UNESCO WORLD HERITAGE SITE VISITATION IN NOVA SCOTIA: DETERMINANTS OF TOURIST EXPENDITURES AND ECONOMIC IMPACTS

by

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Abstract

The United Nations Education, Scientific and Cultural Organization (UNESCO) World Heritage (WH) list recognizes and encourages the preservation of sites of outstanding historic value, both cultural and natural. The province of Nova Scotia hosts three WH sites: Old Town Lunenburg, the Joggins Fossil Cliffs, and the Landscape of Grand-Pré. All three sites reference the interntionally recognized WH incription in marketing material to increase local economic activity through tourist visitation. Existing literature, however, is inconclusive regarding the economic benefit of this designation and how to maximize it.

The presence of three WH sites in close proximity in Nova Scotia provides an opportunity to identify local economic impacts arising from visitor spending. The identification of major influences on levels of total economic output may provide guidance to regions that wish to capitalize on the WH inscription of a local site.

First, this study estimates total visitor spending and determines the resultant total economic output in the areas surrounding Nova Scotia's three WH sites using input-output (IO) models. The effect of regional economic structure, and how tourists allocate spending across specific industries, is examined by applying hypothetical spending simulations to the IO models. It is also noted that average per-person expenditure differs significantly across sites. To account for these differences, possible determinants of tourist spending levels are discussed. Proposed factors include the cost and availability of local amenities, location of visitor origin, and the influence of the UNESCO designation on the decision to visit a site.

It is determined that across the three WH sites in Nova Scotia, differences in regional economic structure and allocation of tourist spending accounts for very little variation in total economic output. However, as individual expenditure at each location differs greatly, it is proposed that higher total output from UNESCO site visitation corresponds with a large and diverse offering of local goods and services.

1 Introduction

Tourism in Nova Scotia is both a major contributor to economic activity and a means of generating the interest and revenue required to preserve sites of historic and cultural significance. Tourism Nova Scotia, the crown corporation which is broadly responsible for the development of the tourism industry in the province, has claimed that in 2010 non-resident expenditures totaled $1.18B and the visitor economy contributed $722M to the provincial gross domestic product (GDP) (Tourism Nova Scotia 2013). Various regions and sites throughout Nova Scotia continue to pursue new methods of attracting visitors, encouraging greater levels of local spending, and increasing their profile in other provinces and countries. Simultaneously, some locations of significant historic importance are experiencing declining visitation and/or a lack of financial and legal resources to protect their heritage assets. As a result, some sites in Nova Scotia have sought UNESCO World Heritage status as a method of promoting interest and seeking protection. Thus, this study will analyze the economic impact of tourist visitation to UNESCO sites in Nova Scotia.

1.1 UNESCO World Heritage Sites in Nova Scotia

The United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Programme designates places of "outstanding value to humanity" as World Heritage (WH) sites based on attributes of cultural and historic significance. Under this program, groups managing sites which bear the WH inscription are required to protect and conserve the integrity of the sites, but also benefit from technical and professional support, emergency funding, and increased tourist awareness resulting from the renowned WH brand. As a result, many designated sites attempt to leverage WH

status as a marketing tool to improve visitation and tourism revenue, with mixed results. A large and growing body of literature is devoted to studying economic activity associated with tourism at WH sites (UNESCO World Heritage Centre n.d.).

To date, three sites in Nova Scotia have obtained WH inscription: Old Town Lunenburg, the Joggins Fossil Cliffs, and the Landscape of Grand-Pré. Following the collapse of the cod fishery in the early 1990's, the town of Lunenburg began to diversify its economy and establish itself as a prominent tourist destination in Nova Scotia (VanBlarcom and Kayahan 2011). Having retained and preserved both its 18th century layout as a planned British settlement and the unique architecture of its wooden buildings, it became the first location in the province to receive WH inscription, in 1995 (Old Town Lunenburg n.d.). The WH site inscription features prominently in branding for the town, and immersion in local heritage and culture is a defining characteristic for the estimated 300,000 tourists who visit the town annually.[1] A significant proportion of local establishments are seasonal, operating only during peak tourism season, indicating the economic importance of visitors to the town. Due to its contribution to the success of the local tourism industry, the UNESCO designation in Lunenburg can be considered a "place-making catalyst" (VanBlarcom and Kayahan 2011).

The second site in Nova Scotia to receive WH inscription, in 2008, was the Joggins Fossil Cliffs. A 14.7km length of sea-cliffs along the coast of the Bay of Fundy in the northern region of the province, the site's historic significance flows from the abundance of well-preserved fossils from the carboniferous era which continually emerge from the eroding shoreline. An interpretive fossil institute at the site serves visitors, and while the location claims to currently benefits from adequate government resources,

[1] Lunenburg Board of Trade. *General Government Committee Meeting.* July 23 2015.

maintaining site performance for the benefit of the paleontological community is cited as a future concern (Joggins Fossil Cliffs n.d.).

In 2012, a 1,300-hectare area in Grand-Pré became the third WH site in the province. This designation is warranted by the existence of farmland established on tidal marshes in the 17th century by Acadian settlers, and the presence of archaeological artifacts and village remnants which remained at the site following their deportation in 1755 (Landscape of Grand Pré n.d.). The inscription was sought for reasons similar to Lunenburg: nomination documents indicate a desire to refresh visitor interest in the area, contribute to local economic development, and support the agricultural activity which continues to use the land (Hockin Cronin Associates 2010).

1.2 Study Rationale and Process

Groups managing certain UNESCO locations have expressed an interest in using WH inscription to increase revenue generated through site visitation, however, existing literature has been largely inconclusive in determining how and to what extent that is possible. The existence of three distinctly unique WH sites spanning just 150 linear kilometres in Nova Scotia presents an opportunity to determine and compare the economic impacts of tourist visitation on the regions surrounding these sites, and to examine various factors which correspond to different levels of economic activity. Insight into what determines the economic impacts of tourist expenditure at these sites may be useful for informing areas which wish to maximize the financial benefits of WH designation.

This study will estimate the economic impacts (direct, indirect, and induced effects) arising from visitor spending at Nova Scotia's three UNESCO WH sites. It will

also examine the degree to which these impacts vary across the sites and look at factors that might explain these differences. To achieve this, direct expenditures by all non-resident tourists by industry at each site will be calculated using visitor spending survey data and estimated visitation levels. Input-output (IO) models adjusted to reflect the industrial characteristics of the regions in which the sites are located will be used to determine the total output resulting from tourist expenditures. Differences in regional economic structure, levels and characteristics of visitor expenditure by location (and factors contributing to spending patterns), as well as site characteristics will be examined. By quantifying and discussing these potential determinants of economic impact, the relative importance of each factor can be inferred and differences in regional tourist spending and resulting economic activity can be accounted for.

This study determined that industry structure between regions accounted for little difference in total output, as did characteristics of visitor expenditure. It also suggests that number and type of regional amenities accounts for the majority of difference in visitor spending and total output across the three sites.

2 Literature Review

The advantages of WH inscription include an array of non-financial benefits such as heritage conservation, civic pride, and cultural education. However, since the mid-1990's, economic benefits have become an increasingly large motivating factor for sites seeking designation. (Rebanks Consulting Ltd and Trends Business Research Ltd 2009). Specifically, it is hoped by many nominee sites that designation will increase visitation and tourism revenues, a notion which has been supported by a proportion of the literature: an increase in visitation was noted by a multitude of authors throughout the 1990's (Ashworth and Tunbridge 2000, Drost 1996, Pocock 1997, Shackley 1998). Thorsell and Sigaty (2001) determined that total visitation to 118 WH sites around the world was approximately 63 million in 1998, with 13% of the sites recording over 1 million visitors per year. However, while total visitation is significant, a number of other studies have revealed that the increase in visitation caused by receiving WH designation is often relatively moderate. Galvin (1997) reported that increase of visitation to WH parks in the United States between 1990 and 1995 was 9.4%, 5.2 percentage points higher than non WH parks. Another study sampling a number of WH sites found that 40% or more experienced an increase in visitation after receiving WH status, typically between 1 and 5% per year since designation (Hall and Piggin 2001).

A causal link between WH designation and visitation has not been clearly established. Sites which are well-known and experience high levels of visitation prior to inscription, such as the Pyramids of Egypt or the Great Wall of China, do not tend to experience greater visitation as a result of receiving WH status (Van der Aa 2005). Conversely, relatively obscure sites appear to benefit from the high profile marketing of

the WH brand. Importantly, designation often leads to an increase in visitation by international tourists, who generally stay longer and spend more than domestic visitors (Van der Aa 2005). Other recent studies highlight the limited role that designation can play, and emphasize the importance of creating an environment which can maximize the benefits of inscription. For example, the small city of Bamberg, Germany uses its designation both as a marketing tool to attract high value tourists, and to sustain a local economic sector specializing in preservation and restoration. This niche industry is worth approximately 300 million Euros to the city annually (Rebanks Consulting Ltd and Trends Business Research Ltd 2009).

Prud'homme (2008) conducts a regression analysis of the impact of designation on French cantons, using a variety of variables such as growth in visitation and tourism-related employment. He concludes that the impact of WH designation on local development is largely exaggerated, as few of these relationships are statistically significant. Additionally, the author determines that the motivation for becoming a WH site, and the actions of the site following the designation, are major determinants of the impact (in addition to simply obtaining WH status itself). Rebanks Consulting Ltd and Trends Business Research Ltd (2009) support the notion that the sites must create certain conditions to capitalize on the potential boost given by the WH designation. They also note that 70-80% of sites had taken little to no action to realize the socio-economic benefits of WH status, particularly at locations which sought WH designation for heritage or conservation purposes. Management and stakeholders who aim to extract the greatest financial benefit from WH designation may be able to do so deliberately, however inscription alone does not typically cause benefits to materialize.

A number of studies determine that generally, WH designation has the potential to increase the visitation to a given site under some (but not all) circumstances, and to also increase the amount of money that visitors are willing to spend on admission. Kim et al. (2007) claim that WH designation resulted in a substantial increase in willingness-to-pay with respect to admission prices at certain sites in South Korea. Buckley (2004) attempts to determine the influence on visitation that WH designation had on National Parks in Australia, but concludes that due to the overwhelming number of external factors and unclear trends in visitation, no clear connection can be established. However, Buckley references evidence from the United States indicating that WH designation resulted in an increase in visitation to certain sites in the 1990's but also notes that in the United Kingdom, no relationship could be determined. Neither Buckley nor Kim et al. attempt to quantify the overall economic impact, total or marginal (post-designation), of WH sites on their surrounding regions.

Cárdenas-García et al (2014) assesses the direct economic impact of tourist expenditures on the region surrounding two neighbouring cities in Spain, Úbeda and Baeza, which are inscribed under a single UNESCO WH designation. Their paper references several other peer-reviewed sources which provide qualitative information about the determinants of tourist spending. The authors determine that the amount of locally available goods and services, the duration of visit, and the demographic characteristics of site visitors are primary determinants of the magnitude of demand. Specifically, they claim that goods and services available at the site should be unique and in agreement with the tourist's perceived image of the destination. As this image is deliberately created through marketing, it is asserted that UNESCO WH designation

could be advantageous in encouraging spending through the promotion of the destination's cultural uniqueness and attractiveness. Cárdenas-García et al. point out that a relative lack of specialized tourism products or services indicate that the Spanish site examined in their study is merely an emerging destination, and could provide more services to extract additional revenue from tourists.

Quantitatively, Cárdenas-García et al. calculate direct economic impact by using:

$$DEI: NT \times ADE \times ALS$$

Where:

DEI is Direct Economic Impact

NT is Number of tourists

ADE is Average daily expenditure

ALS is Average length of stay

Attempts to quantify the economic impact of tourist spending at WH sites, even if only to the extent of Cárdenas-García et al., are uncommon. As such, there is little precedent or guidance for the purposes of this paper. This is not uncommon—the large and growing body of literature concerned with the effects of WH status is typified by work such as that of Kaltenborn et al. (2013), which provides a holistic qualitative overview of the potential positive outcomes of obtaining WH designation. Kaltenborn et al. describe that an increase in economic activity is one of several reasons for which a site may be nominated. Other justifications which are often made alongside—or instead of—increased tourism revenue include cultural protection and recognition, or an attempt to attract public funds for the purpose of site preservation. The authors reference a large amount of existing literature on the topic, and provide insights into the marginal

economic impacts of WH designation. It is concluded by Kaltenborn et al., based on other academic sources including R. Buckley (2004), Cochrane and Tapper (2006), Frey and Steiner (2011), Fyall and Rakic (2006), and Hall and Piggin (2001) that there is not a consistent correlation between tourism development and WH status. However, there is the potential to use the designation to target specific visitor profiles which are characterized by a higher propensity to spend.

Unfortunately, while Kaltenborn et al. provide relevant qualitative information on the subject of WH designation by linking and summarizing a large collection of pre-existing literature, their analysis is survey-based and does not attempt to quantify spending. Instead, local residents' opinions concerning the importance of economic and business development through tourism are examined. Consequently, such studies are of limited use in conducting an economic impact assessment of tourist spending at WH sites.

While they have not been applied specifically to WH sites in the literature, IO models are used in some studies to quantify the economic impact of tourism on a specific region. For example, Surugiu (2009) uses data from Eurostat to construct an IO model for Romania to determine the effects of final demand in the Hotels and Restaurants sector on the outputs of other industries. She also conducts a general analysis of inter-industry linkages and discusses the potential for understanding and forecasting changes in the Romanian tourism industry. While the author examines the effects of final demand in a single sector on outputs at a national level (whereas this study focuses on several sectors at a sub-provincial level), the paper is nonetheless a good example of how to construct and use an input-output model for tourism expenditures. Surugiu interestingly concludes

that an increase in final demand in the hotel and restaurant sector in Romania did not result in a significant multiplier effect on output overall.

To date, the literature concerning the visitation and economic impacts of UNESCO WH sites has been generally inconclusive on the effects of designation. While many WH sites enjoy high levels of visitation and experienced a documented increase following inscription, others documented little to no improvement. Multiple authors describe the need for sites to take additional actions to maximize the economic potential of the WH brand, such as branding and marketing, and development of tourism goods and services that align with the heritage value of the site. There is no precedent in the literature concerning the best method of conducting a quantitative economic impact analysis of WH visitation, though input-output models have been used in more general tourism literature.

3 Methodology

Data detailing the amount of money which visitors to WH locations in Nova Scotia spend on goods and services locally is available from surveys administered within the past seven years by the Acadia University Economics Department. The average expenditures reported are classified by type of spending (i.e., accommodations, meals, etc.), adjusted for inflation and multiplied by the estimated number of visitors to determine the total impact of direct spending. These figures are entered into regionally-adjusted IO models, which calculate the total indirect and induced output, classified by industry, which are induced by visitors' expenditures. This process is described in greater detail in the following subsections. Regional differences in direct spending and output, and the implications thereof, are also discussed.

3.1 Economic Impact Study

An Economic Impact Study (EIS) estimates incremental economic activity that results from a specific event, facility, government policy or other economic stimulus, which would not occur otherwise. Tourism-related EIS typically examines expenditures made by non-resident visitors related to a particular event, program or facility, or, for the purposes of this paper, the existence of UNESCO WH sites. In general, direct expenditures by visitors, such as admission fees for a particular venue constitute only a small portion of the total economic impact resulting from the stimulus being scrutinized. In order to fully assess the economic impact of an activity or facility, all expenditures related to visiting the designated sites, such as accommodations, travel expenses, food or shopping purchases which occur within the local area need to be considered (Vogelsong

and Graefe 2001). In addition, secondary effects of non-resident expenditures should be examined (Fleming and Toepper 1990).

Determining direct economic impacts is relatively straightforward—non-resident visitors purchase goods or services within the study area while visiting the site, and these expenditures are received directly by local businesses. Indirect impacts, however, occur when a portion of the revenue received by local businesses is spent on other local goods and services (inputs). Induced impacts occur when the incomes created through the direct and indirect impacts are recycled throughout the local economy, generating additional activity. Although a clear distinction can be made between induced and indirect economic impacts, they are often considered to be a singular effect, referred to simply as indirect impacts.

Economic impacts must be measured within a clearly outlined geographic area. In this study, the defined area enables differentiation between residents and non-residents, and between local and non-local expenditures. Well-defined boundaries are necessary to ensure that appropriate multipliers are incorporated in the calculations of indirect impacts. While the scale of a study region may vary an individual community to an entire nation, the boundaries of an EIS typically mirrors geopolitical boundaries so as to be consistent with pre-existing data and to ensure that identification of the boundaries is clear to all parties involved in the study.

3.2 Direct Spending Data

The spending data used in this study is derived from visitor surveys conducted at three UNESCO sites as follows:

- In Old Town Lunenburg, 322 surveys were conducted in the downtown area in 2009.
- At the Joggins Fossil Cliffs, 177 surveys were conducted at The Joggins Fossil Institute in 2011.
- At The Landscape of Grand-Pré, 328 surveys were conducted at the Grand-Pré National Historic Site in 2013.

The surveys were not identical, ranging in length from 15 to 19 questions, however the majority of questions were common to all three. Each survey represented the answers of a party of tourists (as opposed to an individual). Respondents living with a 30-minute drive of the Landscape of Grand-Pré and Old Town Lunenburg, or within a 60-minute drive of the Joggins Fossil Cliffs, were immediately instructed to terminate the survey to prevent responses from local residents from influencing data.[2] Questions included queries on origins, demographics (by age and sex), party size, length of visit, the influence of the UNESCO designation on the decision to visit the site, and estimated expenditures on specific categories of goods and services.

For example, the expenditure question from the Lunenburg survey read, "The following question deals with spending in the area (within a 30-minute drive) during your visit to Lunenburg. Please give all answers in Canadian dollars and include taxes." Respondents were to estimate the spending in the following categories:

- Cost of accommodations
- Meals and beverages in restaurants
- Groceries/liquor at stores

[2] The travel time radius for Joggins Fossil Cliffs was increased to 60 minutes to account for the lack of hospitality and commercial amenities within a 30 minute drive, relative to the other two UNESCO sites.

- Vehicle rental
- Other shopping purchases
- Operation of private vehicle (repairs, gas, oil)
- Recreation and entertainment
- Inclusive travel package
- Other (please specify)

Given that the surveys sampled a small fraction of the total attendance to the UNESCO sites, estimating the total impact of visitor spending requires determining the average spending per visitor per trip, and multiplying by total visitation. Outliers are removed and the average expenditure per party is divided by the average party size to determine per person per spending. [3] Expenditures are adjusted using the Consumer Price Index for All Items in Nova Scotia from the year the survey was conducted to 2014, the year for which visitation estimates are most recently available.[4]

It is estimated by the Lunenburg Board of Trade that 300,000 people visit Lunenburg each year.[5] The Grand-Pré National Historic Site has stated that 25,891 visited the site in 2014, while the Joggins Fossil Institute estimates that 20,000 individuals visited the Joggins Fossil Cliffs in 2014 (12,254 paid admission to the institute, however the cliffs are accessible without admission).[6] For The Landscape of Grand-Pré and the Joggins Fossil Cliffs, visitation figures are adjusted downward by 5% to discount visitation by local residents (VanBlarcom and Kayahan 2011).

[3] Outliers were abitrarily considered to be total per-person spending of less than $10 or more than $400.
[4] Statistics Canada. No date. *Table 326-0021 Consumer Price Index, annual* (table). CANSIM (database). Last updated January 22, 2016.
[5] Lunenburg Board of Trade. *General Government Committee Meeting.* July 23 2015.
[6] Joggins Fossil Institute Annual Report 2014-2015

3.3 Indirect and Induced Effects: An Input-Output Model

Input-output (IO) analysis is the tool employed to measure the multiplied impacts of visitor expenditures at the three WH sites. The IO framework and uses of the model will be summarized briefly below, however a more detailed description of the theory and matrix algebra used to produce a functional IO model is provided in Appendix A.

The IO framework begins with a transaction table which describes the structure of an economy by the value of transactions between industries, consumers of final goods, and input factors. This table classifies the output of all industries in a region by final demand, and sales to other industries. Similarly, inputs purchased from other industries are distinguished from imports and value added (profits). When all information is present, the input and output values of all industries balance.

Using these transactional values, a functional model can be produced. Through the application of matrix algebra, the value of inputs required from all industries to produce a dollar's worth of output in a specific industry in a given region can be determined. Using the Leontief inverse, generalized ratios (referred to as direct technical coefficients) between the final demand in a specific industry and the inter-industry transactions generated in all other industries as a result can be calculated. With these coefficients, the output of all industries arising from a hypothetical increase in final demand in a specific industry can be determined.

For the purposes of this study, final demands entered into the IO models will be the direct spending of tourists after adjustments have been made for non-local sales taxes and various markup leakages in certain industries.

3.3.1 Assumptions Underlying an IO Model

Using an IO model (and the related multipliers) to estimate the impact of a change in final demand constitutes a form of comparative static analysis. Comparative static analysis is a method of economic analysis that compares the differences between two or more equilibrium states that result from changes in exogenous variables (Pass, et al. 1991). In conducting impact analysis using the IO framework, there are a number of key assumptions that must be recognized. These assumptions are given below, based on Hastings and Brucker (1993).

1. The output of each industry (sector) is produced with a single (unique) set of inputs. There exists no input substitution in the production process.
2. Resources are efficiently employed and the levels of inputs purchased by an industry (sector) are exclusively determined by the level of this industry's (sector's) output.
3. Technology is constant and there are no economies of scale or price effects in production.
4. There are no constraints on industry capacity. Whatever is demanded by industries as inputs can be supplied at current prices. Supply of inputs is infinite and perfectly elastic.
5. There exist no external economies of scale. Additional types of production do not increase the relative efficiency of other industries.
6. The distribution of domestic (local) and imported sales and purchases remains constant.

7. Household consumption patterns are fixed and linear. In other words, a dollar worth of income will be spent in the same manner, regardless of the level of income.

In summary, the IO framework assumes that relative prices and market structures remain constant, the state of technology and distribution of economic interactions are fixed, and the supply of inputs perfectly elastic. The probability that these assumptions will hold may be affected by the magnitude of change in final demand. For example, assumptions concerning perfect elasticity of input supply and economies of scale may hold for a small relative increase in final demand and inputs, but fail as a result of a proportionally significant increase.

For the purposes of this analysis, the Nova Scotia IO Model, produced by the Nova Scotia Department of Finance, will be used. However, given that we aim to quantify and compare the local spending effects, Service Canada Centres (SCCs) are used as geographical areas, as opposed to the entire province. An SCC is an area surrounding a Service Canada office, comprised of a multitude of smaller Census Subdivisions, from which the majority of that office's clientele would be reasonably expected to originate. They are used for this analysis due to their more ideal size and geographic distribution relative to alternative options: in Nova Scotia, Census Divisions correspond with counties, which are large and not ideally positioned (i.e., Grand-Pré is located in the southeast corner of Kings County rather than the centre). Census Subdivisions are too small and irregularly distributed to be practical. The SCCs used are Bridgewater (for Old Town Lunenburg), Amherst (for the Joggins Fossil Cliffs), and Kentville and Windsor (for The Landscape of Grand-Pré). For simplicity and clarity, these SCCs will henceforth

be referred to by a shortened version of the name of each associated UNESCO site: Lunenburg, Joggins, and Grand-Pré.

3.4 Location Quotient

To adjust the provincial-level IO model to each individual SCC, direct technical coefficients are adjusted using regional employment (due to the absence of regional output data) by industry, as per the location quotient (LQ) method (VanBlarcom and Backman 2007). The location quotient compares the relative importance of an industry to a region to the importance of that industry to the province, and adjusts the coefficients of the transaction matrix accordingly, as per Richardson (1972).

For industry i:

$$LQ_i = \frac{\frac{X_{ir}}{Xi}}{\frac{X_{in}}{X_n}}$$

Where:

LQ_i is the location quotient for industry i

X_{ir} is regional employment in industry i

X_i is total regional employment

X_{in} is national (provincial/state) employment in industry i

X_n is total national (province/state) employment

The numerator measures the proportion of regional output comprised by the given industry. The denominator measures the proportion of national (provincial/state) output comprised by the same industry. If the LQ is equal to or greater than one, then the region is specialized (relative to the nation/province/state) in this industry and produces enough output to satisfy regional demand (with excess production being exported). In this

instance, the national (provincial/state if applicable) coefficient in the transaction matrix is assumed to be correct for the local economy (Braschler and Devino, 1993). Conversely, if the location quotient is less than one, the regional coefficients for row i are estimated by multiplying the national (provincial/state) coefficient by the location quotient (Richardson, 1972). In this case a region is relatively less specialized in a specific industry than the province overall, it is assumed goods from that industry must be imported to the region and costs are treated as a leakage. In the Nova Scotia model, and the SCC model that is derived from it, it is assumed that wages are paid to local residents, profits are treated as leakages, and households are treated as an industry.

4 Potential Sources of Impact Differentials Across the Three UNESCO Sites

Entering total visitor expenditure into the IO models which have been adjusted to reflect the industry structure of the three SCCs in which the UNESCO WH sites are located reveals that total multiplied output varies significantly across locations. This section examines differences in visitor spending and resulting multiplied output at the three UNESCO sites through the following process: First, possible factors which may cause the level and industrial distribution of output to differ are proposed. Second, the influence of these factors on output are explored using two hypothetical IO model simulations. Finally, the results of these simulations, as well as various influences on visitor spending, will be discussed with reference to trends described in the literature review.

Total visitor spending is as follows:

- Old Town Lunenburg: $84,961,172
- Joggins Fossil Cliffs: $1,917,254
- The Landscape of Grand-Pré: $2,760,810

And total outputs derived from the IO model are as follows:

- Old Town Lunenburg: $99,437,102
- Joggins Fossil Cliffs: $2,216,647
- The Landscape of Grand-Pré: $3,263,706

Visitor spending and output by industry are stated in more detail in section 4.1.3.

A very large difference between Lunenburg and the other two sites is immediately apparent, with both visitor spending and total multiplied output being more than 30 and

40 times greater than Grand-Pré and Joggins respectively. It should also be noted that total multiplied output ranges from 15.6% greater than visitor spending (in Joggins) to 18.2% greater in Grand-Pré. It is possible that the assumptions of the IO model are less likely to hold in Lunenburg as a result of the magnitude of output arising from visitor spending. However, the proportion of output resulting from tourism relative to total regional output may be small enough that the assumptions do hold.

Three factors are proposed which may affect the output of specific industries in a region resulting from visitor expenditure:

1. Structural differences in the WH site local economies (accounted for by IO models): Differences in inter-industry transactions arising from intrinsic structural differences in regional economies could result in similar expenditures at different sites producing differing levels of total output. This is investigated by entering identical levels of visitor spending in IO models for all three SCCs and comparing the results.
2. Differences in the distribution of tourist spending across industries: Holding total expenditure constant, differences in the industry allocation of spending may result in different multiplied outputs. In other words, differences in how visitors spend their money can produce different total impacts even if total expenditures are constant. This is determined by preserving the proportions of visitor spending specific to each region but scaling expenditures to create a hypothetical spending profile with a total sum of $1,000.
3. Differences in other factors: the amount and allocation of spending by visitors is influenced by a wide variety of other factors such as local price levels, availability

of attractions and visitor origin. These are discussed based on specific site/visitor characteristics.

4.1.1 Variations in Local Economy and Industrial Structure

This simulation involves a hypothetical tourist spending $1,000 at each site, based on the distribution between industry of the average visitor to Nova Scotia.[7] These inputs are entered uniformly into the IO models for each region. Any differences in outputs are therefore the result of differences in the industrial composition (economic structure) of each region.

The hypothetical expenditures are derived from the 2010 Nova Scotia Visitor Exit Survey (hereinafter referred to as "Exit Survey"), which was prepared for the province's former Department of Economic and Rural Development and Tourism. This survey classifies type of expenditure by aggregated Standardized Industrial Classification (SIC) codes which are of interest to the tourism industry, and also distinguishes visit type. Visit types are: business; pleasure; visiting family and relatives; and overall (which is an average of the former three classifications). For the purpose of this analysis, pleasure visitors are deemed to be the most relevant, and their expenditures are used.

While the industry classification used in the IO model is in accordance with the North American Industrial Classification System (NAICS), the types of expenditure in the Exit Survey are not. Hence, types of expenditure from the Exit Survey are allocated into the most relevant NAICS categories (as decided by the author) before being entered into the IO model.

[7] $1000.00 was determined to be minimum amount required to produce output figures detailed enough to be practical for the purposes of comparison. Source for distribution is 2010 Nova Scotia Visitors Exit Survey.

Following this classification, input expenditures are as follows:

NAICS Industry	*All SCCs*
Retail Trade	$279.02
Transportation	$88.26
Accommodation & Food Services	$517.99
Other services	$113.37
TOTAL	$1000.00

Table 4-1

Outputs derived from the IO models by site are as follows:

NAICS Industry	*Grand-Pré*	*Lunenburg*	*Joggins*
Agriculture	$8.78	$8.79	$8.76
Forestry and Logging	$1.42	$1.45	$1.39
Fishing, Hunting and Trapping	$0.47	$5.24	$2.44
Support Activities for Agriculture and Forestry	$1.25	$1.25	$1.25
Mining	$0.60	$0.48	$0.59
Utilities	$17.85	$23.26	$14.49
Construction	$11.03	$10.98	$8.89
Food Manufacturing	$42.66	$42.72	$42.65
Other Manufacturing	$30.20	$30.62	$29.89
Wholesale Trade	$54.30	$51.84	$55.48
Retail Trade	$103.48	$103.27	$103.24
Transportation	$95.91	$94.01	$95.58
Finance, Insurance, Real Estate	$123.00	$119.53	$119.02
Business Services	$10.93	$11.96	$9.30
Accommodation and Food Services	$537.69	$538.58	$538.31
Other Services	$119.45	$120.48	$118.67
Hospitals Health Care	$5.74	$5.69	$5.69
Education	$6.05	$5.35	$5.81
Government	$3.13	$2.36	$3.12
Households	$416.41	$416.44	$413.93
TOTAL	$1,173.93	$1,177.86	$1,164.60

Table 4-2

It is apparent that the inter-industry transactions resulting from the expenditures of an average out-of-province visitor are generally quite similar regardless of SCC. The majority of industries which account for larger output amounts vary less than 5% across SCCs (i.e., Retail Trade or Finance, Insurance, Real Estate), while industries experiencing significant proportional variation across SCCs (i.e., Fishing, Hunting and

Trapping) account for little output in dollar terms. These trends indicate that inputs concentrated among the NAICS codes relevant to tourist expenditures result in little output variation between SCCs. Therefore, variations in UNESCO site tourist spending impacts cannot be attributed to structural differences in the local economies of the regions in which the WH sites are located.

Overall, the extent to which $1,000 of tourist expenditure produces a total multiplier effect on output varies slightly across SCCs: total output in Grand-Pré is about 0.8% greater than in Joggins and about 0.08% less than Lunenburg. As IO model location quotients are adjusted based on employment by industry, the general lack of variation in indirect and induced output can be attributed to highly similar labour markets across the three SCCs. Specific industries traditionally dominated employment these regions, though in recent decades a decline of primary sector employment coupled with an increase in importance of the service sector employment has resulted in a high degree of homogeneity in labour markets throughout rural Nova Scotia. Thus, inter-industry transactions are quite similar regardless of location.

Additionally, out of necessity (as it relates to firm-specific confidentiality), a large number of industries have been aggregated into the 15 classifications present in the IO models used for this analysis, which may cause some differentiation between SCCs to be lost. Finally, regions with a greater degree of specialization than the provincial average in a specific industry according to the location quotient model default to the provincial value for that industry. Thus, if two regions are highly specialized in the same industry but to different degrees, they will both revert to the provincial transaction value and hence be identical.

4.1.2 Simulation II: Variations in the Distribution of Visitor Spending

Survey spending data from the three UNESCO WH sites reveals that visitors allocate spending differently across expenditure categories depending on which site is being visited. This simulation isolates differences in the distribution of spending by allocating the standardized sum of expenditures to $1,000.00 (as in Simulation I) according to actual distribution for each site. Entering these standardized amounts into the IO models quantifies differences in output resulting from spending patterns.

Total spending is as follows:

NAICS Industries	*Grand-Pré*	*Lunenburg*	*Joggins*
Retail Trade	$277.71	$294.52	$293.63
Transportation	$18.79	$108.71	$55.68
Accommodation & Food Services	$625.38	$551.52	$570.60
Other services	$78.12	$45.25	$80.08
TOTAL	$1000.00	$1000.00	$1000.00

Table 4-3

Outputs are as follows:

NAICS Industries	*Grand-Pré*	*Lunenburg*	*Joggins*
Agriculture	$10.02	$9.14	$9.34
Forestry and Logging	$1.46	$1.44	$1.40
Fishing, Hunting and Trapping	$0.52	$5.47	$2.61
Support Activities for Agriculture and Forestry	$1.42	$1.30	$1.33
Mining	$0.61	$0.49	$0.59
Utilities	$19.04	$23.26	$14.79
Construction	$11.09	$11.43	$8.91
Food Manufacturing	$49.67	$44.63	$45.95
Other Manufacturing	$26.60	$30.70	$27.75
Wholesale Trade	$54.64	$53.37	$57.16
Retail Trade	$103.31	$106.17	$106.07
Transportation	$22.86	$114.46	$61.19
Finance, Insurance, Real Estate	$126.75	$120.86	$120.08
Business Services	$10.73	$11.49	$9.10
Accommodation and Food Services	$644.80	$570.95	$590.32
Other Services	$83.62	$51.84	$85.01
Hospitals Health Care	$5.72	$5.71	$5.63
Education	$6.08	$5.28	$5.76
Government	$3.22	$2.38	$3.16
Households	$416.99	$418.28	$411.24
TOTAL	$1,182.15	$1,170.38	$1,156.16

Table 4-4

Given that the models exhibited little differences in Simulation I, variations emerging here can be linked directly to industry variations in visitor spending distribution. Most notably, Transportation and Other Services are significantly different across the three SCCs in both the visitor spending and hence output figures, largely due to differences in visitor origin and mode of transportation. Most industries in which direct spending has been allocated, such as Accommodation and Food Services, produce a slight multiplier effect in total output in that industry, as well as modest demand for intermediate goods in a variety of others. For example, the hypothetical $625 spent in Accommodation and Food Services in Grand-Pré results in $640 of output in that industry, $99 in Finance, Insurance and Real Estate, $47 in Food Manufacturing and

smaller amounts in a variety of other sectors. Retail Trade is unique as it results in less output than spending, due to the large proportion of imported inputs which leak from the regional economy. Overall, output resulting from $1,000.00 total demand in this simulation produces demands varying by $25.99 or approximately 2.2% between regions, which is a *greater* variation than when uniform spending distribution is used. This indicates, for example, that structural and transactional differences result in less induced output in Joggins, and that the spending profile of visitors to the Joggins Fossil Cliffs compounds this phenomenon.

4.1.3 Simulation III: Actual Expenditure Site Visitor

This simulation uses actual spending estimates to produce total output for each site. First, Table 4-5 displays the total visitor spending by site, which is the product of the average spending profile of each visitor and the total estimated visitation. Table 4-6 reports the total output derived using the IO model for total visitation. This exercise produces the figures mentioned at the beginning of this section:

Total visitor spending is as follows:

- Old Town Lunenburg: $84,961,172
- Joggins Fossil Cliffs: $1,917,254
- The Landscape of Grand-Pré: $2,760,810

And total outputs are as follows:

- Old Town Lunenburg: $99,437,102
- Joggins Fossil Cliffs: $2,216,647
- The Landscape of Grand-Pré: $3,263,706

Total visitor spending is as follows:

NAICS Industries	*Grand-Pré*	*Lunenburg*	*Joggins*
Retail Trade	$766,707.10	$25,022,614.78	$562,962.60
Transportation	$51,866.21	$9,236,024.46	$106,761.56
Accommodation & Food Services	$1,726,551.62	$46,857,969.03	$1,093,986.58
Other services	$215,685.42	$3,844,563.55	$153,542.85
Total	$2,760,810.34	$84,961,171.83	$1,917,253.59

Table 4-5

Outputs are as follows:

NAICS Industries	*Grand-Pré*	*Lunenburg*	*Joggins*
Agriculture	$27,668.11	$776,592.03	$17,904.21
Forestry and Logging	$4,031.01	$122,609.66	$2,682.94
Fishing, Hunting and Trapping	$1,427.52	$464,782.94	$5,001.97
Support Activities for Agriculture and Forestry	$3,931.90	$110,597.95	$2,546.36
Mining	$1,694.82	$41,633.58	$1,139.28
Utilities	$52,572.10	$1,976,624.29	$28,354.91
Construction	$30,611.00	$971,348.51	$17,073.96
Food Manufacturing	$137,117.91	$3,792,210.96	$88,102.42
Other Manufacturing	$73,437.58	$2,608,190.98	$53,205.26
Wholesale Trade	$150,838.17	$4,534,114.68	$109,592.09
Retail Trade	$285,219.91	$9,020,196.63	$203,354.14
Transportation	$63,124.82	$9,724,455.30	$117,311.70
Finance, Insurance, Real Estate	$349,927.35	$10,268,824.46	$230,231.55
Business Services	$29,626.27	$976,170.90	$17,441.97
Accommodation and Food Services	$1,780,161.37	$48,508,687.19	$1,131,793.97
Other Services	$230,856.12	$4,404,175.88	$162,992.67
Hospitals Health Care	$15,779.58	$485,244.53	$10,803.42
Education	$16,781.25	$448,847.76	$11,051.13
Government	$8,898.88	$201,793.93	$6,062.88
Households	$27,668.11	$776,592.03	$17,904.21
TOTAL	$3,263,705.68	$99,437,102.13	$2,216,646.84

Table 4-6

For the purpose of investigating the different impacts of each visitor to the individual sites, Tables 4-7 and 4-8 display per-person expenditure and total output

respectively. It is obvious that individual expenditure to each site varies significantly, resulting in large differences in total multiplied spending per person.

Total visitor spending inputs are as follows:

NAICS Industries	*Grand-Pré*	*Lunenburg*	*Joggins*
Retail Trade	$31.17	$83.41	$29.63
Transportation	$2.11	$30.79	$5.62
Accommodation & Food Services	$70.20	$156.19	$57.58
Other services	$8.77	$12.82	$8.08
Total	$112.24	$283.20	$100.91

Table 4-7

And induced output is as follows:

NAICS Industries	*Grand-Pré*	*Lunenburg*	*Joggins*
Agriculture	$1.12	$2.59	$0.94
Forestry and Logging	$0.16	$0.41	$0.14
Fishing, Hunting and Trapping	$0.06	$1.55	$0.26
Support Activities for Agriculture and Forestry	$0.16	$0.37	$0.13
Mining	$0.07	$0.14	$0.06
Utilities	$2.14	$6.59	$1.49
Construction	$1.24	$3.24	$0.90
Food Manufacturing	$5.57	$12.64	$4.64
Other Manufacturing	$2.99	$8.69	$2.80
Wholesale Trade	$6.13	$15.11	$5.77
Retail Trade	$11.60	$30.07	$10.70
Transportation	$2.57	$32.41	$6.17
Finance, Insurance, Real Estate	$14.23	$34.23	$12.12
Business Services	$1.20	$3.25	$0.92
Accommodation and Food Services	$72.37	$161.70	$59.57
Other Services	$9.39	$14.68	$8.58
Hospitals Health Care	$0.64	$1.62	$0.57
Education	$0.68	$1.50	$0.58
Government	$0.36	$0.67	$0.32
Households	$1.12	$2.59	$0.94
TOTAL	$132.69	$331.46	$116.67

Table 4-8

Differences in spending profiles can likely be generally attributed to the characteristics of each site: Lunenburg is a popular overnight destination, reflected in part by differences in Accommodation and Food Services spending. It has an extensive retail industry, and accommodations are characterized by a large proportion of more highly priced bed and breakfasts. Conversely, Grand-Pré and Joggins are more geographically isolated from businesses providing goods and services which are explicitly targeted at tourists.

The resulting differences in output in this simulation are extensive and cannot be quickly summarized. Overall, per-person spending at Lunenburg is more than double than at Joggins or Grand-Pré (as are outputs). While variations across SCCs in expenditure on Retail Trade and Accommodations and Food Services correspond with variations of total expenditure, amounts spent on Transportation for Lunenburg visitors were 5 and 13 times greater than in Joggins or Grand-Pré respectively.

4.2 Discussion

As demonstrated, the major total differences in economic impacts resulting from direct spending by visitors to the UNESCO WH sites do not result from structural differences in the regional economies or distributional differences in spending across industries, but from variations in the expenditures of visitors. Average total per-person expenditure in the Town of Lunenburg, for example, was 281% greater than at the Joggins Fossil Cliffs, and 252% greater than at Grand-Pré. Visitor expenditures, in turn, are influenced to a great degree by the site's marketing, the type of site and local amenities. To further discuss visitor spending, the original survey estimates of

expenditure by category (which have previously been condensed into NAICS categories for us in the IO model) are shown below.

NAICS Industries	*Grand-Pré*	*Lunenburg*	*Joggins*
Accommodation	$39.96	$83.47	$32.62
Food	$29.91	$67.42	$24.96
Groceries and Liquor	$8.54	$12.40	$8.94
Vehicle Rental	$2.11	$30.79	$5.62
Misc. Shopping	$14.09	$29.09	$6.57
Vehicle Expenditure	$8.54	$41.92	$14.13
Museum Admission	$7.98	$7.72	$8.07
Tour Package	$0.33	$5.31	$0.00
Other	$0.79	$5.09	$0.01

Table 4-9

While tourist spending is higher in every category in Lunenburg, a large proportion of the total difference arises from expenditures in Accommodation and Food. As these are necessities which will be strongly correlated to the length of stay, it is possible that average visit duration has contributed to the differences. The surveys indicate that the average length of stay in Lunenburg was 1.9 nights, as opposed to 1.49 for Grand-Pré and 1.6 for Joggins. Thus, length of stay does not fully account for the difference in accommodation expenditure: stays in Lunenburg were 28% longer than Grand-Pré while Accommodation expenditure was 109% greater; and stays in Lunenburg were 19% longer than Joggins while expenditure was 156% higher. This may indicate that costs do not escalate linearly, or that expenditure in Lunenburg is higher for all lengths of visit. Examining food expenditure reveals a similar trend of disproportionately high spending in Lunenburg. It follows that the average price of one meal and/or one night of accommodation purchased by survey respondents in Lunenburg was significantly higher than at Grand-Pré and Joggins.

4.2.1 Influences of Categorized Expenditure Differences

A quick survey of the municipal websites of Lunenburg and the town of Amherst shows that while the majority of beds available in Amherst are in large, franchised brand hotels in close proximity to the Trans-Canada Highway, Lunenburg is dominated by small inns, bed and breakfasts and boutique hotels. These differences may indicate that, to generalize, accommodations in Lunenburg are focused on providing an historically authentic experience with more personalized service, while accommodations in Amherst mostly serve travellers passing through on the Trans-Canada Highway who are seeking a familiar, economical brand for expedient lodging. Therefore, there may be a relationship between the dominant accommodation style and the nightly per-visitor spending reported. The area surrounding Grand-Pré is populated by fewer major chain hotels and bed and breakfasts, and survey respondents on average stayed the shortest period of time while visiting this site. As this area is neither a leading tourist destination in the province nor situated near a major provincial entry point, this is unsurprising.

For food and miscellaneous shopping expenditures, a similar pattern is evident. Lunenburg hosts a large number of specialty seasonal shops and restaurants ostensibly targeted at the town's summer tourist population, while Amherst has an abundance of lower priced chain restaurants and retail outlets serving travellers on the Trans-Canada Highway and local year-round residents. Communities with restaurants and retail services in the study area surrounding Grand-Pré (such as Wolfville) have mixture of economical and cultural niche establishments, and visitors to that site reported spending amounts less than Lunenburg but greater than Joggins.

Expenditure on vehicle rentals, and other costs associated with using a vehicle, were also substantially higher for visitors to Lunenburg. Data from the 2010 Nova Scotia Visitors Exit Survey indicates that the tourist regions in which Joggins and Grand-Pré are located are characterized by a large proportion of visitors originating in Atlantic Canada and travelling by car. Conversely, 47% of visitors the South Shore (the tourism region in which Lunenburg is located) arrived by air, and were more likely to be from the United States or overseas. In comparison, 33% of visitors to the Bay of Fundy and Annapolis Valley region (in which Grand-Pré is located) arrived by air, while just 27% of visitors to the Northumberland Shore did (Joggins is situated near the border dividing these two regions). Renting a vehicle is a virtual requirement for those arriving by air due to a general lack of public transportation in Nova Scotia, which would increase the average vehicle expenditure reported by respondents in Lunenburg compared to the other locations.

4.2.2 Reported and Theoretical Effects of UNESCO World Heritage Status on Expenditure

The significant differences in spending profiles at the three sites correspond to a number of points mentioned in the literature review with respect to realizing the potential economic impact of WH designation. Prud'homme (2008) discussed the relative importance of sites' actions following designation in determining the realization of socio-economic benefits, while Cárdenas-García et al. (2014) specifically state that unique products and experiences which authentically reflect the image of a UNESCO designation are instrumental in influencing tourist expenditure. In this way, Lunenburg's concerted effort to develop its tourism industry following the collapse of the cod fishery,

and the resultant emergence of dozens of bed and breakfasts, restaurants, shops, and diverse attractions demonstrate the site's deliberate attempt to create a well-rounded destination with broad appeal. The WH designation specifies the preservation of historic architecture, local culture and colonial town plan, but many of the goods and services consumed by tourists there are only tangentially related to those characteristics. While the designation is beneficial in consolidating the site's brand, the resources available to visitors are appealing to a wide range of tourist types.

Conversely, the other two sites examined have received WH status more recently than Lunenburg, and to date, little to no development of nearby establishments targeted toward site tourists has occurred. The UNESCO sites at Joggins and Grand-Pré each have a single interpretive resource: the Joggins Fossil Institute and Grand-Pré National Historic Site, respectively. Otherwise, both immediate areas lack establishments, though basic amenities are available within a few kilometers. While Grand-Pré is adjacent to a major provincial highway and close to communities with accommodations and attractions, Joggins is noteworthy in its geographic isolation, being 30km from the Trans-Canada Highway on a sparsely populated and undeveloped route. It should be noted that in recent years, Grand-Pré has become characteristically distinguished from Joggins by the rapid growth of a local wine industry. Tours and activities based on the concentration of vineyards and wineries situated within 10km of Grand-Pré have become a popular and lucrative subset of the local agriculture industry, and may represent an opportunity to retain visitors to the Grand-Pré WH site for a longer period of time.

Regardless of tourist exposure to nearby businesses and attractions, other questions from the survey provide some insight into the influence of the WH designation

on tourists' decisions to visit the sites. Of respondents who answered whether they had prior knowledge of the UNESCO sites, visitors to Lunenburg were most likely to know of the inscription, with approximately 63% answering "yes." Rates for Joggins and Grand-Pré were 56% and 51% respectively. A possible explanation for this difference could be the amount of time that elapsed between the WH inscription of Old Town Lunenburg and the survey date (14 years), as opposed to Joggins and Grand-Pré (three years and one year, respectively). Lunenburg's status as a WH site has been a component of its marketing media for longer than a decade, increasing the probability that a visitor is aware of the designation, compared to sites which have only been UNESCO sites for a few years. Lunenburg also tends to appear with more frequency in Nova Scotia tourism promotional literature, increasing the likelihood that a given tourist would have encountered a promotion touting the designation.

When asked whether the UNESCO designation had impacted their decision to visit a site, respondents answering "yes" were the minority at all locations, but with some variation. 36% of respondents at Joggins stated "yes", compared to 32% at Grand-Pré and 28% at Lunenburg. These figures create ambiguity concerning the effect of the WH designation—while awareness of the UNESCO designation at Lunenburg is more prevalent and individual expenditure is higher than at the other sites, the WH designation's impact on the decision to visit is weakest. Respondents were then asked to rate the influence of the UNESCO designation on their decision to visit the site, on a scale from 0 to 10. Of those who answered, visitors to Lunenburg were more likely to rank the designation as a major influence, with approximately half selecting from 7 to 10, whereas responses for Joggins were slightly less enthusiastic with a high concentration of

rankings in the 5 to 7 range. This question was not posed to visitors to Grand-Pré. While these responses seem to contradict each other to some degree, it is prudent to note that only a portion of total respondents answered each of these questions, with some answering one but not the other.

Finally, another question queried the intent of tourists to visit other sites in the area. 74% of respondents in Lunenburg indicated "yes," while only 39% of respondents in Joggins did. Grand-Pré was in between, with 60%. This is perhaps unsurprising given the density of attractions in proximity to the respective sites.

These figures, combined with the characteristics of the sites and other literature on the subject, shed light on the site-specific profiles of visiting tourists and their differences in spending. For instance, the lower proportion of tourists who stated that the UNESCO inscription impacted their decision to visit Lunenburg coupled with a high percentage who were aware of the designation may indicate a large body of tourists whose attention was drawn to WH brand marketing, but whose decision to visit was motivated more by local amenities and attractions than the designation itself. Conversely, the figures for Joggins could indicate that while the site's inscription is not as widely known as Lunenburg, it may be effective at motivating tourists to travel to a distant area where they do not expect to find other attractions. The middling figures for Grand-Pré and its position among other tourist attractions suggest a mixture of tourists interested in the UNESCO designation and visitors who learned of the site through other means.

5 Summary and Conclusions

As explained in the Introduction (Chapter 1), the goal of this study was to estimate the direct spending and total output arising from visitation to Nova Scotia's three UNESCO WH sites, and examine variation across the sites. Possible determinants which were discussed included regional industry structure, spending distribution by industry, visitor profiles, and site characteristics.

In Chapter 2, a review of literature revealed mixed and uncertain conclusions about the effect of WH designation on visitation. For example, existing studies point to greater visitation in sites with WH inscription in the United States (Galvin 1997). Conversely, other authors claim that no such relationship exists in the United Kingdom and an attempt to quantify the effect of inscription on sites in Australia was deemed impossible due to other influences (Buckley 2004). It has been asserted that the potential for increased visitation is greater for smaller, less well-known sites, and that the benefit of increased visitation is further improved as WH status may attract a larger proportion of tourists of international origin who tend to stay longer and spend more (Van der Aa 2005, Kaltenborn, et al. 2013). It was also noted that realizing the potential benefits of increased visitation and spending depends largely on other actions of the site, such as strong marketing and encouragement of spin-off industries (Rebanks Consulting Ltd and Trends Business Research Ltd 2009, Cárdenas-García, Pulido-Fernández and Mudarra-Fernández 2014). However, due to the dominance of qualitative benefits in both the literature and the rationale for nomination, relatively few quantitative economic impact analyses have been conducted.

In Chapter 3, the methods of estimating the total induced output of visitation and exploring possible factors that determine output were explained. First, visitor spending data obtained from surveys administered at WH sites was adjusted for inflation and multiplied by total visitation to estimate total final demand at the three sites. Total demand induced by visitors was calculated by using a regionally adjusted IO model which accounts for inter-industry transactions (due to the use of intermediate goods from various industries in producing a final good) and leakages as a result of imports.

In Chapter 4, it was determined that for both final demand and output, wide variations between sites exist, with output ranging from $2,216,647 in Joggins to $99,437,102 in Lunenburg. To try to account for these variations, two additional IO model simulations based on hypothetical levels of final demand were performed. First, the spending distribution of a hypothetical leisure tourist to Nova Scotia was entered identically into all three regional IO models to determine whether differences in inter-industry transactions play a substantial role in induced output. This simulation yielded outputs by industry that were quite similar across all regions, varying by just 1.1% overall, indicating that structural differences in local economies do not have a substantial impact on the level and distribution of induced output. This is due to similarities in regional employment by industry, on which the IO model adjustments are based.

Second, as distribution of spending (in percentage terms) of visitors varies from site to site, a hypothetical spending profile with a total expenditure of $1,000 but distributed between industries in proportions consistent with reported expenditures at specific sites was entered into the IO model. This was to evaluate the possibility of visitors to a specific site allocating more of their spending toward goods produced by

industries which induce larger levels of output. For example, biasing spending toward industries with few regional leakages and a high dependence on locally produced intermediate goods may have resulted in greater induced output. The results indicated a variation of 2.2% in total output between the highest and lowest sites, indicating that spending distribution creates more variation than industry structure variations caused. However, differences resulting from this factor were still quite modest.

Using the IO models it was determined that, in per-dollar terms, economic structure and distribution of direct spending is responsible for little variation in total output across these three WH sites. In per-person terms, however, it is apparent that visitor spending in Lunenburg eclipses spending at Joggins and Grand-Pré, despite relatively small variations in the average length of visit. Through a discussion of qualitative differences such as location, visitor original, cost of local services and amount/diversity of nearby attractions, it was hypothesized that per-person spending in Lunenburg is relatively high due to a number of factors. Lunenburg has a large number of unique, seasonal boutique establishments which are linked to the town's culture and history, allowing the region to capitalize more extensively on the site's WH inscription, consistent with the claims of several authors noted in the literature. It also has a large number of unrelated tourism-based establishments which may appeal to tourists who are uninterested in the town's widely-publicized WH status. Visitors to the town are more likely to originate from further away and stay longer than visitors to Joggins and Grand-Pré, which corresponds with greater levels of expenditure, on average.

Visitor data indicates that visitors to Joggins and Grand-Pré are less likely to know of the UNESCO inscription, but more likely to cite it as a motivation to visit those

sites than visitors to Lunenburg. However, due to the smaller number of nearby businesses, visitors to these sites are less likely to visit other attractions in close proximity, which is reflected by their average spending profiles. A subjective evaluation of local businesses indicates that firms located near Joggins and Grand-Pré tend to be less culturally specialized to the WH site than those in Lunenburg, which may reduce the appeal of novelty to visitors. This, combined with a possible difference in pricing for substitute service (i.e. motels vs. bed and breakfasts), reduces the ability of these two sites to encourage UNESCO based tourists to spend money within the region.

Overall, the analyses here indicate that of the three UNESCO sites in Nova Scotia, visitor expenditure and total output in surrounding regions varies mostly because of qualitative differences in local attractions. Secondarily, the distribution of spending by industry, and the economic structure of the respective regions induce small discrepancies in output. These trends suggest that to increase the economic impact of visitation to Joggins and Grand-Pré (or WH sites outside of Nova Scotia), the development of complimentary services and attractions in the geographic vicinity of those WH sites should be a top priority. Furthermore, attempts to increase levels of visitation by tourists originating from distant locations and/or arriving by air may increase average individual expenditure and length of stay, compared to tourists who arrive by car.

6 Appendix A: IO model

The following, patterned on Hefner, (1994) and Taylor et al, (1992), describes how the transaction table can be transformed into an IO model.

Table 6-1 shows a simplified economy, illustrating each industry's sales (dollar value) to other industries and to final consumers. It also shows each industry's purchases from all other industries as well as a value added (comprised of household income from wages and profits and subsequently referred to as households). The total value of output (sales revenue) for each industry equals the total value of input purchases (expenditures). Profits are the balancing item between revenues and expenditures.

Sales across Purchases down	*Construction*	*Manufacturing*	*Final Demand*	***Total Output***
Construction	**$200**	**$100**	$700	$1000
Manufacturing	**$300**	**$400**	$600	$1300
Value Added (Households)	$125	$200	$75	$400
Imports	$375	$600	$225	$1200
Total Inputs	$1000	$1300	$1600	$3900

Table 6-1

Reading down the industry columns of Table 6-1 shows the total dollar value of inputs purchased from other industries as well as payments to value added (to households for wages/profits) and imports. Thus, in this example, the construction industry purchases $1000 of inputs (the sum of the first column), of which $200 is from the construction industry, $300 from the manufacturing industry, $125 from households (labor inputs) and imports of $375.

Reading across the table gives the dollar value of output (sales) for a given industry, in terms of intermediate sales to other industries and to final consumers (final demand). For example, the manufacturing industry has sales of $300 to the construction industry, $400 to the manufacturing industry and $600 to final consumers. For any given industry, the total value of output (sales) is the sum of the intermediate sales and final demand sales.

Table 6-2 re-states Table 6-1 using generalized notation. The column sums from Table 6-2 have been omitted since they are equal to the row sums. In Table 6-2, subscript i denotes a given row and subscript j a given column. For example, the entry in the first row, first column, has i = 1 and j =1, and is denoted Z_{11}. The element in the first row, second column has i = 1, j =2, and is denoted Z_{12}. Similarly Z_{21} denotes the value in the second row, first column.

Sales across Purchases down	*Construction*	*Manufacturing*	*Final Demand*	***Total Output***
Construction	**Z_{11}**	**Z_{12}**	F_1	X_1
Manufacturing	**Z_{21}**	**Z_{22}**	F_2	X_2
Value Added (Households)	Z_{31}	Z_{32}	F_3	X_3
Imports	Z_{41}	Z_{42}	F_4	X_4

Table 6-2

$_i$ designates a row, $_j$ designates a column

Z_{ij} = inter-industry flow from industry $_i$ to industry $_j$

F_i = final demand of industry $_i$

X_i = total output of industry $_i$

For any given industry, the total value of output (sales) is the sum of the intermediate sales and final demand sales. This can be re-stated equivalently as a system of linear equation (using the notation from Table 6-2) as follows:

$$X_1 = Z_{11} + Z_{12} + F_1$$

$$X_2 = Z_{21} + Z_{22} + F_2$$

$$X_3 = Z_{31} + Z_{32} + F_3$$

$$X_4 = Z_{41} + Z_{42} + F_4$$

Or generally as:

$$X_i = Z_{i1} + Z_{i2} + F_i$$

The total output from each industry is the sum of the intermediate demand and the final demand. In matrix notation:

$$X = Z + F$$

Where

X = total output vector

Z = intermediate demand vector

F = vector of final demand

The square 2x2 matrix designated in bold print in Table 6-1 (specific form) and Table 6-2 (generalized form) is shown as Table 6-3, and constitutes what is known as an inter-industry transaction matrix. This matrix contains sales and purchases of intermediate goods. Intermediate goods are those used as factor inputs in producing other goods. In other words, goods sold to other firms for further processing, prior to sale to consumers (final demand). Table 6-1 shows that the construction industry purchases $200 worth of intermediate products from the construction industry and $300 worth of

intermediate products from the manufacturing industry. In general terms, a given row (i) illustrates intermediate sales by industry (i), to other industries. Similarly, a given column (j) illustrates intermediate purchases made by industry (j) from other industries.

Sales across Purchases down	*Construction*	*Manufacturing*	*Final Demand*	***Total Output***
Construction	**$200 | Z_{11}**	**$100 | Z_{12}**	F_1	X_1
Manufacturing	**$300 | Z_{21}**	**$400 | Z_{22}**	F_2	X_2

Table 6-3

Data from the inter-industry matrix can be used to calculate the direct inputs required per dollar of output (sales) for each industry. Dividing the inter-industry elements by the total industry sales (which is, by definition, equivalent to total industry purchases) produces the direct (technical) coefficients. Stated mathematically using generalized notation:

$$a_{ij} = \frac{Z_{ij}}{X_j}$$

Where: a_{ij} represents the value of inputs from industry i necessary to produce a dollar's worth of output in industry j; Z_{ij} is the dollar value of inputs from industry i used in the production of industry j output; and X_j is the dollar value of output (and inputs) from industry j.

Rearranging the previous equation gives:

$$Z_{ij} = a_{ij} \times X_i$$

Re-stating in matrix form:

$$Z = AX$$

Where:

Z = inter-industry transaction vector

A = matrix of direct technical coefficients

X = total output vector

These direct coefficients show the direct inputs (purchases) required per dollar of output (sales). The coefficients make up what is known as a direct requirement (coefficient) matrix (often referred to as an "A" matrix).

$$\begin{bmatrix} \frac{Z_{11}}{X_1} & \frac{Z_{12}}{X_2} \\ \frac{Z_{21}}{X_1} & \frac{Z_{21}}{X_2} \end{bmatrix} = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} = A$$

A direct requirement matrix using data from the previous hypothetical example is shown in below. These technical coefficients show that $.20 worth of construction inputs and $.40 worth of manufacturing inputs are required to produce $1.00 of construction output. It further takes $.08 of construction inputs and $.31 of manufacturing inputs to produce a dollar of manufacturing output.

$$\begin{matrix} Con: \\ Mfg: \end{matrix}\begin{bmatrix} \frac{200}{1000} & \frac{100}{1300} \\ \frac{300}{1000} & \frac{400}{1300} \end{bmatrix} = \begin{matrix} Con: \\ Mfg: \end{matrix}\begin{bmatrix} .2 & .08 \\ .3 & .31 \end{bmatrix} = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} A$$

The data contained in the direct requirements matrix serves to quantify (on a per dollar basis) sales and purchases between the construction and manufacturing industries. The direct requirement matrix is a critical element in an input output model. It will be combined with the basic IO accounting identity (which states that total output equals intermediate demand plus final demand) via matrix algebra to produce an IO model.

Recalling $X = Z + F$

Where:

X = total output vector

Z = intermediate demand vector

F = vector of final demand

Substituting $Z = AX$ into the previous equation gives:

$$X = AX + F$$

In terms of the given example:

$$\begin{bmatrix} X_1 \\ X_2 \end{bmatrix} = \begin{bmatrix} .2 & .08 \\ .3 & .31 \end{bmatrix} \times \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} \times \begin{bmatrix} F_1 \\ F_2 \end{bmatrix}$$

Equivalently, as a system of linear equations:

$$X_1 = 0.2X_1 + 0.08X_2 + F_1$$

$$X_2 = 0.3X_1 + 0.31X_2 + F_2$$

By subtraction:

$$X - AX = F$$

In terms of the given example:

$$\begin{bmatrix} X_1 \\ X_2 \end{bmatrix} - \left(\begin{bmatrix} .2 & .08 \\ .3 & .31 \end{bmatrix} \times \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} \right) = \begin{bmatrix} F_1 \\ F_2 \end{bmatrix}$$

As a system of linear equations:

$$X_1 - 0.2X_1 - 0.08X_2 = F_1$$

$$X_2 - 0.3X_1 - 0.31X_2 = F_2$$

Factoring equation gives:

$$(I - A) \times X = F$$

Where I is an identity matrix (a matrix with ones along the main diagonal and zeros elsewhere). Note that the product of multiplying a matrix by an identity matrix is the original matrix.

In terms of the given example:

$$\left(\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix} - \begin{bmatrix}.2 & .08\\ .3 & .31\end{bmatrix}\right) \times \begin{bmatrix}X_1\\ X_2\end{bmatrix} = \begin{bmatrix}F_1\\ F_2\end{bmatrix}$$

Which is equivalent to:

$$\begin{bmatrix}.8 & -.08\\ -.3 & .69\end{bmatrix} \times \begin{bmatrix}X_1\\ X_2\end{bmatrix} = \begin{bmatrix}F_1\\ F_2\end{bmatrix}$$

As a system of linear equations:

$$8X_1 - 0.08X_2 = F_1$$

$$-0.3X_1 - 0.69X_2 = F_2$$

By multiplication of the $(I - A)$ inverse, equation becomes:

$$(I - A)^{-1}(I - A)X = (I - A)^{-1}F$$

Rewriting equation:

$$X = (I - A)^{-1}F$$

Where $(I - A)^{-1}$ is matrix $(I - A)$ inverted. Note that dividing $(I - A)$ is equivalent to multiplying by $(I - A)^{-1}$ in equation. The term $(I - A)^{-1}$ is called the Leontief inverse. The numerical result of $(I - A)^{-1}$ using this example is given below.

$$(I - a)^{-1} = \begin{bmatrix}1.3043 & .1449\\ .5652 & 1.5072\end{bmatrix}$$

In terms of the given example:

$$\begin{bmatrix}X_1\\ X_2\end{bmatrix} = \begin{bmatrix}1.3043 & .1449\\ .5652 & 1.5072\end{bmatrix} \times \begin{bmatrix}F_1\\ F_2\end{bmatrix}$$

As a system of linear equations:

$X_1 = 1.3043F_1 + 0.1449F_2$

$X_2 = 0.5652F_1 + 1.5072F_2$

$X = (I - A)^{-1}F$ therefore represents an IO based model (system of equations) that quantifies the relationships between output, final demand and the inter-industry structure of the economy (given by the Leontief inverse). Inserting the final demand values in the example (F_1 = 700 and F_2 = 600) into the direct technical coefficient equation yields the corresponding values for output in the construction industry (X_1) and output in the manufacturing industry (X_2), as shown below.

$X = (I - A)^{-1}F$

In terms of the given example:

$$\begin{bmatrix} X_1 \\ X_2 \end{bmatrix} = \begin{bmatrix} 1.3043 & .1449 \\ .5652 & 1.5072 \end{bmatrix} \times \begin{bmatrix} 700 \\ 600 \end{bmatrix} = \begin{bmatrix} 1000 \\ 1300 \end{bmatrix}$$

As a system of linear equations:

$X_1 = 1.3043F_1 + 0.1449F_2$

$X_2 = 0.5652F_1 + 1.5072F_2$

Therefore, given the linkages between industries (as specified in the inter-industry matrix), the IO model can calculate (via the Leontief inverse) total output (by industry) associated with given values of final demand.

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