
An integrated model for evaluating investments in cultural heritage tourism in the Dominican Republic

Tourism Economics

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Abstract

In the Dominican Republic, tourism represents a significant share of growth domestic product. Improving and increasing cultural heritage tourism opportunities offer potential for tourism product diversification which can expand the visitor base, increase tourism expenditure, and ultimately contribute to enhanced economic growth and development for tourism dependent economies. This study presents an integrated economic bottom-up model for tourism investment analysis. The framework links simulation models and valuation approaches from different economic research fields including economy-wide modelling, time series modelling, stated preference approaches, and net present value analysis. Applied to the analysis of an investment for enhancing cultural heritage tourism in the Colonial City of Santo Domingo, the integrated model generates valuable insights on the transmission pathways through which investment in cultural heritage tourism can accelerate economic growth, generate employment, and raise incomes. The framework presented here can be developed and applied to other country contexts where decision makers have similar interests in investing and diversifying the tourism opportunities available to visitors.

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Keywords

bottom-up approach, cost–benefit analysis, cultural heritage tourism, Dominican Republic, dynamic computable general equilibrium model, integrated model, investment valuation

Introduction

The Dominican Republic is a Caribbean island where tourism represents a significant share of growth domestic product (GDP). The economy of the Dominican Republic is the largest of the Caribbean and Central American region, and the Dominican Republic is considered a middle-income country. Strong economic sectors include agriculture, mining, and tourism. Indeed, tourism accounts for 16% of GDP (WTTC, 2015), and it is largely based on leisure and beach, sun, and sand tourism. The four primary destinations in the Dominican Republic are Punta Cana, La Romana, Puerto Plata, and Samaná, which together account for 85% of total national hotel accommodations (BCRD and MITUR, 2015).

The Dominican Republic also offers cultural heritage opportunities as it is home to the Americas' oldest city, the Colonial City of Santo Domingo (CCSD), and the first cathedral and university in the New World. The CCSD is a UNESCO World Heritage site since 1980 and can be considered representative of the Dominican Republic's cultural heritage tourism assets. Due to its central location and already established tourism infrastructure, investing in enhancing the CCSD tourism opportunities can generate positive spillovers for other traditional tourism destinations in the country (Ashley et al., 2005; Velasco et al., 2015). Thus, the valuation of investment programs to expand and diversify tourism services for cultural heritage tourism is a high priority for the government and investors, both in the CCSD and beyond.

Cultural heritage tourism is a tourism modality that capitalizes on cultural richness and complexity and can generate higher than average local returns due to the higher purchasing power and spending patterns that its participants typically possess (Csapo, 2012; Zadel and Bogdan, 2013). Decisions on whether or not to invest in cultural heritage tourism opportunities have in the past been based on historical, archaeological, and cultural assessments and therefore were typically in the domain of archaeologists, architects, and urban planners (Throsby, 2012). With public resources becoming scarcer, however, economic approaches are increasingly applied to generate advice on the allocation of limited public budgets among competing priorities. Quantitative economic methods may be used *ex ante* to assess the potential economic impacts of investments in preservation and enhancement of cultural heritage and the potentially catalyzing effects they may have on private sector investments.

Methods borrowed from different research fields including econometrics, environmental economics, and investment theory are typically applied to the economic assessments of tourism investments. However, the tourism sector is not an isolated sector; it is composed of many subsectors beyond the cultural asset including hotels, restaurants, food and beverage, travel, tours, and transportation sectors. Sectors such as agriculture, construction, and the manufacturing sector produce intermediate inputs into tourism subsectors. Furthermore, investments in heritage tourism often involve components of urban infrastructure and public services (Licciardi and Amirtahmasebi, 2013). Individual analytical methods applied to cultural heritage valuation do not consider necessarily the full breadth of the intersectoral, backward, and forward linkages, and the second-round and induced impacts of investments in cultural heritage tourism. Thus, these approaches are likely to underestimate the economic

impacts due to the multisectoral nature of tourism investments (Banerjee et al., 2015a; 2015b; 2016; Dwyer et al., 2000, 2004).

This article develops an integrated bottom-up model for the ex ante economic evaluation of investment in cultural heritage tourism and applies it to the analysis of a US\$90 million investment in the CCSA. The model links quantitative methodologies from different economic research fields and allows for a comprehensive evaluation of the potential benefits of investment in cultural heritage tourism. Autoregressive integrated moving average (ARIMA) methods were used to estimate business as usual tourism arrivals and expenditure. A survey-based quasi-contingent valuation approach was developed and implemented to estimate tourism demand responses to investment in cultural heritage tourism. These inputs were used to calibrate scenarios in a dynamic computable general equilibrium (CGE) model to assess the economy-wide impact of the investment. The CGE framework is considered the appropriate methodology for tourism impact analysis where investments are multisectoral and strong intersectoral linkages are present (Banerjee et al., 2015a, b; 2016; Burnett et al., 2007; Dwyer et al., 2003; Dwyer and Kim, 2003; Polo and Valle, 2008a, b).

The rest of the article is structured as followed. “The integrated economic model for the Dominican Republic” section presents the integrated economic model developed for this study and its submodels. “Scenario description” section describes the scenarios, while “Results” section analyses the results of the investment program in cultural tourism. The final section concludes with key findings.

The integrated economic model for the Dominican Republic

ARIMA modelling is applied to time series data for visitor arrivals and expenditure for the Dominican Republic. This modelling generates a baseline tourism demand forecast. To understand the potential tourism demand response to investment in cultural heritage tourism in the CCSA, a survey-based quasi-contingent valuation approach is developed and applied. In the case of the Dominican Republic, this approach can generate important insights into the demand for cultural heritage tourism since the Dominican Republic is primarily recognized as a sun and sand destination and not necessarily as a cultural heritage destination. With the ARIMA forecast and results of the quasi-contingent valuation study, “with investment” tourism demand can be estimated. Next, to determine whether a business case exists for the investment, the breakeven tourism demand is calculated in a net present analysis optimization framework. Finally, a dynamic CGE model is calibrated with a new Social Accounting Matrix (SAM) for the Dominican Republic with the baseline, “with investment” and breakeven tourism demand estimations used to formulate the scenarios to be evaluated.

The dynamic CGE model

To capture the direct, indirect, and induced impacts of the investment in the tourism sector, we calibrate the dynamic PEP 1-t CGE model developed by Decaluwé et al. (2013) with a SAM we constructed for the Dominican Republic based on 2010 National Accounts data. A dynamic CGE is the appropriate tool to evaluate such investments as it is able to elucidate economic transition paths arising from a temporally allocated policy shock—investments spanning more than 1 year in this case—as well as their short-term and long-term costs and benefits (Cattaneo, 1999). Moreover, CGE models take into account sectoral linkages between the tourism sector and the rest of the economy. Finally, increases in tourist consumption will have macroeconomic impacts that a CGE

approach is particularly well suited to capturing. Though the PEP 1-t model is fully described in Decaluwé et al. (2013), key features of the model are presented here.

In line with the SAM, the model has 25 activities and 39 commodities, where one activity can produce more than one type of commodity. The production function technology is assumed to be of constant returns to scale and is presented in a three-level production process. At the first level, output is a Leontief input–output of value added and intermediate consumption. At the second level, a constant elasticity of substitution (CES) function is used to represent the substitution between composite labor and capital. At the third level, composite labor demand is a CES function between labor and mixed income.

The Dominican Republic is a small country and thus international prices are fixed in the model. Production is either intended for the domestic market or exported to foreign markets. The model assumes an imperfect substitution between demand for domestic and export goods through a CES function. Demand for exports is a constant elasticity of transformation function with infinite elasticity. The domestic market supply originates from two sources: domestic production and imports with imperfect substitution between the two, which reflects differences in quality.

The model considers four types of economic agents or institutions: households, government, firm, and the rest of the world. Households receive most of their income from labor, whether formal or as mixed income. The share of dividends, 17.7% in the case of the 2010 SAM for the Dominican Republic, and the share of remittances in household income are relatively high compared to the transfers received by the government. Households spend most (90.4%) of their income on consumption, with the balance allocated toward direct taxes and savings.

There is a representative firm that receives a portion of capital income and pays dividends to households and to the rest of the world. The firm pays taxes to the government and saves. The government receives its income from direct taxes paid by both households and firms and from indirect taxes on local and imported commodities. The government spends its income on consumption of goods and services and transfers. The rest of the world receives income from capital and export earnings and makes transfers to the Dominican Republic.

Finally, the Dominican Republic is faced with unemployment. Following Blanchflower and Oswald (1995), it is assumed that there is an equilibrium wage rate compatible with the unemployment rate. Blanchflower and Oswald (1995) show the existence of an empirical relationship linking wage rates and unemployment rates, which is understood as the “wage curve.” The relationship shows a negative slope between the unemployment rate and the wage rate.

In terms of CGE model closure rules, it is assumed that the nominal exchange rate is the model numeraire. Following the small country hypothesis, world prices of imports and exports are exogenous. The current account balance is fixed as a proportion of GDP.

Estimating tourism demand in the baseline and with investment

Baseline tourism demand. As previously mentioned, it is quite important for the government of the Dominican Republic to understand how investments in cultural heritage tourism are likely to be perceived by visitors to the CCSD. To estimate future tourism demand, surveys were undertaken in the two main international airports of Dominican Republic in 2011 and 2015. The surveys were conducted upon the tourists’ departure from the country and were applied to (i) tourists who visited the CCSD, to understand their perceptions of the Colonial City, duration of stay, and expenditures; and (ii) tourists who did not visit the CCSD, to understand the factors that influenced their decision not to visit. Based on these data, it was estimated that 14.8% of the tourists surveyed had visited the

CCSD, and that on average, their expenditure accounted for 2.16% of total tourism expenditure in the country. These data were used to estimate historical arrivals and expenditure in the CCSD (Banco Central de la Republica Dominicana, 2015).

There are various methods available for projecting future tourism demand based on time series data. The purpose of the analysis and data availability are key considerations in determining the appropriate method. Where evaluating the determinants of tourism demand is a central component of the analysis, multiple regression techniques are often suitable. Where the emphasis of the analysis is less on evaluating determinants of demand but rather generating a forecast based on available time series data, simpler methods such as moving average or simple exponential smoothing methods may be employed. In this study, historical and projected demand were simulated by developing an ARIMA model. This type of modelling approach has been shown to generate reasonable projections under the appropriate circumstances and is commensurate in complexity with the other integrated model components developed here (Burger et al., 2001).

The ARIMA model was estimated to project arrivals of foreign nonresident visitors and tourism expenditure at the national level and for the CCSD (equation (1)). An ARIMA model is an auto regression model where the variable of interest, tourism demand Y_t in this case, is regressed against itself. More specifically, a moving average model uses past forecast errors in a regression and the dependent variable is a weighted moving average of a past predetermined number of forecast errors.

To develop an ARIMA model, time series data must exhibit stationarity where data properties do not depend on the time at which the series was observed. Data exhibiting time trends are nonstationary. There are different approaches for testing for stationarity, including graphical methods and unit root tests, which include the augmented Dicky–Fuller test (Hyndman and Athanasopoulos, 2014). Nonstationary data are transformed to a stationary condition through differencing. This approach calculates the difference between consecutive observations to eliminate time trends.

The general form of an ARIMA model is as follows

$$Y^d_t = c + \phi_1 y_{t-1} + \dots + \phi_p y_{t-p} + \theta_1 e_{t-1} + \dots + \theta_q e_{t-q} + e_t \quad (1)$$

In this specification, the right-hand side variables are lagged values y at time t and lagged errors, e . This functional form is known as an ARIMA (p, d, q) model, where

c : a constant;

Y^d_t : the differenced series (tourism demand);

y_t : historical tourist demand observed;

e_t : variance of the error term;

ϕ : a coefficient;

p : order of the autoregressive;

d : degree of first differencing; and

q : order of the moving average.

Plots of the autocorrelation function and the partial correlation function are used to identify the orders of “ p ” and “ q ” after differencing has been performed. To select the best-fitting model, the *log* likelihood of the data (which is the logarithm of the probability of the observed data being generated from the model), Akaike’s information criterion (AIC), and the Bayesian information criterion (BIC) are used. Closer fitting models minimize the AIC and BIC. Finally, model

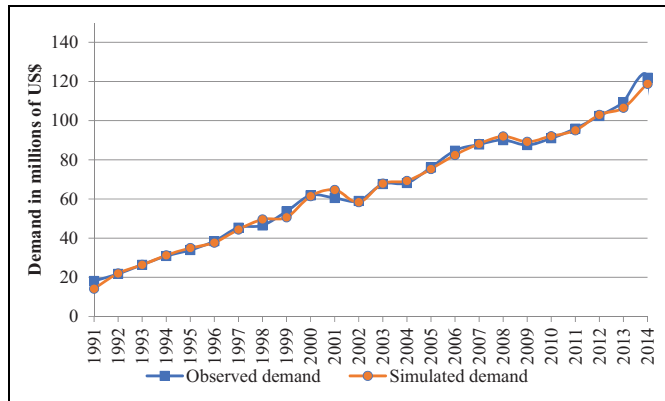


Figure 1. Ex post comparison between observed and simulated nonresident visitor demand.

parameters are estimated with maximum likelihood estimation. Figure 1 shows the current and projected tourist expenditure by year. The proximity of the blue line (actual expenditure) to the red line (projected expenditure) in the historical series indicates that the model is well calibrated to the data.

“With investment” tourism demand. A second round of tourist exit surveys was conducted in 2015 in the Dominican Republic’s two main international airports. The respondents were asked about the additional expenditures they would be willing to make as well as the additional time they would be willing to spend in the CCSD, if investments in cultural heritage tourism were made. Based on the tourists’ additional willingness to spend where cultural heritage tourism opportunities were enhanced, the total additional tourism demand was derived. This additional demand was 41.7% higher (US\$52.6 million) than tourism expenditure in 2015. This additional tourism demand represents the projected demand “with investment” in cultural and heritage tourism and was distributed across the full period over which the investment program was implemented (i.e. the years from 2018 to 2040). To compute the annual increase in tourism demand, the US\$52.6 million was distributed according to a log normal distribution as shown in equations (2) and (3)

$$Y_t^{\text{proj}} = (Y_{2015}^{\text{hist}} \times \text{WTP} \times \text{SH}_t) + Y_t^{\text{base}} \quad (2)$$

$$\text{SH}_t \sim \phi\left(\frac{\ln(t) - \mu_N}{\delta_N}\right) \quad (3)$$

where

t : years for additional tourist demands resulting from the investment program, $t = \{0, \dots, 23\}$

= years = $\{2017, \dots, 2040\}$;

Y_t^{proj} : projected demand with investment program for the years t ;

$Y_t^{\text{base}} = Y^t$: reference demand for the years t ;

Y_{2015}^{hist} : historical demand in the year 2015 = US\$126,099,655;

WTP: willingness-to-pay coefficient determining the additional demand = 41.7%;

SH_t : share distributing the additional demand ($\text{WTP} \times Y_{2015}^{\text{hist}}$) to the historical demand (Y_{2015}^{hist}) according to a log normal distribution.

Estimating breakeven tourism demand. An optimization model was calibrated to estimate the minimum tourism expenditure required for the investment program to be economically viable. This value represents the minimum tourism expenditure required for the net present value (NPV) to be equal to zero with a discount rate of 12%. At the end of the period of analysis in 2040, these benefits are equal to US\$38.0 million compared to the US\$52.6 million estimated based on the tourist exit survey data. The difference between these two values indicates that there is a comfortable margin between the minimum required increase in tourism demand for the program to be economically viable and the expected demand with the cultural heritage tourism investment.

In terms of model mechanics, the nonlinear optimization model computes the breakeven tourist demand as described in equations (4) to (7). The conditions of the investment program (I_t) are considered in the model as exogenous assumptions (equation (7)). The NPV is set equal to zero and the model solves the variable of the breakeven demand as the optimized tourist demand (Y_t^{opti}). The optimized tourist demand (Y_t^{opti}) represents the minimum tourist demand required for the investment to be economically viable.

$$\text{NPV}^{\text{opti}} = \sum_{t=0}^{23} \frac{\text{NB}_t^{\text{opti}}}{(1+r)^t} = 0 \quad (4)$$

$$\text{NB}_t^{\text{opti}} = B_t^{\text{opti}} - I_t \quad (5)$$

$$B_t^{\text{opti}} = Y_t^{\text{opti}} - Y_t^{\text{base}} \quad (6)$$

$$I_t = f(a, d, r, \dots) \quad (7)$$

where

- t : years for the investment program, $t = \{0, \dots, 23\} = \{2017, \dots, 2040\}$;
- Y_t^{opti} : optimal/breakeven tourist demand (expenditures) with investment program;
- Y_t^{base} : reference tourist demand (expenditures) without investment program;
- B_t^{opti} : optimal/breakeven benefit resulting from the investment program;
- $\text{NB}_t^{\text{opti}}$: optimized/breakeven net benefit resulting from the investment program;
- I_t : costs resulting from the investment program;
- a : amount of investment = US\$90 million;
- r : discount rate = 12%; and
- d : dynamic 5 years: 2017 = 14.3%, 2018 = 24.5%, 2019 = 28.2%, 2020 = 15.2%, 2021 = 13.5%, 2022 = 4.3%.

Linking the submodels

Figure 2 provides a graphical overview of the linked modelling framework. The integrated approach can be described as a representation of three different economic agents: the tourist, the investor, and economic sectors. Tourist demand (Y) is the variable linking the different agents and is modelled to simulate the investment program under different demand scenarios.

Modelling tourist visitation and expenditure was survey-based and enabled the historical tourism demand to be derived (Y^{hist}). Historical tourism demand was used as an input for the ARIMA model to forecast the future expected tourism demand without the new investment program, which is the baseline tourism demand (Y^{base}). The investor considered baseline tourism demand (Y^{base}) in the context of exogenous assumptions about the investment program and

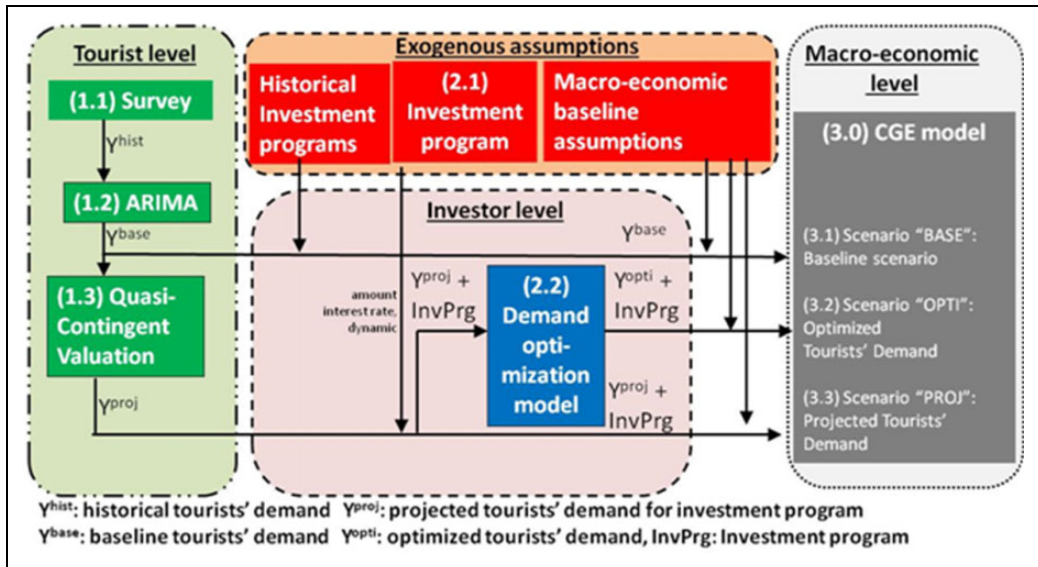


Figure 2. Overview of the integrated economic model for the valuation of investments into cultural heritage tourism. Source: authors' own elaboration.

macroeconomic assumptions. The baseline tourism demand was an input into the CGE model, which computed the baseline scenario "BASE." The "BASE" scenario serves as the reference scenario to which all other scenarios are compared.

The quasi-contingent valuation estimates provided an estimate of tourist WTP for the new visitor experiences generated by the investment program. The WTP modifies the baseline demand (Y^{base}) to represent the projected tourism demand with the investment in cultural heritage tourism (Y^{proj}). The investor considered the projected tourism demand (Y^{proj}) in the context of exogenous assumptions related to the financial terms of the investment program (e.g. the investment amount, interest rate, and dynamic), with this investment scenario introduced into the CGE model. The resulting scenario "PROJ" simulates the macroeconomic impacts of the investment implemented under projected tourism demand with the investment. The second demand scenario "OPTI" is that of minimum or optimized tourism demand (Y^{opti}) for the investment to breakeven.

Scenario description

The investment program is evaluated in two scenarios compared with the "BASE" reference scenario. The model runs from 2010, the base year of the SAM, to 2040. The baseline scenario replicates the observed and forecasted GDP growth rates estimated by the International Monetary Fund (IMF (2015)). The two simulations "PROJ" and "OPTI" differ from "BASE" with the introduction of the investment and variations in tourism demand. Both PROJ and OPTI introduce the same investment in increasing the cultural heritage tourism opportunities in the CCSD.

The value of the investment is US\$90 million, beginning in 2017 and completing in 2022. This investment is distributed as follows: 14.3% in the first year, 24.5% the second year, 28.2% in the third year, 15.2% in the fourth year, 13.5% in the fifth year, and 4.3% in the last year. It was

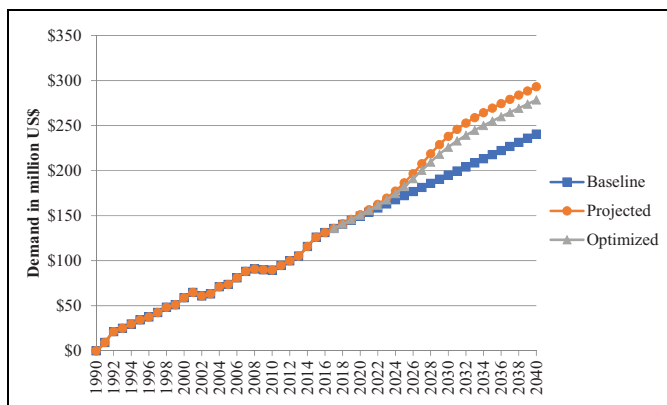


Figure 3. Tourism demand, baseline, projected, and optimized/breakeven.

estimated that the cost of operations and maintenance of new infrastructure under the investment program would be equivalent to 5% of the value of this new infrastructure, charged on an annual basis. It is assumed that the investment is financed through a foreign transfer from a multilateral investment bank.

The scenario “PROJ” simulates forecasted tourist demand according to new tourist demand for the improved visitor experience generated by the investment. The scenario attributes tourist preferences as the driver of future expected tourism demand. The scenario “OPTI” simulates the future tourism demand required for the investment to breakeven, which is the minimum increase in tourism demand for an investor to consider the investment as viable, given a 12% opportunity cost of investment capital.

Results

The results describe on the one hand the future development of tourist demand according to (i) the historical data without the investment program, (ii) tourist preferences with the investment program, and (iii) the investor’s minimum expectation of tourism demand with the investment program. In addition to tourism demand impacts of the investment, the results also illustrate the impacts of the investment program itself on the economy of the Dominican Republic and inter-linked macroeconomic sectors and actors under each tourism demand scenario.

Tourism demand

In the simulation period from 2017 to 2040, tourism demand in BASE would follow a linear development reaching about US\$240 million by 2040 (see Figure 3). In the years after 2020, tourism demand in the scenarios PROJ and OPTI would be significantly higher than in BASE. The demand in OPTI would be slightly smaller than the demand in PROJ (by 5% after 2030). Thus, for the investment to be economically viable, slightly less tourism demand than that indicated by the PROJ scenario would be required. According to these results, the investor could fund the investment loan and could consider the risk of not being able to pay off the investment as being small, since estimated tourist preferences would drive tourism demand 5% higher than that required for the investor to simply breakeven.

Table 1. Impact on selected macroeconomic indicators (% deviation from baseline).

	PROJ		OPTI	
	2022	2030	2022	2030
GDP at market prices	0.03	0.02	0.03	0.02
Real household consumption	0.01	0.01	0.01	0.01
Total investment	0.05	0.04	0.05	0.03
Real exchange rate	-0.02	-0.01	-0.02	0.00
Wage rate	0.03	0.01	0.02	0.01
Unemployment rate	-0.01	-0.04	0.00	-0.03

Note: CGE: computable general equilibrium.

Source: Authors' own elaboration based on CGE model results.

Macroeconomic impacts

The similarity between tourism demand in PROJ and OPTI would result in similar macroeconomic impacts on the Dominican Republic's economy (Table 1). Results are presented for the year 2022, which is the last year of the investment program, and for 2030 to shed light on medium-term impacts. Investment impacts would be positive for the Dominican economy, with accelerated GDP growth over the period of analysis. The PROJ and OPTI scenarios represent a combined positive shock: on the one hand, the construction and tourism sectors would directly benefit from the increase in investments, their capital stock would increase, and they would hire more workers to generate more economic output. Together with the new workers hired, the stimulated economic sectors would demand more intermediate inputs and therefore would catalyze production in other sectors. On the other hand, the increase in tourist expenditure would stimulate the activities producing the main goods and services tourists purchase. For these activities as well, there would be an increase in production, attracting more investment and workers, with an overall positive impact for the rest of the economy through intersectoral links. These interactions would be expressed at the macrolevel with GDP increasing throughout the period.

Economic sectors would hire more workers to meet increasing demand which would lead to a reduction in the unemployment rate. The unemployment rate would fall by 0.04% and 0.03% for PROJ and OPTI, respectively, by 2030, while there would be a concomitant increase in the wage rate. The increased wage rate would remain higher than baseline levels in the long run. Household income is largely based on wages and thus would experience faster growth. With more income, households would be able to consume more, which would translate into greater demand for some commodities and, *ceteris paribus*, would have a positive impact on the economic sectors that produce those commodities. Increases in household income and consumption would have a positive impact on government revenue through greater indirect and direct tax receipts. For each economic agent, this increase in income would also enable them to save more. Consequently, increased savings would result in greater public and private investment which would benefit most economic sectors, particularly those with greater than average returns, most notably the construction sector in the PROJ and OPTI scenarios.

Sectoral impacts

At the sectoral level, for both PROJ and OPTI scenarios, all economic sectors would benefit from the investment program and would see their production increase, especially the tourism and the

construction sectors. Other sectors if not directly stimulated would benefit from the indirect effects of the investment program. As explained above, the tourism and construction sectors would need inputs to produce more, and therefore backward linkages would induce production from additional economic sectors. In addition to this intersectoral effect, the positive impact on household consumption would also stimulate sectoral production. Moreover, direct tourism demand also would result in a positive effect on those sectors that cater to tourists such as food commodities, beverages, and textiles.

In terms of trade, it is interesting to note that both exports and imports would increase faster. The increase in imports can be explained on the one hand by increased household income, but on the other hand, by the closure of the model. Indeed, we assume that the current account balance was a fixed as a proportion of GDP, and the investment program was financed through a foreign transfer, allowing the total budget for imports to increase.

Conclusions

This study developed an integrated economic bottom-up model for the Dominican Republic, which links simulation models and valuation approaches from different economic research fields. The approach developed here linked ARIMA modelling, quasi-contingent valuation, NPV analysis, and dynamic CGE modelling to provide a comprehensive assessment of impacts on investment in cultural heritage tourism. The bottom-up integrated framework enabled assessment of the impacts of the investment itself on the economy, as well as how tourism demand could evolve with the investment and the new visitor experiences it aimed to create.

The information generated with such a modelling framework can support policy makers in evaluating investments considering multiple criteria including tourism demand, regional economic growth, sectoral output, household welfare, and employment. Estimation of breakeven tourism demand and projected tourism demand based on additional visitor expenditures can help substantiate a business case for investment in cultural heritage tourism. The application of the integrated model to investment in the CCSD showed that expectations on how tourism demand might evolve with investment in cultural heritage tourism were more than sufficient to cover the costs of investment capital. This information can serve to motivate both public and private investors and partnerships between the two when interests are aligned.

The economy-wide approach implemented in this study is particularly appropriate where multisectoral linkages and induced and second-round impacts are important. The temporally dynamic nature of the model also enables consideration of investments made through time and elucidates the specific transition paths of an economy. The approach also sheds light on sectoral impacts, which can be important where a public policy or investment can involve difficult trade-offs and result in some sectors being disadvantaged.

The model developed here was national in scale. To better understand trade-offs between sectors as well as regions, regional disaggregation of the model would be important. Where poverty analysis may be a key concern for future analysis, linking a microsimulation poverty module to the integrated framework would enable household-level impacts of investments to be discerned. The model developed in this study is amenable to these extensions and provides a strong starting point for subsequent analysis of investment in cultural heritage tourism in the Dominican Republic. Certainly, the framework developed here can be developed for other countries where tourism is an important driver of economic growth and well-being.

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References

- Ashley C, Goodwin H and McNab D (2005) *Making Tourism Count for the Local Economy in Dominican Republic: Ideas for Good Practice*. London: Pro Poor Tourism Partnership and Travel Foundation.
- Banco Central de la Republica Dominicana (2015) *Estadísticas Económicas, Sector Turismo*. Santo Domingo, Dominican Republic: Banco Central de la Republica Dominicana.
- Banerjee O, Cicowicz M and Cotta J (2016) Economics of tourism investment in data scarce countries. *Annals of Tourism Research* 60: 115–138. DOI: 10.1016/j.annals.2016.06.001
- Banerjee O, Cicowicz M and Gachot S (2015a) A framework for ex-ante economic impact assessment of tourism investments—an application to Haiti. No. Inter-American Development Bank Working Paper Series 616. Washington, DC, USA: Inter-American Development Bank.
- Banerjee O, Cicowicz M and Gachot S (2015b) A quantitative framework for assessing public investment in tourism—an application to Haiti. *Tourism Management* 51: 157–173. DOI:10.1016/j.tourman.2015.05.015.
- BCRD and MITUR (2015) *Boletines de Estadísticas Nacionales y de Turismo, Series 2004–2014*. Santo Domingo, Dominican Republic: Banco Central de la Republica Dominicana y el Ministerio de Turismo.
- Blanchflower DG and Oswald AJ (1995) An introduction to the wage curve. *Journal of Economic Perspectives* 9: 153–167.
- Burger CJSC, Dohnal M, Kathrada M, et al. (2001) A practitioners guide to time-series methods for tourism demand forecasting—a case study of Durban, South Africa. *Tourism Management* 22: 403–409.
- Burnett P, Cutler H and Thresher R (2007) The impact of tourism for a small city: a CGE approach. *The Journal of Regional Analysis and Policy* 37(3): 233–242.
- Cattaneo A (1999) *Technology, Migration and the Last Frontier: A General Equilibrium Analysis of Environmental Feedback Effects on Land Use Patterns in the Brazilian Amazon*. Baltimore, MD, USA: John Hopkins University.
- Csapo J (2012) The role and importance of cultural tourism in modern tourism industry. In: Kasimoglu M and Aydin H (eds), *Strategies for Tourism Industry—Micro and Macro Perspectives*. Rijeka: Intech.
- Decaluwé B, Lemelin A, Robichaud V, et al. (2013) *PEP-1-t: The PEP Standard Single-Country, Recursive Dynamic CGE Model*. Québec, Canada: PEP, Université Laval.
- Dwyer L, Forsyth P, Madden J, et al. (2000) Economic impacts of inbound tourism under different assumptions regarding the macroeconomy. *Current Issues in Tourism* 3: 325–363. DOI: 10.1080/13683500008667877.
- Dwyer L, Forsyth P and Spurr R (2004) Evaluating tourism's economic effects: new and old approaches. *Tourism Economics* 25: 307–317. DOI: 10.1016/S0261-5177(03)00131-6.
- Dwyer L, Forsyth P and Spurr R (2003) Inter-industry effects of tourism growth: implications for destination managers. *Tourism Economics* 9: 117–132. DOI: 10.5367/000000003101298303.
- Dwyer L and Kim C (2003) Destination competitiveness: determinants and indicators. *Current Issues in Tourism* 6: 369–414. DOI: 10.1080/13683500308667962.
- Hyndman RJ and Athanasopoulos G (2014) *Forecasting: Principles and Practice*. Melbourne: OTexts.
- IMF (2015) *World Economic Outlook Database April 2015*. Washington, DC, USA: International Monetary Fund (IMF).

- Licciardi G and Amirtahmasebi R (2013) *The Economics of Uniqueness: Investing in Historic City Cores and Cultural Heritage Assets for Sustainable Development*. Washington, DC, USA: World Bank.
- Polo C and Valle E (2008a) An assessment of the impact of tourism in the Balearic islands. *Tourism Economics* 14: 615–630.
- Polo C and Valle E (2008b) A general equilibrium assessment of the impact of a fall in tourism under alternative closure rules: the case of the Balearic islands. *International Regional Science Review* 31: 3–34. DOI:10.1177/0160017607309448.
- Throsby D (2012) *Investment in Urban Heritage, Economic Impacts of Cultural Heritage Projects in FYR Macedonia and Georgia*. Washington, DC, USA: World Bank.
- Velasco M, Muñoz G, Delaunay T, et al. (2015) *Programa de Desarrollo Turístico Integral de la Ciudad Colonial de Santo Domingo; Propuesta para el Desarrollo de la Operación (DR-L1078)*. Washington, DC: Inter-American Development Bank.
- WTTC (2015) *Travel and Tourism Economic Impact 2015: Dominican Republic*. London, UK: World Travel and Tourism Council (WTTC).
- Zadel Z and Bogdan S (2013) Economic impact of cultural tourism. *UTMS Journal of Economics* 4: 355–366.