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To cite this article: Sakiru Adebola Solarin, Abdulkareem Alhassan, Taiwo Temitope Lasisi & Festus Victor Bekun (28 Mar 2025): The economic impact of educational tourism development: the role of educational tourism receipts, Current Issues in Tourism, DOI: 10.1080/13683500.2025.2482896

To link to this article: <https://doi.org/10.1080/13683500.2025.2482896>



Published online: 28 Mar 2025.



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RESEARCH ARTICLE



The economic impact of educational tourism development: the role of educational tourism receipts

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ABSTRACT

In many nations, one of the major tourism thrusts is educational tourism development, especially the improvement of educational tourism receipts. The tourism sector is more effective when there is an increase in educational tourism revenues as against a mere increase in educational tourism arrivals. However, the few papers on the economic impact of educational tourism development have largely ignored the impact of educational tourism receipts. The objective of this paper is to investigate the impact of educational tourism development on the economy of Australia. The novelty in this paper is that we have not only considered educational tourism arrivals but also educational tourism receipts. The relationship between educational tourism development economic growth has been examined within an augmented neoclassical growth model, which also recognises capital stock, exports of goods and services and population growth as potential determinants of economic growth. A new dynamic Autoregressive Distributed Lag (DARDL) approach has been adopted to estimate the relationship in the series. The empirical findings indicate that an increase in educational tourism arrivals has a positive impact on economic growth of Australia. Besides, educational tourism receipts growth generates positive economic growth, which agrees with the tourism-led growth hypothesis.

ARTICLE HISTORY

Received 28 February 2024
Accepted 17 March 2025

KEYWORDS

Educational tourism development; inbound tourism; economic growth; dynamic autoregressive distributed lags; Australia

JEL CLASSIFICATION CODES

C32; C51; Z32

Originality and significance statement

A novelty of this study is the use of tourism receipts to represent educational tourism development in the analysis. We add a theoretical layer to the discussion, expanding the understanding of the relationship between educational tourism development and economic growth using the neoclassical growth model framework. This also provides the opportunity to test the tourism-led hypothesis using educational tourism receipts, which has not been done in the previous papers. A new Dynamic Autoregressive Distributed Lag (DARDL) technique has been employed to examine the educational tourism–economic growth nexus. The usage of the DARDL approach facilitates the extraction of the dynamic impact of educational tourism shocks on the economy, therefore might assist to project the potential trajectory of economic growth aftermath of an educational tourism (receipts) shock.

1. Introduction

Although defined in various forms, educational tourism generally involves individuals travelling away from their environment or country with either the main or subsidiary aim being to acquire some knowledge in a different environment or country. It is a form of tourism that is often triggered by the desire to learn (Ritchie et al., 2003). Educational tourism packages often provide the chance of combining guided experiential learning with leisure. The gains of hosting foreign students are enormous to the host countries. This is because having foreign students often leads to strong global ties and influence and which can ultimately lead to more international trade and positive economic growth (International Education Association of Australia, 2020). Educational tourism development provides additional employment prospects in both the educational and travel sectors of the host countries. Educational tourism fosters the need for additional infrastructural facilities in the host countries. The revenue derived from educational tourism provides extra source of fund for additional infrastructural facilities (Tang, 2020).

Despite the perceived numerous effects of educational tourism development, the economic impact of educational tourism development has been rarely examined in the literature. The importance of determining the economic impact of educational tourism is that the results can provide insights on the benefits of promoting educational tourism. A positive impact of educational tourism is an indication that it is worthwhile to promote educational tourism in the host countries. The few empirical studies that are available on the economic impact of education tourism have used tourism arrivals for educational purpose or total enrolment of foreign students as the indicator of educational tourism development (Matahir & Tang, 2017; Tang, 2020). However, educational tourism arrivals may not accurately reflect the development of educational tourism.

Educational tourism receipts represent a better measure of educational tourism development as increases in educational tourism receipts constitute an additional income generated in the tourism subsector, which might be due to increases in expenditures per tourist. Some arrivals for international education hurriedly return home because of their inability to acclimatise to the atmosphere of the host countries (OECD, 2023). This act is bound to reduce the expected revenue that the host countries are expected to generate from such students. Therefore, a host nation may witness high rates of international tourist arrivals, but low rates of tourism earnings (receipts) and the impact of the educational tourism development will be minimal. Some of the arrivals that register as education tourists might end up in the country engaging in activities that are not associated with education and these activities might be injurious to the economy (Tang, 2020). Educational tourism remains insignificant in many tourist receiving countries. For instance, foreign students constitute about 3% of total enrolment in short-cycle tertiary programmes in 2021 (OECD, 2023). The low number of arrivals indicates that it might not be insufficient to rely on just an indicator of the educational tourism development, especially tourism arrivals.

We have focused on Australia for several reasons. Education is one of Australia's largest service exports (Tran et al., 2020). In 2019, international education was valued at about 38 billion Australian dollar, making it Australia's third-largest export industry (after iron ore and coal) and employs 240,000 people (Australian Trade and Investment Commission, 2019), making it one of the country's largest employers. The Australian Bureau of Statistics (2020) reported that in 2019, international education-related travel accounted for 13.6% of all international travel to Australia, with education-related spending totalling 14.9 billion Australian dollars. This spending supports the local economy by creating jobs and stimulating economic activity in sectors such as accommodation, food and entertainment. About 1 million Australian dollars of economic activity is produced in other sectors in Australia for every three foreign students enrolled in institutions in Australia (International Education Association of Australia, 2020). Aside from paying their tuition fees, international students use cafes, public transport, restaurants, and the theatres. Their presence in Australia also engenders their family and friends to subsequently visit as tourists. For instance, one out of seven

tourists in the Visiting Friends and Relatives (VFR) classification in the country are visiting a relative studying or a student in 2018 (International Education Association of Australia, 2020).

The aim of this paper is to make four contributions to the literature on the economic impact of educational tourism. First, we have examined the impact educational tourism in Australia for the period 1976–2020. This is an aspect that has been under-researched in the literature. Second, we have not only used educational tourism arrivals but also educational tourism receipts as proxies for tourism development. Third, we add a theoretical layer to the discussion, expanding the understanding of the relationship between educational tourism development and economic growth using the neoclassical growth model framework. This also provides the opportunity to test the tourism-led hypothesis using educational tourism receipts, which has not been done in the previous papers. Fourth, a new Dynamic Autoregressive Distributed Lag (DARDL) technique has been employed to examine the educational tourism–economic growth nexus. The usage of the DARDL approach facilitates the extraction of the dynamic impact of educational tourism shocks on the economy, therefore might assist to project the potential trajectory of economic growth aftermath of an educational tourism (arrivals or receipts) shock.

The next section (Section 2) examines previous research on the relationship between the observed variables. The third section introduces the data, variables and research methodologies used in this study. Section 4 presents the findings from the data analysis, while Section 5 includes conclusion and policy recommendations.

2. Literature review

2.1. Educational tourism and GDP

In recent years, educational tourism has emerged as a significant form of travel, with various authors providing different definitions for it. For instance, Lau et al. (2023) define educational tourism as travel undertaken with the purpose of acquiring educational learning, such as gaining historical and sociocultural knowledge or learning a new language. Similarly, El Shamy and Ahmed (2024) define it as a novel form of tourism, serving as a means for ongoing education, conducting research and gaining knowledge. Educational tourism has been found to have a positive impact on the economy of the destination countries.

Education tourism expenditure refers to the expenses incurred by international students who travel to study in another country. This includes tuition fees, living expenses such as accommodation, food and transportation, as well as other related costs such as insurance and textbooks. Studies have shown that there is a bidirectional relationship between educational tourism and economic growth (e.g. Soyer et al., 2020). On the one hand, several studies have investigated the relationship between educational tourism expenditure and economic growth. One such study conducted by Wang and Li (2008) examined the impact of educational tourism on economic growth in China. The study found that educational tourism expenditure had a positive impact on economic growth, as it increased the demand for goods and services in the tourism industry. Similarly, a study conducted by Matahir and Tang (2017) examined the relationship between educational tourism and economic growth in Malaysia. The study found that number of international students enrolled in Malaysia's tertiary institutions had a positive impact on economic growth, as it generated employment opportunities and increased the demand for goods and services. Moreover, Hussein et al. (2021) found that educational tourism had a positive impact on China's economic growth, as it increased the revenue generated from the tourism industry.

On the other hand, as the economy of a country grows, the standard of living of its citizens improves, and people have more disposable income to spend on travel and tourism, including educational tourism. According to the World Tourism Organization (UNWTO), the number of international tourists has been steadily increasing over the years, with educational tourism being a significant segment. In 2019, 1.5 billion international tourists travelled around the world, and

approximately 11% of these travellers participated in educational tourism activities (UNWTO, 2020). Countries with higher economic growth tend to attract more educational tourists due to the availability of resources to invest in educational tourism infrastructure and programs. For instance, countries such as the United States, the United Kingdom and Australia have established a reputation for providing high-quality education, attracting students from different parts of the world (Abbas et al., 2021). In addition, economic growth also promotes the growth of the education sector, leading to the development of new programs and courses that attract international students. This will result in a significant increase in the number of students traveling to different countries to pursue higher education. Furthermore, economic growth has also enabled the development of advanced technologies (Tang, 2020) that have facilitated the growth of distance learning and online education, providing opportunities for international students to access education from anywhere in the world.

2.2. Labour and GDP

Labour is a critical factor in economic growth. Labour refers to the workforce, which includes both skilled and unskilled workers, and is a critical factor in economic growth, and its role in the production process cannot be overstated. The relationship between labour and economic growth is not unilateral. The availability of labour and the demand for labour are key factors that determine employment levels in each economy. One of the most influential theories on the relationship between labour and economic growth is the Solow–Swan model (Solow, 1956; Swan, 1956). This model argues that economic growth is driven by three main factors: capital accumulation, technological progress and labour input. According to this model, an increase in the quantity and quality of labour inputs can lead to higher levels of economic output, all else being equal. This is because a larger labour force can increase the production of goods and services, while a more skilled labour force can lead to greater efficiency and productivity. Empirical evidence supports the Solow–Swan model's predictions, showing that countries with larger and more educated labour forces tend to have higher levels of economic growth (Habibi & Zabardast, 2020; Hanushek & Woessmann, 2020).

The relationship between labour and economic growth can be influenced by various factors, one of which is the quality of the workforce. While an increase in the quantity of labour can lead to higher levels of economic output, the quality of labour is also important (Lamadon et al., 2019). For example, a larger labour force may not necessarily lead to higher levels of economic growth if the workforce lacks the necessary skills and education to perform efficiently. In addition, technological progress can lead to labour-saving innovations, reducing the need for labour inputs and potentially slowing down economic growth (Korinek et al., 2021). Another important factor to consider is the institutional environment. Labour market institutions, such as minimum wage laws and labour unions, can affect the relationship between labour and economic growth (Obadić et al., 2023). For example, minimum wage laws can increase labour costs for firms, potentially reducing their incentives to hire workers and invest in capital. On the other hand, labour unions can negotiate higher wages and better working conditions for their members, which can lead to increased productivity and output. Finally, the relationship between labour and economic growth is also influenced by demographic factors, such as population growth and aging (Munir & Shahid, 2021). An aging population can lead to a decrease in the size of the labour force, potentially reducing economic growth, while population growth can lead to increased demand for goods and services, driving economic growth.

Several studies have investigated the bidirectional relationship between labour and economic growth. Kebede (2020) found that employment has a positive effect on economic growth, as it increases labour productivity, enhances human capital and promotes technological progress (Maharani & Isnawati, 2014). Furthermore, labour productivity can also affect economic growth by increasing efficiency, reducing costs and improving competitiveness. However, economic growth can also affect employment by creating new job opportunities and increasing demand for labour (Korkmaz & Korkmaz, 2017). A study conducted by Thaddeus et al. (2022) examined the role of female labour

force participation on economic growth in Sub-Saharan Africa. The study found a unidirectional causality from economic growth to labour force participation. This is because that economic growth can increase labour productivity by creating new industries, improving technology and increasing demand for skilled labour. Furthermore, a study conducted by Sultana et al. (2022) examined the relationship between economic growth and informal employment in developing countries. The study found that economic growth can reduce informal employment by creating formal job opportunities and improving working conditions. However, informal employment can also affect economic growth by increasing labour market flexibility, reducing costs and improving competitiveness.

2.3. Export and GDP

Export is a crucial component of economic growth as it can generate foreign exchange, create jobs and increase economic activity. The export-led growth hypothesis (ELGH) is a well-established theory that suggests that exporting goods and services can be a key driver of economic growth. The idea is that exporting can increase a country's income by providing access to new markets, generating foreign exchange earnings, and promoting innovation and productivity improvements.

Several recent studies have investigated the export-led growth hypothesis, with numerous empirical studies providing evidence of a positive relationship between exports and economic growth. For instance, using the Modified Wald (MWALD) causality tests, Tang et al. (2015) investigated ELGH in four Asian countries. The ELGH was validated, however, the authors highlighted that it was unstable for all four economies. Also the ELGH was investigated for the Gulf Cooperation Council (GCC) countries by Kalaitzi and Chamberlain (2020). The ELGH was valid for UAE and Bahrain in the short run and long run respectively. While several other studies have validated the ELGH, the ELGH has been invalidated in other studies. For instance, in nine MENA countries, Abu-Qarn and Abu-Bader (2004) investigated the relationship between exports and economic growth. Findings from the empirical study indicated that the ELGH is invalid in most of the nations under study when aggregate exports are considered. Similar findings have been confirmed in Afzal et al. (2009) in Pakistan, among others.

Various empirical analyses have found connections between trade openness, measured by exports as a percentage of GDP, and several economic indicators like R&D spending, innovation capacity, ICT adoption, GDP per capita and the Global Competitiveness Index (GCI) across different nations (Marčeta & Bojnec, 2023). Furthermore, research suggests that the growth in exports, especially when multiplied by the export share in GDP, can effectively capture how exports influence GDP growth rates, underscoring their significance in driving economic expansion (Dao, 2018). Additionally, the relationship between exports and GDP has been studied within different sectors, such as agriculture and services. For example, studies have shown a positive correlation between agricultural exports and economic growth in various countries (Solanki et al., 2022). Similarly, there is substantial evidence indicating a strong positive correlation between the expansion of service exports and both GDP growth and GDP per capita (Prohorovs & Solesvik, 2018).

2.4. Capital and GDP

Capital accumulation is a crucial factor for economic growth as it helps to increase productivity, create employment opportunities and boost economic activity (Topcu et al., 2020). Capital accumulation refers to the process of increasing the stock of physical, human and financial capital in an economy (Dean et al., 2020). Physical capital includes machinery, equipment and infrastructure, while human capital refers to the knowledge, skills and education of the workforce. Financial capital refers to the funds available for investment in physical and human capital (Awan, 2021). Studies have examined the relationship between specific types of capital and economic growth. For example, research has shown that investment in human capital, such as education and training,

can lead to higher productivity and economic growth (Čadil et al., 2014). Similarly, investment in physical capital, such as infrastructure and equipment, can increase productivity and output, leading to economic growth (Garzarelli & Limam, 2019; Pomi et al., 2021). Several studies have investigated the relationship between capital and economic growth in different context. For instance, Olusanya (2012) found that capital, labour and energy consumption have a positive impact on economic growth in Nigeria, while Shahbaz et al. (2011) found a positive but insignificant relationship between capital and economic growth in Portugal. However, Shahbaz and Lean (2012) found a positive relationship between capital and economic growth in China, while Noor and Siddiqi (2010) found a positive and significant relationship between growth capital and economic growth in five countries in south Asia, but Narayan and Smyth (2008) observed that capital and energy use had a long-term positive impact on economic growth in G7 countries.

Several factors can influence the effectiveness of capital accumulation in promoting economic growth. For example, the quality of institutions, such as property rights and the rule of law, can affect the productivity of capital (Dima et al., 2018; Iqbal Hussain et al., 2021). Similarly, macroeconomic stability and the availability of credit can influence the ability of firms to invest in capital (Azofra et al., 2020; Ehigiamusoe & Samsurijan, 2021). The protection of property rights is essential to encourage investment and economic growth.

3. Methodology

3.1. Theoretical model

The theoretical framework of this study is anchored on the Solow (1956) and Swan (1956) growth models, which is based on the Cobb–Douglas production function. Accordingly, we used the model to estimate the nexus between education tourism and economic growth. Following the Cobb–Douglas production function with labour-augmenting technology, the Solow growth model expressed output (Y) as a function of capital stock (K) and labour (L) and labour-augmenting factors including technological advancement and economic efficiency (A). The model is represented mathematically as follows:

$$Y_t = K_t^\alpha (A_t L_t)^\beta \quad (1)$$

where $\alpha < 1$ and $\beta = (1 - \alpha)$ denote the marginal products of capital and labour respectively. The labour L_t and the labour-augmenting factor can be expressed further as

$$L_t = L_0 e^{n \cdot t} \quad (2)$$

$$A_t = A_0 e^{g \cdot t} Z_t^{\pi_i} \quad (3)$$

Equation (2) shows that labour (L_t) depends on its exogenous growth rate (n) and the initial stock of labour (L_0). However, Equation (3) shows that the technological advancement does not only depend on its exogenous growth rate (g) initial level of technology (A_0) but also other factors (Z_t) such as education tourism (ETOUR) and exports (EXP). Thus in this study $A_t = A_0 e^{g \cdot t} \text{ETOUR}_t \text{EXP}_t$

Expressing in units per labour form, Equation (1) becomes

$$y_t = A_t k_t^\alpha \quad (4)$$

where $y_t = \frac{Y_t}{L_t}$ and $k_t = \frac{K_t}{L_t}$ denote output per labour and capital per labour respectively. The accumulation of capital is a crucial component of the growth model. The dynamics of the stock of capital, derived from Equations (1) to (4), can be expressed as follows:

$$\dot{k}_t = s k_t^\alpha - (n + g + \delta) k_t \quad (5)$$

In Equation (5), the depreciation of capital is denoted by δ , $\dot{k}_t$ represents the growth of capital over

time. At steady state (where $\dot{k}_t = 0$), the capital per labour and output per labour are expressed in Equations (6) and (7) while the balanced growth path is presented in Equation (8).

$$k^* = \left[\frac{s}{(n + g + \delta)} \right]^{\frac{1}{1-\alpha}} \quad (6)$$

$$y^* = \left[\frac{s}{(n + g + \delta)} \right]^{\frac{1}{1-\alpha}} \quad (7)$$

Substituting for k in Equation (4) gives

$$y_t = A_t \left[\frac{s}{(n + g + \delta)} \right]^{\frac{1}{1-\alpha}} \quad (8)$$

We substitute $A_t = A_0 e^{g \cdot t}$ ETOUR_t EXP_t into Equation (8) and take the natural logarithm to expand Equation (8) as follows:

$$\ln y_t = \ln A_0 + gT_t + \pi_1 \ln \text{EXP}_t + \pi_2 \ln \text{ETOUR}_t + \frac{1}{1-\alpha} \ln k_t + \frac{1}{1-\alpha} \ln (n + g + \delta)_t \quad (9)$$

Equation (9) provides the basic theoretical model for the model specification in this study. Therefore, given $\ln A_0 = \beta_0 + \varepsilon_t$, we specify the empirical model without trend in Equation (10) as follows:

$$\ln \text{GDP}_t = \beta_0 + \beta_1 \ln \text{CAP}_t + \beta_2 \ln \text{EXP}_t + \beta_3 \ln \text{ETOUR}_t + \beta_4 (n + g + \delta)_t + \varepsilon_t \quad (10)$$

where GDP, CAP, EXP and ETOUR represent the real GDP, real capital stock, real exports and educational tourism. The $(n + g + \delta)_t$, which is represented by population growth rate plus 5%, is not logged because the growth rates are measured in percentages. The use of 5% is based on the work of Mankiw et al. (1992) that assumed that technology growth is 2% and depreciation is 3%.

3.2. Data

The data for GDP (which is the gross domestic product per capita (constant, 2010 US\$)), capital stock (which is the gross fixed capital formation per capita (constant 2010 US\$)), exports (which is the net exports of goods and service (after removing tourism receipts) per capita (constant 2010 US\$)) and population growth rate (based on the total number of people living in the country) have been retrieved from World Bank (2023), while the data for education tourism arrivals (number of arrivals for educational tourism) has been retrieved from the Australian Bureau of Statistics (2023). The data for educational tourism receipts, which is the total spending by education visitors per capita (constant, 2010 US\$), has been generated from Tourism Research Australia (2022). The data is available in Tourism Research Australia (2022) in Australia dollar and not in per capita form. The exchange rate used to convert the series into US\$ has been generated from the World Bank (2023). The population series used to transform the series into per capita form has been obtained from World Bank (2023). The data for educational tourism receipts is available on a yearly basis from 2010. To have enough observations for the analysis involving educational tourism receipts, we converted the series into a quarterly series. For the quarterly data analysis, which is for the 2010:1 to 2019:4 period, the annual data have been converted into quarterly using the approach of Gandolfo (1981). The method was used because of its desirable properties compared to other interpolation methods. First, it is based on quadratic algorithm and nonparametric procedures. Second, it is applicable to both stock and flow variables. To actualise the study objective in Equation (1). Subsequently, the present study partially accounts for the impact of real export and other explanatory variables on economic growth in the baseline regression. This is to enable a holistic view on the theme for onward policy formulation.

3.3. Unit root (stationarity) tests

The econometric procedure in this study started with unit root analysis. Time series variables are often trended and hence non-stationary. The ordinary least square regression analysis of non-stationary variables produces spurious estimates. It is pertinent to evaluate the stationary characteristics of the variables under consideration. To check the stationarity attributes of the variables used in this study, we used Augmented Dickey-Fuller or ADF, Phillips-Perron or PP and Kwiatkowski, Phillips, Schmidt, Shin or KPSS unit root tests. These tests are used to ensure the robustness of the order of integration of the variables.

3.4. Estimation techniques

The DARDL model is applied for estimation of the models in this study. This technique was developed to remedy the defects of the conventional ARDL, which include the complexity of specification – multiple lags, first differences and lagged difference (Jordan & Philips, 2018). The model has numerous advantages. It has desirable properties of simulating a variety of ARDL models, provides alternative hypothesis testing of model coefficients via counterfactual scenarios, and automatically simulates and plots, and predict counterfactual changes or responses in one variable to shocks in another variable. We used the DARDL to exploit its desirable features and numerous advantages. Accordingly, the general form of the DARDL is specified as follows:

$$\begin{aligned}\Delta(y)_t = & \vartheta_0 + \gamma_0(y)_{t-1} + \gamma_1(x_1)_{t-1} + \cdots \gamma_k(x_k)_{t-1} \\ & + \sum_{i=1}^p \alpha_i \Delta(y)_{t-i} + \sum_{j=0}^{q_1} \beta_{1j} \Delta(x_1)_{t-j} \\ & + \cdots \sum_{j=0}^{q_k} \beta_{kj} \Delta(x_k)_{t-j} + \varepsilon_t\end{aligned}\quad (13)$$

In Equation (13), Δ symbolises the first difference operator, which plays the role of removing auto-correlation (Philips, 2018), y is the dependent variable, x is independent variable while p and q respectively denote the maximum lags of the dependent and independent variables and stochastic error term is represented by ε . We domesticated Equation (13) to specify the empirical model of this study based on the framework of the DARDL as follows:

$$\begin{aligned}\Delta(\ln \text{GDP})_t = & \vartheta_0 + \gamma_0(\ln \text{GDP})_{t-1} + \gamma_1 \ln \text{EXP}_{t-1} \\ & + \gamma_2 \ln \text{ETOUR}_{t-1} + \gamma_3(n + g + \delta)_{t-1} \\ & + \sum_{i=1}^p \alpha_i \Delta(\ln \text{GDP})_{t-i} + \sum_{j=0}^{q_1} \beta_{1j} \Delta(\ln \text{EXP})_{t-j} \\ & + \sum_{j=0}^{q_1} \beta_{1j} \Delta(\ln \text{ETOUR})_{t-j} \\ & + \sum_{j=0}^{q_1} \beta_{1j} \Delta(n + g + \delta)_{t-j} + \varepsilon_t\end{aligned}\quad (14)$$

Equation (14) represents a model in which real GDP is the dependent variable.

4. Empirical results and discussion

This section focuses on the empirical results and discussion of the theme under consideration. Table 1 highlights the preliminary analysis that outlines the summary statistics that comprises of measure of central tendencies and measures of dispersion of the variables under review to give a glimpse into

the study variables. The basic moments of the series show all series are positively skewed and normally distributed. Although correlation analysis is insightful but not sufficient to establish a claim. Thus the need for further econometrics estimators' examination.

Furthermore, to avoid the pit fall of spurious analysis and by extension misleading inferences, it is worthwhile to explore the stationarity or unit root properties of the outlined study variables with the Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) Unit root test and stationarity test of KPSS. First, the current study fitted three baseline models namely with constant, with constant and trend, and model without constant and trend (which is a more restricted version of previous two). The present study applies multiple models to avoid spurious regression. The ADF and PP unit root test both hold a null hypothesis against its alternative of stationary, while its counterpart KPSS holds reverse hypotheses. The ADF and PP outlines for all variables, inclusive of educational tourism arrivals and educational tourism receipts, are non-stationary at level form. However, real exports and population growth for model with constant and with trend are stationary at level but for more restricted model without constant and trend fails to reject the null hypothesis. Furthermore, similar trend occurs for PP unit root test estimator. The plausible explanation could be due to the data asymptotic. The mixed results necessitate the need for a stationary test such as the KPSS with reverse hypotheses for both the yearly and extrapolated quarterly dataset. The confirmatory test affirms the position of unit root stationary. In summary, the stationarity test study outlined in [Table 2](#) demonstrates that with the use of any of the unit root tests (while considering different variants of each test used such as with constant, with constant & trend, or without constant & trend model), there is evidence that all variables are of mixed integration orders, i.e. $I(0)$ and $I(1)$. Therefore, we have also proceeded with the results of a unit root test that allows for a structural break. Specifically, we have used the unit root test of Vogelsang and Perron (1998) and the null of the test is the presence of unit root. The results which are reported in [Table 3](#) suggest that there is evidence that all variables are of mixed integration orders (i.e. $I(0)$ and $I(1)$), when either with constant, or with constant & trend model is considered. There are several structural breaks, which indicate that several events have affected the variables under observation at different periods. This position qualifies for the adoption of the DARDL method. However, prior to baseline regression there is need to explore the cointegration traits of the variable to see if there is a convergence among the variables in the long run. We have been able to establish long-run equilibrium relationship between the variables under consideration with the ARDL bounds test for cointegration as outlined in [Table 4](#). This is because the F-statistic is greater than the upper bound statistics in all cases.

Furthermore, the results are illustrated in [Tables 5](#) and [6](#), which have leverage on the DARDL methodology which simultaneously to explore short- and long-run dynamics on the nexus between educational tourism and economic growth for Australia. [Table 5](#) demonstrates the impact of educational tourism on economic growth on a yearly basis for the 1976–2020 period. Educational tourism arrivals series has been used as a proxy for educational tourism development in neoclassical framework that accommodate capital stock accumulation, population growth that capture depreciation, and export. To have a robustness analysis, we considered two model – without export and with export models. The short run analysis shows that educational tourism has a positive and significant impact on economic growth for model with and without export dynamics for the case of Australia. This result resonates with the finding of Matahir and Tang (2017) for the case of Malaysia which demonstrate the pertinent role of educational tourism to drive economic growth in Malaysia. Similar outcomes are corroborated in the study of Tang (2020) for a balanced panel study of 61 countries using a threshold regression. Furthermore, capital accumulation exert a positive and significant relationship on economic growth. Additional results also demonstrated that export drives economic growth in Australia. This result affirms the capital and export which can play important role in improving economic growth of Australia. These results align with the proposition of the neoclassical growth hypotheses. The results further suggest that an increase in population growth dampens economic growth in Australia.

Table 1. Summary statistics of the variables.

Statistics	Yearly					Quarterly				
	GDP	ETOUR	CAP	EXP	NGD	GDP	ETOUR	CAP	EXP	NGD
Mean	42266.62	193663.3	9625.271	6459.133	6.365782	12480.61	1364.484	3327.645	2140.052	1.500865
Median	41555.90	143510.0	8863.650	5883.360	6.319790	13737.15	1302.725	3551.950	2352.540	1.642095
Maximum	57183.40	620420.0	15973.40	11096.50	7.061050	18701.70	2879.280	5205.080	3578.310	2.198210
Minimum	27944.20	10280.00	4602.430	3391.370	5.624680	3259.970	265.8690	851.1730	482.0560	0.396997
Std. Dev.	9884.673	177864.1	3682.737	2351.645	0.280042	5237.507	729.6753	1402.481	923.5862	0.628424
Skewness	0.077250	0.797058	0.301239	0.308678	0.188103	-0.865797	0.233390	-0.836116	-0.732057	-0.893664
Kurtosis	1.509915	2.614567	1.558139	1.778205	3.298652	2.404547	2.248043	2.391085	2.339146	2.411446
Jarque-Bera	4.207917	5.043304	4.578642	3.513584	0.432607	5.588298	1.305538	5.278563	4.300598	5.901560
Probability	0.121973	0.080327	0.101335	0.172598	0.805491	0.061167	0.520602	0.071413	0.116449	0.052299
Observations	45	45	45	45	45	40	40	40	40	40

**Table 2.** Unit root tests without breaks.

PP At Level	Yearly data					Quarterly data				
	LNGDP	LNTOUR	LNCAPI	LNEXP	NGD	LNGDP	LNTOUR	LNCAPI	LNEXP	NGD
With Constant	-1.2440	-1.8583	-1.5003	-0.3581	-4.3972***	-16.4115***	-7.2184***	-11.5148***	-9.7797***	-13.9880***
With Constant & Trend	-0.6486	1.3475	-1.1903	-3.2597*	-4.5085***	-16.0933***	-9.6863***	-17.8166***	-9.6113***	-18.1790***
Without Constant & Trend	6.7422	1.5902	2.5251	3.8247	0.3839	0.0609	0.2147	-0.0224	0.0417	-2.5983**
At First Difference	d(LNGDP)	d(LNETOUR)	d(LNCAPI)	d(LNEXP)	d(NGD)	d(LNGDP)	d(LNETOUR)	d(LNCAPI)	d(LNEXP)	d(NGD)
With Constant	-5.2403***	-1.1733	-5.0438***	-6.9756***	-20.3343***	-23.7683***	-26.4513***	-24.0349***	-28.0121***	-32.0424***
With Constant & Trend	-5.2824***	-1.4794	-5.1519***	-6.8263***	-21.7181***	-23.4957***	-26.9423***	-23.6338***	-23.5096***	-31.7011***
Without Constant & Trend	-3.2059***	-1.4415	-4.5443***	-5.7700***	-19.0098***	-24.1219***	-26.3223***	-24.2842***	-28.4196***	-32.3991***
ADF At Level	LNGDP	LNTOUR	LNCAPI	LNEXP	NGD	LNGDP	LNTOUR	LNCAPI	LNEXP	NGD
With Constant	-1.2924	-1.9028	-1.5193	-0.6403	-4.3972***	-3.6081**	0.0804	-5.8427***	-2.8637*	-1.1749
With Constant & Trend	-0.4503	1.0722	-1.5081	-3.1499	-4.5085***	-3.2901*	-1.5997	-2.7254	-2.4051	-1.3365
Without Constant & Trend	3.6321	-0.1913	2.7326	2.0707	0.1881	-0.6409	0.8352	-0.9985	-0.5589	-0.9925
At First Difference	d(LNGDP)	d(LNETOUR)	d(LNCAPI)	d(LNEXP)	d(NGD)	d(LNGDP)	d(LNETOUR)	d(LNCAPI)	d(LNEXP)	d(NGD)
With Constant	-5.2596***	-0.9659	-5.1311***	-5.5182***	-7.8798***	-28.3560***	-4.7135***	-4.1044***	-5.2220***	-3.7302***
With Constant & Trend	-5.3476***	-1.3921	-5.2689***	-5.4603***	-7.8092***	-29.0076***	-5.5262***	-4.4276***	-6.6789***	-4.1221***
Without Constant & Trend	-3.3121***	-1.3072	-4.5871***	-5.7700***	-7.9710***	-3.8891	-4.6628	-3.9965	-5.2600	-3.6742
KPSS At Level	LNGDP	LNTOUR	LNCAPI	LNEXP	NGD	LNGDP	LNTOUR	LNCAPI	LNEXP	NGD
With Constant	0.8480***	0.8145***	0.8216***	0.8476***	0.2826***	0.1588	0.3600*	0.3410	0.1694	0.2336
With Constant & Trend	0.1283*	0.2191***	0.0969	0.0967	0.1114	0.1291*	0.1388*	0.1201*	0.1480**	0.1288*
At First Difference	d(LNGDP)	d(LNETOUR)	d(LNCAPI)	d(LNEXP)	d(NGD)	d(LNGDP)	d(LNETOUR)	d(LNCAPI)	d(LNEXP)	d(NGD)
With Constant	0.2618	0.5047**	0.2155	0.1161	0.4886**	0.1447	0.1481	0.1388	0.1625	0.1412
With Constant & Trend	0.1499**	0.1156	0.1241*	0.1160	0.4497***	0.1146	0.1113	0.1161	0.1155	0.1090

Note: Phillips-Perron (PP), Augmented Dickey-Fuller (ADF), Kwiatkowski-Phillips-Schmidt-Shin (KPSS), *, ** and *** denote 10%, 5% and 1% level of significance respectively.

Table 3. Unit root test with a break.

At Level	Yearly data				Quarterly data			
	LNGDP	LNETOURL	LNEXP	NGD	LNGDP	LNETOURL	LNEXP	NGD
With Constant	-3.5297 (0.3706)	-2.9053 (1986)	-1.6696 (1986)	-6.1477*** (2007)	-9.2552*** (2011Q2)	-7.0078*** (2010Q4)	-9.1096*** (2011Q2)	-9.7693*** (2011Q2)
With Constant & Trend	-2.8800 (2011)	-2.3608 (2005)	-5.0654** (2005)	-6.4736*** (2007)	-20.0031*** (2012Q2)	-8.8121*** (2011Q2)	-8.9574*** (2011Q2)	-9.820*** (2011Q3)
At First Difference	d(LNGDP)	d(LNETOURL)	d(LNEXP)	d(NGD)	d(LNGDP)	d(LNETOURL)	d(LNEXP)	d(NGD)
With Constant	-5.9885*** (1983)	-4.3426* (2019)	-6.5329*** (1981)	-8.4389*** (1981)	-49.2863** (2012Q2)	-28.3321*** (2013Q1)	-29.3500*** (2016Q1)	-28.5957*** (2011Q2)
With Constant & Trend	-6.8176*** (1983)	-4.4258 (2018)	-6.9958*** (2011)	-8.3228*** (1983)	-48.5964*** (2012Q3)	-27.8923*** (2017Q2)	-11.2800*** (2011Q3)	-28.2898*** (2018Q1)

Note: We have used Akaike Information Criterion (AIC) to select the appropriate lags in the estimation process after setting the maximum lag at 4. The critical values provided in Vogelsang (1993) have been used.

Table 4. Results of the cointegration test.

Model specification	Bounds tests F-Statistics	Lags	Cointegration
<i>Yearly data</i>			
Lngdp = f(Inetour Incap ngd)	8.39***	4, 2, 4, 2	Yes
Lngdp = f(Inetour Incap Inexp ngd)	14.53***	4, 2, 4, 0, 2	Yes
<i>Quarterly data</i>			
Lngdp = f(Inetour Incap ngd)	8.03***	3, 1, 4, 3	Yes
Lngdp = f(Inetour Incap Inexp ngd)	6.12***	4, 4, 4, 4, 4	Yes

We have used AIC to select the appropriate lags in the estimation process after setting the maximum lag at 4.

The critical values provided in Narayan (2005) have been used. We have used the restricted intercept and no trend model.

Table 5. Dynamic simulated ARDL estimates of the impact of education tourism on economic growth (yearly data).

Independent variables	Dependent variable: Real GDP per capita (log)	
	(1) Without export	(2) With export
<i>Short-run estimates</i>		
L1_Lngdp	−0.1294* (−1.7781)	−0.1601* (−1.8443)
D_Inetour	0.01819** (2.5847)	0.01435* (1.9795)
D_Incap	0.1813*** (6.5158)	0.1926*** (6.2956)
D_Inexp		0.04025* (1.9751)
D_ngd	−0.01179* (−1.8836)	−0.01000 (−1.6150)
<i>Long-run estimates</i>		
L1_Inetour	0.01266* (1.7190)	0.01356* (1.8842)
L1_Incap	0.04090 (1.4662)	0.04809* (1.7135)
L1_Inexp		0.007999 (0.3466)
L1_ngd	−0.01994** (−2.4844)	−0.01631* (−2.0021)
Constant	0.9933* (1.9810)	1.1503** (2.0675)
<i>Diagnostic statistics</i>		
Observations	44	44
R-squared	0.716	0.746
Jarque-Bera Normality test	1.1108 [0.5738]	0.7129 [0.7001]
BG Serial Correlation LM Test	0.214509 [0.8080]	0.179658 [0.8363]
Heteroscedasticity test	0.974572 [0.4457]	1.880778 [0.1017]
Ramsey RESET Stability test	1.209495 [0.2785]	1.603110 [0.1182]

(), [], *, ** and *** denote standard errors, *P*-values, 10%, 5% and 1% level of significance respectively.

In the context of long-term dynamics, it is noteworthy that capital stock exerts a positive influence on GDP per capita. This observation is substantiated by the coefficient of 0.048, as ascertained through the model incorporating exports. The proposition posits that an increase in capital yields a concomitant increase in GDP per capita over the study period. The present outcome is of utmost importance to government administrators in the study area. In the realm of educational tourism, a parallel result is observed wherein the positive influence on GDP per capita is evident. This is substantiated by the coefficients of 0.01266% and 0.01356% in the models devoid of and inclusive of exports, respectively. The results posits that a surge in educational tourism within Australia engenders a commensurate escalation in the country's GDP per capita over the study period. Moreover, it is worth noting that over the study period, population growth exhibits a discernible

Table 6. Dynamic simulated ARDL estimates of the impact of education tourism on economic growth (quarterly data).

Independent variables	Dependent variable: Real GDP per capita (log)	
	(1) Without export	(2) With export
<i>Short-run estimates</i>		
L1_Ingdp	−0.2008* (−1.9720)	−0.1600 (−1.6811)
D_Inetour (receipts)	0.1913*** (5.3465)	0.1490*** (4.6228)
D_Incap	0.7528*** (13.522)	0.6512*** (12.177)
D_Inexp		0.1746*** (4.3068)
D_ngd	0.06175 (1.4727)	0.02852 (0.8265)
<i>Long-run estimates</i>		
L1_ Inetour (receipts)	0.04435** (2.2370)	0.03034* (1.8068)
L1_Incap	0.1439* (1.9546)	0.1334** (2.1035)
L1_Inexp		0.004384 (0.1971)
L1_ngd	0.02699 (0.6235)	−0.001588 (−0.04482)
Constant	0.3654 (1.1003)	0.1789 (0.6425)
<i>Diagnostic statistics</i>		
Observations	39	39
R-squared	0.9998	0.9998
Jarque-Bera Normality test	0.1834 [0.9124]	1.5514 [0.4604]
BG Serial Correlation LM Test	0.311639 [0.7363]	0.313066 [0.7398]
Heteroscedasticity test	0.587196 [0.8567]	1.467288 [0.2687]
Ramsey RESET Stability test	1.146600 [0.2603]	1.059955 [0.2979]

(), [], *, ** and *** denote standard errors, *P*-values, 10%, 5% and 1% level of significance respectively.

inverse statistical correlation with both economic growth models, namely those with export and those without export. This proposition posits that the growth of Australia's population manifests deleterious consequences on its economic growth. The models exhibit commendable robustness and appropriateness for the purpose of policy crafting, as the explanatory variables effectively account for a substantial proportion of approximately 71.6% and 74.6% of the observed variation as indicated by the R-square value in the models without and with exports respectively. Also, the diagnostic tests results indicate the absence of serial correlation and heteroscedasticity in all the models. In summary, the present study is supported by empirical data, that the phenomena of educational tourism, capital stock accumulation and export exert a favourable influence on the economic growth of Australia both in the short- and long-run periods of the study.

Further exploration is undertaken to delve into the theme at hand by utilising quarterly data for the 2010:1 to 2019:4 period with the aim of determining whether educational tourism receipts have any impact on economic growth in Table 6. The empirical findings from short-run estimations reveal a noteworthy and statistically robust association between educational tourism receipts and corresponding economic growth. The findings posit that a surge in receipts from educational tourism exhibits a positive correlation with heightened levels of economic growth as evidenced by the data presented in Table 5. The findings presented herein align with the scholarly study of Matahir and Tang (2017). It is noteworthy to acknowledge that economic growth is subject to the influence of population growth and capital stock accumulation, both of which manifest as constructive and statistically significant factors. The long-term estimations exhibit analogous trends, wherein

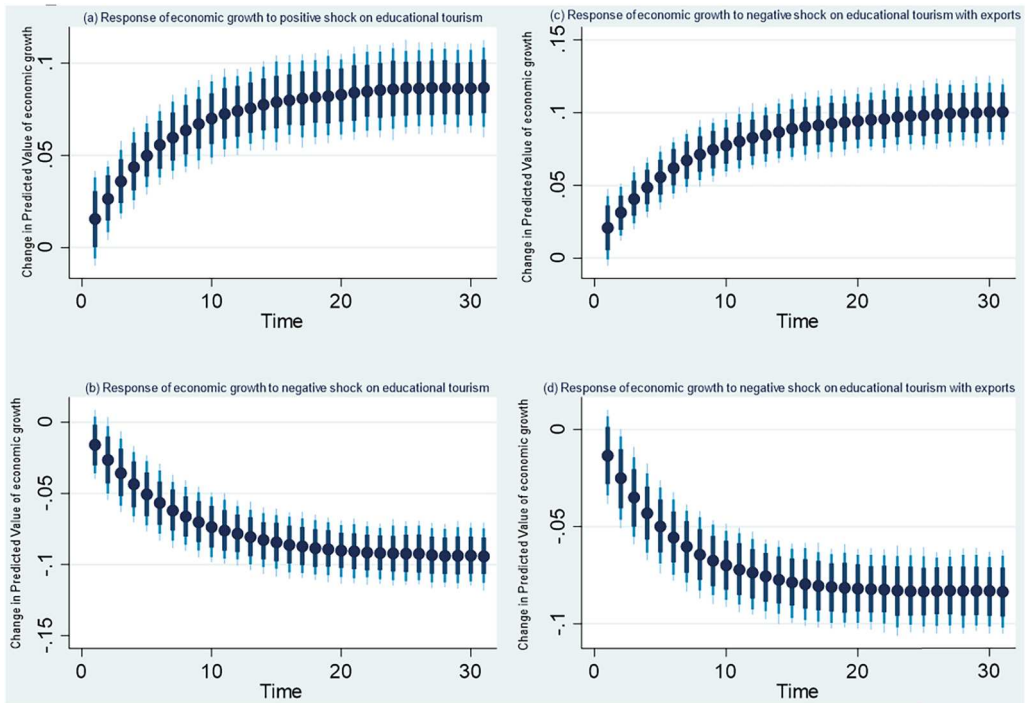


Figure 1. Yearly response of economic growth to shocks on education tourism.

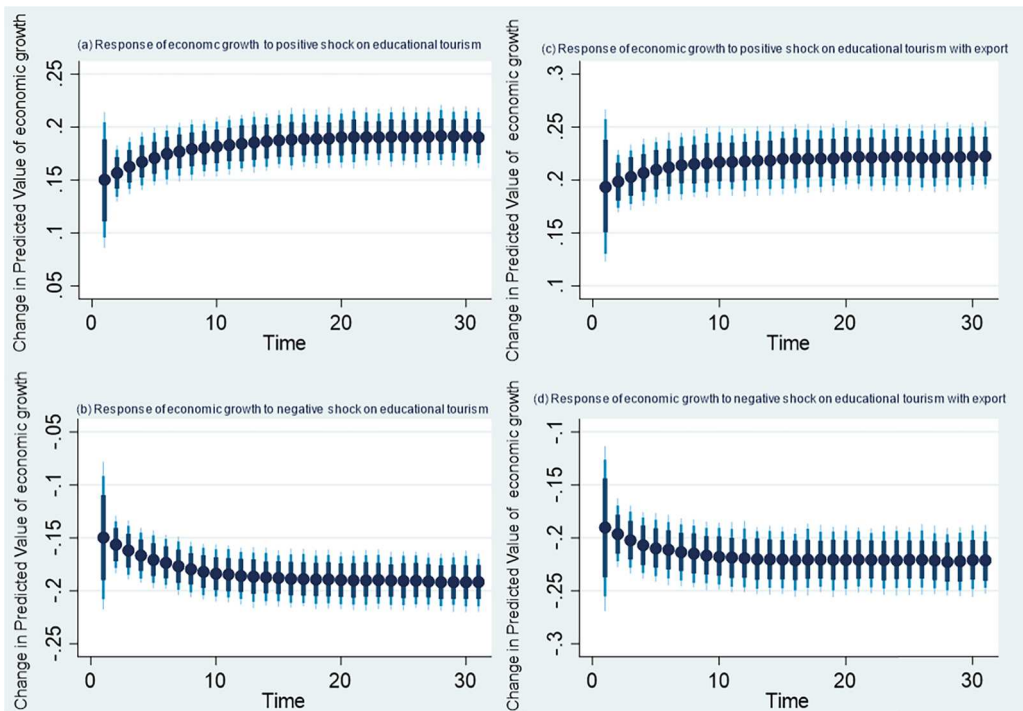


Figure 2. Quarterly response of economic growth to shocks on education tourism.

the delayed influx of educational tourism expenditures manifests a favourable influence on the trajectory of economic advancement. The results are not surprising given that international education accounts for two-thirds of the tourism spend in Australia (Financial Review, 2023). Moreover, influx of international students for educational purposes has trickle-down effect on economic growth housing demands and transportation.

Further sensitivity analysis on the study theme is outlined by the simulated impulse response graphs of DARDL model have been demonstrated in Figures 1 and 2 based on the empirical models fitted for the present study. In Figures 1 and 2, the change in the forecasted values was similar and the effect of the explanatory on the explained variable in the baseline regression was also similar. In Figure 1, it demonstrated that economic growth responds positively to shock on educational tourism arrivals. Similar results are obtained when the tourism development is represented with educational tourism receipts in Figure 2, where positive shocks in educational tourism receipts induce positive response of economic growth in both short run and long run. This implies that increase in educational tourism receipts stimulates economic growth.

5. Conclusion and policy recommendation

The objective of this paper is to investigate the impact of educational tourism development on the economy of Australia. The main deviation of this paper is that we have used two proxies of educational tourism development – educational tourism arrivals and educational tourism receipts. The few papers such as studies of Matahir and Tang (2017), Tang (2020) and Hussein et al. (2021) on educational tourism development have only used educational tourism arrivals to capture educational tourism development. The importance of using educational tourism receipts is that it is likely to have a more pronounce effect on the economy than educational tourism arrivals. Arrivals simply capture the frequency of education tourists, and not all education arrivals will necessarily contribute to economy as some arrivals might abruptly leave for their home country immediately after their arrivals. Some tourists might immediately proceed to leave for other countries for their educational pursuits immediately after arriving in Australia. Furthermore, some of the arrivals that initially register as educational tourists might end up in the country engaging in activities that are not associated with education and these activities might be injurious to the economy. Educational tourism receipts embody revenue generated from educational tourists and as such more impact on the economy.

The relationship between educational tourism development economic growth has been examined with an augmented neoclassical growth model, which also recognises capital stock, exports of goods and services and population growth as potential determinants of economic growth. A recently introduced DARDL approach has been used on the data of Australia spanning 1976–2020. The empirical findings indicate that an increase in educational tourism arrivals has a positive impact on economic growth. Besides, educational tourism receipts growth generates positive economic growth, which confirms the existence of tourism-led growth hypothesis. The results also suggest that capital stock and export of goods and services lead to positive economic growth, while population growth has an adverse impact on economic growth.

An implication of the foregoing results is that strategies that ensure continuous supply of educational tourists as well as expansion in receipts from tourism arrivals will have positive impact on the economic growth in Australia. One possible way to ensure continuous supply of educational tourist and expansion in receipts from tourism arrivals is to maintain cordial relationship between Australia and countries that supply educational tourists to the country. Whenever there is a rise in tension between Australia and those countries with huge supply of educational tourists to the country, such tension should be doused immediately. A good example is China, which recently has a diplomatic fallout with Australia (Tourism Australia, 2023). China accounted for around a quarter of the total foreign students in Australia and 15% of short-term visitors, the single-largest

provider overall in 2019 and the tension negatively affected inflow of educational tourists from China (Pham et al., 2021).

Another implication of the preceding findings is that efforts to promote educational tourism in Australia will improve the economic impact of the tourism sector in the country. Hence, promoting educational tourism should be one of the tourism thrusts in the country. There are still adequate rooms for expanding the marketing efforts to promote educational tourism in the country. International education is responsible for about 67% of the tourism spend but about 3% of the marketing spend (Financial Review, 2023). The marketing efforts have also been substantially focused on the priority markets (including China, the UK, the USA, Germany, Japan, France, Italy, Malaysia, New Zealand, Canada, South Korea, Singapore, India, and Indonesia) because they contribute 80% of inbound travel to Australia in 2019 (Tourism Australia, 2023). A relevant strategy is to supplement the strategy of focusing on priority markets by also increasing promotion efforts on educational tourism in additional countries such as Brunei, Sri Lanka, Thailand and Vietnam. These countries are not too far from Australia; they have several educational tourists that seek nations where English is used as medium of communication (Reserve Bank of Australia, 2020); and have the financial capacity to supply a substantial number of educational tourists to Australia (World Bank, 2023).

Furthermore, exchange programmes i.e. collaborative agreement between Australian based educational institution and rest of the world should be pursued as this will engender economic and sustainable growth in the country. This position can be further enhanced by lessening visa processes for international students. However, there is a need for investment in educational infrastructure on the part of government official to manage the influx of international students with aim of enhancing robust education experience in Australia without adverse consequences.

One of the numerous strategies of *THRIVE 2030* is to drive more educational visitors as a means of the improving the role of the tourism sector in the economy. *THRIVE 2030* strategy is a government-supported but industry-led framework for the long-term development of the tourism sector in Australia for the 2022–2030 period. An objective of the *THRIVE 2030* is for visitor expenditure to reach to 230 billion Australian dollar by the year 2030. Another objective is for regional visitor expenditure to grow to 100 billion Australian dollar by 2030. The expansion of educational tourism arrivals and receipts is expected to play critical roles in the realisations of these objectives.

Beyond educational tourism development, there are important policies that the government must take into consideration to realise adequate positive economic growth. For instance, policies that engendered export promotion should be supported as export and capital stock accumulation contribute to economic growth. This implies the need for promotion of export managing companies (EMC's) that concentrates on export strategies on Australia's core comparative advantage to glean sustainable economic growth. There is also the need for right inputs mix on the country productive possibilities curve frontier in terms of capital stock accumulation so as not to compromise sustainable development in Australia.

Although the present study has explored the impact of educational tourism receipts on economic growth in Australia, there is the need to explore the theme for other developed tourism destinations to either refute or corroborate the claim of this study. Moreover, there is a need to consider other determinants of economic growth including energy consumption and demographic indices to enrich the literature tourism-led growth hypothesis. In terms of study limitation, the study is constrained by data availability as outlined in Section 3 of our study. The present study is a single country analysis as such its policy interpretation and extrapolation are somewhat limited to the study country as an inherent short fall.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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