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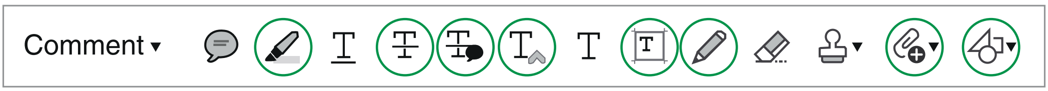

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Empirical Article

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An index of the economic dependence on Tourism

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Abstract
This study proposes a methodology to construct a Tourism Economic Dependence Index for a sample of 144 countries spanning the period 1995–2019. This index aims to serve as a summary measure of countries' dependence on tourism while controlling for differences in economic development levels across countries. Findings suggest that an index value of 20% may be considered a threshold for identifying highly tourism-dependent countries. Furthermore, the results of the index indicate that economies have experienced a slight trend toward higher levels of dependence on tourism since the global financial crisis. However, estimates from a panel convergence model suggest that the hypothesis of convergence toward a common long-run equilibrium in index levels across countries can be rejected. Instead, different groups of countries converging toward the same long-run equilibrium level of the index have been identified.

Keywords
club convergence, composite index, country-level analysis, economic dependence on tourism, panel data

AQ2 Introduction

Despite several decades of debate and analysis, the issue of the impact of tourism on economic development remains unresolved (Bianchi, 2018). As Sharpley and Telfer (2023: 19) put it: "Development is not an inevitable outcome of tourism but is dependent upon how its economic contribution translates into broader development policies." It is known that, although international tourism can initiate economy-wide structural change in developing countries, its potential to leverage economic development might be limited when countries fail to transform initial export-led

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growth into more sustainable and wider economic diversification (Skerritt and Huybers, 2005). For example, Palma (2005) highlighted that the over-development of export-service activities, mainly tourism and finance, could lead to excessive de-industrialization and negative impacts on long-term growth and employment, especially in developing countries. Additional evidence supporting this view was provided, among others, by Corden and Neary (1982), Copeland (1991), Lejárraga and Walkenhorst (2013), and De Vita and Kyaw (2017), who showed that high dependence on a growing tourism industry might crowd out resources from other sectors, leading to de-industrialization and "beach disease" (Holzner, 2011). Also, Marcouiller (2023) indicates that stimulating tourism in economies that suffer from a lack of economic diversity can create dependencies that may act against sustainable forms of development.

In this context, the principal aim of this study was to construct an index for measuring the broader economic dependence of countries on tourism. At this point, it is essential to distinguish between the concepts of 'tourism specialization' (Bragi et al., 2017), the size of the tourism sector (Khalid et al., AQ3 2021), and the concept of economic dependence on tourism. The proposed index aims to measure the economic dependence on tourism of national economies as a whole. However, it is crucial to note that not all highly specialized tourism economies, or those playing a prominent role in the international tourism industry (e.g., in terms of the number of visitors received), can be considered 'tourism-driven' or 'tourism-dependent' economies. For example, France and Italy are cases in point. Data from UNWTO show that in terms of tourist arrivals worldwide, France ranked first (90.9 million) and Italy ranked third (64.5 million) in 2019. It is clear that both economies can be considered tourism-specialized, with well-developed international tourism industries. However, these fully developed economies cannot be considered economically dependent on tourism.

The index, referred to as the Tourism Economic Dependence Index (TEDI), was constructed upon the concept of economic development (Hill, 2023). Also, both the "staple theory of economic growth" (Altman, 2003; Innis, 1933; Watkins, 1963) and the "path dependence" framework (Martin and Sunley, 2006), helped to provide the conceptual groundwork for this index. This theoretical background was chosen because similar characteristics are shared by economies that are highly dependent on tourism and those dependent on traditional staple industries (Schmallegger and Carson, 2010). According to Carson (2011), the main shared features are as follows: on the one hand, these economies are often susceptible to boom and bust cycles due to their overdependence on external demand (e.g., international tourism). On the other hand, highly tourism-dependent economies might fail to transform initial export-led growth into more sustainable economic diversification, falling into a "staple trap" that hinders development. Thus, TEDI aims to provide two main advantages over alternative simple measures of tourism shares in the economy: (1) the index is a summary measure of key dimensions of tourism dependence; (2) it measures the level of economic dependence on tourism when differences in countries' economic development are accounted for.

Recently, Mooney and Zegarra (2020) developed a tourism-dependence index for Latin American countries to gauge their degree of tourism dependency. They employed tourism's contribution to GDP, employment, and foreign receipts to construct a normalized tourist dependence index (graded from 0 to 100) for a set of 166 countries based on 5-year averages of these indicators for the period 2014 to 2018. However, the resulting index does not control for differences in economic development across countries. For that reason, TEDI could prove instrumental in fully understanding the origins and magnitude of the economic dependence of countries on tourism. Additionally, this viewpoint underscores that the risks of excessive dependence on tourism might be mitigated by diversifying economic activities and bolstering the assets reserves that drive economic development (Hill and Brennan, 2000).

Thus, this study contributes to the following aspects. Firstly, we constructed a TEDI to improve our understanding of the evolution of economic dependence on tourism across 144 countries for the period 1995 to 2019. Secondly, as a direct application of this index, TEDI can help determine whether convergence across countries exists, identifying groups of countries that converge toward the same long-run equilibrium on index level. With these aims, the study is structured as follows: firstly, we present the theoretical background justifying the proposal and construction of the index; we then describe the methodology used to construct the index, followed by an analysis of the main results; next, we examine the existence of convergence clubs in the index long-run growth, presenting the main determinants of convergence club membership, and discussing their implications; finally, we offer some conclusions.

Literature review and theoretical background

The economic development of countries may be boosted by expanding their portfolio of new goods and services and by enhancing the productive capabilities of existing industries (Hill, 2023). For these reasons, economic development crucially depends on the ability of countries to constantly renew their portfolio by introducing new or emerging products (i.e., increasing product diversity over their lifecycle). As highlighted by Markusen (1985), this process complements the sectoral diversity needed within economies. Therefore, over-reliance on one export sector may lead to a long-term economic decline in a given country due to: (1) an insufficient sectorial diversity; and (2) an inadequate renewal of the products (goods or services) that form the export base of the economy.

Within economic literature, the "staple theory of economic growth", proposed by Innis and Mackintosh (Innis, 1933), attempted to elucidate the processes of economic development in economies with significant dependence on natural resources. The fundamental premise of this theory is that the exports of a "staple" (i.e., the export of natural resources that require minimal on-site processing) becomes the leading sector in the economy and shapes the pace of economic growth (Watkins, 1963). However, this dependence on the staple sector may give rise to significant economic and developmental challenges in the long term. Auty (2001), Barnes (1996), Carson (2011), and Martin (2010) identified the following key challenges: (1) the creation of extraction economies that are overdependent on external markets, because in most cases the domestic market for the staple is either non-existent or severely limited; (2) the exposure of the staple economy to boom-and-bust cycles, due to dependence on external demand in highly competitive markets; and (3) the formation of "locked-in" economies that are overdependent on a particular industry, especially when these economies fail to diversify and rejuvenate. Thus, sustained overdependence on export-oriented industries could lead to structural weaknesses in the economy of countries due to a lack of productive diversification and, consequently, give rise to increased vulnerability. The literature refers to this situation as the "staple trap".

International tourism is a significant contributor to economic development, particularly in economies lacking competitive industrial sectors and possessing natural assets, such as an attractive climate, and an abundance of labour, thus providing comparative advantages for the development of tourism (Bond and Ladman, 1980). However, high dependence on international tourism can render economies over reliant on external income, leading to unstable economic situations (Holzner, 2011). Thus, in terms of economic development, the critical question regarding economic overdependence on tourism is whether a potential decline in this sector will also lead to the decline or demise of the economy as a whole, acting against resiliency and sustainable forms of development (Marcouiller, 2023).

Although tourism has often been considered as a suitable industry for escaping the staple trap, the tourism industry itself may be akin to a natural resource staple (Schmallegger and Carson, 2010). As Britton (1991) pointed out, tourism is not always the strategic lever that can be used by less-developed economies to achieve sustainable development. In fact, the tourism industry can be considered a staple industry under certain circumstances, such as high dependence on external sources of capital, limited domestic economic linkages, and high vulnerability to exogenous shocks and demand fluctuations in markets. Tourism-dependent economies may fall into a staple trap in these cases. This situation is especially evident in certain tourism destinations such as SIDS and peripheral countries with limited resource bases, in which domestic economies fail to diversify as they become overdependent on international tourism. Some SIDS economies have developed by relying on a relatively narrow base of commodity exports as well as a small range of service sectors, notably tourism, real estate and construction (UNEP, 2014). Such economies may experience negative lock-in, with a development path characterised by slow long-term growth and economic vulnerability due to a lack of diversification and path dependence (Martin and Sunley, 2006). For example, Deng et al. (2014) examined whether a 'tourism resource curse' exists, even in non-tourism-dependent regional economies in China. They found that tourism resource development tends to reduce economic growth, mainly through crowding out human capital. In addition, Yao et al. (2021) noted that the expansion of tourism has squeezed out manufacturing industries through resource transfer effects and income effects, thereby causing a negative impact on the overall economy of the Western region of China. Therefore, it could be argued that tourism presents an opportunity for resource-rich countries to avoid dependency on traditional staples, and that developing the tourism industry may enhance specialisation levels within the industry, leading to improved specific knowledge and potential for innovation. However, economic development theories and the canonical model of "path dependence" (Martin, 2010) have shown that failure to diversify from a basic exports-led industry may lead to economic dependency and truncated development (Carson and Carson, 2017).

For these reasons, an index that measures a country's dependence on tourism must not only consider the specific importance of the tourism industry in the economy —as measured by its contribution to GDP, employment, and foreign receipts— but also variables that moderate these contributions. These adjustment variables should control for existing differences in the degree of diversification, complexity, and competitiveness that have been attained by economies (i.e., their level of economic development). It has been established that the diversity and complexity of a country's economic structure confer higher growth and greater stability (Hausmann, 2014). This task may be accomplished by the integration of appropriate adjustment variables into the index as well as the abovementioned basic indicators of dependence.

Development of the index and results

Taking the foregoing into account, the main variables used to construct the TEDI were as follows: (1) tourism value as a fraction of GDP; (2) tourism employment relative to total employment; and (3) export receipts from tourism in relation to total export earnings. These variables correspond to the three dimensions through which tourism activities may impact the economy: contribution to foreign exchange, national income, and employment (Eadington and Redman, 1991). However, some adjustments had to be made to account for differences in industrial competitiveness between countries prior to constructing the composite index. UNIDO (2021) has defined industrial competitiveness as the capacity of countries to increase their presence in international and domestic markets whilst developing industrial sectors and activities with high value added and technological content. According to this definition, two key elements are needed to improve industrial competitiveness: (1) expanded production, which is needed to increase presence in domestic and international markets; and (2) increased technological content. The focus of the first element is clear; however, the focus of the second element is the “quality” of such expansion. The creation of technology-intensive goods is linked to a higher capacity to innovate and adopt new technologies, which is strongly correlated with successful trade performance and higher economic growth and development (Dosi et al., 1990; Verspagen, 2001). On these grounds, the variables chosen to adjust the three basic indicators are: (1) the manufacturing value added per capita index; (2) the total employment share of industry; and (3) high-tech export revenue as a share of global high-technology export revenue. These adjustment variables were chosen to control for differences in three key dimensions of industrial competitiveness, namely the capability of economies to develop industries with high value added and technological content. The choice of adjustment variables was made considering their relevance as proxies for the comparative advantage and complexity of economies, as well as their availability in public databases. In this instance, for example, it would be more appropriate to employ data referring to the manufacturing sector. However, more disaggregated sectoral data for the industry were not available. Thus, the TEDI was constructed following the framework depicted in Figure 1.

Figure 1 shows the three basic indicators of dependence on the tourism sector. Each dimension of dependency was calculated by modifying every base indicator by an adjustment factor. This conceptualization of the index is, by no means, based on “tourism bashing” (Sharpley and Telfer, 2023) or on the a priori view that tourism specialization is negative for development. Rather, we fully acknowledge the advantages of tourism development and specialization, especially for less developed countries (Sinclair, 1998). However, the TEDI construction can also contribute to making it clear that there exists a positive way to effectively reduce countries’ economic dependence on tourism without diminishing tourism specialization: by implementing productivity-enhancing sectoral policies, diversifying countries’ economic structure, and increasing their market share in high-tech exports.

Accordingly, TEDI accounts for the existing inequalities in countries’ economic development by “discounting” the value of each basic indicator based on the level of its corresponding adjustment variable. These adjustments are implemented following the methodology proposed by the United

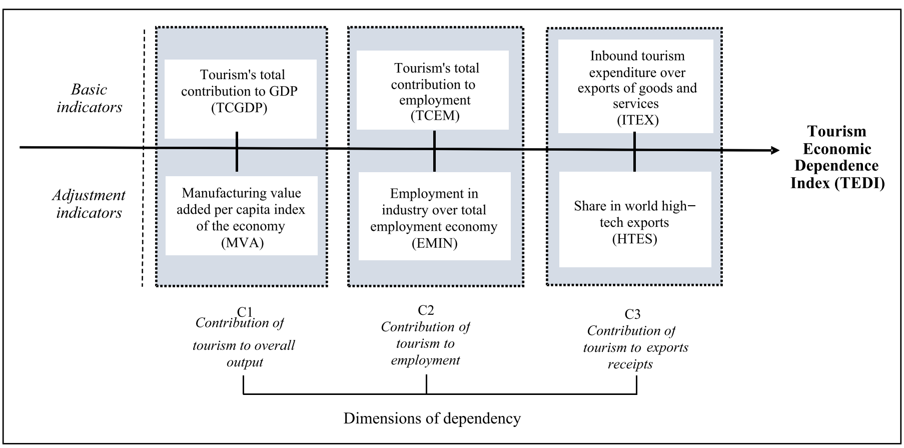

Figure 1. Tourism economic dependence index.

Nations Development Programme (UNDP) in constructing the inequality-adjusted HDI (UNDP, 2020), and also the index proposed by Hailu and Kipgen (2017). In the case of the first component of the index, the following adjustments were made for each country (i) and time period (t):

$$C1_{it} = TCGDP_{it} \times (1 - MVA_{it}) \quad (1)$$

where the basic indicator is the total contribution of tourism to GDP (%) and the adjustment variable is the manufacturing value added per capita index of the economy (MVA), which is a proxy for the level of labour productivity in the manufacturing sector (range: 0 to 1). The second component was adjusted as follows:

$$C2_{it} = TCEM_{it} \times (1 - EMIN_{it}) \quad (2)$$

where the basic indicator is the total contribution of tourism to employment (%) and the adjustment variable is the total employment share of industry (i.e., manufacturing, construction, and other secondary sectors; see Table 1) (EMIN) (range: 0 to 1). The third component was adjusted as follows:

$$C3_{it} = ITEX_{it} \times (1 - HTES_{it}) \quad (3)$$

where the basic indicator is inbound tourism expenditure over the total exports of goods and services (%), and the adjustment variable is the high-technology exports revenue share (HTES) of the country (i) in global revenues from high-tech exports (range: 0 to 1).

The dimensional sub-indices were aggregated to produce a single index. Thus, the index was the geometric mean of the three sub-indices:

$$TEDI_{it} = (C1_{it} \times C2_{it} \times C3_{it})^{1/3}, \quad 0 \leq TEDI_{it} \leq 100 \quad (4)$$

The geometric mean was chosen for the aggregate on the assumption that although the indicators are substitutable, a low value in one component would not be linearly compensated for by a better measure in another. An undesirable feature of additive aggregation is that it implies full compensability, meaning that poor performance in a given sub-index could be offset by high values in another component of the index (Sagar and Najam, 1998). Moreover, the equal weighting of the indicators was based on the implicit assumption that a weighting system is introduced by the informative value of each individual indicator (Nardo et al., 2005). Table 1 presents the data used to construct the index and their respective sources.

The calculation of different index's components is explained by means of an example as follows.

A corrected measure of the total contribution of tourism to GDP

In equation (1), the adjustment variable is the value of the Manufacturing Value Added per capita index (MVA). This choice is justified as this index is a composite measure of a country's competitive industrial performance. A positive change in the MVA value of a given country over time suggests increased productive capacity and higher quality of products, which leads to a better chance of success in international markets. Consequently, a comparison of the MVA across countries offers insight into the comparative advantage of one economy over another. For these reasons, two countries with identical TCGDP values may differ in their degree of tourism dependence if one of them displays a superior competitive industrial performance as measured by having a higher MVA. Vietnam and Switzerland are a case in point. Both countries demonstrated comparable economic

Table 1. Variables employed and data sources.

Variable and definition	Source
Inbound tourism expenditure over exports of goods and services (%).	UN World Travel Organization (UNWTO)
Tourism' total contribution to employment (%). WTTC's estimations of total economic impacts include direct, indirect, and induced effects of industries that deal directly with tourists.	World Travel & Tourism Council (WTTC) through World Bank (WB) TCdata360
Tourism' total contribution to GDP (%). WTTC's estimations of total economic impacts include direct, indirect, and induced effects of industries that deal directly with tourists.	WTTC data through WB TCdata360
High-tech exports revenues share in world high-tech exports revenues. This share is a proxy of the impact of a country on world high-tech exports, which represents a country's competitiveness. Range: 0 to 1.	UN Comtrade database through WITS platform (WB) and own work
Total employment share, industry. Number of employees in the "industry" as a quotient of total employment in that economy. Modeled ILO estimate. The "industry" sector consists of mining and quarrying, manufacturing, construction, and public utilities. Range: 0 to 1.	International Labor Organization (ILO) through WB TCdata360
Manufacturing Value Added (MVA) per capita *index*. UNIDO index is a proxy for industrial competitiveness. This index follows the Min-Max normalization process from 0 to 1.	UNIDO - Competitive Industrial Performance Index (CIP index) through WB TCdata360
Rigorous and impartial public administration index. This variable measures the extent to which public administration is characterized by arbitrariness and biases (i.e., nepotism, cronyism, or discrimination). The question covers the public officials that handle the cases of ordinary people. If no functioning public administration exists, the lowest score (0) applies. Scale: Ordinal (0 to 4), converted to interval by the measurement model.	Varieties of Democracy (V-Dem) Project
Pollution emissions index. This index measures progress on managing the emissions of two primary air pollutants. It is composed of two indicators, adjusted emission growth rates for SO_2 and NO_X. The growth rates are calculated as the average annual rate of increase or decrease in SO_2 and NO_X over the years 2005-2014. These growth rates are then adjusted for economic trends to isolate change due to policy rather than economic fluctuation. Both indicators are given equal weight in the aggregation. Range: 0 (lowest) to 1 (highest emissions growth rates).	The Quality of Government Environmental Indicators Dataset (QoG-EI)
Total natural resources rents (% of GDP). Countries' total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents.	WB TCdata360
Land area. Countries' land area in millions square kilometres.	Varieties of Democracy (V-Dem) Project
GDP per capita, PPP (constant 2017 international $). GDP per capita based on purchasing power parity (PPP). Data are in constant 2017 international dollars.	World Development Indicators WB

reliance on the tourism sector in 2019, with TCGDPs of 9.210% and 9.222%, respectively, according to WTTC data. However, a more detailed examination of both economies reveals marked differences in the MVA. In 2019, the values stood at 0.015 for Vietnam and 0.593 for Switzerland. The figures are as follows:

Vietnam (South-Eastern Asia)	*Switzerland* (Western Europe)
$C1_{2019} = [TCGDP_{2019} \times (1 - MVA_{2019})] = [9.210\% \times (1 - 0.015)] = 9.07\%$	$C1_{2019} = [TCGDP_{2019} \times (1 - MVA_{2019})] = [9.222\% \times (1 - 0.593)] = 3.75\%$

Thus, there is a significant change in narrative after adjusting the basic indicator. Although Switzerland and Vietnam have identical total contributions of tourism to GDP, according to this index component, Vietnam's economy is much more tourism-dependent than Switzerland's. In a fiercely competitive global market, Switzerland's comparative advantage in manufacturing productivity may lead to stronger future growth and, as a result, a decreased dependence on the tourism sector when compared to Vietnam.

A corrected measure of the total contribution of tourism to employment

In equation (2), the primary indicator is adjusted by the proportion of industrial employment to total employment. This adjustment is deemed appropriate as a higher proportion is associated with more resilient labour markets due to their greater diversification of employment across sectors (Fingleton et al., 2012). Furthermore, a reduction in contributions to manufacturing growth is often suggestive of a possible decline in overall labour productivity and income (Kaldor, 1967). A low proportion of workers in the manufacturing sector could indicate that there is an issue of de-industrialisation or even symptoms of "Dutch disease" (Palma, 2005; Rodrik, 2016).

To illustrate this, we show figures for Kenya and Qatar:

Kenya (Eastern Africa)	*Qatar* (Western Asia)
$C2_{2019} = [TCEM_{2019} \times (1 - EMIN_{2019})] = [8.931\% \times (1 - 0.062)] = 8.38\%$	$C2_{2019} = [TCEM_{2019} \times (1 - EMIN_{2019})] = [9.002\% \times (1 - 0.537)] = 4.17\%$

In 2019, both Kenya and Qatar showed similar contributions of tourism to total employment at 8.931% and 9.002%, respectively. Once again, the narrative significantly changes when these contributions are adjusted for the share of industry in total employment. The figure for Kenya (8.38%) is significantly higher than that of Qatar (4.17%). Thus, in terms of employment, Kenya's economy can be considered to be more tourism dependent than Qatar's. This result can be attributed to Kenya's reduced capacity for employment diversification into more robust sectors of the economy when compared to Qatar.

A corrected measure of the share of tourism receipts in total revenue exports

Economies reliant on international tourism receipts must explore new avenues for foreign exchange and focus on export diversification to mitigate dependence on this sector. High-income countries exhibit a clear trend toward increased sectoral specialisation in exports (Imbs and Wacziarg, 2003), which depends significantly on the capability of firms to produce and supply high-value goods and services. This aspect also rests on firms' capabilities for innovation and development. Recent studies have suggested that it is not just the diversity but also the complexity of a country's exports that act as strong indicators of an economy's knowledge base and expertise. These two factors are key to facilitating economic growth and development (Hidalgo, 2021). The development of complex activities implies the combination of many capabilities, which provide a source of regional/national competitiveness (Fleming and Sorenson, 2001). Such capabilities can be inferred from a country's share of high-tech exports revenue in the pool of global high-tech exports revenue. This metric contributes to the broader measure of competitive industrial performance between countries and also serves as a gauge of an economy's complexity and its influence on global high-tech exports. Thus, the share of global high-tech exports was used as an adjustment metric for the basic indicator in equation (3).

For a clearer understanding of this component, we compare and contrast the data for Latvia and Hong Kong:

Latvia (Northern Europe)	*Hong Kong* (Eastern Asia)
$C3_{2019} = [ITEX_{2019} \times (1 - HTES_{2019})]$ $= [4.973\% \times (1 - 0.0005)] = 4.97\%$	$C3_{2019} = [ITEX_{2019} \times (1 - HTES_{2019})]$ $= [5.0379\% \times (1 - 0.1129)] = 4.47\%$

The adjusted data reveals stark contrasts between Latvia and Hong Kong. Latvia's share of high-tech manufacturing export revenues was negligible in 2019, whereas Hong Kong contributed a substantial 11.3% of global high-tech manufacturing revenues in the same year. In terms of this index component, Latvia's economic dependence on tourism surpassed Hong Kong's because Latvia had a diminished capacity to earn foreign currency via high-tech manufacturing exports. Such exports are vital components of external demand, and often indicate potential future economic growth and demonstrate resilience against external shocks, lessening this way countries' economic dependence on tourism.

The index was constructed for a set of 144 countries for the period 1995 to 2019. This sample represents about 97% of the global GDP within that period. We used the linear interpolation technique to estimate plausible values for some countries that had missing data. Figures 2 and 3 show the results of the index, indicating significant variances across world's regions and countries.

Figure 4 shows the evolution of average index levels for 110 of the 144 countries included in the primary database, covering the period 2000 to 2019. It reveals a slight trend toward increased levels of economic dependence on tourism. Nevertheless, significant variances among countries remain unaltered. As indicated by the coefficient of variation, there is also an observable increase in the dispersion of the index across countries during this period.

The slight trend shown in Figure 5 mirrors that shown in Figure 4. Figure 5 delineates a kernel density estimate for the cross-sectional distribution of the index in 1995 and 2019. Notably, there are two unimodal distributions with corresponding emergent peaks on the right. By 1995, the 90th percentile of the distribution aligns with an index value of 17.3%, rising to 20.8% by 2019.

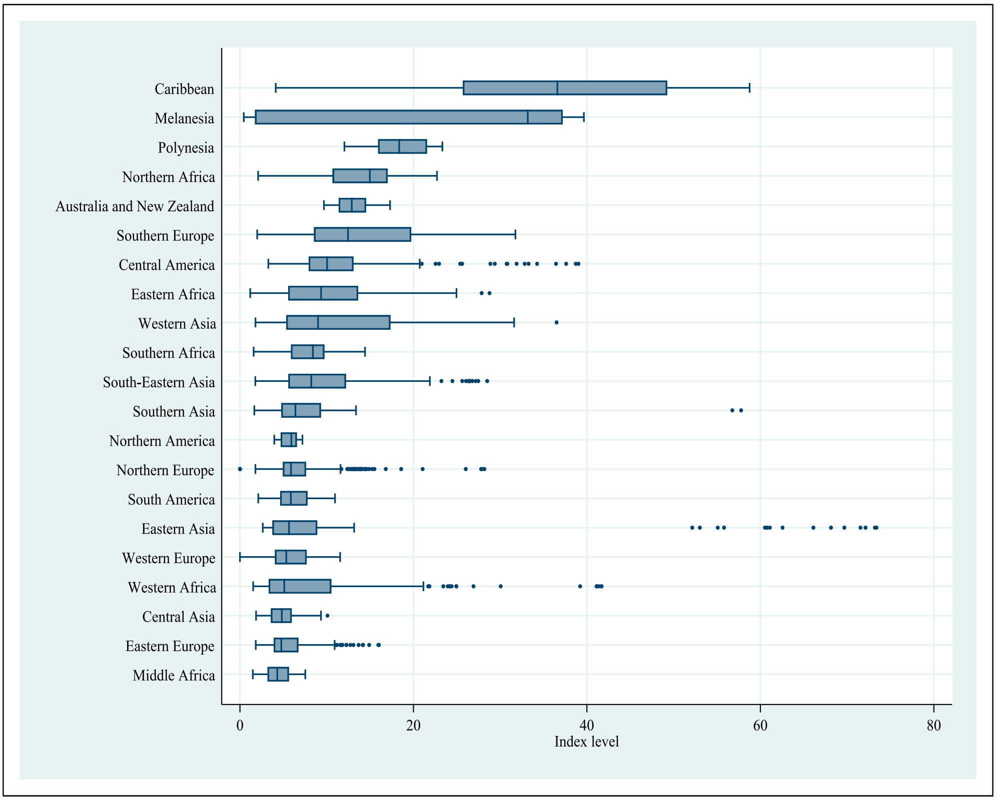

Figure 2. The Tourism Economic Dependence Index. Box-and-whisker plots for regions. Note: Unbalanced panel: 2971 yearly observations for 144 countries in the sample. The dots in the graph show what can be considered as outliers for each region considered.

At first sight, TEDI levels surpassing 20% tend to diverge significantly from average values. Hence, as a rule of thumb, an index value circa 20% may serve as a critical benchmark to potentially identify the cluster of countries highly dependent on tourism. However, in order to establish a TEDI cut-off based on statistical criteria, we can employ the methodology underpinning the Human Development Index (HDI). The HDI reports employ a system of fixed cut-off points to categorize countries based on achieved human development levels (UNDP, 2020). Analogously, employing data-mining techniques, we can identify cut-off points for each of TEDI's three components (C1, C2, and C3). Upon determining the cut-off for each component, we can compute the TEDI cut-off by calculating the geometric mean of these values. In our case, we employ a data-mining technique, the *k-means partition cluster analysis*, to discern these cut-off points. This iterative method segregates the data sample into k groups or clusters. Given our objective to determine a threshold to identify high tourism-dependent countries, we hypothesize two distinct clusters for each TEDI component's distribution. Consequently, our *k-means* algorithm sets k = 2, using a Minkowski distance metric with an infinite argument (essentially, a maximum-value distance) to assess similarity between observations (Hastie et al., 2009). This non-supervised clustering algorithm was applied to C1, C2, and C3 values for the

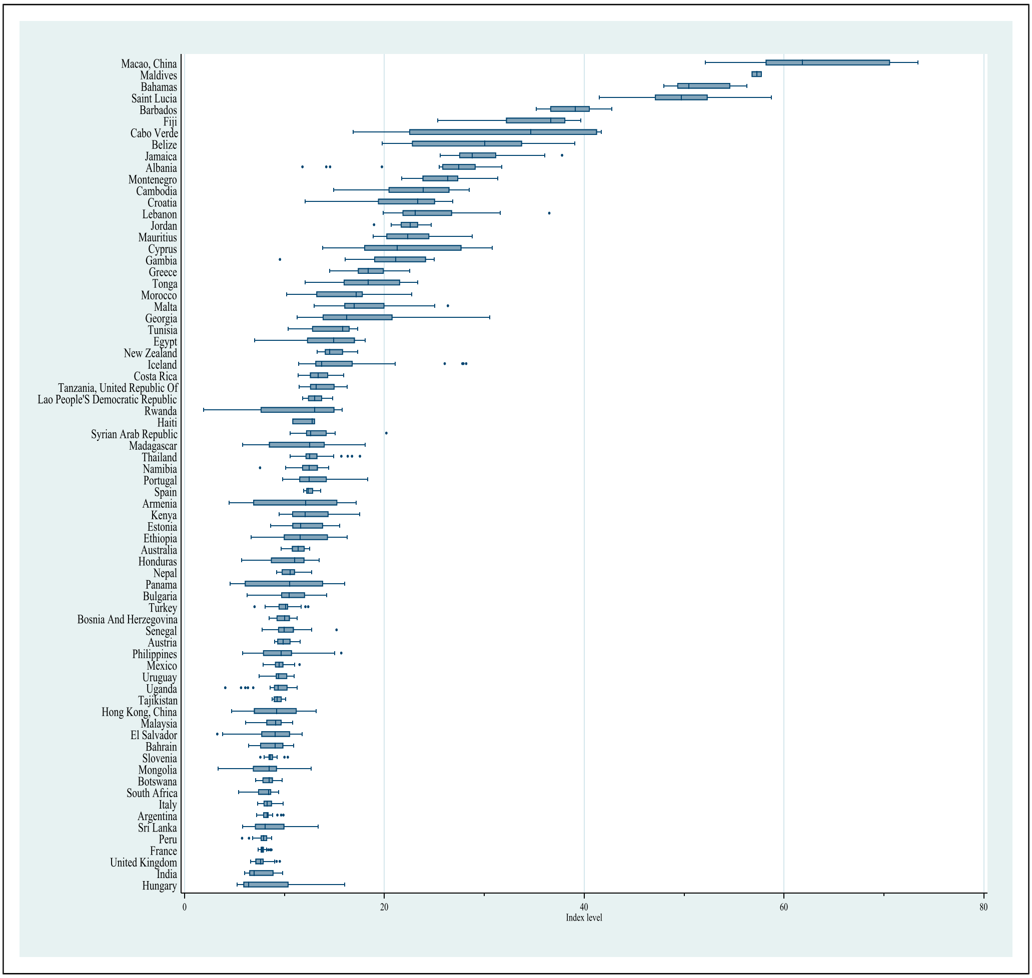

Figure 3. The Tourism Economic Dependence Index. Box-and-whisker plots for countries in the sample belonging to 1st and 2nd quartiles. Note: Unbalanced panel: 1498 yearly observations corresponding to the top 72 countries in the sample. The dots in the graph show what can be considered as outliers for each country considered.

144 countries sampled from 1995 to 2019. Using this clustering mechanism, we derived cut-off points as follows: 20.4% for C1, 16.2% for C2, and 29.1% for C3. The geometric mean of these values yields 21.3% - similar to the figure observed from TEDI's 2019 cross-sectional distribution density estimate. This consistency bolsters our confidence that a 20% benchmark for TEDI effectively indicates countries with significant travel and tourism dependence, making them susceptible to potential developmental traps and economic or travel-related shocks. Interestingly, Adamou and Clerides (2010) have shown that the economic growth rate is maximized when tourist receipts represent 20.8% of GDP. Above this threshold, tourism can still contribute to economic growth, but countries may be better off diverting their resources to

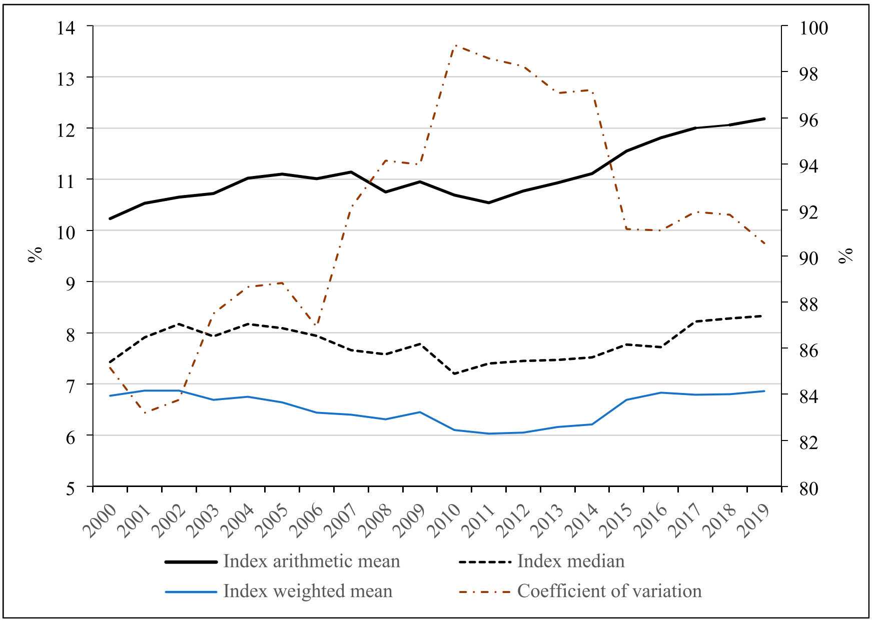

Figure 4. Evolution of the index means and the coefficient of variation. Note: the means (left scale) and the coefficient of variation (right scale) were computed for a balanced panel of 110 countries, covering the period 2000 to 2019. Observations for the period 1995 to 1999 have been not considered in the figure because for some of the 110 countries in the panel data was not available prior to 2000. The weight employed to construct the index weighted mean is the constant GDP for each country.

other areas of economic activity. For that reason, we consider that an index value below 20% may serve as a benchmark to identify the cluster of countries for which the potential benefits of tourism are not exhausted.

In view of these findings, two research questions can be raised concerning the evolution over time of differences in index levels across countries: Over time, is there a discernible overarching trend of convergence across countries in index levels? If we assume that certain disparities are entrenched and perpetual (i.e., overall divergence), is there permanent dependence on different long-term equilibrium index levels for specific groups of countries? Thus, divergence might be a straightforward alternative to convergence. Nevertheless, another plausible scenario is “club convergence”, where clusters of countries with comparable initial conditions converge toward similar long-term index levels. Further analysis may elucidate any permanent trends toward various long-term equilibrium levels for specific groupings of countries.

Club convergence analysis

Methods

The empirical literature on economic growth describes a “convergence club” as a cluster of countries exhibiting similar long-term outcomes regarding the evolution of a certain variable of

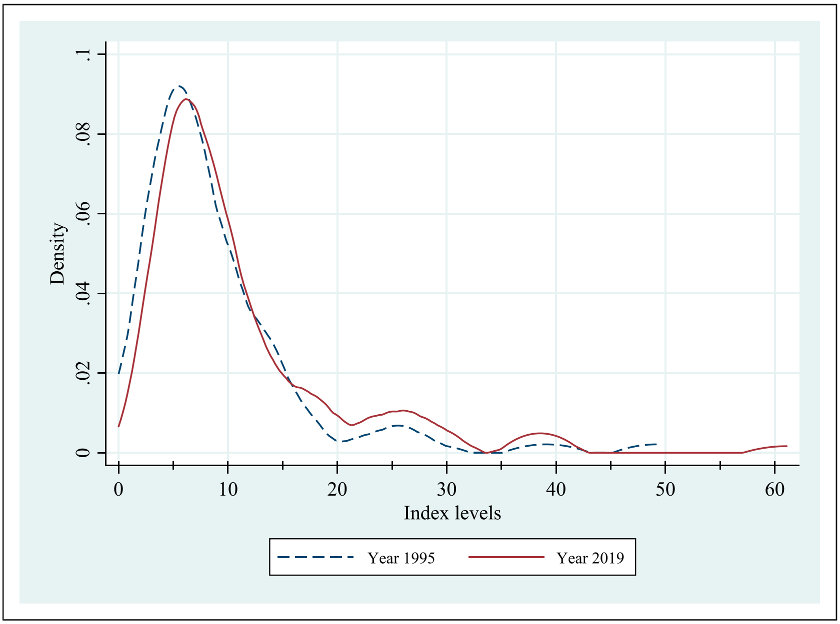

Figure 5. Kernel density estimate for the index cross-section distribution in 1995 and 2019. Note: The number of countries with no missing data in 1995 was 88. This figure increased to 113 in 2019.

interest. Thus, a "club convergence hypothesis" could be assumed when countries with similar initial conditions demonstrate a shared growth trajectory toward the same long-term equilibrium level concerning the variable in question (Galor, 1996).

Among the various strategies developed to test the "club convergence" hypothesis, Phillips and Sul (2007, 2009) proposed a nonlinear factor model grounded in a process of panel convergence. This model shows whether the cross-sectional distribution of the variable of interest indicates a decreasing tendency over time. This model can serve as a comprehensive panel data econometric method to analyse whether economies exhibit the following behaviour: (a) converge toward a shared long-term equilibrium level; (b) diverge; or (c) exhibit "club convergence". A main advantage of this methodology is its data-driven approach, sidestepping potentially contentious *ex-ante* sample divisions based on, for example, the structural attributes of countries. On this basis, these authors proposed a 'regression log t-test' for the null hypothesis of absolute convergence in long-run levels of the variable of interest across countries. The null hypothesis of convergence is rejected if the one-sided t-statistic obtained is less than -1.65 (for a 5% significance level). However, the rejection of H_0 for the panel of countries as a whole is compatible with the possible existence of different clusters of countries converging to the same long-run equilibrium level on the TEDI. For that reason, Phillips and Sul (2007, 2009) also proposed a data-driven clustering algorithm to identify the existence of these "convergence clubs" and to also identify the resulting cluster of diverging countries. Given that the initial club classifications identified may potentially overdetermine the number of clubs (i.e., the number of countries in each club primarily identified might be small), these authors proposed an algorithm to merge neighbouring clubs into suitable larger convergent clubs. Given this background, the Stata package developed by Du (2017) was employed to perform the econometric convergence “log t-test” for TEDI and the clustering algorithm of the ensuing countries’ club.

Results of the convergence test and club clustering

The convergence analysis of the TEDI was conducted for the period 2000 to 2019. Note that this time frame is more condensed than the entire period used for constructing the index. Data before 2000 was excluded because, for the “log t-test” estimation, it is essential that no countries within the panel have a missing value for the initial year of analysis. Consequently, broadening the time span of the panel to encompass years prior to 2000 would have led to a significant reduction in the sample size of countries available for estimation. This is particularly relevant given that in 1995 only 88 countries had complete data. Therefore, 110 countries out of the initial 144 were finally included in the sample to ensure balanced panel data for this designated period. In line with Phillips and Sul’s (2007) recommendations, the Hodrick-Prescott filter was applied before estimating the “log-t model" to filter out the cyclical components from the series. It is also noteworthy that, when testing convergence using yearly data and the sampling timespan T is small, the result of the inference is likely to be biased in the direction of finding less convergence. However, Phillips and Sul (2007) demonstrated that the downward bias in the coefficient of convergence due to small T quickly disappears for $T > 10$. Moreover, Du (2017) showed in a Monte Carlo simulation for the effectiveness of its clustering algorithm, that even for small samples ($T = 20$), which are common in applied work, the algorithm has satisfactory performance.

As anticipated, the estimation results indicate that the hypothesis of absolute convergence can be rejected at the 5% significance level for the period 2000 to 2019, given that the value of the t-statistic calculated is −74.8, which is significantly less than −1.65. This outcome implies that the set of 110 countries did not converge toward a unified long-run equilibrium level of TEDI. Subsequently, we employed the clustering test procedure of the “psecta” command in Stata to pinpoint potential convergence clubs. This procedure initially identified 11 club categories and two diverging countries, namely, Albania and Macao. To consolidate these results, we utilised the “scheckmerge” and “imergeclub” commands, implementing the merging test proposed by Du (2017). This exercise culminated in the identification of four definitive convergence clubs.

Table 2 shows the list of countries (column 3) in each identified club (column 1) and the corresponding estimation results of the “log t-test” for each club (column 2). Table 2 (column 1, in brackets) also shows the mean index level in 2000 and 2019 of the countries included in the same club.

We highlight the following points based on the results of the estimations presented in Table 2. The observed clubs can be ordered according to the long-run index equilibrium levels of the countries within their respective membership club. Countries in Clubs 3 and 4 are converging to higher index levels than those in Clubs 1 and 2. Furthermore, Clubs 1 and 4 exhibit the highest speed of convergence toward their unique steady-state equilibrium levels, with Club 4 at 11.6% per annum and Club 1 at 13.5% per annum. Besides that, Club 2 presents the lowest speed of convergence, at 0.7% per annum.

Club 4 has the highest speed of convergence and the highest level of dependence. It is primarily made up of non-resource countries where tourism could serve as the key to development. Within Club 4, two “newcomers” merit attention: Iceland and Georgia. In addition, it is noteworthy that several South European countries, apart from Italy, are categorised in Club 3. Clubs 3 and 4 form the cluster representing the world’s most tourism-dependent economies. In addition, the majority of Eastern European countries, with the exception of Bulgaria and Hungary, were categorised in Club

Table 2. Results of the *log t-test* for the Tourism Economic Dependence Index (110 countries, period 2000–2019).

Club # (# countries) Mean index [2000 | 2019] (1)	$\widehat{b}$ (standard error) [t-stat] (2)	*Region:* | Country | (3)
Club 4 (9) [26.57 | 38.68]	0.2329 (0.0544) [4.28]	· *Caribbean*: | Bahamas | Jamaica | St. Lucia | · *Central America*: | Belize | · *Northern Europe*: | Iceland | · *Western & Middle Africa*: | Cabo Verde | · *South-Eastern Asia*: | Cambodia | · *Western Asia*: | Georgia | · *Australia, NZ & Melanesia*: | Fiji |
Club 3 (23) [12.49 | 16.46]	0.1316 (0.0207) [6.37]	· *Central America*: | Costa Rica | Honduras | Panama | · *Southern Europe*: | Croatia | Greece | Malta | Portugal | Spain | · *Northern Africa*: | Morocco | · *Southern Africa*: | Namibia | · *Eastern Africa*: | Ethiopia | Madagascar | Mauritius | Rwanda | Tanzania | · *Southern Asia*: | Sri Lanka | · *South-Eastern Asia*: | Thailand | · *Eastern & Central Asia*: | Hong Kong, China | · *Western Asia*: | Armenia | Azerbaijan | Cyprus | Jordan | · *Australia, NZ. & Melanesia*: | New Zealand |
Club 2 (54) [7.63 | 7.96]	0.0103 (0.0513) [0.20]	· *Caribbean*: | Trinidad and Tobago | · *Central America*: | El Salvador | Guatemala | Mexico | · *South America*: | Argentina | Bolivia | Chile | Colombia | Ecuador | Peru | Uruguay | · *Northern America*: | Canada | USA | · *Western Europe*: | Austria | France | Germany | Luxembourg | · *Southern Europe*: | Italy | North Macedonia | Slovenia | · *Eastern Europe*: | Bulgaria | Hungary | · *Northern Europe*: | Denmark | Estonia | Finland | Latvia | Norway | Sweden | UK | · *Eastern Africa*: | Kenya | Malawi | Mozambique | Uganda | Zambia | · *Southern Africa*: | Botswana | South Africa | · *Western & Middle Africa*: | Cameroon | Côte d'Ivoire | Niger | Senegal | · *Northern Africa*: | Egypt | Tunisia | · *Western Asia*: | Israel | Oman | Saudi Arabia | Turkey | · *Southern Asia*: | India | Nepal | · *South-Eastern Asia*: | Indonesia | Malaysia | Singapore | · *Eastern & Central Asia*: | Kyrgyzstan | Mongolia | · *Australia, NZ & Melanesia*: | Australia |

(continued)

Table 2. (continued)

Club # (# countries) Mean index [2000 | 2019] (1)	$\widehat{b}$ (standard error) [t-stat] (2)	*Region:* | Country | (3)
Club 1 (22) [5.22 | 4.19]	0.2693 (0.0678) [3.97]	· *South America*: | Brazil | Paraguay | Suriname | · *Eastern Europe*: | Belarus | Czech Republic | Moldova | Poland | Romania | Russian Federation | Ukraine | · *Western Europe*: | Belgium | Netherlands | · *Northern Europe*: | Lithuania | · *Southern Africa*: | Eswatini | · *Western & Middle Africa*: | Ghana | Nigeria | · *Eastern & Central Asia*: | China | Japan | Kazakhstan | Korea | · *Western Asia*: | Kuwait | · *Southern Asia*: | Pakistan |
Not convergent (2) [35.96 | 45.31]	−0.9110 (0.0243) [−37.49]	· *Southern Europe*: | Albania | · *Eastern & Central Asia*: | Macao, China |

Notes: the *log t* estimated parameter $\widehat{b}$ is twice the speed of convergence toward the index steady state equilibrium level. *t-stat* indicates the convergence one-tail t-statistic with a critical value of −1.645 at the 5% significance level. Since the regression errors can be serially correlated, the heteroskedasticity and autocorrelation consistent estimator for the covariance of was used to compute the t-statistic. Applied truncation parameter = 0.33 (i.e. given that T = 20, the first seven periods are discarded before regression for the final club classification).

1. This club predominantly comprises labour-abundant economies and resource-rich countries. Lastly, the non-convergent group comprised Albania and Macao (China).

Figures 6 and 7 depict the transition paths for each country, thus clarifying the trend describing the converging pattern over time of countries within the final convergence clubs 3 and 4. These transition paths were calculated on the assumption that the common stochastic trend of TEDI within each club was represented by the evolution of the sample's cross-sectional TEDI averages for every year under consideration. Thus, a visual examination of the curves in Figures 6 and 7 offers insights into: (1) the outcomes of the testing methodology utilised for the club convergence analysis; and (2) the tracking of TEDI's evolution for each country in relation to the sample average within each club. In essence, Figures 6 and 7 serve to corroborate the results derived from the statistical club convergence analysis conducted in this study, as all curves in both figures converge over time to a value of 1.

Factors conditioning final club convergence

Methods and empirical model

One additional empirical question to be addressed in this section is: which factors might drive club formation in countries' TEDI long-run growth path? With this aim, and in line with the work of Bartkowska and Riedl (2012), we employed an ordered logit model to analyse how different factors could determine the probability of a country belonging to a given convergence club. In this model, the observed dependent variable is a categorical variable in which each alternative value represents the specific convergence club identified in Table 2. Given that these alternatives (i.e., the different convergence clubs) can be ranked according to the club's average index level during the period

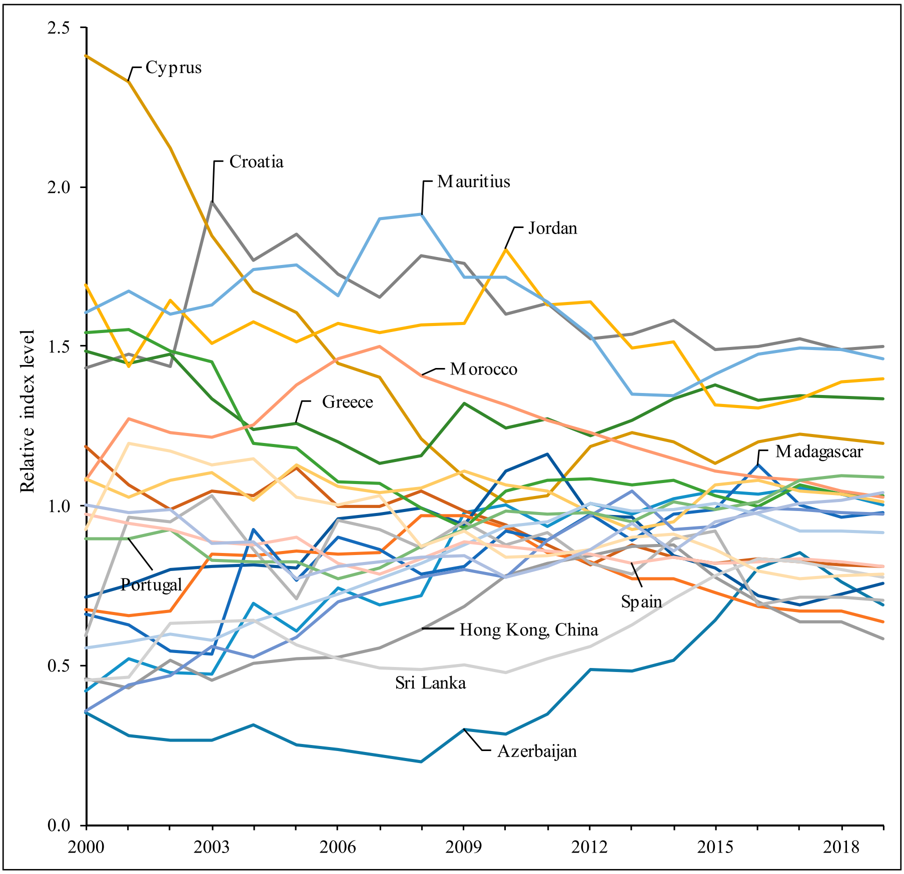

Figure 6. Evolution of the index level of countries relative to the club average. Final convergence Club 3. Note: for each year (t) and country (i), the relative index level (RI) was calculated according to the following expression: $RI_{it} = \frac{TEDI_{it}}{\frac{1}{N}\sum_{i=1}^{N} TEDI_{it}}$.

2000 to 2019, this dependent variable can be considered an ordinal categorical variable, ranging from the least to the highest tourism-dependent club of countries. However, in order to have a similar number of countries in each resulting cluster, we pool final convergence clubs 3 and 4 into a single cluster. Thus, we can conduct a maximum likelihood estimation of the resulting ordered logit model for the three resulting clusters (Cluster 1, 2, and 3). In this ordered logit model, a positive sign of a regression parameter indicates that an increase in the value of the independent variable reduces the probability of belonging to Cluster 1, the least tourism-dependent cluster, and increases the probability of belonging to Cluster 3, the most tourism-dependent cluster (Cameron and Trivedi, 2010).

When deciding which factors would potentially be responsible for the formation of convergence clubs in TEDI, we have to focus on two types of variables (Galor, 1996): (i) state variables, which describe countries' initial conditions that could be crucial in determining their growth path in TEDI; and (ii) structural or environmental variables which, independent of countries' starting conditions,

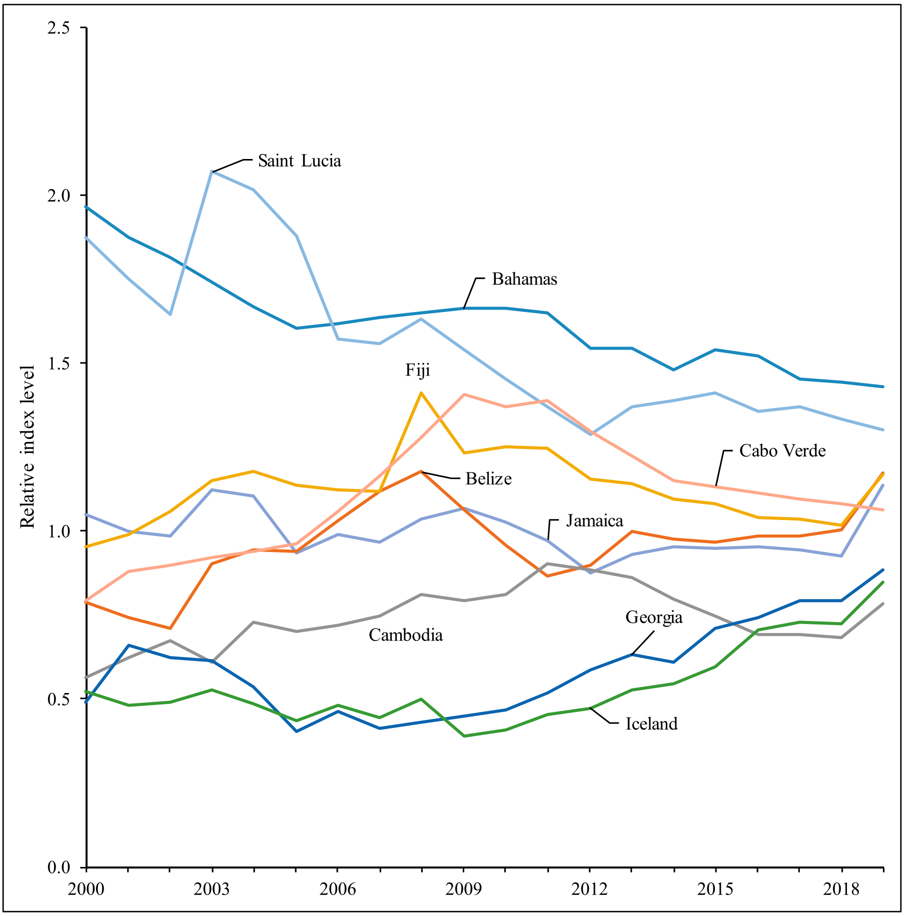

Figure 7. Evolution of the index level of countries relative to the club average. Final convergence Club 4. Note: for each year (t) and country (i), the relative index level (RI) was calculated according to the following expression: $RI_{it} = \frac{TEDI_{it}}{\frac{1}{N}\sum_{i=1}^{N} TEDI_{it}}$.

might also determine TEDI's long-run growth path. Empirical contributions to the literature on tourism development and growth may provide a guide to identifying a number of initial and structural factors which may drive an economy's long-run growth path in tourism dependence (Seetanah et al., 2022). Table 3 shows the variables included in the specified ordered logit model.

On the one hand, among the possible variables related to countries' structural characteristics, we first consider the size of the country as measured in *Country Land Area* (in square kilometres). The reason that justifies its employment is that Liu and Jenkins (1996) found a strong negative correlation between the log of tourist arrivals per square meter and the log of country size. As Lanza and Pigliaru (2000: 64) put it: "when countries are of heterogeneous absolute size, *if only one group of them is willing to specialise in tourism, this group must the one formed by the countries of the smallest size*." It is important to consider that this result could be a consequence of small countries also likely to be characterized by higher than average relative amounts of natural resources. This

Table 3. Variables included in the ordered logit model. Summary statistics.

Variables	Mean	Std. Dev.	Min	Max
Cluster membership (indicator variable for convergence clubs)	2.04	0.695	1	3
Land area (10^6 kms^2)	1.065	2.537	0.002	16.827
Total natural resources rents (% of GDP) (in logs, year 2000)	0.407	1.963	−4.605	3.939
Rigorous and impartial public administration index (year 2000)	0.769	1.491	−1.890	4.006
Pollution emissions index (2019 data, covering period 2005-2014)	0.674	0.264	0.009	1
GDP per capita, PPP (in logs, year 2000)	9.193	1.151	6.432	11.506
Number of observations available for estimation = 100				

Note: the model includes dummy regional variables as additional independent variables. These variables are the following: *Australia & NZ, Northern America, Caribbean, Central America, Eastern & Central Asia, Northern Africa, Southern Europe, South-Eastern Asia* and *Western Asia.*

circumstance offers a developmental advantage for tourism in small countries. For these reasons, in contrast to vast continental territories, it can be expected that small countries tend to be more dependent on tourism, as it is more likely that tourism is one of the sectors where they can hold a comparative advantage, and also possibly having fewer alternatives to economic diversification (Brau et al., 2007). Thus, it was expected that the variable country size plays a negative role in the likelihood of countries to belong to Cluster 3.

In addition to that, it is also known that natural resource dependency may crowd out the tourism industry (Sharma, 2021). For this reason, a variable measuring the countries' level of resource dependence, as measured by *Total Natural Resources Rents* (as a percentage of GDP, in logs), can be another potential structural determinant of club membership. Thus, it was expected that countries at higher levels in that variable would show a lower probability of belonging to Cluster 3.

On the other hand, among the variables controlling for countries' initial conditions, we first consider the variable *GDP* per capita (constant 2017 PPP international US dollars, in logs). Adamou and Clerides (2010), among others, point out that countries at an early stage of development, which have the required natural resources, can relatively easily develop successful tourism industries. For that reason, it is expected that a country's growth path in TEDI be contingent on the initial level of economic development as well as its financial system's absorptive capacity (De Vita and Kyaw, 2017). Thus, we also consider that the variable GDP per capita in 2000, the initial year of the convergence analysis, would be a suitable proxy for both economic development and financial system absorptive capacity. Specifically, it was expected that economies with higher levels of real GDP in 2000 would show a lower probability of belonging to Club 3.

Additionally, we have also considered that countries' institutional quality plays an essential role in tourism development and growth. Better institutional quality is argued to foster economic activity and investment (Williamson, 2000). In particular, better institutional quality may promote tourism development through a reduction in the risk and information asymmetry within markets (Nguyen et al., 2023). Thus, the variable *Rigorous and Impartial Public Administration Index* from the database *V-Dem Indicators* is employed as a proxy for countries' initial conditions in institutional quality. This variable measures the extent to which public administration is characterized by arbitrariness and biases (i.e., nepotism, cronyism, or discrimination), covering the public officials that handle the cases of ordinary people (if no functioning public administration exists, the lowest score of this variable applies). Given that bureaucratic hurdles and arbitrariness may dampen the prospects of tourism development, we consider that this variable may determine countries' growth path in

TEDI. Thus, countries with higher levels of this variable in 2000 were predicted to have a higher probability of belonging to the convergence club with the highest TEDI level (Cluster 3).

Tourism development can also be dependent on a healthy environment. Specifically, Zhang et al. (2020), among others, show that air quality could play a vital role in tourists' decisions: Bad air quality will discourage tourists from visiting a destination, thereby causing the decline of a resource/tourist destination. For that reason, we considered that a variable controlling for countries' environmental quality can be a relevant factor conditioning countries' growth path in tourism dependence. With this purpose, we employ data from the *Pollution Emissions* category of the *Environmental Performance Index* (EPI) (Wendling et al., 2020). This index measures air pollution and is composed of two indicators: adjusted emission growth rates for sulphur oxide SO_2 and nitrogen oxide NO_X. In this case, it is expected that countries with higher levels of this variable in 2019, the year of available data for the full sample of countries considered in the analysis, were predicted to have a higher probability of belonging to the convergence club with the lowest TEDI level (Cluster 1).

Finally, a set of regional dummy variables was included in the model to avoid potential omitted-variable bias and to control for time-invariant structural location-specific elements that may drive the long-run growth path of tourism dependence.

Results

Table 4 shows that, as expected, the latent club membership variable is increasing on the *Rigorous and Impartial Public Administration Index* and decreasing on the *Country Land Area, Total Natural Resources Rents, Pollution Emissions Index*, and *the logarithm of GDP* per capita. Also, Table 5 shows the predicted and observed probabilities for each of the three outcomes of the dependent variable. We can observe that predicted probabilities are very close to the sample frequencies computed for each cluster.

The relevance of these variables in determining club membership can be seen in Table 4, which also shows the estimated marginal effects on the probability of belonging to each cluster of countries when the specific regressor changes while holding other regressors fixed at their sample averages. It can be seen that the strongest predictor of countries' membership is the *Pollution Emission Index*. In this case, a 10-percentage-point higher pollution emissions index is associated with a reduction in a country's probability of belonging to the cluster of countries in Cluster 3 by 3.26% and an increase in the probability of belonging to Cluster 1 by 2.77%. The impact on probabilities is also significant in the case of the index measuring countries' quality of administration and the level of countries' GDP per capita. A marginal change in log (GDP per capita) from the average level in 2000 increases the probability of belonging to Cluster 1 by 1.34% and decreases the probability of belonging to Cluster 3 by 1.57%. Furthermore, marginal changes in the participation of total natural resources rents in GDP (in logs) and countries' land area from the average levels in 2000 are associated with similar increases in the probability of belonging to Cluster 1 and decreases in the probability of belonging to Cluster 3. The estimation results also underscore the role that time-invariant regional factors play in shaping the likelihood of a country being a member of a convergence club. To clarify, Table 4 shows that, for example, the likelihood of Eastern and Central Asia countries being members of Cluster 3 diminishes by 32.5% when other independent variables are held constant at their mean values. Conversely, the probability of a Southern Europe country being a member of Cluster increases by 39.0%, all other factors remaining constant. Analogous patterns emerge for countries

Table 4. Ordered logit estimation results.

Independent variables		Ordered logistic regression	Marginal effects on probabilities		
			Cluster 1 (Club1)	Cluster 2 (Club 2)	Cluster 3 (Clubs 3 + 4)
		Coefficient (Robust standard error) (1)	Coefficient (Robust standard error) (2)	Coefficient (Robust standard error) (3)	Coefficient (Robust standard error) (4)
Dummy regional variables	*Australia & NZ*	4.286*** (1.201)	−0.314** (0.124)	−0.055 (0.128)	0.369*** (0.136)
	Northern America	5.301*** (1.619)	−0.389** (0.167)	−0.068 (0.159)	0.457** (0.183)
	Caribbean	4.520*** (1.125)	−0.331*** (0.116)	−0.058 (0.134)	0.389*** (0.117)
	Central America	4.035*** (0.932)	−0.296*** (0.102)	−0.052 (0.118)	0.348*** (0.094)
	Central Asia	−1.740** (0.679)	0.128** (0.052)	0.022 (0.057)	−0.150* (0.082)
	Eastern Asia	−3.771*** (1.044)	0.276*** (0.099)	0.048 (0.116)	−0.325** (0.117)
	Northern Africa	5.160*** (1.057)	−0.378*** (0.124)	−0.066 (0.151)	0.445*** (0.109)
	Southern Europe	4.533*** (1.312)	−0.332*** (0.124)	−0.058 (0.138)	0.390** (0.153)
	South-Eastern Asia	5.324*** (1.164)	−0.390*** (0.127)	−0.068 (0.157)	0.459*** (0.121)
	Western Asia	5.750*** (1.216)	−0.421*** (0.131)	−0.074 (0.172)	0.495*** (0.144)
Land area		−0.331** (0.162)	0.024* (0.014)	0.004 (0.010)	−0.029* (0.017)
Total natural resources rents (in logs)		−0.344** (0.171)	0.025* (0.014)	0.004 (0.011)	0.030* (0.017)
Rigorous and impartial public administration index		1.515*** (0.349)	−0.111*** (0.036)	−0.0195 (0.045)	0.131*** (0.038)
Pollution emissions index		−3.783** (1.491)	0.277** (0.131)	0.049 (0.115)	−0.326** (0.153)
GDP per capita, PPP (in logs)		−1.827*** (0.428)	0.134** (0.042)	0.023 (0.055)	−0.157*** (0.050)
Pseudo R^2 = 0.417					
Log pseudolikelihood = −59.647					
Number of observations available for estimation = 100					

Notes: Dependent variable: indicator for cluster membership (Cluster 1, 2 and 3; Cluster 3 is the group of countries converging to the highest tourism dependence). Heteroskedasticity and autocorrelation consistent covariance. Only statistically significant regional dummies are included in the estimations. These specific dummies were selected according to a drop-down procedure in which the first estimated model included all dummies and then discarded the non-significant ones. A definition of the variables and their sources are provided in Table 1. ***$p < .01$, **$p < .05$, *$p < .1$.

Table 5. Ordered logit. Frequencies and predicted probabilities.

Categorical values for the dependent variable	Statistic	Mean	Std. Dev.	Min	Max
Cluster membership = 1	*Frequency in the sample*	0.220	0.416	0	1
	Predicted probability	0.220	0.291	0	1
Cluster membership = 2	*Frequency in the sample*	0.530	0.502	0	1
	Predicted probability	0.522	0.265	0	0.826
Cluster membership = 3	*Frequency in the sample*	0.250	0.435	0	1
	Predicted probability	0.258	0.301	0	0.985

situated in Northern and Central America, Caribbean, Northern Africa, and South-Eastern and Western Asia.

General discussion and conclusions

Development is not an inevitable outcome of tourism, but it is dependent upon how the economic contribution of tourism translates into broader development policies and strategies (Sharpley and Telfer, 2023). Although tourism must be considered an integral part of the national economy and policy, especially in instances where few alternatives for development exist, Adamou and Clerides (2010) have shown that at high levels of specialization, the contribution of tourism to economic growth becomes minimal. Their findings indicate that at a level of specialization above 20.8% (measured as tourism receipts as a percentage of GDP), countries may be better off diverting their resources to other areas of economic activity, thus avoiding falling into a developmental trap. In this case, a diversification strategy will carry their economy further once the potential benefits of tourism are exhausted. Additionally, De Vita and Kyaw (2017) show that the positive effect of tourism specialization on growth is contingent on the level of economic development of recipient economies. This can be due to the fact that countries with similar levels of specialization in tourism may not be equally developed. For these reasons, this study aims to provide a new index (TEDI) to analyse countries' dependence on tourism, considering the moderating effects that diversification and competitiveness may exert on the impact of countries' tourism specialization.

From this perspective, research findings suggest that a value of TEDI circa 20% may be considered a critical threshold to identify countries with high tourism dependence from the standpoint of economic development. This level of dependence raises concerns regarding potential development traps and heightened vulnerability to economic shocks, providing an additional explanation of why the potential benefits of tourism might be exhausted once surpassed a specific level in tourism specialization. Although the calculated TEDI revealed a gradual shift toward increased economic reliance on tourism following the global financial crisis for the entire sample of countries, stark variances persist across countries. Notably, there has been little decrease in the dispersion of index values between countries in the period 2000 to 2019. Furthermore, the analysis identifies four distinct convergence clubs, with two countries diverging from these groupings.

Thus, a high level of specialization in tourism does not necessarily need to be avoided, but it could be indicative of the need to develop strategies for the future diversification of economic activities (Benner, 2020). From this perspective, an economic development proposal, in general, is not to reduce tourism specialization; rather, it is to increase the level of the adjustment indicators that compound TEDI (i.e., enhancing productivity, augmenting the share of manufacturing employment, and increasing market share in high-tech exports).

In analysing factors that could determine club convergence membership, estimation results show that bigger and natural resources-dependent countries, and also countries with relatively low progress in managing the emissions of two primary air pollutants such as SO_2 and NO_X, are less likely to belong to the high-speed convergence/high-dependence cluster (Cluster 3). On the contrary, countries with high values in the quality of public administration are expected to belong to convergence clubs in Cluster 3. Nevertheless, further research into the high-dependency countries is needed, notably those within Club 4, in order to more thoroughly investigate the potential issue of development traps across various empirical settings.

This study has several limitations. Firstly, it relies on aggregate data sourced from public databases, and thus the variable choices for index construction are restricted by data availability. Secondly, exploring alternative adjustment variables may prove advantageous in future studies, particularly those focused on understanding the issue of development traps at subnational levels. Lastly, due to data constraints, this study did not analyse the impact of the Covid-19 pandemic. Upcoming studies equipped with more recent data series can bridge this gap and shed light on the pandemic's influence on tourism dependence and related economic issues.

In addition, given that in its present form the index uses overall national and annual indicators to evaluate tourism economic dependence, the concepts and measures employed to construct this index could be further refined and explored in far greater depth. The TEDI is thus a macroeconomic index without the capacity to consider sub-national variations and internal core-periphery differences. Similarly, it does not consider seasonal variations or variations emerging from different types of tourism dependence. Future research could address these spatial, temporal, and thematic variations to provide a more nuanced understanding of tourism dependence in different contexts.

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