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Analyzing tourist expenditures incurred on long-, medium-, and short-haul trips to Taiwan

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ABSTRACT

This study examined the consumption demands of short-, medium-, and long-haul tourists in Taiwan, considering the effects of tourism attractiveness, generational cohorts, and nationalities on tourism consumption demand. We employed an Almost Ideal Demand System model to estimate the expenditures and price elasticities based on tourism expenditure data of 3018 visitors to Taiwan. The results indicated that varying degrees of price elasticity were observed among short-, medium-, and long-haul tourists. Long-haul tourists exhibited the highest elasticity in terms of shopping prices and expenditure. The factors influencing tourists' attraction to Taiwan were identified as the geographical convenience of their travel and their nationalities, which, in turn, affected their consumption demands. Thus, based on tourists' relevant characteristics to implement targeted marketing strategies.

1. Introduction

Data from the World Tourism Organization (World Tourism Organization, 2020) have shown that there was a record high of 1.5 billion international tourists in 2019. Following this trend, Taiwan welcomed 11.86 million visitors, the highest number to visit the country to date, and 70% of these were independent travelers. Travel distance is an important factor that affects tourism consumption demand (Vanegas, Valencia, Restrepo, & Muñeton, 2020; Wang, Rompf, Severt, & Peerapatdit, 2006; Xue & Zhang, 2020). Short-haul tourists tend to be younger and enjoy the pleasure of tourism consumption, often incurring higher expenditures related to shopping. However, long-haul tourists focus on the travel experience and tend to incur higher expenditures related to food and entertainment (Bao & Mckercher, 2008; Ho & McKercher, 2014). However, few studies have focused on the impact of travel distance on tourism consumption demand, or the impact of tourism demand price and expenditure elasticity. To meet this gap, we examine the relationship between travel distance, the characteristics of short- and long-haul visitors, and tourism consumption demand. We aimed to differentiate the market based on these factors thereby providing evidence that could aid in maximizing tourism income.

As tourism has become an integral part of modern society, tourists'

contributions to local economies are increasingly being considered important. Therefore, understanding tourism's impact on a given destination's local economy and the various types of tourism consumption demand has become crucial (Li, Song, & Witt, 2004). How tourists manage their budget is a critical factor in understanding the various decision-making processes in tourism consumption demand research (Anderson, 2010; Li et al., 2004). Previous tourism consumption demand-related research studies have explored how tourists allocate their limited budgets to meet tourism consumption demands at the destination and the various factors that affect tourism consumption demand (e.g., tourism characteristics, destination choices, tourism-related products or services, and tourism motivations) (Dayour, Adongo, & Taale, 2016; Gómez-Déniz, Dávila-Cárdenes and Boza-Chirino, 2021; Van Loon and Rouwendal, 2017; Pulido-Fernández, Cárdenas-García, & Carrillo-Hidalgo, 2017).

Tourists' expenditure patterns can directly impact local businesses. Scholars have proposed various strategies for attracting tourists (e.g., offering a wider variety of products in shopping areas and creating comfortable shopping environments to encourage short-term tourists to spend more). Regarding long-term tourists, it has been suggested that preserving and promoting local specialties, cultures, and scenery can attract more visitors (Bao & Mckercher, 2008; Ho & McKercher, 2014;

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Lee, Sok Jee, Funk, & Jordan, 2015; Smolčić Jurdana & Soldić Frleta, 2017; Wang et al., 2006). Lee et al. (2015) found that American tourists spent more on shopping, recreation, and transportation but less on accommodation as the distance they traveled increased.

Recent literature suggests that age group, nationality, and the attractiveness of tourist destinations can also affect tourism spending (Ahn, Lee, & Lee, 2020; Brida, Meleddu, & Pulina, 2013; Goeldner & Ritchie, 2006). Young or Millennial tourists tend to prefer independent travel. According to Ahn et al. (2020), Millennials spend more on shopping but relatively less on food and recreation compared with Generation X and Baby Boomers. Differences in nationality can significantly impact tourist consumption demand and shopping behavior (Divisekera & Deegan, 2010; Flognfeldt Jr., 1999; Pizam & Sussmann, 1995; Wu, Li, & Song, 2010). Factors attracting tourists can also significantly affect the development of tourist destinations. Previous studies have not included the impact of interest and appeal on tourism consumption demand. When tourists show a stronger interest in local culture and food, their expenditure with regard to these aspects tends to be higher (Walsh-Heron & Stevens, 1990).

This study employed original data sourced from the Taiwan Tourism Bureau's 2019 Survey Report on the Consumption and Activity of Visitors to Taiwan, in order to estimate the price and expenditure elasticity of short-, medium-, and long-term independent travelers. The theoretical contribution elaborates on whether tourism attractiveness, generational cohorts, and nationalities have a direct or indirect impact on the pattern of tourists' tourism consumption expenditure. In terms of the practical contribution, the article addresses the question of whether the tourists' demand for tourism consumption and price elasticity varies from short-, medium-, and long-term tourists. The value of this article lies in using empirical findings to help tourism destination operators formulate marketing and promotion strategies based on tourists' feedback on the price of tourism products or services.

2. Literature review

2.1. Tourism demand theory

Tourism demand has been extensively studied, applying conventional economic theories, encompassing both utility theory and consumption behavioral theory. The primary factors influencing tourism demand are economic in nature, including income, price, substitute price, advertising, and supply constraints (Smeral, 2012). In contrast, travel demand studies have historically overlooked key aspects such as psychological, anthropological, and sociological characteristics (Um & Crompton, 1990), as well as distance impact, generational cohorts, nationality, and tourist attraction. As such, Archer (1976) asserts that tourism demand analysis relies on traditional economic theories of demand (e.g., political, social, and technological characteristics). Song, Romilly, and Liu (2000) argue that social, psychological, and geographic factors influence a tourist's decision to choose a destination.

Furthermore, space and time are crucial factors in travel decisions and tourism research. Travel involves both physical and psychological aspects, with tourists often seeking distinctive experiences, leisure, mental respite, and variety by exploring unconventional or remote destinations (Hall, 2005; McCabe, 2009). Time allocation decisions in traveling have a significant impact on the number of activities a person can pursue and the depth with which they can experience each activity. Oh, George Assaf, and Baloglu (2014) posit that, in slow tourism, travelers seeking self-reflection, novelty, and discovery may find their journeys particularly enriching (meeting both physical and mental demands). According to Fennell (1996), travelers' experiences with accommodation, transportation, facilities, attractions, and regional visitation are influenced by the aspects of time and space. Based on the argument, this study examined the influence of total travel budget on different spending categories (i.e., Accommodation, Food, Transportation, Shopping, Miscellaneous), and preferences of short, medium,

and long-haul tourists, utilizing tourism demand theories.

Interestingly, we note that previous studies have either examined the impact of travel-related characteristics on tourist expenditure or how tourists allocate their spending. However, they have mostly used logit, tobit, or ordinary least squares regression analyses. In comparison, the Almost Ideal Demand System (AIDS) models have not been utilized to their full potential in this area of research. Thus, given the effectiveness of the AIDS model in analyzing complex data and accounting for interdependencies among variables, AIDS models can yield more accurate and insightful findings in future studies. Recent research has begun to explore the impact of travel-related characteristics on tourist spending patterns. For instance, a study by Ahn, Baek, Lee, and Lee (2018) considered the effect of travel duration, travel party size, and travel type on the estimation of the AIDS models. The study found that these factors can significantly impact spending patterns, indicating that they are crucial for understanding the expenditure patterns of tourists.

In this study, we have two contributions to the research gap in the estimation of tourist expenditure patterns. Firstly, we examine the effect of travel-related characteristics, such as generational cohorts, nationality, tourist attraction, and distance, on the estimation of the AIDS models. Secondly, although many previous theories have used the AIDS approach to estimate expenditure elasticity, no research has yet been conducted to determine the impact of tourism-related factors on price and expenditure elasticities. Therefore, it is important to explore this area to gain a better understanding of how tourism-related factors can influence spending behavior. After the estimation of the AIDS model, we use ordinary least squares regression to analyze the impact of travel-related characteristics, such as tourism attractiveness, generational cohorts, and nationalities, on price and expenditure elasticities.

2.2. The price elasticity

Several empirical scholars have utilized various methods, sample periods, and source markets to estimate price elasticities for tourism demand (Divisekera, 2016; Garín-Muñoz, 2007; Lee et al., 2015; Li, Wong, Song, & Witt, 2006; Nguyen, 2021; Song et al., 2000). In the tourism industry, product pricing encompasses various components. A significant portion of the total price is dedicated to expenses for goods and services obtained at the destination (Crouch, 1992). Brons, Pels, Nijkamp, and Rietveld (2002) argue that long-haul air travel constitutes a significant cost factor, alongside substantial transportation expenses to reach the destination. Factors like travel insurance and the opportunity cost of travel time also influence pricing decisions. From the above literature, our study aims to estimate the price elasticity among expenditure categories, including accommodation, food, transportation, shopping, and entertainment, for tourists traveling short-, medium-, and long-distances.

2.3. Distance impact

Tourism is commonly categorized based on the distance between the point of origin and the destination. Short-, medium-, and long-distance tourism are distinguished based on the distance traveled, where short-distance tourism refers to travel within 3000 km, medium-distance tourism refers to travel between 3000 and 7000 km, and long-distance tourism refers to travel beyond 7000 km (Bao & Mckercher, 2008; Ho & Mckercher, 2014).

Studies have shown that tourists undertaking travel to different distances exhibit variations in their demographic characteristics, travel purposes, and behaviors (Bao & Mckercher, 2008; Ho & Mckercher, 2014). For instance, compared with long-distance tourists, female travelers make up a higher proportion of short-distance tourists, who are also often young. These travelers often frequently travel with friends, and their primary travel purposes are shopping or participating in recreational activities. However, long-distance tourists are older and visit multiple destinations; their main travel purposes tend to be appreciating

special sceneries or experiencing local cultures—not shopping (Bao & Mckercher, 2008).

Travel distance can also affect tourist spending at the chosen destination (Crouch, 1994; Li, Li, & Li, 2019; Long, Perdue, & Allen, 1990; Xue & Zhang, 2020); short-distance tourists spend more than long-distance tourists. However, long-distance tourists spend more on transportation (Lee, 2001; Long et al., 1990; Prideaux, 2000; Wang et al., 2006), food and beverages, shopping, and entertainment (Lee, 2001; Wang et al., 2006). Furthermore, distance can negatively impact accommodation expenses. Taiwanese tourists have been found to be less affected by distance but are more influenced by their income levels (Xue & Zhang, 2020).

2.4. Effects of generational cohorts

In recent years, there has been growing interest in different generational cohorts' expenditure behaviors in tourism; these include the Baby Boomers (born approximately between 1945 and 1964), Generation X (born between 1965 and 1979), and Millennials (born between 1980 and 2000) (Ahn et al., 2020). Generational cohorts form one crucial influencing factor of tourism, as they can reflect differences in education levels, social norms, environments, and socio-economic conditions (Benckendorff, Moscardo, & Pendergast, 2010; Chen & Shoemaker, 2014; Jang & Ham, 2009). However, past literature investigating the relationships between generational cohorts and tourism expenditures has been limited, with most studies considering age as an essential influencing factor for tourism expenditure (Mok & Iverson, 2000).

Recent literature has found that generational cohorts can significantly impact tourism expenditure because members of different generations may show different budget and expenditure patterns with regard to tourism (Ahn et al., 2020). Ahn, Lee and Lee, 2020 explored the consumption patterns and tourism behavior preferences of different generational cohorts and found that Korean tourists exhibited generational differences in their tourism expenditure patterns.

2.5. Effects of nationality

Tourism expenditure can vary across different nationalities, thus reflecting differences in spending habits, travel motivations, and budgets. For instance, American tourists, generally considered to be a high-income group, tend to spend more compared with other nationalities (Sciortino & De Cantis, 2022). When visiting Australia, tourists from New Zealand tend to allocate a larger portion of their budget to shopping, whereas American tourists tend to spend more on accommodation. Further, British tourists tend to focus on food and shopping, while Japanese tourists tend to prioritize shopping (Divisekera & Deegan, 2010).

The price elasticity of tourism consumption demand can also vary across nationalities. Japanese tourists used to show low price elasticity in their demand for accommodation because they considered it as a necessity; however, since 2000, their perception of accommodation as a necessity has gradually decreased, and their sensitivity to changes in accommodation prices has increased. By contrast, Korean tourists show a higher price elasticity in their demand for hotel accommodation compared with tourists from other source markets; this suggests that promotional activities targeting Japanese and Korean tourists may increase revenue. Finally, Singaporean tourists tend to be sensitive to shopping price elasticity but less to accommodation (Wu et al., 2010).

2.6. Effects of tourist attraction

Tourist attraction is a crucial factor that can influence tourists' decisions to visit a given destination (Crompton & McKay, 1997; Shinde, 2021; Uysal & Hagan, 1993). The relevant literature suggests that various factors can influence tourist attraction; these include natural scenery (Goeldner & Ritchie, 2006), cultural heritage (Shaykh-Baygloo,

2021; Turco, Riley, & Swart, 2002; Van Loon & Rouwendal, 2017), local food and beverages, and shopping opportunities (Goeldner & Ritchie, 2006). Tourists may have different preferences and intensities regarding attraction factors, thus allowing tourism operators to use targeted marketing strategies to segment the market effectively. By enhancing the tourist attraction quotient of a given destination, its visitors can be increased accordingly, thus bringing economic benefits to the relevant destination.

3. Data and methodology

3.1. Sample and data collection

This study utilized data from the 2019 Taiwan Tourism Bureau survey on visitor expenditures and trends in Taiwan to estimate the price elasticities and expenditure elasticities of short-, medium-, and long-haul tourists' travel expenditures; it focused on independent travelers to Taiwan, mainly because independent tourists have complete detailed information on travel expenditures. The tourists were categorized as short-haul (within 3000 km of Taiwan), medium-haul (3000–7000 km from Taiwan), and long-haul (over 7000 km from Taiwan) based on the distance between their residence and Taiwan. Short-haul visitors were from countries such as China, Japan, South Korea, Philippines, Vietnam, and Thailand; medium-haul visitors were from Malaysia, Singapore, and Indonesia; and long-haul visitors were from the Americas and Europe (e.g., the US, Canada, UK, and France).

The tourism expenditure data included the costs of food, accommodation, transportation, shopping, and entertainment expenses for each tourist. The survey data, which were obtained from the Taiwan Tourism Bureau, concerned foreign and overseas Chinese visitors who entered Taiwan each year; quota sampling was used for the data collection. To ensure the completeness of the tourism expenditure information, only independent travelers were considered in the data analysis; these included those who planned their own itineraries, those who booked accommodations (and flights) through travel agencies, and those who arrived in Taiwan without booking any accommodations or flights and subsequently participated (or did not participate) in local travel agencies' arrangements. After data cleaning, the sample sizes for independent travelers in the short-, medium-, and long-haul groups were found to be 2209, 421, and 388, respectively, totaling 3018.

The current study measured the quantity of tourism expenditure using the number of travel days (Divisekera & Deegan, 2010). The costs of food, accommodation, transportation, shopping, and entertainment expenses, (these include recreation as well as other miscellaneous expenses), were divided based on the number of travel days to obtain their respective proxy prices. In terms of price adjustment, tourism expenditure prices must be adjusted using a price index. Specifically, the prices of food, accommodation, transportation, and entertainment expenses were adjusted using Taiwan's consumer price index for “out-of-home food,” “accommodation,” “transportation,” and “entertainment,” respectively. However, the shopping category was more complex. An analysis of data from the Taiwan Visitor Expenditure and Trends Survey showed that clothing was the highest spending category. Therefore, the price adjustment for shopping was based on Taiwan's consumer price index for “clothing.”

Using the Visitor Expenditure and Trend Survey, based on different age groups, visitors to Taiwan are divided into Generation Z (Gen Z; defined as those born after 1997 are considered part of Generation Z), Generation Y (Gen Y; defined as those born between 1981 and 1996), and Generation X and Baby Boomers (Gen X & BB; defined as those born between 1980 and 1946). This article divides the main reasons for attracting tourists to Taiwan into four options featured in a multiple-choice survey: scenery (Scen), gourmet foods (Gou), geographical convenience (proximity to their residence) (Conv), and local customs and historical culture (Hist).

3.2. Methodology

This study's empirical analysis employed the AIDS model proposed by Deaton and Muellbauer (1980). To test the generational cohorts, tourism attractiveness, and nationalities on tourism expenditure, we added a dummy variable for each of generational cohorts: Gen Z = 1 if the observation is Z generation, and equals zero otherwise; Gen Y = 1 if the observation is Y generation, and equals zero otherwise. As well as four tourism attractiveness reasons include scenery (Scen), gourmet goods (Gou), geographical convenience (Conv), and local customs and historical culture (Hist). These attractiveness reasons are dummy variables coded 1 when attractiveness reasons is presence in variable, and value 0 is assigned if the attractiveness reasons is not present. Furthermore, we included dummy variables for tourist nationalities in Eq. (1). The augmented AIDS model can be expressed as follows:

$$w_{ik} = \alpha_i + \sum_{j=1}^n \gamma_{ij} \log p_{jk} + \beta_i \log(X/P)_k + \theta_{i1} \text{GenZ}_k + \theta_{i2} \text{GenY}_k + \theta_{i3} \text{Scen}_k + \theta_{i4} \text{Gou}_k + \theta_{i5} \text{Conv}_k + \theta_{i6} \text{Hist}_k + \sum_{j=1}^n \text{Country}_{jk} + \varepsilon_{ik} \quad (1)$$

where w_{ik} denotes the expenditure share of the i good or service for k tourists to Taiwan, $w_i = p_i q_i / X$ where p_i is the price of the i good or service, X is the total expenditure of tourists, and α , β , and θ are parameters. P is the aggregated price index, which is defined as follows:

$$\log P_k = \sum_{j=1}^n \log p_{jk} + \sum_{i=1}^n \sum_{j=1}^n \gamma_{ij} \log p_{ik} \log p_{jk} \quad (2)$$

As Eq. (2) denotes a nonlinear price index, Deaton and Muellbauer suggested Deaton and Muellbauer (1980) also suggested Stone price index can be used for replacing the P variable, thus resulting in the following modified Eq. (2):

$$\log P_k = \sum_{i=1}^n w_i \log p_{ik} \quad (3)$$

The AIDS model has the following properties: adding-up (4), homogeneity (5), symmetry (6), and the augmented AIDS model also satisfies the adding-up restriction (7).

$$\sum_{i=1}^n \alpha_i = 1, \sum_{i=1}^n \beta_i = 0, \sum_{i=1}^n \gamma_{ij} = 0 \quad (4)$$

$$\sum_j \gamma_{ij} = 0 \quad (5)$$

$$\gamma_{ij} = \gamma_{ji} \quad (6)$$

$$\sum_{i=1}^n \theta_{i1} = \sum_{i=1}^n \theta_{i2} = \sum_{i=1}^n \theta_{i3} = \sum_{i=1}^n \theta_{i4} = \sum_{i=1}^n \theta_{i5} = \sum_{i=1}^n \theta_{i6} = 0, \sum_{i=1}^n v_{ij} = 0 \quad (7)$$

Furthermore, by using the augmented AIDS to estimate the parameters and average budget shares (\bar{w}_i), the expenditure elasticity (e_{im}), the uncompensated price elasticity (ε_{ij}) and Hicksian compensated price elasticity (e_{ij}) for each expenditure demand i can be calculated as follows:

$$e_{im} = \frac{\beta_i}{w_i} + 1 \quad (8)$$

$$\varepsilon_{ij} = \frac{\gamma_{ij} - \beta_i (w_j - \beta_j \log(X/P))}{w_i} - \delta_{ij} \quad (9)$$

$$e_{ij} = -\delta_{ij} + \left(\frac{\gamma_{ij}}{w_j} \right) + \bar{w}_j \quad (10)$$

where Eqs. (9) and (10), δ_{ij} is the Kronecker delta (1 when $i = j$, and 0 otherwise).

3.3. Estimation method

This study used an established expanded AIDS model, with the symmetry and homogeneity parameter restrictions included, in order to

estimate the parameters through the seemingly unrelated regression method by using the 2019 data on tourist consumption demands. The utilized computer software package was STATA 17 version. As the sum of all tourist expenditure shares equals one, the estimation process may produce singularity. To avoid this problem, one equation can be reduced during estimation, and the equation that has been reduced can be deduced using the symmetry, homogeneity, and adding-up restriction conditions.

Furthermore, this study used robust standard errors and takes the natural logarithm of variables to solve the problem of possible heterogeneity of variables. Robust standard errors can be used when the assumption of uniformity of variance, also known as homoscedasticity, in a Zellner's seemingly unrelated regression is violated. This situation, known as heteroscedasticity, implies that the variance of the outcome is not constant across observations. Under the assumption of independence of observations, one remedy is using a robust standard error that is based on the square of the individual residuals.

4. Empirical results

After analyzing the average daily expenditures per person for five categories of expenses among independent travelers in 2019 (see Table 1), the current study found that the average daily expenditure of short-haul (China, Japan, South Korea, and Philippines) tourists was the New Taiwan Dollar (NTD) 5949.98, which is higher than that of medium-haul (Indonesia, Malaysia, and Singapore) tourists (NTD 5349.67) and also higher than that of long-haul (the US, Canada, UK, and France) tourists (NTD 5142.15). Among short-haul tourists, accommodation accounted for the highest proportion of total expenditure at 37.25%, followed by food at 23.75% and shopping at 22.88%. Among medium-haul tourists, food accounted for the highest proportion of total expenditure at 33.84%, followed by food and shopping at approximately 23% each.

Among long-haul tourists, accommodation accounted for a higher proportion of total expenditure at 44.07%, followed by food at 24.71%, while shopping expenditure accounted for a relatively low proportion at 12.94%. Among short-, medium-, and long-haul tourists, the highest expenditure was devoted to specialty products, followed by clothing and souvenirs. Proximity to Taiwan was found to be the main tourism attractiveness factor for travel to the country, with tourists having an average daily expenditure of NTD 5914.7 per person. In terms of generational consumption, the Generation X and the Baby Boomer generation had the highest tourism expenditure per day at NTD 6186.37.

In terms of nationalities, Japanese tourists had the highest daily tourism expenditure per person at NTD 6647.46, followed by Chinese tourists at NTD 5942.24, while European tourists had the lowest daily tourism expenditure per person at NTD 4206.66. Regarding accommodation expenditure as a proportion of total expenditure, Japanese tourists showed the highest proportion at 46.99%; regarding food expenditure, Thai and South Korean tourists showed relatively higher proportions at 25.81% and 25.23%, respectively. Regarding transportation expenditure as a proportion of total expenditure, Singaporeans showed the highest proportion at 15.16%, while for shopping expenditure, Vietnamese, Thai, and Chinese tourists showed relatively higher proportions at around 26–27%.

4.1. Parameter estimates

This study aimed to estimate five types of tourism consumption items (food, accommodation, transportation, shopping, and entertainment expenses) for short-, medium-, and long-distance independent travelers by the using AIDS models. The parameter estimation results are presented in Tables 2 and 3; more than 75% of the estimated parameters for price and total expenditure were found to be statistically significant at the 5% level. The total expenditure parameter estimates for food and transportation were positive, while those for accommodation were

Table 1

Descriptive statistics on the expenditures of respondents by travel distance, travel-attractive reasons, tourist generation, and nationality.

| Expenditure category | Travel distance | | | | | | Travel-attractive reasons | | | | | |
|----------------------------------|--------------------------|--------|--------------------------------|--------|-------------------------------|-------------------|---------------------------|--------|--------------------|--------|----------|--------|
| | Short haul | | Medium haul | | Long haul | | Scenery | | Gourmet food | | | |
| | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | | |
| Accommodation | 2276.05 | 37.25 | 1778.06 | 33.84 | 2279.15 | 44.07 | 2160.50 | 36.69 | 2249.08 | 37.08 | | |
| Food | 1305.80 | 23.75 | 1209.78 | 23.66 | 1174.67 | 24.71 | 1246.82 | 23.81 | 1307.12 | 24.03 | | |
| Transportation | 596.95 | 11.04 | 743.20 | 14.14 | 633.36 | 12.88 | 627.19 | 12.12 | 607.45 | 11.27 | | |
| Shopping | 1459.58 | 22.88 | 1357.69 | 23.52 | 767.29 | 12.94 | 1363.71 | 22.62 | 1428.68 | 22.65 | | |
| Miscellaneous | 311.58 | 5.06 | 260.93 | 4.80 | 287.66 | 5.37 | 268.60 | 4.74 | 300.03 | 4.95 | | |
| Total | 5949.98 | | 5349.67 | | 5142.15 | | 5666.83 | | 5892.38 | | | |
| Travel-attractive reasons | | | | | | Generation | | | | | | |
| Expenditure category | Geographical convenience | | Customs and historical culture | | Generation X and Baby Boomers | | Generation Y | | Generation Z | | | |
| | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | | |
| Accommodation | 2445.77 | 40.69 | 2113.37 | 36.62 | 2374.51 | 38.17 | 2136.82 | 36.64 | 1823.69 | 36.14 | | |
| Food | 1378.28 | 24.29 | 1260.66 | 23.48 | 1339.6 | 23.34 | 1264.81 | 24.04 | 1019.33 | 23.78 | | |
| Transportation | 598.67 | 10.56 | 659.42 | 12.64 | 661.87 | 11.49 | 592.94 | 11.51 | 438.50 | 10.87 | | |
| Shopping | 1162.09 | 19.15 | 1367.17 | 21.98 | 1463.81 | 21.57 | 1388.44 | 22.90 | 1208.62 | 25.41 | | |
| Miscellaneous | 329.92 | 5.28 | 318.65 | 5.25 | 346.56 | 5.39 | 283.10 | 4.88 | 172.81 | 3.77 | | |
| Total | 5914.74 | | 5719.27 | | 6186.37 | | 5666.13 | | 4662.96 | | | |
| Nationality | | | | | | | | | | | | |
| Expenditure category | Japan | | China | | Korea | | Philippines | | Vietnam | | | |
| | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | | |
| Accommodation | 3225.37 | 46.99 | 1867.28 | 32.67 | 2603.31 | 40.65 | 1711.13 | 32.93 | 1498.13 | 30.51 | | |
| Food | 1379.56 | 22.38 | 1340.31 | 24.02 | 1268.82 | 25.23 | 1064.66 | 22.08 | 1004.06 | 22.26 | | |
| Transportation | 508.57 | 8.13 | 661.54 | 12.13 | 524.95 | 10.53 | 667.80 | 13.75 | 588.44 | 13.49 | | |
| Shopping | 1103.03 | 16.77 | 1778.97 | 26.13 | 1047.61 | 19.44 | 1353.06 | 25.82 | 1833.94 | 27.53 | | |
| Miscellaneous | 430.91 | 5.71 | 294.12 | 5.03 | 213.95 | 4.12 | 284.77 | 5.41 | 342.58 | 6.19 | | |
| Total | 6647.46 | | 5942.24 | | 5658.67 | | 5081.43 | | 5267.17 | | | |
| Expenditure category | Thailand | | Malaysia | | Singapore | | Indonesia | | America and Canada | | Europe | |
| | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % | Mean exp | Mean % |
| Accommodation | 1710.78 | 31.97 | 2011.49 | 34.65 | 1615.94 | 32.14 | 1703.95 | 38.00 | 2451.43 | 43.19 | 1904.31 | 45.99 |
| Food | 1309.93 | 25.81 | 1335.70 | 24.16 | 1196.33 | 24.24 | 853.53 | 19.55 | 1278.86 | 24.59 | 947.98 | 24.98 |
| Transportation | 582.76 | 11.22 | 791.69 | 13.11 | 751.68 | 15.16 | 545.90 | 13.24 | 675.26 | 12.71 | 542.21 | 13.24 |
| Shopping | 1526.65 | 26.68 | 1552.70 | 23.68 | 1275.23 | 23.98 | 1082.14 | 21.50 | 851.70 | 14.07 | 583.62 | 10.48 |
| Miscellaneous | 260.32 | 4.29 | 269.66 | 4.37 | 227.13 | 4.45 | 376.04 | 7.67 | 314.84 | 5.41 | 228.53 | 5.28 |
| Total | 5390.46 | | 5961.26 | | 5066.33 | | 4561.58 | | 5572.13 | | 4206.66 | |

Table 2

Estimation results of the short-haul travel AIDS model.

| Budget share | α_i | log X/P | logp ₁ | logp ₂ | Logp ₃ | Logp ₄ | Logp ₅ | Scen | Gou | Conv |
|---------------------|---------------------|---------------------|----------------------|----------------------|---------------------|----------------------|---------------------|---------------------|--------------------|---------------------|
| Accommodation | 0.380** (0.048) | -0.099** (0.016) | 0.087** (0.008) | -0.035** (0.005) | -0.013** (0.002) | -0.021** (0.002) | -0.018** (0.003) | -0.003 (0.006) | -0.007 (0.007) | 0.013* (0.006) |
| Food | 0.199** (0.024) | 0.047** (0.010) | -0.035** (0.005) | 0.103** (0.015) | -0.032** (0.009) | -0.013** (0.002) | -0.023** (0.007) | 0.003 (0.004) | 0.002 (0.004) | 0.008** (0.004) |
| Transportation | 0.120** (0.021) | 0.044** (0.007) | -0.013** (0.002) | -0.032** (0.009) | 0.062** (0.011) | -0.009** (0.002) | -0.008** (0.004) | 0.008** (0.002) | 0.005 (0.003) | 0.005** (0.003) |
| Shopping | 0.187** (0.031) | -0.002 (0.012) | -0.021** (0.002) | -0.013** (0.002) | -0.009** (0.002) | 0.052** (0.003) | -0.008** (0.002) | -0.008 (0.005) | -0.005 (0.006) | -0.025** (0.005) |
| Miscellaneous | 0.102*** (0.019) | 0.012* (0.007) | -0.017*** (0.003) | -0.021*** (0.006) | -0.008** (0.003) | -0.008*** (0.001) | 0.058*** (0.009) | -0.001 (0.003) | 0.006* (0.003) | -0.001 (0.003) |
| Budget share | Hist | Gen Z | Gen Y | Jp | Cn | Kr | Phi | Tai | Vie | |
| Accommodation | 0.0001 (0.007) | 0.037 (0.025) | 0.012** (0.006) | 0.151** (0.043) | 0.047 (0.042) | 0.116** (0.043) | 0.06 (0.044) | 0.049 (0.044) | 0.062 (0.046) | |
| Food | 0.003 (0.004) | -0.028* (0.013) | -0.012** (0.004) | -0.068** (0.018) | -0.051** (0.018) | -0.047* (0.018) | -0.057** (0.019) | -0.051* (0.019) | -0.048* (0.021) | |
| Transportation | 0.002 (0.003) | -0.015 (0.009) | -0.005** (0.003) | -0.077** (0.018) | -0.045** (0.018) | -0.064** (0.019) | -0.037** (0.019) | -0.050** (0.019) | -0.035* (0.020) | |
| Shopping | 0.002 (0.006) | 0.022 (0.023) | 0.001 (0.005) | 0.009 (0.026) | 0.071** (0.026) | 0.026 (0.027) | 0.060* (0.028) | 0.078** (0.029) | 0.047 (0.029) | |
| Miscellaneous | 0.002 (0.003) | 0.022 (0.005) | 0.001 (0.003) | 0.009 (0.017) | 0.071** (0.016) | 0.026 (0.017) | 0.060* (0.017) | 0.078** (0.017) | 0.047 (0.018) | |

Note: Robust standard errors in brackets. ***, **, * denote significance level at the 1%, 5%, 10% levels, respectively.

negative for short-, medium-, and long-distance traveler groups. This indicates that, as the total expenditure increased, the proportion of spending on food and transportation also increased, but the proportion of spending on accommodation decreased. The total expenditure parameter estimate for shopping was negative for medium-distance travelers and positive for long-distance travelers, thus indicating that, as the total expenditure increased, medium-distance travelers reduced

their shopping, while long-distance travelers increased such shopping. The parameter estimation values for travel attractiveness reasons were partially statistically significant. Among short-distance travelers, attraction to Taiwan could be attributed to a preference for scenery, which increased their proportion of spending on transportation. An attraction to Taiwan based on geographical convenience increased proportion of spending on food and transportation but reduced the

Table 3
Estimation results of the medium-haul and long-haul travel AIDS model.

| Budget share | | Medium-haul travel | | | | | | | | | | | Long-haul travel | | | | | | | | | | |
|---------------------|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|---------------------|---------------------|--------------------|-------------------|---------------------|---------------------|-------------------|---------------------|--|--|--|--|--|--|--|
| | α_i | log X/P | logp1 | logp2 | Logp3 | Logp4 | Logp5 | Scen | Gou | Conv | Hist | Gen Z | Gen Y | Ma | Sig | Incl | | | | | | | |
| Accommodation | 0.347** (0.066) | -0.077** (0.036) | 0.127** (0.037) | -0.068** (0.028) | -0.016** (0.007) | -0.037** (0.005) | -0.007** (0.002) | 0.029** (0.014) | -0.008 (0.013) | -0.038 (0.020) | 0.004 (0.014) | 0.026 (0.036) | 0.002 (0.013) | 0.046 (0.042) | 0.018 (0.041) | 0.074 (0.043) | | | | | | | |
| Food | 0.157** (0.036) | 0.082** (0.022) | -0.068** (0.028) | 0.111** (0.026) | -0.017** (0.006) | -0.019** (0.005) | -0.007** (0.001) | -0.01 (0.008) | -0.004 (0.008) | 0.051** (0.017) | 0.004 (0.008) | -0.022 (0.019) | 0.011 (0.007) | -0.051** (0.021) | -0.034 (0.020) | -0.047** (0.022) | | | | | | | |
| Transportation | 0.105** (0.037) | 0.045** (0.020) | -0.016** (0.007) | -0.017** (0.006) | 0.035** (0.007) | -0.005** (0.003) | 0.002 (0.001) | 0.0001 (0.008) | 0.016** (0.007) | 0.002 (0.010) | 0.015** (0.009) | -0.038 (0.017) | -0.007 (0.008) | -0.026 (0.023) | -0.012 (0.023) | -0.035 (0.024) | | | | | | | |
| Shopping | 0.319** (0.051) | -0.080** (0.028) | -0.037** (0.005) | -0.037** (0.005) | -0.005** (0.003) | 0.060** (0.008) | 0.0001 (0.002) | -0.019 (0.012) | 0.004 (0.013) | -0.011 (0.022) | -0.02 (0.012) | 0.056 (0.060) | -0.009 (0.012) | 0.047 (0.029) | 0.059 (0.032) | 0.021 (0.032) | | | | | | | |
| Miscellaneous | 0.086** (0.034) | 0.028** (0.017) | -0.008** (0.002) | -0.008** (0.001) | 0.001 (0.001) | 0.001 (0.001) | 0.011** (0.001) | 0.0001 (0.007) | -0.007 (0.008) | -0.003 (0.006) | -0.002 (0.005) | -0.023 (0.013) | 0.003 (0.007) | -0.018 (0.020) | -0.033 (0.019) | -0.013 (0.022) | | | | | | | |
| <i>Budget share</i> | | | | | | | | | | | | | | | | | | | | | | | |
| Accommodation | 0.547** (0.056) | -0.198** (0.032) | 0.134** (0.038) | -0.055** (0.020) | -0.055** (0.023) | -0.012** (0.002) | -0.012** (0.004) | -0.01 (0.017) | 0.033** (0.018) | 0.066** (0.027) | -0.006 (0.014) | 0.132 (0.046) | 0.030** (0.016) | 0.011 (0.020) | 0.007 (0.020) | 0.007 (0.020) | | | | | | | |
| Food | 0.118** (0.039) | 0.083** (0.024) | -0.055** (0.020) | 0.104** (0.045) | -0.043** (0.035) | -0.005** (0.002) | -0.001 (0.002) | 0.009 (0.011) | -0.001 (0.011) | -0.003 (0.022) | 0.006 (0.009) | -0.036 (0.029) | -0.006 (0.009) | -0.003 (0.013) | 0.013 (0.012) | 0.013 (0.012) | | | | | | | |
| Transportation | 0.114** (0.035) | 0.044** (0.019) | -0.055** (0.023) | -0.043** (0.035) | 0.105** (0.035) | -0.005** (0.001) | -0.002 (0.001) | 0.002 (0.007) | -0.005 (0.007) | 0.003 (0.012) | 0.003 (0.006) | -0.017 (0.019) | -0.004 (0.007) | -0.009 (0.008) | -0.001 (0.008) | -0.001 (0.008) | | | | | | | |
| Shopping | 0.127** (0.035) | 0.062** (0.022) | -0.012** (0.002) | -0.005** (0.002) | -0.005** (0.001) | 0.022** (0.001) | 0.0001 (0.001) | -0.005 (0.011) | -0.015 (0.013) | -0.034 (0.018) | 0.003 (0.009) | -0.063 (0.030) | -0.021** (0.011) | -0.005 (0.014) | -0.021 (0.013) | -0.021 (0.013) | | | | | | | |
| Miscellaneous | 0.122** (0.043) | 0.003 (0.022) | -0.024** (0.005) | 0.0001 (0.002) | 0.005 (0.002) | -0.001 (0.001) | 0.014** (0.001) | 0.005 (0.007) | -0.013** (0.009) | -0.025** (0.010) | -0.006 (0.006) | -0.01 (0.011) | 0.003 (0.006) | 0.006 (0.007) | 0.001 (0.007) | 0.001 (0.007) | | | | | | | |

Note: Robust standard errors in brackets. **, * denote significance level at the 5%, 10% levels, respectively.

proportion of spending on shopping, and entertainment expenses. For medium-distance travelers, geographical proximity to Taiwan increased proportion of spending on food; for long-distance travelers, this increased proportion of spending on accommodation. The parameter estimation values for generation and nationality were also partially statistically significant. Generation Z short-distance travelers reduced their proportion of spending on food, while Generation Y short-distance travelers increased their proportion of spending on accommodation and reduced proportion of spending on food and transportation. Generation Y long-distance travelers reduced proportion of spending on shopping. For short-distance travelers across different nationalities, proportion of spending on food and transportation decreased. Japanese and Korean tourists increased their proportion of spending on accommodation, and Chinese and Thai tourists increased their proportion of spending on shopping. Medium-distance travelers from Malaysia and Indonesia decreased their proportion of spending on food.

4.2. Price and expenditure elasticity estimates

Table 4 provides estimates of the price elasticities of five tourism consumption items (accommodation, food, transportation, shopping, and entertainment) for short-, medium-, and long-distance tourists. In this study, all uncompensated own-price elasticities were negative and statistically significant, thus indicating that the expected demand law in economic theory, which assumed negative elasticities, held true. The absolute values of own-price elasticities for accommodation, food, transportation, shopping, and entertainment were all less than one, thus suggesting that tourism demand lacked price elasticity. Both short- and long-distance tourists exhibited higher own-price elasticities for shopping at -0.7517 and -0.886, respectively. Long-distance tourists exhibited the lowest own-price elasticity for transportation at -0.225, thus indicating that transportation was more likely to be perceived as a "necessity" when allocating tourism budgets.

Table 4 also reveals the positive expenditure elasticities for short-, medium-, and long-distance tourists. For short- and medium-distance tourists, food, transportation, and entertainment were found to have expenditure elasticities greater than one, while accommodation and shopping had expenditure elasticities less than one. This suggests that, as tourism expenditures increased, food, transportation, and entertainment were considered to be luxury items for short- and medium-distance tourists, while accommodation and shopping were considered to be necessities. Short-distance tourists exhibited the highest expenditure elasticity for transportation at 1.3914, while medium-distance tourists exhibited the highest expenditure elasticity for entertainment expenses at 1.497. Long-distance tourists exhibited an expenditure elasticity of less than one for accommodation and greater than one for the other four tourism expenditure items, with shopping having the highest expenditure at 1.488.

Table 4 estimates the compensated Hicksian cross-price elasticities. It was found that the cross-price elasticities of tourism demand for short-, medium-, and long-distance tourists were generally low and either positive or negative, thus indicating a weak substitution or complementarity between the different types of tourism expenditures. For short-distance tourists, the cross-price elasticities between food and transportation and between shopping and transportation were negative, thus suggesting that an increase in the cost of local food or shopping would lead to a decrease in transportation demand. For medium-distance tourists, the cross-price elasticity between accommodation and transportation was positive, thus indicating a substitution relationship where an increase in accommodation costs would lead to an increase in transportation demand. For long-distance tourists, the highest cross-price elasticity was found to be between accommodation and shopping at 0.347, thus indicating that an increase in accommodation costs would lead to an increase in shopping demand as a substitute.

Table 4
 Estimation uncompensated own price elasticity, compensated cross price elasticity, and expenditure elasticity.

| Budget share | Short-haul travel | | | | | Expenditure elasticity |
|----------------|-------------------|-------------------|--------------------|-------------------|-------------------|------------------------|
| | Accommodation | Food | Transportation | Shopping | Miscellaneous | |
| Accommodation | -0.667** (-42.81) | 0.134** (27.75) | 0.077** (22.75) | 0.152** (32.47) | 0.030** (8.45) | 0.734** (19.63) |
| Food | 0.219** (27.75) | -0.596** (-40.90) | -0.025** (-3.15) | 0.151** (26.71) | -0.023** (-3.07) | 1.205** (33.28) |
| Transportation | 0.255** (22.75) | -0.334** (-21.57) | -0.493** (-27.48) | -0.336** (-19.76) | 0.128** (15.54) | 1.391** (26.97) |
| Shopping | 0.004** (0.34) | 0.269** (32.47) | 0.164** (26.71) | -0.751** (-52.42) | -0.544** (-63.32) | 0.988** (18.40) |
| Miscellaneous | 0.041** (8.54) | 0.144** (8.45) | -0.068** (-3.07) | 0.006** (0.34) | -0.279** (-11.18) | 1.126** (13.84) |
| | | | Medium-haul travel | | | |
| Budget share | Accommodation | Food | Transportation | Shopping | Miscellaneous | Expenditure elasticity |
| Accommodation | -0.534** (-15.76) | 0.034** (2.08) | 0.089** (7.67) | 0.121** (9.56) | 0.040** (6.87) | 0.770** (8.43) |
| Food | 0.048** (2.08) | -0.616** (-17.57) | 0.066** (4.61) | 0.150** (11.44) | 0.032** (5.51) | 1.346** (17.15) |
| Transportation | 0.220** (7.67) | 0.115** (4.61) | -0.785** (-24.17) | 0.196** (-15.07) | 0.072** (7.80) | 1.330** (9.87) |
| Shopping | 0.176** (9.56) | 0.154** (11.44) | 0.115** (10.21) | -0.659** (-18.79) | 0.061** (8.91) | 0.655** (5.46) |
| Miscellaneous | 0.224** (6.87) | 0.127** (5.51) | 0.164** (7.80) | 0.237** (8.91) | -0.843** (-30.42) | 1.497** (5.96) |
| | | | Long-haul travel | | | |
| Budget share | Accommodation | Food | Transportation | Shopping | Miscellaneous | Expenditure elasticity |
| Accommodation | -0.496** (-14.54) | 0.109** (8.18) | 0.002 (0.23) | 0.100** (18.78) | 0.042** (9.75) | 0.549** (7.31) |
| Food | 0.206** (8.18) | -0.639** (-17.81) | -0.055** (-0.53) | 0.105** (15.20) | 0.066** (9.72) | 1.355** (14.28) |
| Transportation | 0.007 (0.23) | -0.101** (-2.53) | -0.225** (-4.23) | 0.088** (9.85) | 0.056** (6.11) | 1.343** (11.05) |
| Shopping | 0.347** (18.78) | 0.193** (15.20) | 0.088** (9.85) | -0.886** (-31.75) | 0.068** (8.88) | 1.488** (8.73) |
| Miscellaneous | 0.228** (9.15) | 0.223** (9.72) | 0.103** (6.11) | 0.125** (8.88) | -0.799** (-28.79) | 1.128** (4.94) |

Note: t-value in brackets. **, * denote significance level at the 5%, 10% levels, respectively.

4.3. Differences in price and expenditure with regard to travel-related characteristics

Further analysis of the price elasticity and expenditure elasticity relationships between the short-, medium-, and long-haul tourists and their generational cohorts showed that short-haul Generation X and Baby Boomer tourists showed a higher accommodation price elasticity (Fig. 1: (1a)), long-haul Generation Z tourists showed a higher food and entertainment price elasticity (Fig. 1: (1b) and (1e)), medium-haul Generation X and Baby Boomer tourists showed a higher transportation price elasticity (Fig. 1: (1c)), and long-haul Generation X and Baby Boomer tourists showed a higher shopping price elasticity (Fig. 1: (1d)). Short-haul Generation X and Baby Boomer tourists showed a higher accommodation expenditure elasticity (Fig. 1: (2a)), long-haul Generation Z tourists showed a higher shopping expenditure elasticity (Fig. 1: (2d)), and medium-haul Generation X tourists showed the highest transportation and entertainment expenditure elasticities (Fig. 1: (2c) and (2e)).

Regarding the price elasticity and expenditure elasticity relationships between reasons for travel attraction among short-, medium-, and long-haul tourists, it was found that long-haul tourists who enjoyed scenery showed a higher shopping and entertainment price elasticity (Fig. 2: (3d) and (3e)), and medium-haul tourists who enjoyed scenery showed a higher entertainment expenditure elasticity (Fig. 2: (4e)). Further, medium-haul tourists who enjoyed gourmet food showed a higher transportation price elasticity (Fig. 3: (5c)). Long-haul tourists who enjoyed food showed a higher shopping expenditure elasticity (Fig. 3: (6d)). Short-haul tourists who had some type of geographical convenience showed a higher accommodation price elasticity (Fig. 4: (7a)), medium-haul tourists who had some type of geographical convenience showed a higher food price elasticity (Fig. 4: (7b)), short-haul tourists who had some geographical convenience showed a higher accommodation and transportation expenditure elasticity (Fig. 4: (8a) and (8c)), and long-haul tourists who had some geographical convenience showed a higher food and shopping expenditure elasticity (Fig. 4: (8b) and (8d)). Medium-haul tourists who enjoyed local customs and historical culture showed a higher transportation price elasticity (Fig. 5: (9c)), and long-haul tourists who enjoyed local customs and historical culture showed a higher shopping expenditure elasticity (Fig. 5: (10d)).

4.4. Effects of travel-related factors on the price and expenditure elasticities of travel products

To examine the effects of tourism-related factors on the price elasticities of tourism products, this current study utilized a robust linear regression model. Table 5 shows the estimated results of the five types of tourism demand price elasticities affected by tourism-related factors. Tourists attracted to Taiwan because of geographical convenience were found to have a relatively high price elasticity regarding food and transportation. Generational differences had no significant impact on the five types of tourism demand price elasticity. As for the impact of nationality, Japanese tourists showed a higher price sensitivity in terms of accommodation and lower price elasticity in terms of food and transportation compared with other tourists. Chinese tourists showed a lower price elasticity in terms of transportation. Korean tourists showed a higher price sensitivity in terms of accommodation and lower price elasticity in terms of transportation. Tourists from the Philippines showed a lower price elasticity in terms of food. Malaysian tourists showed a lower price elasticity in terms of transportation. Tourists from the US, Canada, and Europe showed a lower price elasticity in terms of transportation and higher elasticity in terms of entertainment expenses.

Table 6 shows the estimated results of the expenditure elasticity of the five types of tourism demand affected by tourism-related factors. The expenditure elasticities of food and transportation for tourists who were attracted to Taiwan because of geographical convenience were found to decrease, and no significant impact of generational differences were found with regard to the expenditure elasticity of the five types of tourism demand. Japanese and Korean tourists showed a higher expenditure elasticity in terms of accommodation and transportation compared with other tourists. Chinese tourists showed a higher expenditure elasticity in terms of transportation compared with other tourists. Malaysian and Indonesian tourists showed a higher expenditure elasticity in terms of food and transportation compared with other tourists. Tourists from the US, Canada, and Europe showed a higher expenditure elasticity in terms of food, shopping, and entertainment expenses compared with other tourists.

5. Discussion and implications

The study, focusing on independent tourists, reveals insightful patterns in expenditure behavior, shedding light on their preferences and tendencies. Key findings indicate that when their total travel budget increased, short-, medium-, and long-haul tourists tended to increase

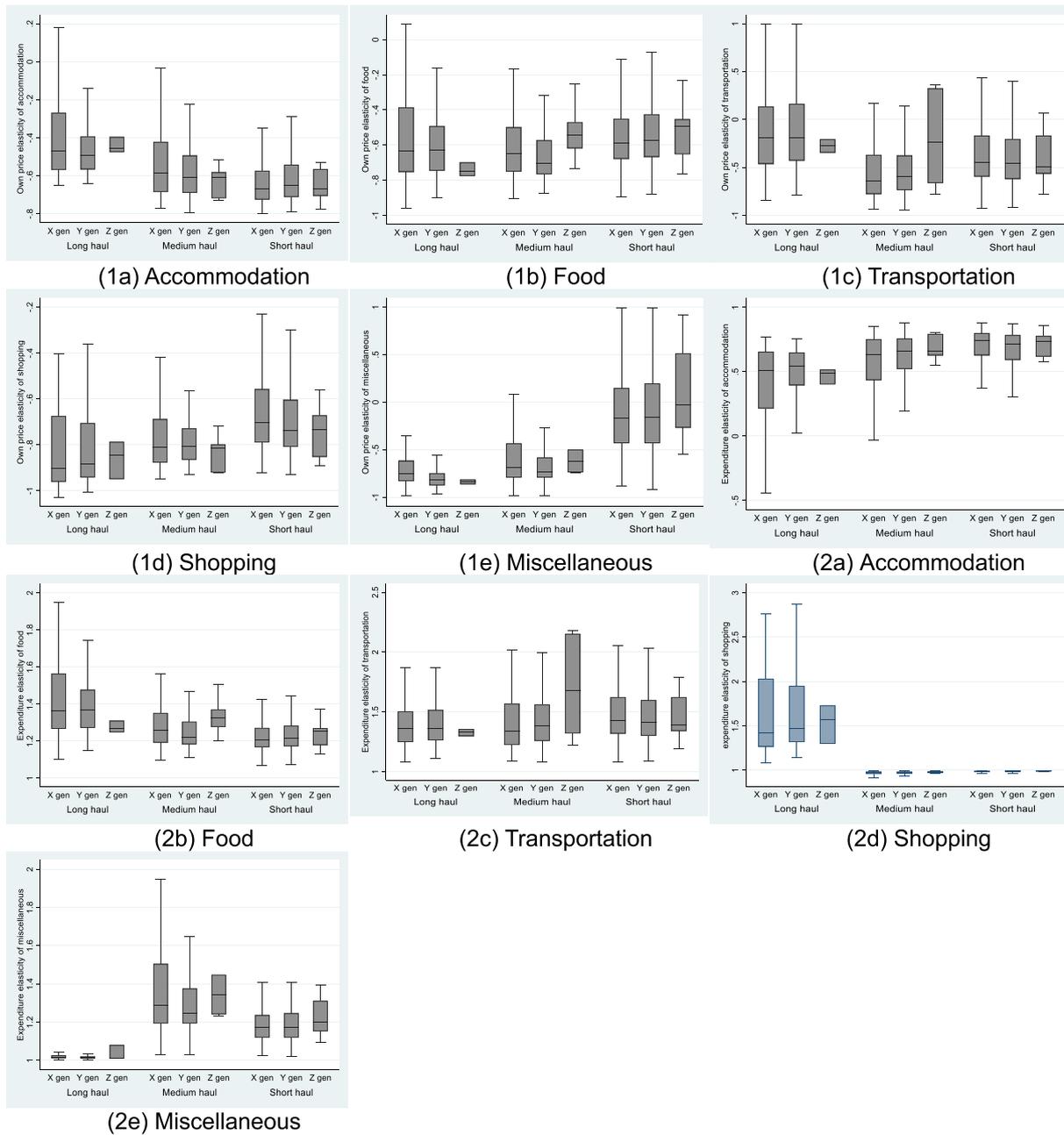


Fig. 1. Own price and expenditure elasticity of travel-related commodities by distance and generation.

Fig. 1 Alt Text: Figs. 1 demonstrate the price and expenditure elasticity of five travel-related commodities. The price and expenditure elasticities of the commodities are calculated in Eqs. (10) and (9), respectively. The black circle denotes increased (or reduced) flexibility in each product's expenditure. The sample period runs from 2019.

their spending on food and transportation. This result agrees with the findings of Ahn et al. (2018) and Ahn et al. (2020). Medium-haul tourists often spend more on entertainment expenses, while long-haul tourists spend more on shopping. In terms of price elasticity, the own-price elasticity of the five types of tourism consumption demands is less than one, thus indicating that tourism consumption demands are relatively lacking in terms of price elasticity. Long-haul tourists showed the highest price elasticity regarding shopping demand, and the expenditure elasticity for shopping was significantly greater than one. Medium-haul tourists showed the highest price elasticity regarding entertainment expenses, and the expenditure elasticity for entertainment expenses was also significantly greater than one. This result indicates that long-haul tourists consider shopping to be a luxury and that medium-haul tourists consider entertainment expenses as luxuries as well. Although the

transportation expenditure elasticity was significantly greater than one, thus indicating that it was a luxury for short-haul tourists, their own-price elasticity was low. The government can assist such tourists by providing information on the most suitable and convenient transportation options for foreign tourists (e.g., self-driving, public transportation, bicycle rentals, bus stops, parking lots, and tourist information services).

All short-, medium-, and long-distance tourists were found to have an expenditure elasticity of less than one for accommodation, while their expenditure elasticities for food, transportation, and entertainment expenses were greater than one. These results differ from previous estimations (Chang, Chen, & Meyer, 2013).

This study found that tourists' accommodation expenditure elasticity had decreased compared with the past, thus indicating that, in 2019,

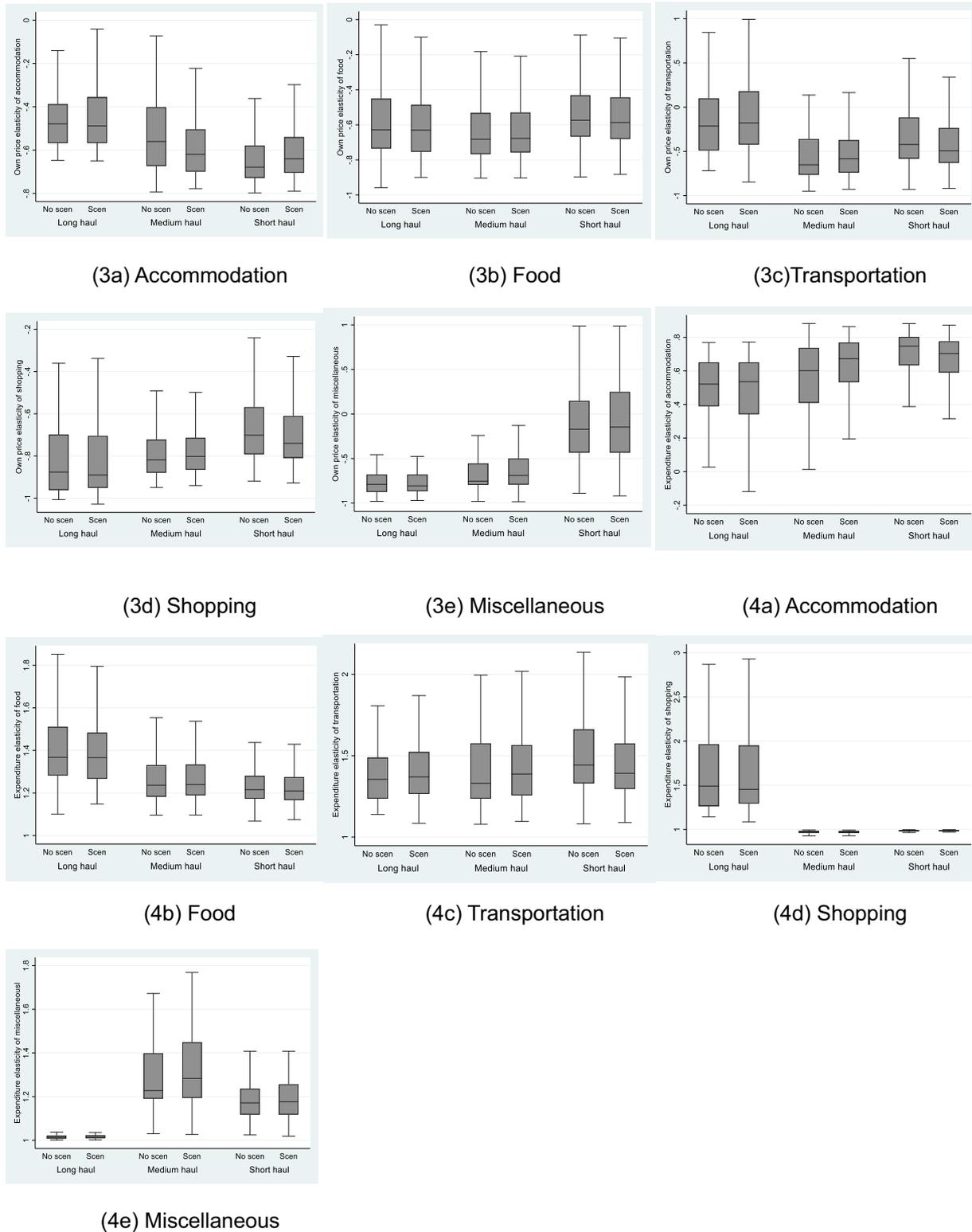


Fig. 2. Own price and expenditure elasticity of travel-related commodities by distance and reason for scenery attracted.

Fig. 2 Alt Text: Figs. 2 demonstrate the price and expenditure elasticity of five travel-related commodities. The price and expenditure elasticities of the commodities are calculated in Eqs. (10) and (9), respectively. The black circle denotes increased (or reduced) flexibility in each product's expenditure. The sample period runs from 2019.

tourists were willing to save on accommodation costs and allocate a greater proportion of their travel budget to food, transportation, and entertainment expenses, thus making accommodation a necessity rather than a preference. The elasticity of food expenditure has increased compared with the past, with tourists being primarily attracted to

Taiwan for its local cuisine. Food has gradually become a primary focus of tourism and has become part of a new tourism trend, particularly among Malaysian, Indonesian, and Western tourists, who are willing to spend more on local food; this has made food a significant aspect of the local tourist experience (Ting, Fam, Hwa, Richard, & Xing, 2019). For

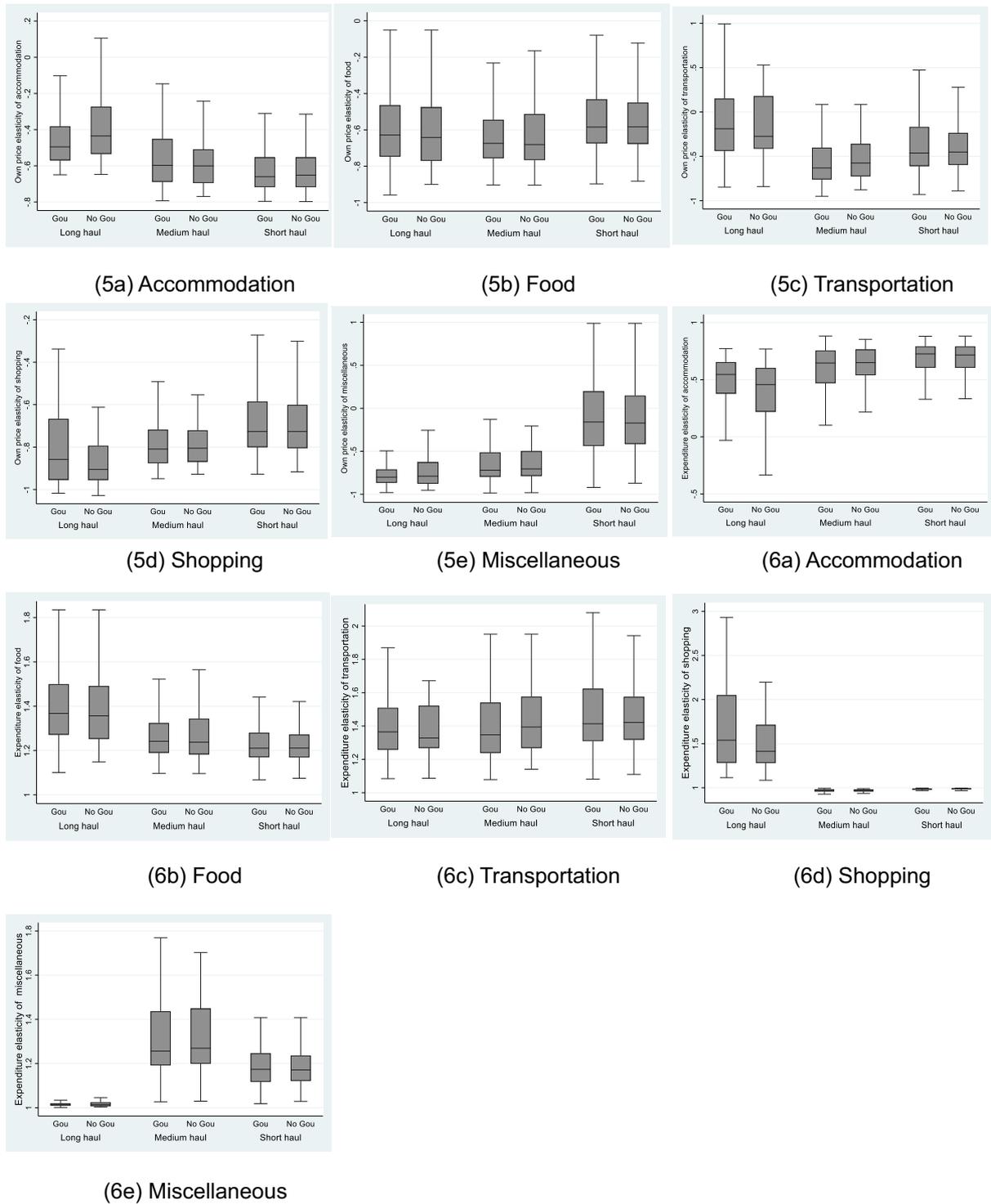


Fig. 3. Own price and expenditure elasticity of travel-related commodities by distance and reason for gourmet food attracted.

Fig. 3 Alt Text: Figs. 3 demonstrate the price and expenditure elasticity of five travel-related commodities. The price and expenditure elasticities of the commodities are calculated in Eqs. (10) and (9), respectively. The black circle denotes increased (or reduced) flexibility in each product's expenditure. The sample period runs from 2019.

example, tourists are willing to pay more for locally produced food items, including locally grown fruits and vegetables, artisanal cheeses, fresh seafood, and locally brewed beer or wine, as they perceive these items to be more authentic and offer a unique experience. Taiwan's culinary tourism offers more than just dining. Food tours, cooking classes, tea ceremonies, and farm-to-table experiences showcase the country's rich heritage, traditions, and unique flavors. These immersive

experiences let tourists engage with the community and explore Taiwan's culinary landscape. In addition, tourists enjoy luxury dining experiences at Michelin-starred restaurants and renowned food destinations in Taiwan. These offer elevated interpretations of traditional Taiwanese dishes, modern fusion cuisine, and gourmet tasting menus by talented chefs.

The elasticity of shopping expenditure has increased among long-

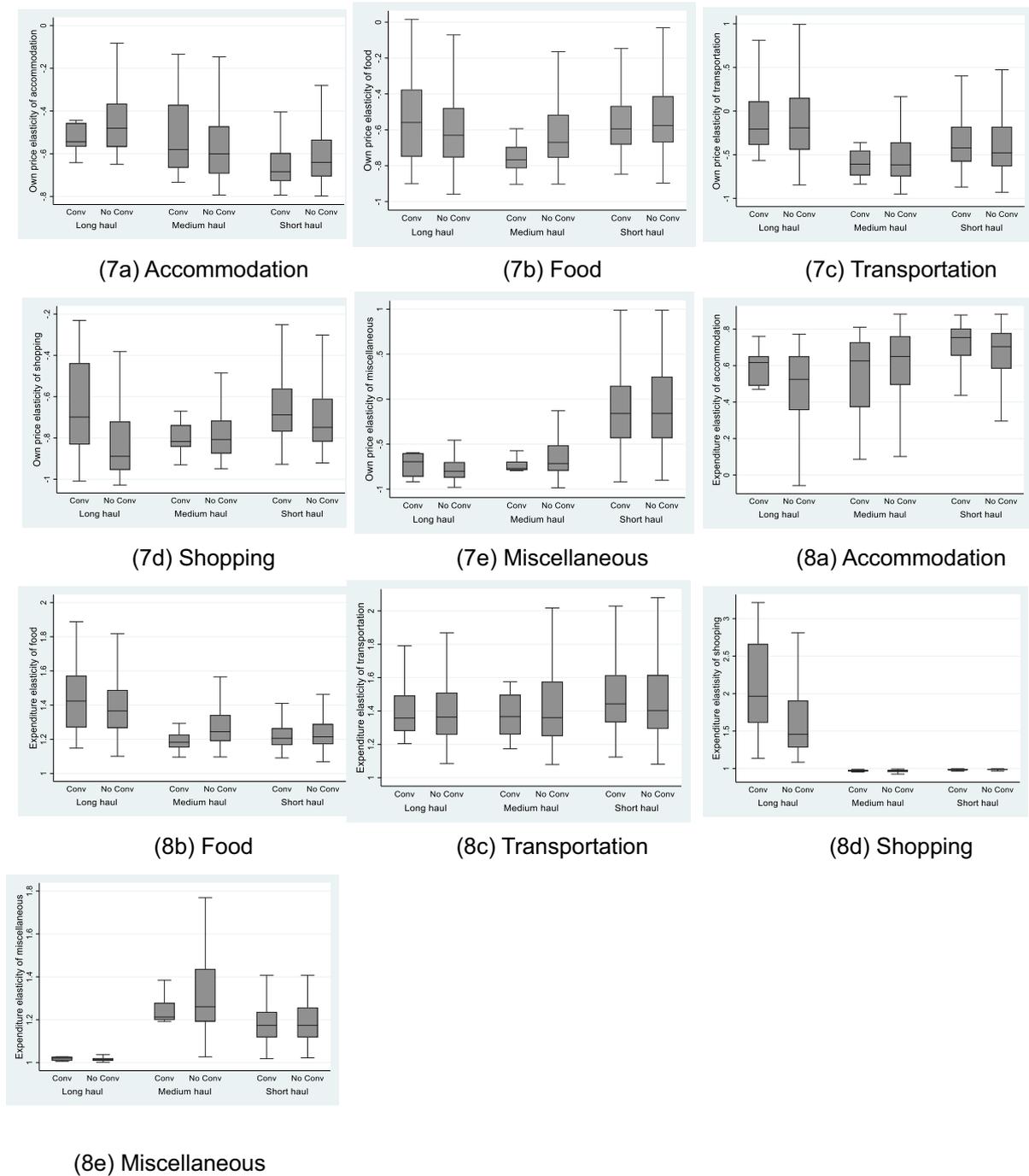


Fig. 4. Own price and expenditure elasticity of travel-related commodities by distance and reason for geographical convenience attracted.
 Fig. 4 Alt Text: Figs. 4 demonstrate the price and expenditure elasticity of five travel-related commodities. The price and expenditure elasticities of the commodities are calculated in Eqs. (10) and (9), respectively. The black circle denotes increased (or reduced) flexibility in each product's expenditure. The sample period runs from 2019.

distance Western tourists but decreased among medium-distance tourists, thus indicating that shopping has become a necessity for medium-distance tourists but a luxury for long-distance tourists. Furthermore, shopping prices often have greater elasticity, thus allowing for the utilization of moderate price discount strategies. Promoting popular shopping areas, luxury brand stores, local unique products and brands, and various promotional activities can all encourage tourist consumption in this regard. Long-haul tourists often consider shopping an indulgent activity that adds value to their overall travel experience. It allows them to indulge in luxury items that may not be readily available in their home countries. This may be driven by various factors, such as

the desire for unique souvenirs, quality goods, designer fashion brands, or exclusive shopping experiences available in the destination (like Shin Kong Mitsukoshi, Taipei 101, and Breeze Center). On the other hand, medium-haul tourists tend to view entertainment experiences as optional expenses that can enhance their enjoyment and satisfaction while exploring the destination. They may allocate a significant portion of their budget to entertainment activities such as visits to theme parks, cultural performances, nightlife, or other entertainment venues. These activities can enrich their travel experiences and create lasting memories. The cross-price elasticity of tourist consumption demand among short-, medium-, and long-distance travelers was found to be small, thus

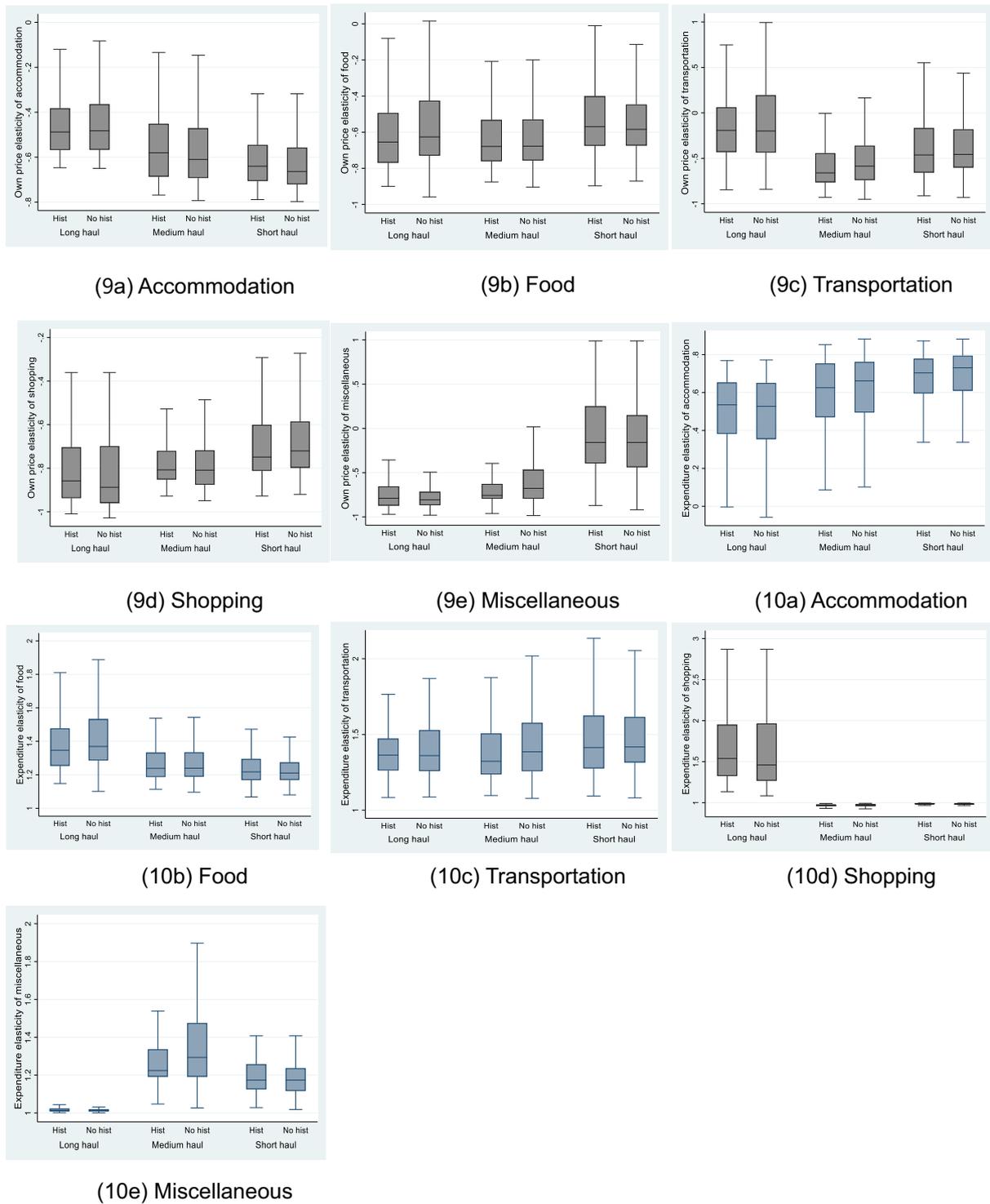


Fig. 5. Own price and expenditure elasticity of travel-related commodities by distance and reason for local customs and historical culture attracted. Fig. 5 Alt Text: Figs. 5 demonstrate the price and expenditure elasticity of five travel-related commodities. The price and expenditure elasticities of the commodities are calculated in Eqs. (10) and (9), respectively. The black circle denotes increased (or reduced) flexibility in each product's expenditure. The sample period runs from 2019.

indicating that tourists tend to allocate their travel budget flexibly rather than impulsively. This finding agrees with those of previous studies, which suggested that Korean tourists, who value collectivism, tend to avoid impulsive spending compared with individualistic American and Australian tourists (Ahn et al., 2018; Lee & Torelli, 2008). A complementary relationship was observed between food and transportation and between shopping and transportation, thus indicating that reducing

food and shopping costs could increase demand for transportation. Thus, transportation service providers could consider cooperating with local food and shopping industries in order to introduce unique local cuisines, products, brands, and popular shopping areas and thus increase food, shopping, and transportation consumption among tourists.

Long-distance tourists were found to have the lowest expenditure elasticity for accommodation, thus indicating that accommodation has

Table 5

Estimation regression results of travel-attractive factors, tourist generation and nationality on own price elasticities.

| Variables | Accommodation | Food | Transportation | Shopping | Miscellaneous |
|---------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Constant | 0.431** (5.192) | 0.663** (7.600) | 0.688** (5.229) | 0.664** (7.612) | 0.383** (2.529) |
| Travel-attractive factors | | | | | |
| Scen | 0.00313 (0.297) | 0.0184 (1.662) | 0.00895 (0.535) | 0.00876 (0.778) | -0.0348 (-1.762) |
| Gou | -0.0165 (-1.435) | -0.00546 (-0.452) | 0.000369 (0.020) | -0.00873 (-0.716) | 0.00264 (0.122) |
| Conv | 0.0227 (1.818) | 0.0459** (3.500) | 0.0471** (2.382) | -0.021 (-1.593) | 0.0209 (0.899) |
| Hist | -0.0104 (-0.877) | 0.0147 (1.185) | 0.0141 (0.751) | -0.00094 (-0.074) | -0.0131 (-0.587) |
| Generation | | | | | |
| Gen Z | 0.0547 (1.179) | 0.0152 (0.312) | -0.0874 (-1.190) | 0.0569 (1.169) | -0.134 (-1.556) |
| Gen Y | 0.0153 (1.465) | -0.00119 (-0.108) | -0.0280 (-1.690) | 0.003 (0.269) | 0.0187 (0.951) |
| Nationality | | | | | |
| JP | 0.242** (2.890) | -0.193** (-2.201) | -0.535** (-4.045) | -0.0683 (-0.779) | -0.27* (-1.803) |
| CN | 0.114 (1.377) | -0.155 (-1.780) | -0.270** (-2.054) | 0.0346 (0.397) | -0.285 (-1.885) |
| KR | 0.189** (2.244) | -0.137 (-1.549) | -0.349** (-2.618) | -0.0285 (-0.323) | -0.310** (-2.017) |
| PHI | 0.121 (1.420) | -0.221** (-2.472) | -0.225 (-1.667) | -0.0192 (-0.214) | -0.236 (-1.519) |
| TAI | 0.146 (1.678) | -0.142 (-1.546) | -0.259 (-1.871) | 0.068 (0.743) | -0.310 (-1.949) |
| VIE | 0.0999 (1.122) | -0.157 (-1.678) | -0.183 (-1.295) | -0.00929 (-0.099) | -0.294 (-1.809) |
| MA | 0.0921 (1.090) | -0.0896 (-1.010) | -0.268** (-1.999) | 0.114 (1.284) | 0.189 (1.223) |
| SIG | 0.0782 (0.929) | -0.0466 (-0.527) | -0.153 (-1.147) | 0.0821 (0.929) | 0.185 (1.202) |
| IND | 0.125 (1.417) | -0.125 (-1.351) | -0.228 (-1.624) | -0.053 (-0.571) | 0.273 (1.680) |
| USCAN | -0.0517 (-0.609) | -0.150 (-1.678) | -0.622** (-4.626) | 0.143 (1.593) | 0.359** (2.294) |
| EU | -0.00832 (-0.098) | -0.106 (-1.190) | -0.520** (-3.878) | 0.121 (1.357) | 0.354** (2.278) |
| Adj R-squared | 0.114 | 0.034 | 0.124 | 0.078 | 0.24 |

Note: t statistics in brackets. **, * denote significance level at the 5%, 10% levels, respectively. Nationality or region abbreviation: JP (Japan); CN (China); KR (South Korea); PHI (Philippines); TAI (Thailand); VIE (Vietnam); MA (Malaysia); SIG (Singapore); IND (Indonesia); USCAN (Americas and Canada); EU (European Union).

become a necessity for them. A substitution relationship was observed between accommodation and shopping and between accommodation and entertainment expenses, thus indicating that tourists often prefer to save on accommodation costs and allocate a greater proportion of their travel budget to shopping, and entertainment expenses.

Short-haul tourists, who live in countries that are closer to Taiwan, often increase their demand for accommodation, food, and transportation while decreasing their demand for shopping, and entertainment expenses. Past literature has also suggested that short-haul tourists tend to favor high-end hotels and restaurants, while long-haul tourists are more concerned about the characteristics and quality of the products (Xue & Zhang, 2020). Taiwan's scenic beauty has also been found to increase the demand for transportation among tourists compared with non-scenic destinations.

Many studies have demonstrated the different price elastic tourism demand. The price elasticity of tourism demand of international tourists traveling to Vietnam is relatively small, while the price elasticity of travel demand for Asian tourists is relatively large (Nguyen, 2021). This study found that the price elasticity of transportation demand of European and American tourists is small, but the price elasticity of miscellaneous expenses and entertainment demand is high. Therefore, price promotions for entertainment activities for European and American

tourists will help increase industry profits.

This study found that differences in nationality significantly affected the tourism expenditure of short-haul tourists. Japanese and Korean tourists tended to have higher accommodation expenses compared with other tourists; this finding is consistent with previous research results (Wu et al., 2010). Short-haul Japanese and Korean tourists, medium-haul Malaysian tourists, and long-haul tourists from the US and Canada all showed an elasticity of greater than one for transportation expenditure, thus indicating that transportation is a luxury for tourists and that their demand for it is less affected by prices. American and European tourists exhibited the greatest elasticity regarding shopping expenditure, thus indicating that shopping can be considered a luxury item for them, which is consistent with previous research findings that they tend to shop more (Divisekera & Deegan, 2010).

Differences in tourism expenditure patterns across generations also showed some influences among short and long-haul tourists. Millennial short-haul tourists tended to spend a larger proportion of their budget on accommodation compared with Generation X and Baby Boomers and a smaller proportion on food and transportation. Generation Z short-haul tourists tended to spend a smaller proportion of their budget on food compared with Generation X and Baby Boomers. Long-haul tourists had a shopping expenditure share of only 12.94%, which was significantly

Table 6

Estimation regression results of travel-attractive factors, tourist generation and nationality on expenditure elasticities.

| Variables | Accommodation | Food | Transportation | Shopping | Miscellaneous |
|---------------------------|---------------------|-----------------------|-----------------------|----------------------|----------------------|
| Constant | 0.466** (4.549) | 1.182** (23.845) | 1.257** (13.431) | 0.970** (13.590) | 0.970** (13.590) |
| Travel-attractive factors | | | | | |
| Scen | 0.00325 (0.250) | -0.00966 (-1.534) | -0.009 (-0.756) | 0.00469 (0.509) | 0.00469 (0.509) |
| Gou | -0.0194 (-1.367) | 0.00232 (0.338) | -0.00288 (-0.222) | 0.0181 (1.813) | 0.0181 (1.813) |
| Conv | 0.0272 (1.764) | -0.0227** (-3.045) | -0.0361** (-2.567) | 0.0180 (1.668) | 0.0180 (1.668) |
| Hist | -0.0117 (-0.805) | -0.0132* (-1.866) | -0.0105 (-0.787) | 0.00649 (0.628) | 0.00649 (0.628) |
| Generation | | | | | |
| Gen Z | 0.0677 (1.184) | -0.00795 (-0.288) | 0.0721 (1.380) | -0.00438 (-0.110) | -0.00438 (-0.110) |
| Gen Y | 0.0215 (1.664) | -0.00196 (-0.314) | 0.0184 (1.556) | -0.0109 (-1.197) | -0.0109 (-1.197) |
| Nationality | | | | | |
| JP | 0.273** (2.654) | 0.0843 (1.691) | 0.382** (4.062) | -0.0131 (-0.182) | -0.0131 (-0.182) |
| CN | 0.128 (1.254) | 0.0683 (1.379) | 0.194** (2.075) | -0.00046 (-0.006) | -0.00046 (-0.006) |
| KR | 0.212** (2.046) | 0.0598 (1.189) | 0.252** (2.652) | -0.00864 (-0.119) | -0.00864 (-0.119) |
| PHI | 0.136 (1.297) | 0.0997 (1.959) | 0.162 (1.688) | -0.00105 (-0.014) | -0.00105 (-0.014) |
| TAI | 0.165 (1.531) | 0.0623 (1.196) | 0.186 (1.892) | 0.0063 (0.084) | 0.0063 (0.084) |
| VIE | 0.111 (1.013) | 0.0711 (1.337) | 0.132 (1.315) | 0.00266 (0.035) | 0.00266 (0.035) |
| MA | 0.0894 (0.859) | 0.125** (2.480) | 0.273** (2.864) | -0.0155 (-0.213) | -0.0155 (-0.213) |
| SIG | 0.0722 (0.696) | 0.0983 (1.957) | 0.177 (1.869) | -0.0188 (-0.260) | -0.0188 (-0.260) |
| IND | 0.129 (1.185) | 0.149** (2.823) | 0.240** (2.407) | -0.039 (-0.513) | -0.039 (-0.513) |
| USCAN | -0.0925 (-0.884) | 0.279** (5.500) | 0.165 (1.721) | 0.691** (9.414) | 0.691** (9.414) |
| EU | -0.0283 (-0.272) | 0.242** (4.796) | 0.122 (1.276) | 0.749** (10.227) | 0.749** (10.227) |
| Adj R-squared | 0.113 | 0.176 | 0.08 | 0.55 | 0.55 |

Note: t statistics in brackets. **, * denote significance level at the 5%, 10% levels, respectively. Nationality or region abbreviation: JP (Japan); CN (China); KR (South Korea); PHI (Philippines); TAI (Thailand); VIE (Vietnam); MA (Malaysia); SIG (Singapore); IND (Indonesia); USCAN (Americas and Canada); EU (European Union).

lower than the shopping expenditure shares of 22.88% and 23.52% among medium-haul and short-haul tourists, respectively. This study found that Millennial tourists tended to spend a smaller proportion of their budget on shopping compared with Generation X and Baby Boomers. Young Millennial tourists tended to use online resources to plan their trips, enjoy shopping, and were familiar with 3C products. Therefore, we recommend using social media platforms (e.g., Facebook and Instagram) to promote and advertise tourism activities in order to strengthen marketing efforts among younger age groups and to encourage them to visit Taiwan.

Most countries are expecting a wave of pent-up consumption after the pandemic, and Taiwan's tourism industry is also looking forward to a boost. However, because of a shortage of tourism personnel and a significant post-pandemic increase in travel costs, it is suggested that more diverse tourism themes must be provided for short-, medium-, and long-term tourists. For example, short-term tourists often prefer food and can be targeted with food-themed promotions and advertisements through social media. Medium-term tourists prefer cultural and ecological experiences and can be attracted through targeted advertising in major cities in the tourists' home countries and strengthening market segmentation. Long-term tourists often prefer shopping experiences and

can be targeted with specialty products and clothing in order to increase brand awareness and reputation.

The study makes significant theoretical contributions by delving into the price elasticity of tourism consumption demands, revealing patterns across expenditure categories, nationalities, and generations. Besides, this study shows that in addition to the influence of income and price on tourism consumption, the geographical convenience of their travel and their nationalities also have a direct or indirect impact on the patterns of tourism consumption expenditure. It also extends existing economic theories and contributes to our understanding of consumer behavior in the tourism context, particularly post-pandemic dynamics and cultural influences.

Practical implications stem from actionable recommendations for policymakers, marketers, and industry stakeholders. The findings can be used as a basis for governments to formulate tourism business-management policies. Tourism operators can gather tourists' feedback on the price of tourism products or services and develop travel tours or references for product pricing with differentiated marketing promotion strategies to develop sustainable tourism markets in various countries. Our study also highlights the importance of promoting local cuisine and culinary experiences to enhance the appeal of destinations. Overall, this

research provides a comprehensive view of tourism expenditure patterns and offers actionable strategies for both academia and industry stakeholders.

6. Conclusions, limitations and future research

This study analyzed various differences in consumption demands and expenditure patterns between free independent travelers located at different travel distances from Taiwan. The results showed that travel distance had some impact on tourist preferences and expenditures. The absolute value of the own-price elasticity of the five tourism demands was less than 1, thus indicating that tourism demand lacked price elasticity.

This suggests that discount pricing strategies alone may not significantly increase tourist consumption demand and that other promotional activities are therefore necessary. The five types of tourism demands showed weak substitution or weak complementarity, thus indicating that tourists tend to allocate their travel budget flexibly rather than impulsively (especially with regard to purchases). Regarding expenditure elasticity, as the total tourism expenditure increased, transportation became the main expenditure item for short-term tourists, while entertainment expenses became the biggest expenditure items for medium-term tourists; furthermore, shopping became the biggest expenditure item for long-term tourists. The study also found that travel attractiveness, tourist generation, and nationality had an impact on tourist consumption demand and expenditure elasticity, with geographical convenience and tourist nationality affecting price and expenditure elasticity. In conclusion, our study's insights provide crucial implications for policymakers, marketers, and industry stakeholders, informing strategies to serve the evolving preferences of independent tourists. By understanding the expenditure patterns and preferences of independent tourists, stakeholders can develop tailored offerings, enhance destination appeal, optimize marketing efforts, and utilize market segmentation to target specific tourism characteristics, thereby driving sustainable tourism growth in Taiwan.

This study analyzed official tourist data exclusively for the year 2019, which recorded the highest number of arrivals to Taiwan. In the future, it is imperative to gather sustainable longitudinal inbound tourism data to comprehend whether actual tourist consumption demands undergo any changes over time. This study only investigated differences in price, expenditure, tourism attractiveness, tourist generation, and nationality. However, other factors (e.g., micro-spatial and temporal dimensions of tourism) may also impact tourist consumption in Taiwan. Therefore, future studies should consider incorporating such factors in their analysis.

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CRediT authorship contribution statement

Wei-Tse Pai: Conceptualization, Formal analysis, Visualization, Data curation, Methodology, Writing – original draft, Writing – review & editing. **Kieu-Thi Phan:** Formal analysis, Visualization, Data curation. **Ca-Van Pham:** Formal analysis, Methodology, Data curation, Writing – review & editing. **Jie-Min Lee:** Supervision, Conceptualization, Data curation, Methodology, Writing – review & editing. **Chi-Jung Hsieh:** Supervision, Writing – review & editing.

Declaration of competing interest

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Data availability

Data will be made available on request.

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