## Contributions to theory, measurement and policy

The theoretical contribution is a distinction between exposure and *conditional shock severity* within the tourism-dependence debate. Briguglio et al. (2009) argue for separating structural vulnerability from resilience, and this study takes a comparable distinction into a measurable tourism-export setting. The conceptual refinement can be carried into future research on commodity-dependent and service-dependent economies, where an industry's share of the export basket is mechanically related to the macroeconomic significance of a given sectoral loss but may be weakly associated with the sector's own percentage contraction. This is particularly useful when the event is so widespread that shocks affect many destinations irrespective of their specialism.

The empirical contribution is a reproducible comparison across 125 economies in the first pandemic year, with the same baseline and outcome definitions for each unit. The use of a continuous dependence regressor avoids arbitrary cutoff rules, while HC3 inference, pre-period growth controls, alternative dependence windows, outcome transformations, and sampling restrictions expose the level of uncertainty. The results are not presented as a causal identification strategy. As advocated by Zenker and Kock (2020), a pandemic setting becomes more useful analytically when it disciplines the question rather than supplying novelty by itself. In this paper, the novelty is the explicit contrast between an imprecise severity gradient and a quantitatively large exposure-accounting gap.

For public policy, the evidence supports a dual dashboard. The first indicator tracks the intensity of a sector-specific shock—for example, changes in receipts, arrivals and tourism-related employment. The second tracks how important that sector is to the wider economy, using tourism's contribution to exports, GDP, employment or government revenue. Decision makers should avoid using a receipts-to-exports share as a substitute for tourism GDP or livelihoods. A destination with relatively diversified national exports can still have vulnerable tourism-dependent communities; conversely, a small island state can experience severe balance-of-payments pressure even if its receipts contraction is not exceptional in percentage terms (Dwyer et al., 2004; Spenceley & Meyer, 2012).

The findings also speak to crisis governance. Tourism destinations can prepare for severe visitor-demand disruptions by stress-testing foreign-exchange earnings, assessing enterprise liquidity, diversifying visitor-source markets where feasible, strengthening domestic value chains, and building adaptable labor capabilities. Such strategies are consistent with tourism crisis-management and business-resilience research (Ritchie, 2004; Mair et al., 2016; Jiang et al., 2019; Dahles & Susilowati, 2015). They are not causal policy prescriptions established by the regressions here. Effective interventions must be evaluated using detailed evidence on policy implementation, exposure channels and heterogeneous regional conditions.

## Relevance to Indonesian tourism research

The Indonesian results are particularly instructive because they disentangle a sharp tourism-revenue shock from the sector's relative place in the country's exports. Previous research highlights the importance of foreign tourism and the role of destination development policies, including those relevant to the Mandalika Special Economic Zone (Azizurrohman et al., 2021, 2023; Wang et al., 2026; Yuli et al., 2025). The present finding does not contradict those studies. A substantial fall in internationally generated tourism earnings may coexist with diversified national export receipts and very serious local difficulties for hotels, guides, transport providers and small enterprises concentrated in tourism regions. A country-level receipts share cannot reveal these localized effects.

Research by Sekolah Tinggi Pariwisata Mataram scholars on community participation in Gunung Tunak, tourism-village development in North Lombok, and enterprise sustainability provides a complementary lens on the local mechanisms through which tourism conditions are experienced (Noviyanti et al., 2023; Gede et al., 2024; Martayadi & Siwantari, 2026). Taken together, the evidence encourages future inquiry that connects internationally comparable shock indicators to local enterprise survival, employment continuity, recovery

investment, and welfare. These cited local studies are contextual contributions; they do not supply additional observations for the present cross-country regression.

### Limitations and research priorities

Five limitations qualify the results. First, the dataset ends in 2020 and cannot document medium- or long-run recovery; absence of data after 2020 should not be mistaken for an absence of recovery. Second, international tourism receipts are reported in current US dollars, so the observed changes incorporate valuation and exchange-rate effects alongside changes in visitor spending and the mix of services purchased. Third, tourism-receipts definitions and transport components differ across reporting systems. Although one robustness check restricts the measured transport-revenue component, residual comparability issues remain. Fourth, the study is limited to 125 economies with sufficiently complete 2019–2020 observations, and missingness may be systematic. Finally, no controls are available in the supplied files for border restrictions, vaccination timing, epidemiological severity, income structure, source-market dependence or fiscal support. These omitted factors prevent causal interpretation and may contribute to the low explanatory power of the models.

The accounting exposure indicator must also be interpreted carefully. It uses total exports in the pre-pandemic denominator and attributes a portion of export-related revenue shortfall to disappearing tourism receipts under the WDI definitions. It neither isolates travel-service value added nor adjusts for offsetting growth in other sectors. Moreover, because baseline dependence uses tourism receipts in its numerator and the loss measure includes that same baseline amount, mathematical coupling and regression-to-the-mean effects remain possible in the severity test. Employing pre-period averages, alternative outcomes and a placebo reduces concern about one arbitrary operationalization but does not remove every source of bias.

Future research should combine the observed receipts series with tourism satellite accounts, tourism employment, real GDP and balance-of-payments data and, where possible, pre-pandemic international air connectivity and pandemic policy measures. Difference-in-differences or event-study designs could compare exposure gradients over a richer temporal window, but would require transparent assumptions about treatment and parallel trends. More detailed tourism-source-market data could reveal whether pre-crisis dependence on particular origin countries or aviation corridors explains more of the shock than tourism's export share. Subnational studies of destinations such as Lombok could complement aggregate tests with enterprise and household data, clarifying the distributional outcomes that a national receipts ratio cannot capture (Faber & Gaubert, 2019; Yergeau, 2020; Siwantari et al., 2024).

## 06 Conclusion

Using matched World Bank tourism statistics for 125 countries and economies, this study tests whether higher pre-pandemic tourism-export dependence predicted larger percentage falls in tourism receipts during the first year of COVID-19. It finds that 2020 tourism-receipts losses were widespread and severe, averaging 63.8%. The preferred continuous-model dependence slope is positive but statistically uncertain ($\beta = 0.079$; HC3 SE = 0.066; $p = .227$), and alternative model choices do not establish a robust positive gradient. The evidence therefore does not substantiate the simple claim that more tourism-dependent destinations consistently experienced *deeper percentage contractions* in their international tourism receipts.

At the same time, the economic exposure associated with those contractions differed dramatically. The median foregone tourism receipts were equivalent to approximately 1.98% of 2019 exports in the least tourism-dependent quartile and 31.06% in the most dependent quartile. This difference follows from the accounting interaction of baseline specialization and realized sectoral decline and should not be mistaken for a causal finding or the actual fall in total exports. The core contribution is a clearer framework for discussing tourism-related vulnerability: policy and scholarship should ask not only how much tourism contracted, but also how consequential the contraction was for the pre-crisis economic structure. Distinguishing those questions produces more precise comparisons and more appropriately targeted policy discussions.

## 07 Declarations

**Data availability.** The study uses publicly accessible World Development Indicators data. The indicator codes, construction rules, and sample criteria are described in the Methods section; the original series can be obtained from World Bank DataBank.

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**Author contributions.** Md Razaul Karim: conceptualization, methodology, statistical analysis as reported, interpretation, writing—original draft, and writing—review and editing.

## 08 References

Azizurrohman, M., Hartarto, R. B., Lin, Y.-M., & Nahar, F. H. (2021). The role of foreign tourists in economic growth: Evidence from Indonesia. Jurnal Ekonomi & Studi Pembangunan, 22(2), 313–322. https://doi.org/10.18196/jesp.v22i2.11591

Azizurrohman, M., Martayadi, U., Najmudin, M., Fathurrahim, F., & Bratayasa, I. W. (2023). Tourism industry and community readiness: A case study of the Mandalika Special Economic Zone (KEK). Journal of Economics Research and Social Sciences, 7(1), 60–68. https://doi.org/10.18196/jerss.v7i1.13652

Balaguer, J., & Cantavella-Jordá, M. (2002). Tourism as a long-run economic growth factor: The Spanish case. Applied Economics, 34(7), 877–884. https://doi.org/10.1080/00036840110058923

Becken, S. (2013). Developing a framework for assessing resilience of tourism sub-systems to climatic factors. Annals of Tourism Research, 43, 506–528. https://doi.org/10.1016/j.annals.2013.06.002

Brida, J. G., Cortes-Jimenez, I., & Pulina, M. (2016). Has the tourism-led growth hypothesis been validated? A literature review. Current Issues in Tourism, 19(5), 394–430. https://doi.org/10.1080/13683500.2013.868414

Briguglio, L., Cordina, G., Farrugia, N., & Vella, S. (2009). Economic vulnerability and resilience: Concepts and measurements. Oxford Development Studies, 37(3), 229–247. https://doi.org/10.1080/13600810903089893

Britton, S. G. (1982). The political economy of tourism in the Third World. Annals of Tourism Research, 9(3), 331–358. https://doi.org/10.1016/0160-7383(82)90018-4

Crouch, G. I. (2011). Destination competitiveness: An analysis of determinant attributes. Journal of Travel Research, 50(1), 27–45. https://doi.org/10.1177/0047287510362776

Dahles, H., & Susilowati, T. P. (2015). Business resilience in times of growth and crisis. Annals of Tourism Research, 51, 34–50. https://doi.org/10.1016/j.annals.2015.01.002

Dogru, T., & Bulut, U. (2018). Is tourism an engine for economic recovery? Theory and empirical evidence. Tourism Management, 67, 425–434. https://doi.org/10.1016/j.tourman.2017.06.014

Dwyer, L., Forsyth, P., & Spurr, R. (2004). Evaluating tourism's economic effects: New and old approaches. Tourism Management, 25(3), 307–317. https://doi.org/10.1016/S0261-5177(03)00131-6

Dwyer, L., & Kim, C. (2003). Destination competitiveness: Determinants and indicators. Current Issues in Tourism, 6(5), 369–414. https://doi.org/10.1080/13683500308667962

Faber, B., & Gaubert, C. (2019). Tourism and economic development: Evidence from Mexico's coastline. American Economic Review, 109(6), 2245–2293. https://doi.org/10.1257/aer.20161434

Gede, I. P., Idrus, S., & Siwantari, P. A. P. D. (2024). Menggali potensi desa wisata gunung daratan dan pesisir (Gudasir) menuju SDGs desa berkelanjutan di Kabupaten Lombok Utara. Bali Journal of Hospitality, Tourism and Culture Research, 1(2), 95–100. https://doi.org/10.5281/zenodo.12592432

Gössling, S., Scott, D., & Hall, C. M. (2021). Pandemics, tourism and global change: A rapid assessment of COVID-19. Journal of Sustainable Tourism, 29(1), 1–20. https://doi.org/10.1080/09669582.2020.1758708

Jiang, Y., Ritchie, B. W., & Verreynne, M.-L. (2019). Building tourism organizational resilience to crises and disasters: A dynamic capabilities view. International Journal of Tourism Research, 21(6), 882–900. https://doi.org/10.1002/jtr.2312

Lee, C.-C., & Chang, C.-P. (2008). Tourism development and economic growth: A closer look at panels. Tourism Management, 29(1), 180–192. https://doi.org/10.1016/j.tourman.2007.02.013

Mair, J., Ritchie, B. W., & Walters, G. (2016). Towards a research agenda for post-disaster and post-crisis recovery strategies for tourist destinations: A narrative review. Current Issues in Tourism, 19(1), 1–26. https://doi.org/10.1080/13683500.2014.932758

Martayadi, U., & Siwantari, P. A. P. D. (2026). A field experiment on student-led sustainability change in tourism micro and small enterprises in West Nusa Tenggara, Indonesia. Global Review of Tourism and Social Sciences, 2(3), 396–407. https://doi.org/10.53893/grtss.v2i3.544

Noviyanti, L. S., Murianto, & Martayadi, U. (2023). Empowering communities: Unleashing the potential of Gunung Tunak Natural Park through active participation in sustainable tourism. Advances in Tourism Studies, 1(2), 72–78. https://doi.org/10.53893/ats.v1i2.21

Ritchie, B. W. (2004). Chaos, crises and disasters: A strategic approach to crisis management in the tourism industry. Tourism Management, 25(6), 669–683. https://doi.org/10.1016/j.tourman.2003.09.004

Ritchie, B. W., & Jiang, Y. (2019). A review of research on tourism risk, crisis and disaster management: Launching the Annals of Tourism Research curated collection on tourism risk, crisis and disaster management. Annals of Tourism Research, 79, 102812. https://doi.org/10.1016/j.annals.2019.102812

Romão, J. (2020). Tourism, smart specialisation, growth, and resilience. Annals of Tourism Research, 84, 102995. https://doi.org/10.1016/j.annals.2020.102995

Scott, D., Hall, C. M., & Gössling, S. (2019). Global tourism vulnerability to climate change. Annals of Tourism Research, 77, 49–61. https://doi.org/10.1016/j.annals.2019.05.007

Sequeira, T. N., & Nunes, P. M. (2008b). Does tourism influence economic growth? A dynamic panel data approach. Applied Economics, 40(18), 2431–2441. https://doi.org/10.1080/00036840600949520

Sigala, M. (2020). Tourism and COVID-19: Impacts and implications for advancing and resetting industry and research. Journal of Business Research, 117, 312–321. https://doi.org/10.1016/j.jbusres.2020.06.015

Siwantari, P. A. P. D., Gede, I. P., & Hadisukarno, T. (2025). The role of ecotourism in environmental conservation in the Kerujuk area, North Lombok Regency. J-TRUE: Journal of Travel and Leisure, 2(1). https://doi.org/10.52352/jtrue.v2i1.2038

Siwantari, P. A. P. D., Gede, I. P., & Pati, I. (2024). A GIS approach to identifying tourism potential across varied landscapes: A case study in West Lombok Regency. Bali Journal of Hospitality, Tourism and Culture Research, 2(1), 44–52. https://doi.org/10.5281/zenodo.14602778

Spenceley, A., & Meyer, D. (2012). Tourism and poverty reduction: Theory and practice in less economically developed countries. Journal of Sustainable Tourism, 20(3), 297–317. https://doi.org/10.1080/09669582.2012.668909

UNCTAD. (2021). COVID-19 and tourism: An update—Assessing the economic consequences (UNCTAD/DITC/INF/2021/3). United Nations Conference on Trade and Development. https://unctad.org/publication/covid-19-and-tourism-update

UN Tourism. (2022). Impact assessment of the COVID-19 outbreak on international tourism. https://www.untourism.int/impact-assessment-of-the-covid-19-outbreak-on-international-tourism

UN Tourism. (2021, January 28). 2020: Worst year in tourism history with 1 billion fewer international arrivals. https://www.untourism.int/news/2020-worst-year-in-tourism-history-with-1-billion-fewer-international-arrivals

Wang, T.-L., Azizurrohman, M., & Pramuja, R. A. (2026). Attracting tourists to Indonesia: How SEZs and visa-free policies influence international arrivals. Journal of Policy Research in Tourism, Leisure and Events, 18(2), 379–397. https://doi.org/10.1080/19407963.2024.2432634

World Bank. (2026). World Development Indicators: International tourism receipts (current US$; ST.INT.RCPT.CD) and international tourism receipts (% of total exports; ST.INT.RCPT.XP.ZS) [Data and metadata]. https://databank.worldbank.org/metadataglossary/world-development-indicators/series/ST.INT.RCPT.XP.ZS

Yergeau, M.-E. (2020). Tourism and local welfare: A multilevel analysis in Nepal's protected areas. World Development, 127, Article 104744. https://doi.org/10.1016/j.worlddev.2019.104744

Yuli, S. B. C., Azizurrohman, M., Pramuja, R. A., & Ginting, Y. M. (2025). Tourism-driven development: Evaluating the benefits of the Mandalika Special Economic Zone. Cogent Social Sciences, 11(1), 2460317. https://doi.org/10.1080/23311886.2025.2460317

Zenker, S., & Kock, F. (2020). The coronavirus pandemic—A critical discussion of a tourism research agenda. Tourism Management, 81, 104164. https://doi.org/10.1016/j.tourman.2020.104164