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ORIGINAL ARTICLE

The dynamic linkages among outbound tourism, economic growth, and international trade: empirical evidence from China

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Abstract

The aim of this research was to examine the long- and short-run relationships among real expenditures on outbound tourism from China, economic growth and international trade for the period of 1995 to 2018, applying a newly developed cointegration test—the Bootstrap Autoregressive Distributed Lag framework. Evidence of cointegration was found when expenditures on outbound tourism served as the dependent variable, and economic growth and international trade were important factors affecting outbound tourism from China. For the short-run, a two-way Granger causality relationship was detected between economic growth and outbound tourism expenditures, and the feedback was confirmed between outbound tourism expenditures and international trade. The findings have important policy implications for the growth of the outbound tourism market. Large volumes of outbound tourists result in economic losses for China and outbound tourism reduces the growth of tourism-driven international trade.

Keywords Outbound tourism · Economic growth · International trade · Cointegration · Bootstrap ARDL test · China

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Introduction

Over the last 20 years, Chinese outbound tourism has rapidly grown, and the volume of outbound travelers reached 135 million with expenditures of USD 258 billion, reflecting annual growth rates of 5.3% and 3.2%, respectively, in 2017 (UNWTO 2018). International tourism expenditures by Mainland Chinese are the largest of all countries since 2012 (UNWTO 2015). Around 10% of China's 1.4 billion inhabitants travel internationally and Chinese travellers spent a record US$ 277 billion abroad that China remains the world's largest spender in 2018 (World Tourism Organization 2019). The development of Chinese outbound tourism can be attributed to the nation's political liberalization and increasing economic prosperity.[1] Therefore, recent economic growth is inextricably linked to China's outbound tourism growth. The economic growth trend of China followed the introduction of the "Open Door" policy in 1978 when the country began the transition to a market economy. China embarked on an import-substitution and export-oriented industrialization strategy in the early stages of economic growth.

Several researchers have suggested that the dramatic growth in China's outbound tourism is related to increasing economic prosperity. First, gross domestic product (GDP) is an important factor affecting outbound tourism expenditures, which has support from consumer behavior theory. Crouch (1994) and Lim (1997b) reported on very comprehensive surveys of empirical tourism demand studies for the past four decades. These surveys revealed that most of the existing research tends to use tourism expenditures as a dependent variable. The literature also demonstrates that the most widely used explanatory variable is income. Second, there is the question of whether outbound tourism expenditures causes a reduction in China's foreign exchange earnings and affects economic growth. Most of the existing studies adopt the tourism-led growth hypothesis, and less research considers if outbound tourism has the same impact on economic growth. Whether the impact of outbound tourism on China's economic growth is negative still needs to be tested.

This research assumes that the demand factors for outbound tourism not only need to consider the impact of economic growth but also international trade. The investigation followed Kulendran and Wilson (2000) definition of international trade, which is that it comprises China's total exports to and imports from foreign countries. Kulendran and Wilson (2000) proposed a simple flow model for international tourism and trade. They suggested that tourism leads to international trade (export sales and import purchases), which in turn encourages international tourism. Outbound tourism, including taking holidays, visiting friends or relatives, or studying overseas, can generate either the import or export of goods. China's reduction of trade barriers has proven to be a catalyst for international trade and travel. It is, therefore, possible to test the relationship between outbound tourism and international trade.

[1] In May 1991, China's outbound travel development was due to the relaxation of travel regulations by the government. Chinese people can join Chinese tour groups to Singapore; Hong Kong, Thailand and Malaysia and other countries to travel (Wang & Sheldon 1996; Wen & Tisdell 2001).

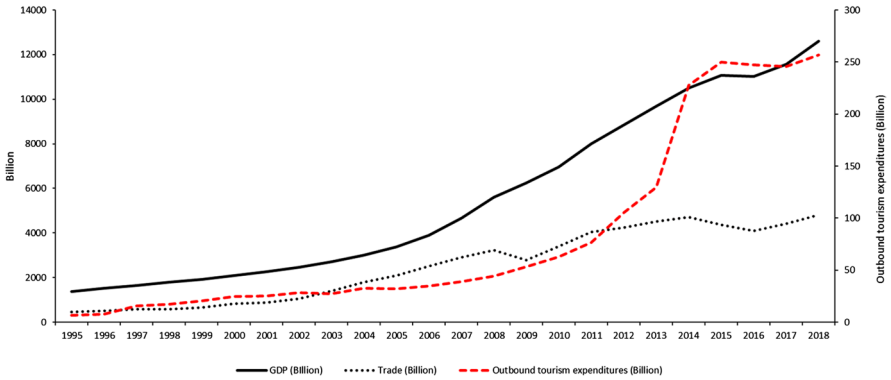

Fig. 1 Outbound tourism, GDP and trade in China 1995–2018

Figure 1 presents outbound tourism expenditures, GDP, and international trade during 1995–2018 for China. This graphic shows outbound tourism expenditures, GDP, and international trade for China have increased exponentially over the 20 years. China's economic prosperity began in the early 1980s, following the introduction of reform and the *Open Door Policy* when the market economy model was adopted. China began to open its market and in so doing attracted a large volume of international trade. As a result, the overall living standards of China's populace steadily improved and disposable incomes substantially increased. There are numerous studies examining the relationship between China's outbound tourism and GDP, but few empirical studies have investigated China's outbound tourism expenditures, international trade, and GDP. Most importantly, Fig. 1 appears to suggest that outbound tourism expenditures, GDP, and international trade are highly correlated. In addition, they may be cointegrated and could have causal relationships. A more sophisticated technical analysis of time series data is needed and was attempted in this research.

There remains an unanswered question of whether growth in GDP and international trade (exports and imports) causes China outbound tourism increases or if China's outbound tourism instead contributes to international trade and economic growth. Previous studies on the relationship among outbound tourism, economic growth, and international trade are scant and lack enough rigor. Therefore, this research focused on the international trade to outbound tourism demand function, and further tested the impact of outbound tourism and international trade on economic growth. and the impact of outbound tourism and economic growth on international trade.

To evaluate the three-way, long-run relationship among outbound tourism, economic growth, and international trade, a specific autoregression distributed lag (ARDL) econometric method, the Bootstrap ARDL was employed, which was pioneered by McNown et al. (2018). This research is the first to use the bootstrap ARDL test in the context of a nation's tourism economic and market development. McNown et al. (2018) modified this test through Bootstrap techniques and the newly developed test has several advantages over the ARDL Bounds test of Pesaran et al.

(2001). The first advantage of the Bootstrap ARDL test is that there is evidence that it is superior to the asymptotic test in the ARDL Bounds tests based on power and size properties. Second, McNown et al. (2018) used Bootstrap techniques solves the endogeneity problem of the ARDL Bounds test, because the ARDL Bounds test assumes that there is no feedback from the dependent to the independent variable. Finally, the advantage of the Bootstrap ARDL test is that it generates critical values for tests of degenerate cases in the ARDL model. McNown et al. (2018) also pointed out that degenerate cases are not a cointegration (Pesaran et al. 2001). Therefore, McNown et al. (2018) added another *F* test to complement the existing *F* and *t* tests for the cointegration proposed by Pesaran et al. (2001).

The structure of this work is as follows. The first two sections review the literature on Chinese outbound tourism, economic development, and international trade. The third section discusses the data and econometric methodology. The fourth provides the empirical results for long- and short-run relationships, and the fifth section is the conclusion.

Literature review and hypotheses

The purpose of this research was to investigate the interactions among outbound tourism, international trade, and economic growth in China. The pairwise related variables are discussed here, and several hypotheses are proposed on the basis of the following literature review. The main focus is on outbound tourism and trade, outbound tourism and economic growth, and the relationships among these three variables.

Outbound tourism and economic growth

Tourism researchers have payed greater attention to the relationship between tourism and economic growth in the past two decades (Castro-Nuno et al. 2013; Eeckels et al. 2012; Ghartey 2013; Husein and Kara 2011; Cortés-Jiménez et al. 2011; Oh 2005; Tang 2011; Chatziantoniou et al. 2013; Nowak and Sahli 2007; Ridderstaat et al. 2014; Lee et al. 2022). However, most of these researchers examined the relationship between inbound tourism and economic growth.

In less than 20 years, China's outbound tourism has rapidly increased. China has become the top outbound tourism spender. Many countries, especially the leading destinations, are greatly interested in the development and influencing factors of China's outbound tourism. Crouch (1994) meta-analyzed 80 studies estimating the income elasticity of international tourism as a function of demand. Lee et al., (2021a, b) examines the relationship between geopolitical risk and tourism demand using panel bootstrapping technique. The results show that geopolitical risk negatively caused tourism demand, which was significant. Lim (1997a, b) reviewed 100 studies about empirical tourism demand in the 1980s. Cointegration and error correction methods have been used to estimate tourism demand and examine income elasticities (Kulendran 1996; Kulendran and King

1997; Vogt and Wittayakorn 1998). Song et al. (2000) built United Kingdom demand for outbound tourism models for different overseas destinations. They found that long- and short-run periods had positive income elasticities and that income had the best forecasting performance for United Kingdom outbound tourism. In addition, Dritsakis (2004) found that real GDP had a positive coefficient for German and British long-run tourism demand for Greece. Halicioglu (2010) aggregated outbound tourism data for Turkey for 1970–2005. He conducted a Granger causality analysis to understand how outbound tourist flows, income, and relative prices determined the direction of causality. Some studies estimated the long- and short-run income elasticities of tourism demand and found that tourism may be considered as a luxury good (income elasticities value greater than one). Therefore, this research proposed the following hypotheses on the relationship of economic growth and outbound demand.

- Hypothesis 1: Economic growth has a positive relationship with outbound tourism; outbound tourism demand and outbound tourism is a luxury good.

As previously noted, most prior research evidence has a focus on inbound tourism and economic growth as a tourism-led growth scenario. A large number of Chinese tourists can increase the economic growth of a region but also cause an environmental impact due to traffic pollution (Lee et al. 2021a, b). Fewer studies have investigated the causal relationship between outbound tourism and economic growth. However, outbound tourism may be more substantial than inbound for some countries, including China. International tourism expenditures by Mainland Chinese are the largest for all countries. Song and Lin (2010) forecast outbound tourism from Asia by considering the impact of the 2008 world financial crisis. Their study showed that outbound tourism generally fell significantly in 2009, except in China and Hong Kong. Because China's economy is predicted to experience significant growth in coming years (albeit interrupted by the effects of the COVID-19 pandemic), many overseas destinations are making efforts to attract Chinese tourists to recover from post-2008 challenges to their tourism sectors. The Chinese tourism market in the past 15 years, has diversified and increased in complexity. Indeed, the characteristics of the outbound China market seem to be a miniature version of global tourism development. These relatively early stages of Chinese outbound tourism offer significant opportunities for longitudinal studies to demonstrate how a market has matured and to describe its life-cycle in a short time period (Jin and Wang 2015). Guo et al. (2007) argued that outbound tourism may have a negative effect on economic growth, because the expenditures abroad result in losses of foreign exchange. However, important questions remain to be answered, including on the relationship between outbound tourism and economic growth in China, and on the short- and long-run differences in this relationship. Thus, the second hypothesis focuses on the interaction of outbound tourism and economic growth.

- Hypothesis 2: Outbound tourism leads to economic losses and has a negative effect on economic growth.

Outbound tourism and international trade

Kulendran and Wilson (2000) found a Marco Polo phenomenon when examining the relationship between outbound tourism and international trade. Countries have extended international trade flows, they also have experienced greater international travel flows, and vice versa. They investigated the relationship between international trade and tourism development flows with data from four important travel and trade partners (United States of America, United Kingdom, New Zealand, and Japan) to Australia. Using cointegration and Granger approaches, they found correlational and bidirectional causal relationships between travel (business, holiday, and total) and international trade.

International trade leads to travel, including the influence of the interest hypothesis. Turner and Witt (2001) found that international trade played an important role in influencing tourism demand. International trade has a network effect that decreases transaction costs as well as leading to growth in travel volumes. Katircioglu (2009) explored a long-run equilibrium relationship among trade, tourism and real income growth for Cyprus. Using data covering the period of 1960–2005, the results indicated that the increases in real income stimulated growth in international trade and growth in international trade also motivated an increase in international tourist arrivals to Cyprus. Analyses of both the long- and short-run relationships between international tourism and trade (Santana-Gallego et al. 2011) demonstrated that international trade promotes tourism development, since international trade encourages improvements in tourism supply. Massidda and Mattana (2013) investigated the relationship across international tourism arrivals and trade in Italy and found there was long-run causality from trade to international tourism arrivals. Studied tourism in Thailand and found that international trade increased outbound tourism demand.

- Hypothesis 3: International trade leads to greater outbound tourism demand (the interest hypothesis).

Kulendran and Wilson (2000) also showed that international travel leads to international trade through what they called the Marco Polo or opportunity hypothesis. However, much of the research about the Marco Polo hypothesis is on the relationship between inbound tourism and trade. Khan et al. (2005) examined the relationship between inbound tourism and trade and detected no correlation and Granger causality between inbound tourism and trade. Gunduz and Hatemi-J (2005) found the relationship between international tourism and trade to be inconclusive. Lionetti and Gonzalez (2012) investigated the relationship between inbound tourism and international trade for six countries in Latin America and the Caribbean. In the long-run, their results showed there was no Granger causality for all six countries. However, in the short-run, several countries (Nicaragua, Chile, Venezuela and Dominican Republic) had bi-directional causality relationships between inbound tourism and trade. Shan and Wilson (2001) found a two-way Granger causality relationship between inbound tourism and international trade in the case of China.

Table 1 Summary of main variables

Variable	Mean	Median	Maximum	Minimum	Std. deviation	Skewness	Kurtosis	Jarque–Bera (probability)
TD	24.604	24.328	26.271	22.651	1.087	0.118	2.125	0.892 (0.640)
GDP	29.102	28.083	30.164	27.946	0.754	− 0.024	1.509	2.224 (0.329)
TR	28.234	28.065	29.203	26.875	0.837	− 0.468	1.642	2.722 (0.256)

Again, however, some important questions remain unanswered, including what is the relationship between outbound tourism and international trade in China?

- Hypothesis 4: Outbound tourism leads to international trade (Marco Polo or opportunity hypothesis).

Variables and data series

This research used annual data for the period from 1995 to 2018.[2] All the databases were from World Bank Development indicators. These included annual data for real GDP in US dollars (2015 = 100), Chinese expenditures on outbound tourism (TD) (international tourism expenditures of Chinese international outbound visitors in other countries), and total international trade in exports and imports (TR).[3] A logarithmic transformation of all three variables was completed.[4]

Table 1 presents summary statistics of the variable-series used in the cointegration analysis. The variable-series demonstrated a considerable range of standard deviations. It was found that all three variables had positive skewness and Jarque–Bera statistics indicating that the outbound tourism expenditures variable was non-normally distributed and economic growth and international trade were normally distributed.

The Bootstrap ARDL test allows for all series to include both I (0) or I (1) time series in a long-run relationship. The Pesaran et al. (2001) approach does not require the modeling of variables with the same order of integration. The order of integration of the three variables was scrutinized to understand the properties of each time series. The Augmented Dickey–Fuller (ADF), Phillips–Perron (PP), and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) Unit Root tests were employed to test the integration level (Dickey and Fuller 1981; Kwiatkowski et al. 1992; Phıllıps and Perron 1988). Table 2 reports ADF, PP, and KPSS unit root test results at level and first difference values

[2] This is the earliest data that we have on Chinese expenditures on outbound tourism from 1995. In fact, China's outbound tourism began to grow significantly around 2000, thence the analysis from 1995 is representative.

[3] All the data we collect exclude Hong Kong and Macau.

[4] Reducing the range of variable variation and converting the increasing (decreasing) variation trend of. variation into linearity is to reduce the estimation error caused by structural changes, so as to facilitate model. estimation.

Table 2 Univariate unit root test

Variables	At level			At first differences		
	ADF	PP	KPSS	ADF	PP	KPSS
LTD	− 1.017(0)	− 0.999(2)	0.691(3)**	− 4.197(0)***	− 4.201(1)***	0.116(1)
LGDP	− 0.697(1)	− 0.692(3)	0.699(3)**	− 3.267(7)**	− 1.883(2)	0.161(3)
LTR	− 1.689(1)	− 1.643(6)	0.445(8)*	− 3.280(0)*	− 3.349(7)**	0.260(7)

The asterisks ***, ** and * denote significant are the 1%, 5% and 10% levels, respectively. The figure in the parenthesis is the optimal lag structure for ADF and PP tests as determined by the Schwert (1989) formula or bandwidth for the KPSS unit root test

Table 3 Zivot and Andrews unit root tests

Variables	At levels		At first differences	
	Intercept (lag) (break year)	Trend and intercept (lag) (break year)	Intercept (lag) (break year)	Trend and intercept (lag) (break year)
LTD	− 3.781 (3)(2012)	− 3.313 (3)(2005)	− 5.113 (0)(2009)**	− 5.726 (0)(2006)***
LGDP	− 3.381 (3)(2010)	− 3.108 (3)(2013)	− 5.073 (0)(2012)**	− 5.782 (0)(2006)***
LTR	− 2.254 (0)(2003)	− 2.761 (0)(2003)	− 4.512 (0)(2000)*	− 5.132 (0)(2005)**

The asterisks ***, ** and * denote significant are the 1%, 5% and 10% levels, respectively. The optimal lag structure for Z–A test is determined by the Schwarz information criterion (SIC)

for real tourism expenditures, real GDP, and real international trade. For real tourism expenditures and real international trade, all tests indicated non-stationary conclusions in the level column. Table 3 reports Zivot–Andrews (Z–A) unit root test that allows an endogenous structural break at a point in the intercept and liner trend (Zivot and Andrews 2002). The Zivot–Andrews unit root test show that three variables rejecting the null hypothesis in the first difference column. However, it was found that three variables turned stationary in the first difference column, means all variables are I (1) process. Thus, it was appropriate to proceed to examine for the presence of cointegration among real tourism expenditures, real GDP, and real international trade.

Econometric methodology

To investigate the long- and short-run relationships among the variables under consideration, the Bootstrap for cointegration within the ARDL (the Autoregressive Distributed Lag) modeling approach was adopted (McNown et al. 2018).[5] This foundational model was developed by Pesaran et al. (2001) and can be applied irrespective of the order of integration of the variables.[6] The ARDL modeling approach involves estimating the following error correction models:

[5] Cointegration is the existence of a long-run relationship between two or more variables. When two time series variables X and Y do not individually hover around a constant value, but their combination (which could be linear) does hover around a constant value, this is called cointegration.

[6] There variances are purely I (0), purely I (1) or mutually cointegrated.

$$\begin{aligned}\Delta \mathrm{TD}_t = {} & a + \beta_{1y}\mathrm{TD}_{t-1} + \beta_{2y}\mathrm{GDP}_{t-1} + \beta_{3y}\mathrm{TR}_{t-1} \\ & + \sum_{i=1}^{n} \gamma_{iy}\Delta \mathrm{TD}_{t-i} + \sum_{i=1}^{n} \delta_{iy}\Delta \mathrm{GDP}_{t-i} + \sum_{i=1}^{n} \theta_{iy}\Delta \mathrm{TR}_{t-i} \\ & + \sum_{j=1}^{m} \pi_{jy} D_{t.j} + \varepsilon_{1t},\end{aligned} \tag{1}$$

$$\begin{aligned}\Delta \mathrm{GDP}_t = {} & a + \beta_{1x}\mathrm{GDP}_{t-1} + \beta_{2x}\mathrm{TD}_{t-1} + \beta_{3x}\mathrm{TR}_{t-1} \\ & + \sum_{i=1}^{n} \gamma_{ix}\Delta \mathrm{GDP}_{t-i} + \sum_{i=1}^{n} \delta_{ix}\Delta \mathrm{TD}_{t-i} + \sum_{i=1}^{n} \theta_{ix}\Delta \mathrm{TR}_{t-i} \\ & + \sum_{j=1}^{m} \pi_{jx} D_{t.j} + \varepsilon_{2t},\end{aligned} \tag{2}$$

$$\begin{aligned}\Delta \mathrm{TR}_t = {} & a + \beta_{1z}\mathrm{TR}_{t-1} + \beta_{2z}\mathrm{GDP}_{t-1} + \beta_{3z}\mathrm{TD}_{t-1} \\ & + \sum_{i=1}^{n} \gamma_{iz}\Delta \mathrm{TR}_{t-i} + \sum_{i=1}^{n} \delta_{iz}\Delta \mathrm{GDP}_{t-i} + \sum_{i=1}^{n} \theta_{iz}\Delta \mathrm{TD}_{t-i} \\ & + \sum_{j=1}^{m} \pi_{jz} D_{t.j} + \varepsilon_{3t}.\end{aligned} \tag{3}$$

In Eqs. (1), (2) and (3), Δ is the difference operator, TD_t is real outbound tourism expenditure, GDP_t is real gross domestic product, and TR_t is international trade. Where i, j are the index of lags; $i = 1, 2, \ldots p$; $j = 1, 2, \ldots p$; t denotes the time periods $t = 1, 2, \ldots T$; $D_{t.j}$ are dummy variables to represent the structural breaks in the equation[7]; $\beta_1, \beta_2, \beta_3, \gamma_i, \delta_i$, and θ_i are coefficients on the lags of the variables.

According to McNown et al. (2018), the F test and t test are used for testing to determine the existence of long-run relationships. They point out that cointegration TD_t, GDP_t and TR_t requires rejection of all three of the null hypotheses:

$H_0 : \beta_1 = \beta_2 = \beta_3 = 0$, F test on all error correction term (define as F_1).

$H_0 : \beta_1 = 0$, t test on lagged dependent variable (define as t).

$H_0 : \beta_2 = \beta_3 = 0$, F test on lagged independent variables (define as F_2).

The F_1, t and F_2 critical values are different in McNown et al. (2018). Pesaran et al. (2001) provided critical values only for F_1 and t but not for the F_2 test on the lagged independent variable. McNown et al. (2018) identified two degenerate cases: degenerate case #1 is a mean, where the F_1 and t tests are significant, but the F_2 test on the lagged independent variable is not significant. Degenerate case #2 is where the F_1 and F_2 tests are significant, but the t test on the lagged dependent variable is

[7] The dummy is specified as one in the identified year and zero otherwise. Considering dummy variables can control possible structural changes can increase the explanatory power of the estimates and have better estimation results in the model.

Table 4 Optimal model by diagnostic checking

Equations	Q-statistic(5)	LM(2)	BPG	F_RESET(1)
LTD	2.000	0.276	0.597	17.69
LGDP	2.581	5.239	1.656	0.527
LTR	7.165	3.068	0.912	2.632

The asterisks ***, ** and * denote significant are the 1%, 5% and 10% levels, respectively. Q-statistic(5) denotes Q statistic at lag 5, LM(2) indicates Lagrange Multiplier statistic against order 2 autocorrelation, BPG denotes Breusch–Pagan–Godfrey chi-square statistic for heteroscedasticity test. F_RESET(1) is the F-statistic for regression specification error test against order 1 for no functional form mis-specification.

not significant. Pesaran et al. (2001) presented critical values for degenerate case #1; however, they only showed the upper and lower bounds for critical values while imposing strict exogeneity on the explanatory variable. Another advantage of the Bootstrap ARDL test is that it is suitable for models with multiple endogenous variables. The Bootstrap ARDL test uses the resampling procedure, which is better than the asymptotic test in the ARDL Bounds test based on size and power properties. McNown et al. (2018) argued that the Bootstrap ARDL test provides a better insight on the cointegration status of the time series in the ARDL model.

The short-run relationships were determined by Granger-causality tests.[8] If cointegration is not found among TD_t, GDP_t and TR_t when TD_t is the dependent variable, the Granger causality test for GDP_t=>TD_t and TR_t=>TD_t should only include the lagged difference on GDP_t and TR_t, i.e., testing $\delta_i = 0$ and $\theta_i = 0$. However, if there is cointegration among the variables, then this means the dependent and independent variables form a fixed linear combination. As a result, the lagged level can be considered as I (0). In this case, the Granger causality test of GDP_t=> TD_t and TR_t=> TD_t should include the lagged difference of GDP_t and TR_t and the lagged level of GDP_t and TR_t, i.e., testing $\beta_2 = \delta_i = 0$ and $\beta_3 = \theta_i = 0$. Therefore, this situation also exists when GDP_t or TR_t is a dependent variable in Eqs. (2) or (3).

Empirical results

Before proceeding with the Bootstrap ARDL cointegration tests, Table 4 shows that the diagnostic details of optimal models.[9] These tests include the correlogram for white noise residuals, the Lagrange multiplier test for no residual serial correlation, the heteroscedasticity test, and the Ramsey RESET test of no functional mis-specification is presented. We found that all equations passed these test diagnoses.

[8] Granger (1969) defines the causal relationship between two variables from the perspective of the. predictive power of variables. Thus, it is said that as a variable X evolves over time its Granger. causes another evolving variable Y if predictions of the value of Y based on its own past values and on the past values of X are better than predictions of Y based only on its own past values.

[9] The manuscript used EViews 8 software as the estimation of the model.

Table 5 Cointegration results: outbound tourism expenditures (TD), economic growth (GDP), and international trade (TR)

DV|IV	Dummy variables	*F*1	*F*1*	*t*	*t**	*F*2	*F*2*	Result
LTD|LGDP,LTR	D07, D11, D14	10.855	4.308	− 4.349	− 2.807	11.658	5.224	Cointegration
LGDP|LTD,LTR	D05, D09, D13	1.440	3.065	− 0.833	− 1.819	1.987	3.101	No-cointegration
LTR|LGDP,LTD	D03, D06, D11	1.345	2.770	1.080	− 1.077	1.026	3.064	No-cointegration

D07 means a dummy variable for the year 2007; other years are 0. F_1 is the *F*-statistics for the coefficients of TE_{t-1}, GDP_{t-1} and TD_{t-1}; *t*_dep is the *t*-statistics for the dependent variable, and F_2_indep is the *F*-statistics for the independent variable. F_1*, *t** and F_2* are the critical value at the 5% significance level, generated from the bootstrap program

Long-run relationship with structural breaks

The Bootstrap ARDL test was used to estimate the long-run determinants of outbound tourism expenditures, economic growth, and international trade so that all three variables could be viewed as endogenous. The Bootstrap ARDL was implemented with structural breaks proposed capturing shocks as the data demonstrated peaks and valleys caused by dummy variables, for example, economic crises and open tourism policies. The Akaike Information Criterion (AIC) was used in lag selection. The optimal number of lag periods was set to one (1 year) because of the length of the sample in the ARDL model.

The Bootstrap ARDL was used to test, Eqs. (1)–(3), and the estimates are reported in Table 5. From Table 5, the existence of a long-run relationship in the model rejected the hypothesis of the F_1 test, F_2 test and *t* test (significant t statistic on the lagged level of the dependent variable). When TD served as the dependent variable, there was cointegration evidence and controlling structure breaks for the years 2007, 2011, and 2014 for China outbound tourism. As reported in Table 3, in the TD equation, all three test statistics, F_1, F_2 and*t*, were significant.

It was found that economic growth and international trade played an important role in China's outbound tourism expenditures in the long-run. First, the results of the Bootstrap ARDL test supported Halicioglu's (2010) research that used Bounds testing to compute outbound tourist flows and income. Second, it is suggested that international trade is also a main variable in determining China's outbound tourism expenditures in the long-run. This research confirmed that international trade should be considered in testing the cointegration of China's outbound tourism expenditures. This is because China's open policy not only affects outbound tourism, but also has an impact on international trade and economic growth.

As shown in Table 6, the coefficients were significant for economic growth and international trade. When economic growth increased by one percent, outbound

Table 6 Long-run coefficient results (dependent variable = LTD)

Variables	Coefficient	*t*-statistic	Probability
LTD(− 1)	− 0.6724***	− 4.3489	0.0012
LGDP(− 1)	1.4734***	4.6639	0.0007
LTR(− 1)	− 0.5421**	− 2.5133	0.0288
C	− 10.6779***	− 3.7908	0.0030

The asterisks ***, ** and * denote the significance at the 1%, 5% and 10% levels, respectively

tourism tended to increase by 1.4734 in the long-run. Outbound tourism for China can be regarded as a luxury good as the income elasticity of demand is positive and exceeds one. Thus, there was empirical evidence in support for hypotheses 1 but this result did not support hypothesis 3 in the long-run relationship. However, this also indicated that international trade had a negative impact on outbound tourism in the long-run with a coefficient of − 0.5421 percent. China's outbound tourism was affected by the lag in international trade behavior. A large volume of early international trade drove China's economic growth, which led to the growth of Chinese outbound tourism after 2009 (Dai et al. 2017). However, after 2009 international trade slowed down. China's outbound tourism has already been improved by the economy and the recent increase in China's outbound tourism has been accelerated due to the stimulation of trade.

Table 5 shows that cointegration did not exist when economic growth or international trade were used as dependent variables. Kulendran and Wilson (2000), Katircioglu (2009) and Massidda and Mattana (2013) discovered a long-run relationship among inbound tourism, trade and economic growth but the analyses found that there is not a long-run relationship from outbound tourism expenditures to international trade and economic growth. The appropriate conclusion is that cointegration does not exist when economic growth is used as a dependent variable.

Short-run Granger causality test based on Bootstrap ARDL

Table 7 reports the Granger causality test results based on the Bootstrap ARDL. A feedback relationship existed between outbound tourism expenditures and international trade. Between outbound tourism expenditures and economic growth and between economic growth and international trade, there were also two-way Granger causality relationships.

In the outbound tourism (TD) equation, economic growth (GDP) positively caused outbound tourism with an F-statistic of 2.896, which was significant. In addition, international trade (TR) positively caused TD at a 1% significance level with an *F*-statistic of 7.612. Looking at the sign of the coefficients of the two independent variables, both GDP and international trade were important determinants of Chinese outbound tourism. The Granger causality test indicated that GDP and international trade are important variables influencing outbound tourism demand. These empirical findings suggested that when economic growth and international trade are increasing, people have more monetary wealth and more frequent contact

Table 7 Granger causality results: outbound tourism expenditures, economic growth, and international trade

Variables	TD equation *F*-statics, (*p* value) (sign)	GDP equation *F*-statics, (*p* value) (sign)	TR equation *F*-statics, (*p* value) (sign)
Outbound tourism expenditures (TD)	–	− 4.629 (0.001)*** (–)	− 5.236 (0.000)*** (–)
GDP	2.896 (0.09) *(+)	–	− 1.856 (0.088)* (–)
International trade (TR)	7.612 (0.008) *** (+)	2.726 (0.018) ** (+)	–

The asterisks ***, ** and * denote the significance at the 1%, 5% and 10% levels, respectively. In addition, (.) are *p* value and sign for the coefficients. The case of non-cointegration and its causality test involved only lagged differenced variables

with foreign goods, and they spend more on travel outside of Mainland China. There are several previous studies concluding that income is a good variable to measure outbound tourism (Kulendran 1996; Lim and McAleer 2001; Seddighi and Shearing 1997). Lim (1997a) found that income was the most commonly used explanatory variable in outbound tourism generation. Most importantly, this research found that international trade is also a key variable for creating China's outbound tourism. It is argued that greater trade in goods and services with a foreign country can enhance the image of the destination country within the origin nation's outbound market; thus, travel opportunities are likely to increase between trading countries. It follows that a full understanding of China's outbound tourism cannot ignore the impact of the nation's foreign trade. Hypotheses 1 and 3 were supported in the short-run relationship.

Furthermore, a Granger causality relationship was found between international trade to GDP, which means international trade positively caused economic growth with a 5% significance level. This confirms that international trade promotes China's economic development. International trade can bring about the upgrading of skills through the adoption of superior production technology and such innovation can positively influence economic growth, in line with the benefits of the division of international trade in classical macroeconomic theory.

There was strong evidence of a Granger causality relationship from outbound tourism to GDP for China. This suggests that outbound tourism expenditures do negatively contribute to GDP in the short-run; therefore, this result supports hypothesis 2. Guo et al. (2007) pointed out that large volumes of outbound tourism expenditures affect China's foreign exchange reserves, thereby reducing economic growth. This investigation has found that there was this effect. The substantial increase in outbound tourism has resulted in the loss of a large amount of foreign exchange reserves in recent years, which not only promoted the tourism development of neighboring countries but also eroded the domestic economic achievements in a short period of time. The economic fluctuation caused by the short-run impact of outbound tourism deserves greater attention from researchers and government.

The last international trade equation suggested that outbound tourism expenditures influence international trade in a negative way. Outbound tourism consumption

increased along with decreases in international trade. These results suggest that increases in outbound tourism expenditures in the previous year will reduce China's foreign trade expenditures for the current year, as more Chinese go abroad to purchase foreign goods, which decreases the demand for traded goods. Kulendran and Wilson (2000) found a *Marco Polo effect,* where tourism drives trade growth; however, the data in recent years indicate that there was a negative *Marco Polo effect* in China. This research supported hypothesis 4, but outbound tourism expenditures had a negative effect on international trade in the short-run. Large volumes of outbound tourism will cause a decline in China's international trade, possibly due to excessive parallel trade in outbound tourism, thus reducing tourism-led trade growth. In the international trade (TR) equation, economic growth (GDP) negatively influenced international trade with an F-statistic of -1.856, which was significant.

Stability of ARDL model

The robustness of the model is ensured by the CUSUM (Brown et al. 1975) and the CUSUM of squares tests (Brown et al. 1975) that are based on the cumulative sums and squares of the recursive residuals. The test finds parameter stability if this option plots the cumulative sum together within the 5% critical lines. In Fig. 2, the CUSUM and the CUSUM of squares tests showed that the residual variance was stable, because the blue lines were within the 5% significance lines.

Conclusions and policy implications

The research aim was to empirically test the long-run relationships and directions of Granger causality among outbound tourism expenditures, economic growth, and international trade for China using a newly developed Bootstrap ARDL model over the period of 1995–2018. There were several main findings and conclusions. First, a long-run equilibrium relationship (Bootstrap ARDL test for cointegration) existed in the model, when outbound tourism expenditures served as the dependent variable. However, this long-run relationship did not exist for the case in which economic growth and international trade were the dependent variables.

The Granger causality test based on the Bootstrap ARDL model found a feedback relationship existed between outbound tourism expenditures and international trade. However, a two-way Granger causality relationship was also detected for outbound tourism expenditures and economic growth. By considering the signs of the coefficients of the independent variables, it was concluded that economic growth and international trade were very important factors for promoting outbound tourism demand in China. The contribution of this research is the finding that economic growth and international trade not only have an impact on inbound tourism (Kulendran and Wilson (2000), Katircioglu (2009), Massidda and Mattana (2013) and Lionetti and Gonzalez (2012)) but also on outbound tourism. Interestingly, the results also suggested that outbound tourism expenditures reduce international trade.

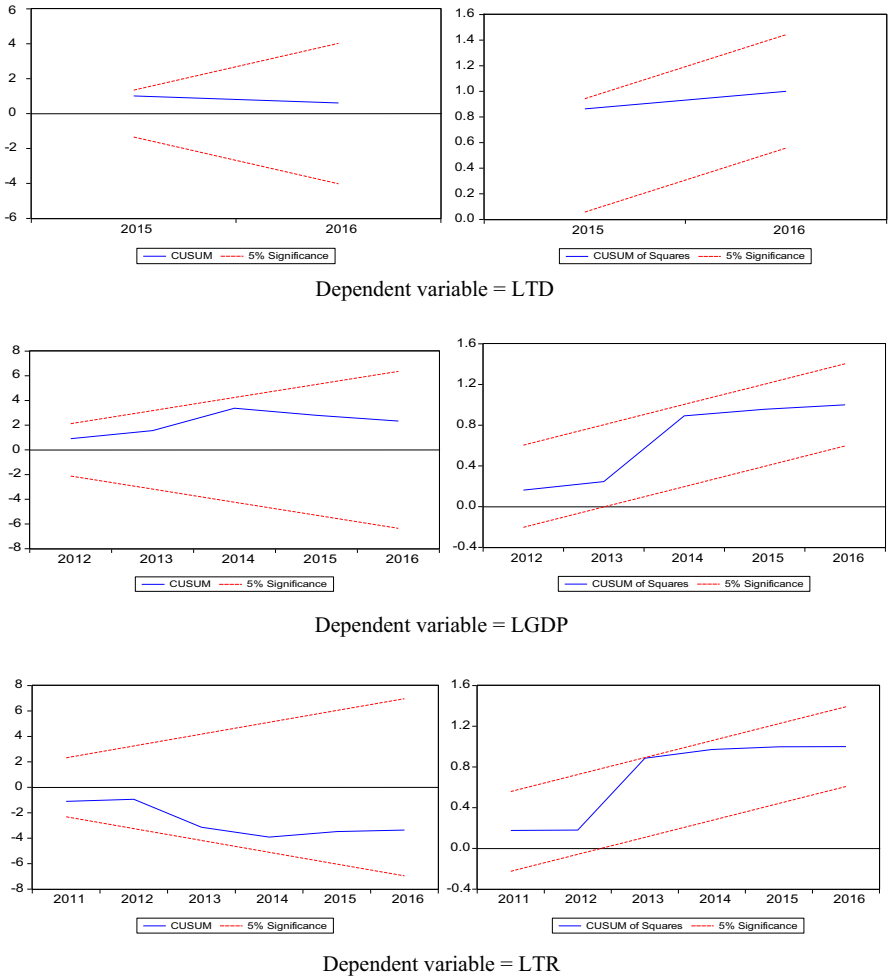

Fig. 2 Plot of CUSUM and CUSUM of squares tests

The income elasticity of demand in the short-run is greater than the long-run, which can be used by policymakers to manage the outbound demand. Short-run economic cycles will have a great impact on China's outbound demand, but in the long-run, the effects of sudden shocks will slow down. For example, the coronavirus pandemic caused a global economic recession, which seriously reduced China's outbound tourism in the short-run, but its impact on China's outbound travel in the long-run will be lower than in the short-run given the same economic situation.

There were two variables that are crucial to increasing outbound tourism expenditures. It was confirmed that when there are increases in economic growth, this will positively affect outbound tourism expenditures. In addition, the promotion of international trade had a positive impact on outbound tourism expenditures. Moreover, the large volume of outbound tourism expenditures had a significant impact on

economic growth in China. Similarly, outbound tourism expenditures may reduce international trade. Outbound tourism expenditures affect the overall economy, and they also have an influence on international trade. Outbound tourism has a negative impact on international trade and international trade is extremely important in driving China's economic engine. Therefore, outbound tourism not only has direct impact on the Chinese economy, but it gas an indirect effect as well.

It may be suggested that China's outbound tourism has grown too quickly, so tourism has become a part of foreign exchange earnings, and China's outbound foreign exchange reserves are already in a trade deficit. Dai et al. (2017) pointed out that China's tourism industry had a deficit of US $372 billion in total trade from 2009 to 2011 and continues to grow. This study provides strong evidence that China's outbound tourism impacts short-run economic growth. Therefore, the Chinese government might consider using a tax levy on outbound travel expenditures to reduce foreign exchange losses. However, the trade deficit in tourism is an outcome of the development of a free economy and is also caused by globalization. The increase in costs of outbound tourism brought out by a tourism tax may have short-run effects, which may lead to the loss of consumption in the tourism industry in the long-run. The second policy implication is the option of strengthening the quality of China's domestic tourism, because domestic tourism and foreign tourism are substitutes for each other and may be affected less by the costs of tourism but more by the respective tourism quality.

The empirical results support a trade-led growth hypothesis for China's economic growth. While short-run impacts of international trade on economic growth exist for most economies, international trade is a key factor promoting China's economic development. Moreover, the short-run results found that the economic growth of the previous year signify a decrease in China's trade demand for the current period. The Granger causality test based on the Bootstrap ARDL model found a feedback relationship existed between economic growth and international trade.

Although this research identifies multiple pathways for future research in the leading emerging economy of China, these opportunities may also be relevant to research in other emerging markets. Brazil, India, Russia, and Eastern Europe have unique social, cultural, historical, and political characteristics, as does China. China's experience can be used as a reference for the long-run strategic development of these markets.

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