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MODELLING INTERNATIONAL TOURIST FLOWS TO THE CARIBBEAN

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ABSTRACT

The aim of this research is to model international tourist flows to the Caribbean with a secondary aim of explaining the distance puzzle in tourism—the confounding tourist flows-geographic distance relationship. Tourist flows are a reflection of distance between origin and destination countries. Conceptually, distance is complex, involving cultural, historical and contemporary relationships, climate, and the economy, among other dimensions. Moreover, the relationships between non-geographic or relative dimensions of distance and international tourist flows have received comparatively little attention in the literature.

This research adopts an interdisciplinary approach, necessitated by the limitations of existing approaches. The study employs the gravity model as, conceptually and theoretically, it provides a framework for modelling international tourist flows and examining the distance puzzle in tourism. The results demonstrate that gravity can explain international tourist flows to the Caribbean. In particular, tourist flows to the Caribbean are increased by cultural proximity, historical and contemporary colonial relationships, despite evidence of gradual erosion, the strength of diasporic and immigrant links, similarity in tastes, and the distance in climatic conditions between the Caribbean and its source markets. Further, the multidimensionality of distance can explain the distance puzzle in tourism.

The current study provides an important input into Caribbean tourism geography and marketing, which can be of considerable value to tourism stakeholders in the region. Findings from this study can provide information for the development of policies or a policy framework, which could enhance the tourism product in the region, or help to forestall any negative outcomes.

DECLARATION OF ORIGINALITY

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Troy Lorde

17 June 2014

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ABBREVIATIONS AND GLOSSARY

ARDL	Autoregressive Distributed Lag
CES	Constant Elasticity of Substitution
CET	Constant Elasticity of Transformation
CIA	Central Intelligence Agency
CIT	Climate Index for Tourism
CPI	Consumer Price Index
CRS	Constant Returns to Scale
CTO	Caribbean Tourism Organisation
ECM	Error Correction Model
ECT	Error Correction Term
GDP	Gross Domestic Product
HOS	Heckscher-Olin-Samuelson
IMF	International Monetary Fund
IPS	Im, Pesaran and Shin
IRS	Increasing Returns to Scale
LLC	Levin, Lin and Chu
NOAA	National Oceanic and Atmospheric Administration
OECD	Organisation for Economic Development
OLS	Ordinary Least Squares
SBC	Schwarz Bayesian Criterion
TCI	Tourism Climate Index
UN	United Nations
UNESCO	United Nations Education, Scientific and Cultural Organization
UNWTO	United Nations World Tourism Organization
UK	United Kingdom

USA	United States of America
USD	United States Dollar
VFR	Visiting friends and relatives
WTTC	World Travel and Tourism Council

CHAPTER 1 INTRODUCTION TO THE STUDY

1.1 Introduction

Since the middle of the 20th century, the international tourism industry has witnessed tremendous growth and expansion. International arrivals and receipts have increased from 25 million (United Nations World Tourism Organization (UNWTO), 2006a) and USD \$2 billion (United Nations World Tourism Organization (UNWTO), 2006b) respectively in 1950 to 1.035 billion and USD \$1.075 trillion in 2012 (United Nations World Tourism Organization (UNWTO), 2013, pp.4-5), averaging annual growth rates of 18.4 percent and 10.5 percent. This exponential development can be attributed to the many features such as population growth, technological change and more time for leisure.

On an international scale, tourism has been recognised as the largest export in international trade for many nations (Goeldner & Ritchie, 2003). At the regional level, collaboration among member countries aided by regional tourism organisations has brought about improvement in the economic welfare of regional economies. At the local level, the tourism industry has facilitated economic restructuring in many countries, particularly developing countries, by shifting the labour force from primary sectors such as agriculture and manufacturing to the service sectors (Cruz-Villalon, 1987; Laguna & Lasanta, 2003; Lasanta & Marin-Yaseli, 2007; Lasanta et al., 2007). Moreover, tourism tends to employ segments of the labour force which have relatively higher unemployment rates, for example, students and young adults (Mathieson & Wall, 1982), low-skilled labour (Culpan, 1987), and women (Cukier-Snow & Wall, 1993). The public sectors in many countries have responded by investing significantly in the

tourism industry through marketing, investment in tourism infrastructure and policy initiatives which have provided incentives for the private sector to also channel resources into tourism projects. As a result, the international tourism industry has increased its contribution to national economies through increased foreign exchange earnings, job creation, higher savings and investment rates, and economic growth (De Mello et al., 2002; Goeldner & Ritchie, 2003; Lim, 1997; Seddigi & Theocharous, 2002).

Apart from the economic benefits and impacts, international tourism has also resulted in significant cultural, social and political influences, environmental policies and regulations, as well as fostered international understanding (Dyer et al., 2007; Kim & Prideaux, 2006; Ng et al., 2007; Tran & Ralston, 2006; Vellas & Becherel, 1995). Some of these influences are positive, for example, the promotion of peace (Kim & Prideaux, 2006), while others are negative, such as crimes (Levantis & Gani, 2000; Pizam, 1999), international terrorism (Pizam, 2000), over-development and depletion of natural resources (United Nations World Tourism Organization (UNWTO), 1993), and increased pollution, congestion and despoilment of the environment (Gursoy & Rutherford, 2004).

Planning is crucial particularly in the tourism industry due to two unique characteristics of tourism products/services. The first is the uniquely perishable nature of tourism products and services. Tourism products cannot be inventoried when the business opportunity vanishes. As a result, tourism firms sell them at reduced prices when market demand is low, and *vice versa*.

The second characteristic is simultaneous production and consumption (Schulmeister, 1979). That is, the relationship between production and consumption of tourism products is virtually one-to-one. Tourism products are usually service-oriented and require their service components to be in place (usually in the service location) to complete the delivery. Although there are some tourism products that can be pre-reserved, tourists are only able to experience their purchased products that are being simultaneously produced.

Technological change has created a “new” type of tourism demand as well. The Internet, for example, provides potential tourists with more control over the terms of their touristic activities and thus enhances their ability to create their own packages in a timely manner. This may be a contributing factor to the increasing unpredictability in travel behaviour of “new tourists” (Poon, 1993, p.144).

To maximise the positive economic and social benefits from tourism, and simultaneously minimise possible negative impacts, it is imperative for tourism policymakers and planners to be cognisant of trends in the tourism industry. Moreover, the need for risk reduction in decision-making is critical in the tourism industry (Gee & Fayos-Sola, 1997). First, tourists are potentially more vulnerable because they are mobile, difficult to account for, and difficult to reach (Bird et al., 2010). Second, tourists typically travel in unfamiliar environments, have limited relationships with local communities, may face language and other cultural barriers, and their predisposition to positive touristic experiences may obstruct their capacity to absorb relevant information (Jeuring & Becken, 2011). Further, tourism is a major user of local infrastructure. Disruptions to these services can have negative repercussions for

tourism, both short- and long-term, including eroding destination image (Huan et al., 2004). Decision-making and planning based on sound tourism research can reduce the risk of unanticipated changes and unforeseen events at the destination.

In recognition of these important characteristics of tourism products and services, and in order to provide tourists with prompt services, managers of tourism-related businesses, tourism planners, administrators and policymakers need to accumulate knowledge concerning the intensity of tourism flows, as failure of a country's tourism sector is often due to failure to meet the demand of the market (Song & Witt, 2000).

1.2 Preview of the Case: Tourism in the Caribbean

Among the large number of tourist destinations available around the world, the Caribbean is unique in the diversity of its options. The term "Caribbean" usually refers to the islands in the greater archipelago, which includes the Greater, and Lesser Antilles and The Bahamas. Caribbean countries possess a mixture of cultures and languages, derived from their African and Amerindian heritage, and historical colonial relationship with Europe. Four main languages are spoken: English, Spanish, Dutch and French.

Caribbean states are heterogeneous in physical dimension, population size, and endowment of natural resources. Notwithstanding such diversity, economic and otherwise, the services sector is the catalyst for economic growth in the majority of these countries. Evidence shows that most Caribbean countries have some of the highest ranked services sectors in the world (United Nations Economic Commission for Latin America and the Caribbean (UNECLAC), 2003). Tourism provides the

foundation for Caribbean economies, particularly the smaller countries, where tourism plays a vital social as well as economic role.

The Caribbean has a natural comparative advantage in terms of tourism development. Traditionally, Caribbean countries have been highly sought after for the “three S’s” of sun, sand and sea by tourists from high latitudinal countries (Davenport & Jackiewicz, 2008). Temperatures vary between 20°C and 33°C and there is an abundance of sunshine year-round. However, Caribbean countries have increasingly focussed on a niche-market approach, compelled by high production costs and the constraints that arise due to small physical size and limited resources. Indeed, regional strategies have increasingly focussed on embedding tourism indigenously culture via heritage and eco-tourism (United Nations Economic Commission for Latin America and the Caribbean (UNECLAC), 2003). Nevertheless, the region has not advanced significantly in these forms of tourism. Alternatively, some countries have tried to isolate their tourism industries from economic downturns in other countries or other economic shocks by developing high-bracket income tourism (Armstrong & Read, 2003).

On average, the United States of America (USA) is the primary tourist source market, followed by Europe, Canada and the Caribbean itself. European tourism originates in the United Kingdom (UK), France, Spain, the Netherlands, and to a lesser extent Belgium, Germany, Italy and Sweden. Within the Caribbean, English-speaking countries have seen their market shares eroded due to the growing popularity of travel to the Hispanic Caribbean comprising Cuba, the Dominican Republic, and Puerto Rico, explained partly by a shift from English-speaking Caribbean destinations to Spanish-speaking ones by primarily European tourists.

Tourism can be considered more important to the Caribbean than to any other region in the world. Indeed, the World Travel and Tourism Council ranks the region first in terms of the sector's contribution to regional economies (World Travel and Tourism Council (WTTC), 2014, p.8). In 2010 total long-stay arrivals to the region were estimated at just over 20.1 million, compared to approximately 4 million in 1970. This translates into an annual rate of growth of about 6 percent over this period. Its total contribution to the economic growth of Caribbean countries was 14 percent of gross domestic product (GDP) in 2013 (World Travel and Tourism Council (WTTC), 2014, p.3). Yet, the Caribbean's shares of international arrivals and receipts have merely kept pace with other regions' (United Nations World Tourism Organization (UNWTO), 2013, p.4).

1.3 The Distance Puzzle in Tourism

Although being undeniably a service-based economic activity, tourism is also a tradable product whose sale is intrinsically directed towards external markets, and with the act of consumption depending on the displacement of the consumer to the marketplace. One of the important influences on this trade is "distance" from market. Indeed, Williams and Zelinsky (1970) argue that distance is one of the most important factors affecting travel patterns.

The notion that tourists prefer to travel to closer destinations is predicated on the generally accepted concept that geographical distance exerts a frictional effect on demand. Because the act of travelling requires an investment of time, money, or effort, resulting in various trade-offs—for example, between paid work and unpaid travel and

leisure—as distance increases, demand is expected to decline. This expectation underpins the first law of geography, by Tobler (1970), that “everything is related to everything else, but near things are more related than distant things” (pp.72-73). The law, typically referred to in the tourism literature as the distance decay effect (McKercher, 1998; 2008a; 2008b), implies that the association between two locations becomes weaker as the distance between them grows larger. Demand will therefore peak near to the origin and then decline exponentially as opportunity costs increase (Bull, 1991). That is, the gravitational pull of a proximate place exceeds that of a more distant one resulting in differences in demand (McKercher et al., 2008). Several empirical studies have found evidence of such decay (Greer & Wall, 1979; Hanink & White, 1999; McKercher, 1998; McKercher et al., 2008; McKercher & Lew, 2003; Zhang et al., 1999).

Some researchers consider geographic distance to be an “implicit” factor of tourist flows (McKercher, 2008a, p.380). McKercher argues that distance dynamics reflect the collective effects of other variables, including availability of time, costs, risk, cultural distance, motive, and so forth. Geographic distance thus acts as an “implicit barrier”, denoting the point of convergence where these variables combine in a manner to make travel increasingly unattractive after a certain distance threshold has been reached.

Another strand of research suggests that distance also conveys positive utility to tourists. The journey in its own right, as an element of the tourism product, could provide utility so that occasionally longer distances are preferred (Baxter, 1979). Some authors, like McKercher and Lew (2003), argue that as travel has become more affordable, distance has become a less significant dissuasive factor. It is possible that

the attractiveness of the destination may be so great that it outweighs the normal spatial friction of geographic distance (Baxter, 1979; Crouch, 1994b; Hanink & White, 1999; Mayo et al., 1988; Ryan, 1991). Moreover, the journey itself may be the attraction (Hall, 2005), for example, railway holidays or safaris. McKercher (2008a) suggests that such tourists may possess larger “time budgets” and have large discretion over how to spend it (p.368).

The distance decay effect in tourism is also confounded by market access, which includes obstacles to travel and intervening opportunities offering similar experiences (McKercher, 2008a; 2008b). Destinations closer to the origin have a natural competitive advantage over destinations located farther from the source market even if they are offering similar products (Pearce, 1989). Conversely, Mayo, Jarvis and Xander (1988) find that tourist flows to some destinations increase with distance; that is, a distant destination has a special appeal simply because it is distant, so destinations closer to the origin with otherwise similar products hold no advantage, and may in fact be at a comparative disadvantage. The relationship between distance to a destination and the desire to travel to that destination is further distorted by the possibility that perceived rather than actual distance may be more relevant for travel decision-making (Ankomah & Crompton, 1992; Mayo et al., 1988).

Hence, on one hand, the literature reports that the volume of tourist flows declines the farther away a destination is from the source; put another way, closer destinations attract greater tourist flows than farther destinations. On the other hand, the literature also finds evidence that relatively distant destinations may hold more appeal than destinations relatively nearby the source. Taking everything into account, this implies

that the volume of tourist flows do not decline monotonically with increasing distance, and can in fact intensify as distance increases. This study coins the confounding relationship between distance and tourist flows as the “distance puzzle” in tourism.

Thus far, the tourism literature has not provided a satisfactory explanation of the distance puzzle. Mckercher (2008a; 2008b) reasons that market segmentation can explain the non-monotonic relationship between tourist flows and distance. This argument holds that distance acts implicitly to drive the difference between tourists who prefer short-haul versus long-haul destinations. Some authors, such as Mathieson and Wall (1982) and Tiefenbacher, Day, and Walton (2000) point out that repeat visitation and visiting friends and relatives (VFR) are associated with shorter distances. Others hold a different view; for example, Fakeye and Crompton (1991), and Gitelson and Crompton (1984) contend that people will repeatedly travel long distances to visit family or friends. Other strong motivations may also allow a tourist to overcome distance (Tiefenbacher et al., 2000).

Clearly, there is a lack of consensus regarding the intensity of tourist flows in relation to distance. This provides the starting point for this study, namely, to model international tourist flows to the Caribbean with a secondary aim of examination of the distance puzzle in tourism.

1.4 Expanding the Dimensional Space of Distance

Until the middle of the 20th century, distance was only considered in geographic or absolute terms. Since then distance is no longer conceived in a purely physical sense,

but also in a more relative context. Relative distance is used to describe new kinds of “stretchable” and “shrinkable” spaces (Abler et al., 1972, p.72). As Kreisel (2004) notes, past interpretations of geographical space premised on spatial aspects only is obsolete and not coincident with “real” space, which includes socio-psychological dimensions of distance as well as spatial elements (p.167). Further, people’s behaviour in relation to relative space does not possess the metric characteristics of geographic distance (Gatrell, 1983).

From a tourism perspective, Hall (2005) asserts that the “distribution of travel behaviour in space and time reflects an ordered adjustment to the factor of distance” (p.69). As a consequence, this adjustment must be accompanied by flexibility in how distance is conceived. A conceptualisation and operationalisation of distance beyond its geographic or physical meaning form the bases on which this study will model international tourist flows to the Caribbean and simultaneously examine the distance puzzle.

Hall (2005, p.69) describes four relativist dimensions of distance: time distance, the time to travel between locations; economic or cost distance, the monetary outlay required to travel the distance between locations (Gatrell, 1983); cognitive or perceived distance, judgements about the physical separation of locations (Ankomah et al., 1996); and social distance, a component associated with differences in social class, and can be expressed in terms of differences in culture (Gatrell, 1983). While important, other facets also define the dimensional space of distance germane to tourist flows. This study expands the definition of distance to include cultural proximity, historical and contemporary colonial relationships, climatic distance, economic similarity, and

diasporic relationships in modelling international tourist flows to the Caribbean. Other dimensions are discussed later in the study.

There is a growing literature on the relationship between culture and economic outcomes (Fernandez, 2007; Guiso et al., 2006). For example, cultural proximity plays an integral role in determining trade flows between countries (Felbermayr & Toubal, 2010), differences in investor rights (Stulz & Williamson, 2003), and stock market participation (Guiso et al., 2008). The degree of cultural proximity or distance represents a source of facilitation (friction) between cultures in different countries that may potentially enhance (reduce) tourist flows between them. Tourists who do not want a vacation that is culturally distant or are disinclined or incapable of coping with large cultural differences will narrow their destination choices to culturally proximate destinations (McKercher, 2008a). Tourists travelling to culturally proximate destinations have a propensity to travel for recreation, refreshment, and pleasure-seeking, while those who travel to culturally distant locales view travel as an opportunity for personal development and learning (McKercher & du Cros, 2003). All things considered, therefore, the net effect of cultural proximity could be positive or negative. This dimension represents a potentially significant factor in modelling international tourist flows to the Caribbean.

Closely related to the construct of cultural proximity is that of historical and contemporary colonial links (Eichengreen & Irwin, 1998; Rose, 2000). Eichengreen and Irwin (1998) argue that current global trade patterns are highly influenced by historical events and relationships that have a permanent effect on trade patterns. Historical events include, for example, past colonial legacies, trade negotiations and

agreements, and relationships include, for instance, strategic military and law enforcement collaboration, foreign aid, and membership in regional and international organisations. As a lasting effect, there are often neo-colonial economic ties between former dependencies and their former metropolitan rulers, mainly from Western Europe. The establishment of trade links was in fact a major incentive behind colonialism (Grier, 1999) and has resulted in enduring trade relationships (Rauch, 1999).

Almost all Caribbean countries are former European colonies; several remain overseas territories at present. Grier (1999) contends that the UK maintains a closer relationship with its former colonies since their independence than has France, Spain, or Portugal. The UK focuses on trade relationships and offering preferential market access to her former dependencies (Brysk et al., 2002). In contrast, Spain's relationships with its former dependencies emphasise the provision of foreign aid, while France's influence is primarily in the military arena (Brysk et al., 2002). Frankel, Stein and Wei (1997) and Sandberg, Seale and Taylor (2006) also discuss the impact of historical ties on trade.

In his seminal and critical work, Harrigan (1974) identifies tourism-dependent economies in the Caribbean as a legacy of the history of colonialism. Indeed, artefacts of the Caribbean's colonial past are used to promote the countries in travel brochures, "to keep the tourists coming back for more" (Palmer, 1994, p.795). In an important paper of the influence of colonialism on tourist flows, McKercher and Decosta (2007) observe that this factor has been ignored in analyses of post-colonial tourism flows. Their work provides evidence that destinations rely heavily on former colonisers as a

key source of visitors. McKercher and Decosta strongly recommend that colonial legacies be explicitly considered in modelling tourist flows.

Taking into account Mckercher and Decosta's (2007) research and the extensive literature which documents colonialism's impact on trade flows and other economic activity, an argument can be made in support of the hypothesis that continuing post-colonial relationships between European and North American metropolises and Caribbean countries can in part explain the pattern of international tourist flows observed. On a theoretical and empirical level, contemporary tourism studies have not widely considered the impact of colonialism and post-colonialism. This discrepancy, highlighted by Hall and Tucker (2004), forms one of the major planks of this research.

Diasporic relationships among and within countries, is an area of growing importance as a driver of economic activity. Diaspora, an ancient concept that for centuries was associated with suffering and expulsion, is increasingly used in the discourse of globalisation and comparative and competitive advantage (Kee, 2014). Information flows and ease of transport have led to an estimated 232 million migrants in 2013 (United Nations (UN), 2013), and an even larger flow of international tourists, numbering over 1 billion in 2012 (United Nations World Tourism Organization (UNWTO), 2013). The fast growing clout of diasporas of various ethnic origins has prompted national and international agencies to give more attention to the capital, knowledge, skills and networks of diasporas as a source of development (World Bank, 2006). As an object of academic interest, analysis and policy discussion have grown more nuanced as attention shifts to possibilities offered by "brain return" from debates about brain drain and brain gain (Lee, 2010).

The Caribbean diaspora resides mainly in the USA, Canada and the former colonial powers in Europe, the UK, the Netherlands and France. By a significant margin, the USA is the number one receiving country, accounting for approximately 75 percent of first- and second-generation diaspora (Segal, 1996). Excluding undocumented migrants, Segal estimates the size of the Caribbean diaspora in the mid-1990s at 6 million. This estimate implies a relative size of the Caribbean diaspora to the population around 20 percent, representing a potentially significant source of tourists to the region. The tourist-destination relationship in diaspora tourism—the travel of people in the diaspora to their ancestral homelands—is unique because tourists with ethnic origins from a destination to which they intend to travel are connected to the people, culture, and heritage of that destination, prior to actually visiting the place (Huang et al., 2013). The proximity due to diasporic relationships thus falls squarely within the current discourse of international tourist flows to the Caribbean.

In a different vein from the discussion thus far is the issue of climatic distance. Understanding tourists' response to the impact of climate is essential to explaining the geographical and seasonal changes in tourism demand, among other things (Gossling et al., 2012). Climate has a strong influence on tourism and recreation and in some regions of the world constitutes the resource on which the sector is predicated, for example, in beach and snow destinations (Kozak et al., 2008).

The importance of climate for vacation destinations is demonstrated in advertising (Gomez Martin, 2005) in addition to construction of destination image (Pike, 2002). Climate's impact has several aspects: physical, physiological and psychological. From a physical perspective, for example, heavy rain or high winds may deter a tourist.

Physiologically and psychologically, factors like high air temperature or humidity may affect general enjoyment or appeal (Moore, 2010).

Relatively few models seeking to explain tourist flows include climate as a factor (Amelung & Viner, 2006). One possible explanation for this discrepancy may be that climate has long been considered a relatively stable factor (Abegg et al., 1998; Baker & Olson, 1992), with little predictable and structural change from year to year. None explicitly consider the difference in climate between origin and destination, that is, the climate distance. Although the number of studies modelling climate's impact on tourism is increasing, significant gaps remain in relation to demand responses (Gossling & Hall, 2006; Hamilton et al., 2003).

Apart from the Caribbean source market, a region that is typically warm, most visitors arrive from countries with cold climates on average. Arrivals reach a peak during the winter season (December to April). One can thus hypothesise that the difference in climate, or climatic distance, between Northern source markets and the Caribbean is partly responsible for international tourist flows. It should be pointed out, that the construct of climatic distance is also relevant for tourists wishing to travel to cold climates.

Supply side trade theory suggests that nations that are economically similar are most likely to benefit from trade induced by relative price differences (Heckscher, 1919; Ohlin, 1933; Samuelson, 1949). This implies that trade is greater between countries with the largest differences in economic structure. In contrast, Linder's (1961) thesis attributes dyadic trade patterns to the demand side tendency of economically similar

countries to share preferences/tastes, so that trade is greatest between the most economically similar countries. Also, a number of scholars have suggested that psychic distance—a perception of the differences between a home country and a foreign country (Sousa & Bradley, 2006)—may be significant in explaining the predisposition of countries to trade relatively more with certain countries (Beckerman, 1956; Linnemann, 1966); that is, countries that are psychically distant trade less than those that are psychically closer. These differences include, but are not limited to, the emotions caused by differences in economic condition, education, and political systems (Brouthers & Brouthers, 2001; Cuervo-Cazurra, 2006; Gray, 1997; Johanson & Vahlne, 1977; O'Grady & Lane, 1996). Thus countries that are economically similar are also psychically closer and *vice versa*.

It is hypothesised that the degree of economic similarity between countries has a positive effect on tourist flows. Income levels, the main indicator of economic similarity, can determine not only whether people respond to factors that encourage travel but also helps determine the range of destination countries that they consider (Morakabati et al., 2012), as similar income levels suggest an underlying similarity in socio-economic values and perspectives. Economic similarities are therefore significant for a number of reasons relating to each principal element in the tourism activity: the source market, the destination and the state of the economy in each country. In short, it is expected that the behavioural response of residents in economically similar countries will enhance tourist flows. Such a response would also provide evidence of the negative effect of psychic distance on tourist flows.

Naturally, one has to be cautious in attributing international tourist flows to the Caribbean to cultural proximity, historical and contemporary colonial legacies, diasporic relationships, climate distance or economic similarity. The intensity of flows may occur solely, or primarily, because of geographic distance. Alternatively, the tourist flows observed could simply be a function of the relative market sizes of the various source countries (Helpman, 1987). Other possibilities also exist. Empirical assessment of international tourist flows to the Caribbean is thus an area ripe for investigation and provides an excellent case study for examination of the distance puzzle in tourism.

1.5 Problem Statement

The Caribbean can trace much of its success in tourism to favourable geographical and situation factors, which have each helped to position tourism as the region's leading industry. The favourable geographical factors of the Caribbean are sun, sand and sea while situation factors are concerned with the easy access to the region, mainly due to its relative geographical proximity to source markets in North America and Western Europe (Dodman, 2009). These geographical and situational factors provide many development benefits, such as generating significant foreign exchange, employment generation, and fostering of linkages with other sectors, for example, agriculture, transportation, and food and beverage. Given the importance of tourism to the economic and developmental fortunes of the region, a question of critical importance to regional policymakers and stakeholders, geographers and tourism economists is: What factors explain international tourist flows to the Caribbean?

In terms of conceptual and theoretical development, the study of tourist flows suffers from inconsistencies and deficiencies. Few comprehensive studies investigate the characteristics of international tourist flows to an entire region. Much of the research so far has been undertaken in confined locations and limited to specific problems, and consequently need to be carefully weighted in different geographical and social contexts.

Intuition, simple observation and past literature strongly suggest that distance is a variable that ought to be considered at each stage of the activity of travelling. Yet, the issue of distance, while not new to the study of tourist flows, remains comparatively neglected in the literature. Even at universities, where the focus of tourism education has been dominated by the marketing approach, tourism research tends to follow the same pattern. Only very recently has the management school begun to recognise the importance of distance (Porter, 2000). This study makes explicit this often taken for granted variable in an effort to explain international tourist flows to the Caribbean. Moreover, there is a lack of consensus on the impact of distance on the volume of tourist flows. Research has shown that distance can be both a deterrent and attraction for tourists. An explanation of this puzzle remains elusive thus far, and demands attention.

The inherent intricacies of these two concepts, tourist flows and distance, encompass a wide range of disciplines, and is an obstacle to the investigation of tourist flows.

Although many theories and concepts can be, and have been drawn, from the disciplines of geography, economics, behavioural science, and so forth, the linkages between these disciplines in relation to tourism are still problematic.

To sum up, there is a distance puzzle in tourism. Explanations offered thus far are unable to resolve the apparently confounding influence of distance on the intensity of tourist flows. The modelling of international tourist flows to the Caribbean offers a unique opportunity to examine this important tourism phenomenon.

In modelling international tourist flows to the Caribbean, this research employs an interdisciplinary approach. An interdisciplinary approach is a way to view the subject matter from a highly integrated perspective. It is a synthesis created between different disciplines so that a more holistic understanding and way of investigation can be achieved. The intrinsic qualities of tourism allow for an interdisciplinary approach so that it can draw on other disciplines in order to develop theoretical and empirical tools (Faulkner & Goeldner, 1998; Graburn & Jafari, 1991). This study will therefore embrace geographic, economic (consumer demand theory and international trade), historical, and behavioural science perspectives, conceptually, theoretically and empirically, to address its main aim of modelling of international tourist flows to the Caribbean. The concept of distance is the common link that will unify the various perspectives.

1.6 Aim and Objectives

The primary aim of this research is to analyse international tourist flows to the Caribbean. As argued, tourist flows are a reflection of distance between origin and destination countries. Conceptually, distance is complex, involving cultural, historical and contemporary relationships, climate, and the economy, among other dimensions. Moreover, the relationships between non-geographic or relative dimensions of distance

and international tourist flows have received comparatively little attention in the literature. This study focuses on the concept of distance, both absolute and relative. It thus fills a gap in the literature on international tourist flows by shedding light on a number of critical issues that have thus far been relatively neglected by mainstream tourism research.

The broad aim of this research is to model international tourist flows to the Caribbean.

The specific objectives are to:

- reconceptualise distance in the context of tourism demand analysis;
- disaggregate distance into various dimensions and to further construct a conceptual framework for analysing the impact of various distance dimensions on international tourist flows;
- develop a new dynamic gravity model with augmented distance variables to model the impact of distance on international tourist flows;
- analyse and interpret tourist flows in the Caribbean based on the estimated gravity model; and
- provide policy/managerial implications for Caribbean destination management organisations and the tourism industry, as well as recommendations for future research.

1.7 Significance of the Study

This study contributes to the literature in several respects. First, it conceptualises distance in the context of tourism demand. It extends the dimensional space of distance by investigating the impact of the socio-psychological traits of tourists, colonial

relationships and diasporic links, preference similarity, and the construct of climatic distance on international tourist flows. Second, it employs an interdisciplinary approach to modelling tourist flows, going beyond neoclassical consumer theory, to incorporate theoretical and empirical elements of international trade, geography, history, socio-psychology, and the impact of climate. Third, the study illustrates the theoretical relevance and empirical representation of the gravity framework for modelling tourist flows. Fourth, it develops a modern gravity model based on the enhanced concept of distance and advanced econometric techniques.

From a practitioner's perspective, the results from this study should prove useful for tourism policymakers in the Caribbean in promoting the region. Other destinations can also use the information or replicate the research to develop their marketing strategies in their search for a differential advantage, competitive positioning and growth in a global market.

1.8 Structure of the Thesis

The remainder of the thesis proceeds as follows:

Chapter 2 reviews related literature in order to develop the conceptual framework for the analysis of international tourist flows to the Caribbean. It examines the disciplinary relationship between tourism and geography thereby leading to the clarification of some relevant concepts for this study. Chapter 2 will also look at the question of how these concepts relate to the research topic of tourist flows. This is followed by a description of the larger system from which the study of tourist flows is a component. This helps to

capture the key features of the concept of tourist flows. Finally, it defines the various scales at which tourist flows operate.

Chapter 3 provides a detailed review of the macroeconomic and microeconomic theories of tourism demand, including the evolution and limitations of these theories. The various ways in which international tourism demand is measured are discussed. A review of the determinants that influence tourism demand and their measurement follows and serves as the basis for the final empirical model in this research. An assessment of the econometric techniques that have been employed in modelling tourism demand is provided, including the rationale behind these methods.

Chapter 4 draws from various theoretical, conceptual and empirical backgrounds in order to provide additional steps in building a framework to investigate international tourist flows to the Caribbean. The chapter reviews the theories of travel motivation, focussing on push and pull factors. Following this, various concepts of distance critical to the study of international tourist flows are discussed. These include cognitive, cultural and psychic distance, historical and contemporary colonial relationships, cultural proximity, diasporic links, climate distance, and economic similarity. Finally, the main approaches to estimating models with a primary focus on distance are described and their limitations outlined.

Chapter 5 introduces the gravity model, the framework used for the empirical analysis of distance. The chapter provides an in-depth discussion of the gravity model. Detailed attention will be given to its historical development and evolution. The conceptual development of the gravity model from different approaches is presented. Following

this, the theoretical foundations of the gravity model from work by several key contributors are extensively reviewed. Applications of the gravity model to explain tourist flows/tourism demand are also evaluated. The findings from these studies are summarised and the elasticities derived from the models presented for comparison.

Chapter 6 presents the case study of international tourist flows to the Caribbean. It describes the emergence of the tourism industry in the Caribbean. Next, it reviews the economic and social features of Caribbean countries, including the contribution of tourism. It then describes the characteristics of Caribbean inbound tourism. Recent developments including the state of resources, major source countries, and tourist compositions are also analysed.

In Chapter 7, the methodological and philosophical stances of the research will be linked to the broader aspects, including ontology, methodology, and epistemology. The chapter opens with a discussion of the methodological and philosophical perspectives of the research. Next, model specification, specific research techniques and strategies are addressed, including ways of measuring and operationalising the variables involved.

Chapter 8 presents and discusses the empirical findings, with special focus on the various dimensions of distance on international tourist flows to the Caribbean. The implications of the findings are also discussed.

Chapter 9 summarises the main findings of the thesis, states its main contributions, and provides some policy implications. It also identifies any weaknesses in the study and suggests recommendations for further research.

2.1 Introduction

What are some of the basic concepts that researchers employ in viewing the world of tourism from their particular area of interest? How do these concerns relate to this study on international tourist flows? To answer these questions, as a starting point it is necessary to ground the study of international tourist flows in a sound understanding of how it is defined and labelled. The aim of this chapter, therefore, is to construct a conceptual framework for this research to enable it to be recognised as a feasible area of investigation and to underpin the entire research process.

To understand the relevant conceptual issues of this research is to look at what kinds of knowledge are involved. The research is mainly a study of how distance influences international tourist flows, incorporating various bodies of knowledge. The internal representation can be conveniently thought of as involving several distinct fields of existing tourism research: the attributes of international tourist flows; the theory of tourism demand; travel motivation theory; the concept of distance; and the theory of gravity. In this chapter, the major concern is the first field of knowledge—tourist flows. The key task is to explain the nature of tourist flows, to find out what the other basic concepts relating to it are and how they underpin the research objectives.

Towards these ends, this chapter is divided into four sections. The first section attempts to identify the concept and scope of tourism geography. It examines the interdisciplinary relationship between tourism and geography thereby leading to the clarification of some relevant concepts for this study. The second section will look at

the question of how these concepts relate to the research topic of tourist flows. The third section describes the larger system from which the study of tourist flows is a component. This helps to capture the key features of the concept of tourist flows. The fourth and final section defines the various scales at which tourist flows operate.

2.2 Geographical View of Tourism Studies

It is apparent that the explanation of tourism concepts derives from a variety of inputs from different established disciplines. Over the years, the subject matter of tourism continues to evolve as more and more themes are abstracted into the paradigm of tourism. Consequently tourism is recognised as a highly interdisciplinary field (Lundgren, 1984). Tourism analysis can be directed either towards any of the integral elements of the phenomenon or towards any combination thereof. It is, however, important to acknowledge that research using an interdisciplinary approach can bring potential challenges. These mainly stem from the different schools of thought across the disciplines. The danger lies in borrowing concepts and theories across disciplines if inference across disciplinary boundaries is not carefully grounded (Roper & Brookes, 1999).

Some fundamental disciplines which underpin the study of tourism include economics, geography, psychology, sociology, anthropology, and business studies. While the range of disciplines used to conceptualise tourism is broad and growing, one distinct feature of tourism is its geographical character. Tourism with its focus on people travelling through time and space is essentially a geographical phenomenon (Warszynska & Jackowski, 1986).

The study of tourism geography dates back to circa 1930s (Mitchell & Murphy, 1991). However, it was not until the early 1960s that geographical studies of tourism appeared relatively frequently in the literature (Pearce, 1979). The main research purpose of tourism geographers is to create theoretical foundations for tourist movement, without neglecting social, economic or environmental factors (Warszynska & Jackowski, 1986).

2.2.1 Definitions of Tourism Geography

Tourism research includes aspects of nearly every major division of systematic geography (Murphy, 1963). The difference between geography and other disciplines in studying tourism is its emphasis on space and place (Tuan, 1977). In terms of tourism destination choice, space and place are always important because tourism is “the experience and consumption of place” (Meethan, 1996, p.179). This alludes to the fundamental association between tourism and geography; they answer the question of “where”.

There are two major dimensions in which geography has exerted a significant influence on tourism research beyond their common interest in spatial phenomena (Faulkner & Goeldner, 1998)—conceptual and theoretical, and methodological. The conceptual and theoretical contributions of geography have motivated tourism to develop its own domain, scope of study and system of questioning. The second dimension, the methodological contribution, ranges from quantitative and qualitative methods to the philosophical underpinnings of these approaches.

In relation to tourism studies, four primary perspectives can be used to understand tourism geography (Bird, 1989). The first perspective is the relevance of the subject

matter. Berry (1964, p.3) observes that the integrating concepts and processes of the geographer are associated with spatial arrangements and distributions, spatial integration, spatial interactions and organisation, and spatial processes. Since tourism involves travel across space, this aspect links tourism intimately with geography.

The second perspective is the scale of investigation. In geography, “processes, patterns and positions” of the physical and cultural environments are studied from two standpoints, regional or systematic (Mitchell & Murphy, 1991, p.58). Regional geographers endeavour to differentiate between regions or to discern the nature and characteristics of a particular region, while systematic geographers focus on the systematic analysis of individual systems or topics. Thus tourism geography can be described as a system with a regional perspective. Tourism objects are organised in geographical orders; therefore the scales of investigation are essential in explaining different activities in tourism geography (Mitchell & Murphy, 1991).

The third perspective is open-endedness. Open-endedness is associated with both environmental influence and continuous evolution. Within this notion, evolutionary and time perspectives are important considerations in geography, and the same applies to tourism studies. It takes a synthesising perspective of geography to study tourism in a broader time-space context. Models developed include tourism destination life-cycle concepts (Butler, 1980), the evolution of tourism types such as mass tourism (Weaver & Oppermann, 2000), demand changes in tourism products (Song et al., 2010), and social trends of tourism development (Stonich, 2000).

The final perspective is exploration of tourism geography. Three major approaches are widely applied. They are the formal, historical-genetic, and functional approaches that operate at different analytical levels (Bird, 1989). The formal approach is a group of methods for describing the locational phenomena of tourism, for example, the physical landscape (Warszynska & Jackowski, 1986). With the historical-genetic approach, tourism studies examine the divergences of the encounter between formal structures and functional structures, and the obstacles and adjustment of these divergences (Warszynska & Jackowski, 1986). The functional approach encompasses methods for defining the subject and interrelationships between the object of travel (such as tourists) and its subject (such as tourist space) (Warszynska & Jackowski, 1986), for example, the behavioural method.

Behavioural geography is regarded as a perspective that emphasises the importance of human involvement and uncertain factors in affecting their spatial choices (Bird, 1989). Behavioural geography has influenced tourism geography to develop its own research platform and philosophical direction. Tourism geography is basically concerned with the spatial dimensions of tourism. However, tourism researchers are not satisfied with mere analysis of spatial patterns isolated from the behavioural components. They are in many ways more concerned with identifying the processes that produce such patterns.

2.2.2 Systematic Approach to Tourism Geography

In tourism geography, two types of systems are commonly used (Mitchell, 1994). One is the system of demand-supply linkages; linkages refer to the connection between the space of demand and supply. Tourism demand is defined as “an expressed but unattained desire to travel to some other place and to participate in some leisure or

recreation activity or activities” (Mitchell, 1994, p.199). Tourism supply has two types. One is the commercial sector for supplying tourism goods and services. The other is the public sector, which supplies tourism goods and services, but is not benefit-oriented.

The second system views the tourism landscape as consisting of three elements: purpose, structure and distribution (Mitchell, 1994), inextricably interlocked and interrelated. This system assumes that there is a fundamental reason for tourists to travel determined by social and behavioural factors, which affects both the structure and the distribution of the tourism landscape. The structure is concerned with the organisation of individuals and/or groups of tourists on the basis of some touristic and environmental criteria in order to match their characteristics with the most appropriate tourism products (typically tourism destinations). The distribution of tourism sites and facilities is another important element of this system.

These systematic views of tourism geography provide frameworks from which the relationship between tourist, space and distance and the special features of tourism geography can be described and operationalised. They help to solve tourism problems that cannot be understood with the narrow individual perspectives of tourists, space or distance respectively, but only when they are integrated.

2.3 The Meaning of Tourist Flows

A deficiency in studies of tourist flows is that the concept of “tourist flows” has been ambiguously used with associated concepts, such as “tourist distribution”, “travel pattern”, or “travel itinerary”, to explain the phenomenon of tourists’ visits at various

locations (Pearce, 1995). For example, Oppermann (1995) uses trip itineraries to describe the travel patterns associated with multi-destination travel while Pearce (1995) states that tourist flows are a multi-dimensional (origin-linkage-destination) framework which considers ports of entry and departure, routes travelled and places visited.

Oppermann (1992) suggests there are two key elements of intra-national tourist flows: the movements of tourists between various locations and their stopovers at these locations, or the dynamic and static characteristics of intra-national tourist flows. Pearce's (1995) analysis also contains dynamic and static elements. However, the meanings of these concepts were not clarified. It is essential to arrive at an understanding of the concept in order to model tourist flows.

2.3.1 Tourist Movement

Cox (1972) suggests that movement has two major areas of understanding: the patterns and the base of movement. The pattern of movement links one location with another and creates regularities deserving explanation (Cox, 1972). Movement is initiated by people, who are in turn influenced by a range of internal and external constraints. The regularities of the movement are the manifestation of the behaviours of the people who undertake the movement. Integration of an individual's choice of movement and the constraints influencing these choices, constitute the second feature of the movement—the base of movement. Base of movement is just the carrier of the movement. Its main concerns are the factors influencing an individual's movement choices. In tourism studies, movement is the dynamic element of the tourism system linking tourists and tourist space (Pearce, 1983).

The intensity of movement is another variable for understanding movement. Intensity of movement is a direct measurement of the character of movement, demonstrated by the volume of tourist traffic between an origin-destination pair (Cox, 1972).

Researchers seek to explain the cause and reason of the intensity by identifying various social and economic attributes such as income levels and cultural background of tourists.

Cox (1972) and Bowden (2003) further suggest that movement has three distinctive characteristics: distance-biased, the link between the intensity and distance of movement; direction-biased, the relationship between the pattern and intensity of movement and its direction; and connection-biased, which emphasises the importance of the connectivity of the channels in affecting the movement from one location to another.

Summarising these views, the structure of movement can be seen as comprising three distinctive elements—pattern (dynamic connectivity), direction (origin-destination configuration), and intensity (volume and frequency). In breaking down the structure of movement, movement becomes measurable and operational.

2.3.2 Tourist Space

Tourist travel is intimately connected with space. Locality and space are central to tourism studies because they are the physical determinant of behaviour and influence on behaviour. Tuan (1977) explains the differences and linkages between space and place. Space is a special kind of object with a physical value. It assumes a frame specified by

the ability to move. Movements are often attracted to, or repulsed by, objects and places that define space and give it a geometric personality.

Mansfield (1990) divides tourist space into three types: actual, functional and perceived.

Actual space is the tourist area that accommodates tourism activities within clear geographical boundaries. It is characterised by its location or region and physical endowment.

Functional space separates the actual into generating and attractive areas; that is, tourism origin and tourism destination, and a transport medium linking them together. This division is also socially, culturally, and economically constructed because the social, cultural, and economic factors shape, and are shaped, by the physical landscape. Mansfield (1990) states that the functional space has dominated the studies of tourist flows because it accommodates all the characteristics of both the generating and attracting areas of tourism space, which take part equally in shaping the emerging patterns in tourist flows.

The last explanation of space is perceived space, which emphasises the behavioural aspect of space. It means, despite its physical and functional character, space is also a result of tourists' mental process. This tourist space reflects tourists' perception and image of that space of which the level and quality are very much determined by the socio-economic and cultural states and personal values of tourists (Mansfield, 1990).

2.3.3 *Tourist Spatial Behaviour*

The spatial behaviour of humans is concerned with patterns of movement in relation to origins and destinations, distances and directions, and frequency of occurrence (Lankford et al., 2004). It describes general principles of how individuals interact with their environment and their behaviour in varying locations.

Several studies have analysed tourists' *internal* behaviour, focussing on the factors that influence tourist behaviour and tourists' decision-making process (Beerli & Martin, 2004; Iso-Ahola, 1982; Muller, 1991; Seddigi & Theocharous, 2002). Tourists' *external* behaviour has received equal attention (Fennell, 1996; Lau & Mckercher, 2007; Mings & McHugh, 1992). In contrast, external behaviour is visible and can be quantified, measured and predicted (Xia et al., 2011), for example, consumption behaviour. This field of study focuses on explaining spatial patterns of tourist activities at different scales, such as global, national, regional and local (Pearce, 1995).

Downs (1970) proposed a spatial behaviour system, enriched by Bird (1989). Its constituents are: the real world, which refers to the external environment; perceptual receptors, which is human recognition of the real world; a value system, derived from implicit or explicit religions, beliefs, social norms and cultural factors; image, embedded in cognition and is often the source of behaviour; decision, based upon the mental processing of the real world, that is, the image of the real world; and spatial behaviour, which are actions that actually take place and have some form of spatial expression in movement and/or pattern.

Tourist spatial behaviour thus refers to the spatial actions of tourists and is typified by the patterns, directions and intensity of their movements. However, as human behaviour is normally goal-oriented, Downs' (1970) behavioural system lacks a major consideration—the function of motivation.

In tourism studies, numerous approaches have been advanced to capture the factors motivating people to travel. One well-recognised theory is the “push-pull” model (Dann, 1977; Yoon & Uysal, 2005). Motivations to travel comprise “push” factors, which are the intrinsic attributes of tourists themselves, and “pull” factors, which are the external features and attributes of the destination.

Including this element in Downs' system, tourist spatial behaviour contains both the concepts of tourism objects such as real world, and the concepts of basic relationships such as behavioural attributes including motivation, cognition and image. Tourist spatial behaviour is a result of tourist decision-making, and is established on the basis of the external influences and internal attributes. The ultimate outcome of the spatial behaviour process is expressed by the three features of the spatial movement of tourists—the pattern, direction and intensity of tourist travel.

2.4 Spatial Distribution

Based upon the analyses of tourist space, tourist movement, and tourist spatial behaviour, the concept of the spatial distribution of tourists becomes clearer. The spatial distribution of tourists can be viewed as a synthesis of the nature of tourist movement with regard to different spatial behaviours, a system containing the following

major subsystems—the movement of tourists, tourist space and location, tourist spatial behaviour, and spatial attributes.

Tourist space is an origin and destination system. The linkage between origin and destination is instigated by tourists, and expressed by their movements. The movement of tourists is stimulated by spatial constraints through the processes of the tourist spatial behaviour system. Tourist movement is then differentiated by these constraints. The differentiation is reflected in the three features of tourist movement—the patterns, directions and intensity. The spatial distribution of tourists thus refers to the relationship between tourists and the features of tourist movement that is influenced by internal and external elements, such as psychological and cultural characteristics, the environment and society. The forms of the spatial distribution that are expressed by pattern, direction and intensity of tourist movement are the manifestations of the decision-makings of tourists.

The spatial distribution of tourists can thus be seen as having three main dimensions. The first is the travel patterns of the spatial distribution of tourists, and focuses on the methods of tourist travel and the routes they follow. The second is about origin-destination configuration or destination choice, and concerns the directionality of the spatial distribution of tourists. The third is about tourist flow or tourist demand between origins and destinations and concerns the intensity of the spatial distribution of tourists. Such studies reveal factors and reasons for the intensity of the movement of tourists and forecast demand on the basis of this understanding. Spatial distribution integrates all three aspects signified by the three features of tourist movement—the pattern, direction and intensity.

2.4.1 Pattern of Tourist Travel

This dimension of the spatial distribution has been described as “travel pattern”, “travel route”, or “travel itinerary” studies (Jeng & Fesenmaier, 1998; Oppermann, 1995). It basically addresses the question of: how tourists from an origin travel to the destination and why? Research suggests that patterns of spatial distribution of tourists are not random, but have regularities. Also, many tourist trips are composed of multiple destination routes. The different forms of movement between the origin and destination pairs are exhibited in tourists’ spatial characteristics. To understand how tourists travel from an origin to a destination is to understand their choice behaviours.

2.4.2 Direction of Tourist Travel

Because all movement has an origin and a destination, and all destination-oriented movement is a directional movement, studies in this aspect of the spatial distribution of tourists answer the question of: where tourists come from, where they travel to and why? A geographical origin in the spatial distribution of tourists is the source of a specific tourism traffic flow, usually the starting point of tourists’ journey; and also the terminus. The operational meaning of tourist geographic origins is described as the nations or regions where tourists are permanently living, and they leave to visit other areas temporarily (Flognfeldt Jr, 1999).

As opposed to geographical origins, tourist geographic destinations refer to the geographical areas where tourists arrive and stay to fulfil their travel purposes. A destination is the major motive for tourists to travel. The destination may not necessarily be a single stop and may include several stops on a circuit. The combinations of origin-destination pairs reflect decision-makings of tourists. Therefore,

the study of origin-destination pairs is often associated with the study of tourist destination choice behaviour. Methods of movement may be random or direction-biased (Cox, 1972), and no matter the type, the origin-destination pair determines the direction as well as the distance of tourist movement.

Williams and Zelinsky (1970) maintain that nationality determines the year-to-year pattern of tourist flows between countries, and that this pattern is stable from year-to-year. The authors find that, even though geographical distance is a determinant of tourist flows, some neighbouring countries still exhibit weak tourist interaction.

Williams and Zelinsky also suggest that cultural and social differences among countries may influence tourist flows.

2.4.3 Intensity of Tourist Travel

This aspect is mostly addressed by studies of tourist demand or tourist flows. These studies answer the question of: how many tourists from an origin visit a destination and why? When this topic is discussed, the predictability of the occurrence of tourists' visitation across a set of destinations is the focus.

Tourist flows are a form of spatial interaction between tourist-generating and tourist destination areas, with the destination having a surplus of a resource (beaches or ski slopes, for example) and the generating area having a deficit of that resource. The study of the intensity of tourist travel aims to discover why a particular volume of tourists from an origin visit different destinations (Ewing, 1983). It is, in fact, possible to detect regularity in the patterns of tourist flows. These patterns are not random occurrences, but behave according to particular rules and are also influenced by various "push" and

“pull” factors. A study of tourist flows thus examines only one of the three features of the spatial distribution of tourists.

2.5 Tourist Flows at Different Geographical Scales

Because of the scale-specificity of tourist movement, the geographical scale of tourist flows is another important conceptual point requiring clarification. Because the reasons behind the intensities of tourist flows between origins and destinations are different, the study of tourist flows should always reflect the scale of the analysis. The movement of tourists links a range of tourists' places of origin to their travel destinations and thus constitute a dynamic system of tourist flows. The scale typifies the measurement and operationalisation of the determinants of tourists' movement. It defines if the focus of the research is on an entire region, on states, or on a particular destination, and so forth (Edgell & Seely, 1980).

The typology of tourists falls into one of the following categories (United Nations World Tourism Organization (UNWTO), n.d.): internal tourism, consisting of domestic plus inbound tourism, is the touristic activity of visitors, both resident and non-resident, within the economic territory of the country of reference; national tourism, consisting of domestic plus outbound tourism, is the touristic activity, of resident visitors, within and outside the economic territory of the country of reference; and international tourism, consisting of inbound tourism and outbound tourism, is the touristic activity of non-resident visitors within the economic territory of the country of reference and the touristic activities of resident visitors outside the economic territory of the country of reference.

Several scales are applied frequently in studies of tourist flows. The intra-country scale is concerned with the origins and terminus of tourist flows within a country's borders; the intra-national scale, with the dispersion of tourist flows from a generating country or the distributing pattern of tourist flows within a destination country; and the international scale, with tourist flows between countries or continents (Bowden, 2003). The intra-country scale refers to domestic tourism, and the other scales to international tourism (Jansen-Verbeke & Spee, 1995; Williams & Zelinsky, 1970). While intra-national movements are not international in a strict sense, they are an integral part of an international travel system (Pearce, 1995).

International travel can also be considered at a range of broader scales. These include global travel, inter-continental, and intra-continental flows. Border tourism is another type of international tourism. Although tourists are of different nationalities, the border tourist does not travel a long distance, and their travel characteristics are very different from those of long-haul travel. Proximity is the major factor for this kind of travel (Pearce, 1995).

Corresponding to the three scales of tourist flows, the scales can be viewed as macro, meso and micro, which link to both the geographic origins and geographic destinations of tourists. Empirical research demonstrates that scale of the study has an impact on research findings. The findings uncovered at one scale do not necessarily remain pertinent at another. For example, in a recreational trip, a traveller might be impeded by geographic distance, while in an overseas holiday, distance can be an appealing factor to tourists (Perdue & Gustke, 1985; Richardson & Crompton, 1988; Williams & Zelinsky, 1970).

The macro scale is at the top of the research hierarchy of tourist flows, corresponding to international tourism. Distance is identified as one of the major determinants of country-to-country tourist movements. As a consequence, the resulting travel behaviour is examined through concepts such as the gravity model or the distance decay concept (Perdue & Gustke, 1985; Richardson & Crompton, 1988; Williams & Zelinsky, 1970). The approaches applied at the macro level are mainly aggregate. Study at the macro level is important in that it gives the broadest understanding of the causes of tourist flows in terms of the collective behaviours of tourists.

A lower scale of study is meso level research. It considers research into intra-national tourism (Morley, 1994a; Oppermann, 1992). Research at this level features all three features of tourists' movement, that is, direction, volume and pattern.

The lowest scale is the micro scale, corresponding to intra-country tourism. Research at this scale focuses on disclosing the travel behaviour of tourists in domestic situations (Mings & McHugh, 1992; Perdue & Gustke, 1985). One deficiency of studies at this scale is that the explanation of the travel behaviour is solely based upon the destination, but not the origin. This is because studies at this level are mainly of domestic tourists or regional tourists, but rarely of international tourists.

2.6 Summary

The main objective of this chapter was to provide adequate definitions for some of the concepts involved in this study. It drew attention to the questions that the study is trying to answer, and how these questions link with the conceptualisation of this

research. By doing this, it aimed to justify this research as a valid area of inquiry and to construct a solid foundation on which to ground this research.

The review of the concepts in this chapter showed that in general, sound conceptualisation has been lacking in the study of tourist flows. This can be particularly damaging in the development of the research methodology and theorising paradigms if it cannot be clarified at the onset of a study. It is recognised that any single approach is incapable of revealing a comprehensive conceptual and theoretical framework for the complexity of tourism studies in general, and tourist flows in particular.

The need for integrating tourism research into a broader scope of disciplinary paradigms is readily apparent. Addressing this point, this chapter integrated geographic and behavioural paradigms. This integration showed that tourist flows are one aspect of the broader concept of the spatial distribution of tourists; the other two aspects are the travel pattern and direction. The study of tourist flows is concerned mainly with identifying and quantifying the psychological, social, economic and environmental variables affecting the intensity or volume of tourist travel.

Tourist flows have four typologies (internal, international, domestic and national) and operate at different geographical scales (intra-country, intra-national and international). This study investigates international tourist flows to the Caribbean region. Based on the classification described, it is macro scale research. The necessity of conceptualising tourist flows will become more evident throughout the entire study, which may assure that the concepts clarified here form an essential and structural component of the study.

CHAPTER 3 THEORETICAL ISSUES IN THE STUDY OF TOURISM DEMAND

3.1 Introduction

In the previous chapter, the concept of tourist flows was clarified in the context of the discipline of geography. This chapter is devoted to economic theory, the second body of knowledge relating to this research. This chapter will explore several theoretical issues related to this research. It examines the concept of tourist flows through the prism of demand. Important insights are then applied to the analysis of international tourist flows in later chapters.

Tourists consume a variety of goods and services that are generated in many industries, for example, hotel, transport, retail and communication. For many, if not most of these industries, tourist consumption will only generate a fraction of the total output of the industry. Consequently, tourism is not analysed as one industry from the supply side; each tourism-related industry would have to be studied separately. This results in tourism being investigated principally from the demand side.

This chapter first reviews macroeconomic and microeconomic theories of tourism demand. Next, the measurement of international tourism demand is discussed. A review of the determinants that influence tourism demand follows. In the next section there is an assessment of the econometric techniques that have been employed in modelling tourism demand. A summary is provided in the final section.

3.2 Macroeconomic Considerations: International Trade Theories

Sinclair and Stabler (1997) and Vellas and Becherel (1995) identify four main schools of international theory, which offer a possible explanation for international tourist flows: the theories of absolute advantage, comparative advantage, factor endowments, and income similarity. These theories explain the position of a country in international tourism exchanges at the aggregate level, by analysing the causes of international tourism and how they influence economic and social growth and development. Although most of them explain tourist flows from the supply side, to some extent, they help us to understand the trends of international tourist flows.

3.2.1 Supply-side Theories

The theory of absolute advantage, generally attributed to Adam Smith in 1776, is widely used to explain the export monopolies of certain countries, which arise either from unique natural advantages or from technological advances (Smith, 1776). In terms of international tourism, absolute advantage implies that countries or regions that possess unique tourism resources (for example, natural wonders and architectural heritage sites) are known worldwide and thus hold a natural monopoly on international tourists. The theory also suggests that technical innovation can reinforce a country's absolute advantages. Technical innovation in the tourism sector primarily involves infrastructure, information, product development and marketing. Innovation would not only help to lower costs (for example, energy savings), but also create new tourism products (such as leisure centres). Thus the theory of absolute provides an explanation for the monopoly position of some tourist destinations.

Another theory of international trade is the theory of comparative advantage. The idea of comparative advantage was actually first mentioned by Adam Smith in 1776, but the law of comparative advantage was formulated by David Ricardo in his 1817 book *On the Principles of Political Economy and Taxation*. The theory of comparative advantage, also known as Ricardian theory, demonstrates that short-term gains from trade can be obtained if each country specialises in the production and export of the goods which it produces relatively efficiently, that is, in which it holds a comparative advantage (Ricardo, 1817). The pattern of trade flows is determined by differences in the relative production efficiencies of different countries typically due to differences in technology and production costs (Krugman et al., 2011), and hence gains from trade can result from product specialisation. Differences in productive capacities cause relative prices to differ among countries. When barriers to trade are fully removed, trade among countries will cause price differentials to disappear.

Comparative advantage can be considered a possible determining factor in international tourist flows. A country that provides tourism services with relatively lower prices will attract more tourists than will competing destinations with higher prices for similar tourism products, everything else held constant. The challenge that Ricardian theory faces, however, is the difficulty in determining what a country specialises in by price alone, even though there are wide fluctuations in costs across countries. Tourism products are typically services and have great diversity. The cost structure is complex, and includes layers such as the cost of transport, accommodation and other services related to hospitality, catering and various leisure services. Variations in exchange rates and national, or even regional, economic policies will directly or indirectly influence the

cost of tourism products. Finally, the quality-prices of these products and other technological differences must be taken into account.

From the early 20th century, the most popular trade theory was the factor endowments model. Heckscher (1919) formulated the model, which was subsequently updated by Ohlin (1933) and Samuelson (1949). The Heckscher-Olin-Samuelson (HOS) model conjectures that trade patterns are determined by differences in relative factor endowments. Essentially, a country that is relatively well endowed in a certain factor will have a tendency to export goods that use this factor relatively intensively in production, and will import goods from countries whose goods are relatively intensive in other factors. HOS theory argues that differences in factor endowments are typically larger between developed and developing countries, than between developed countries or between developing countries, and thus trade flows between developed and developing countries should be larger than trade flows between other pairs. HOS theory thus implies that the difference in (per capita) incomes should have a positive effect on trade. In relation to tourism, the implication of HOS theory is that richer countries should have comparative advantages in tourism. Thus there is a greater probability that they will export international tourism services, resulting in a positive balance in their travel accounts.

HOS theory is useful as it points to the role which the supply side can play in determining patterns of international trade flows, and by extension, international tourist flows. While production of tourism services might, at first blush, be assumed to be labour-intensive, it is likely that tourism is relatively labour-intensive in countries with a large supply of labour and capital-intensive in countries which are capital-abundant,

as tourism is not homogeneous across countries, depends on the stage of tourism growth in the country, and can vary over time (Sinclair & Stabler, 1997).

The link between tourism production and factor endowments is further complicated with respect to measuring factor abundance and quality (Sinclair & Stabler, 1997). For example, abundance could be measured by the quality of tourism products. It could also be measured by the value of tourism products, in which case demand would play a role since a higher demand for the product results in higher price and higher value (Sinclair & Stabler, 1997), particularly if there is a supply constraint.

The new trade theory assigns a key role to increasing returns in explaining differences in efficiency among countries (Romer, 1986). Increasing returns depend on the actions of private agents, or arise via knowledge acquisition and externalities. An element of the new trade literature focuses on the multinational enterprise or foreign direct investment as a critical source of knowledge-based services (Markusen, 1995). Another branch stresses the role of agglomeration or industry clusters as drivers of long-run competitiveness (Ottaviano & Puga, 1998). The final strand is concerned with the location of innovation-driven firms and the diffusion of offshoots to other locales as time passes (Krugman, 1979).

Crouch and Ritchie (1999) apply Porter's (1990) diamond theory to describe the characteristics of both comparative and competitive advantage in tourism. Crouch and Ritchie recognise that a destination's endowment are time-varying, which alters the comparative advantage of a destination, and develop a conceptual model for destination competitiveness. Beyond the achievement of competitiveness in the destination, the

goal of Crouch and Ritchie's model is to enhance the wellbeing of the residents in the destination. Enright and Newton (2004; 2005) use Crouch and Ritchie's model, and find strong support for supply-side factors as determinants of tourism competitiveness. Melian-Gonzales and Garcia-Falcon (2003), Murphy, Pritchard and Smith (2000), and Eugenio-Martin, Martin-Morales and Sinclair (2008) also conclude that supply-side related factors influence tourists to visit a destination.

These theories, old and new, emphasise the role of a country's tourism-related resources, which help to explain the pattern of international tourism flows to that country. Ricardian theory, in particular, is useful in pointing out the gains which countries can make in international tourism if they are relatively efficient in tourism production, and highlights the importance of increasing production efficiency. Tourists may visit a country because they are attracted by the natural endowment, for example, sun, sea and sand, or by cultural heritage (this dimension holds a clear association with HOS theory). Multinational tourism firms have clear advantages in terms of reputation and product recognition to attract tourists to countries where they invest. More countries, especially developing countries, realise that better infrastructure is important in attracting more tourists. New technologies, for example Internet marketing and online reservations, which make travel more convenient, also play a key role. Notwithstanding their attributes, supply-side theories are unable to fully explain international tourist flows, as they offer an explanation for countries' capacity to produce tourism services for export, but are less able of explaining a country's capacity to import such services.

3.2.2 *Gray's General Model*

Gray (1970) attempts to develop a coherent theory of tourism within the context that tourism can be treated like any other commodity or service in international trade, with some minor differences of degree rather than kind. He argues that international tourism conforms to mainstream international trade theory; however, any orthodox theory may only provide a partial explanation for international tourist flows. More specifically, orthodox HOS theory may only partially explain trade in travel services, as the existence of bilateral trade implies that variation in factor endowments alone is not the only cause of trade.

Gray differentiates pleasure travel into two categories of tourist motivation: wanderlust and sunlust. Wanderlust is described as the desire to exchange the known for the unknown. Wanderlust tourists' are motivated to go from familiar environments to unfamiliar, to leave things and places with which they are familiar to go and see different places, people and cultures, architecture of past cultures noted for their historical associations, ruins and monuments. Their leading force to travel is curiosity. Sunlust lovers have a desire for rest and relaxation. They are looking for specific facilities that do not exist at their place of residence. Their activities are conducted outdoor. The critical difference between the two relates to the degree to which they are likely to be international as opposed to domestic travellers, and in the type of travel facilities required in the destination. Wanderlust travellers are expected to be more international in character than sunlust travellers. Sunlust tourism demand focuses on natural resource attractions and is characterised by a high degree of substitutability between products, and strong competitive forces. Wanderlust tourism demand focuses

on people as attractions and is characterised by pronounced heterogeneity of destinations, hence less substitutability and less price sensitivity.

Gray also argues that the actual volume of international travel imports would always be dependent on general economic constraints that determine actual expenditure on goods and services. Such constraints include a large number of factors which operate on individual demand schedules but which are too small individually to be discerned by analysis at the aggregated, national demand for travel imports. These forces include changes in income distribution of the importing country, fluctuations in relative prices both internationally and domestically, the addition of new international transportation routes, and the development of new facilities at different rates in different supply areas.

Gray's foreign trade theory has been criticised on the grounds that it is not fully developed and integrated into a systematic economic theory of tourism demand (Morley, 1992; Smeral, 1989). His generalisation neglects major tourist motivations (apart from wanderlust and sunlust), and important distinctions between types of tourist, which play important roles in analysis of international tourist flows. Moreover, it is still essentially a supply-side oriented approach.

3.2.3 Demand-side Theories

An interesting feature of international tourist flows is that they are bilateral. Thus international tourist flows are perhaps best described by a theory of intra-industry trade. A theory of demand formulated by Linder (1961) offers an explanation for bilateral trade in products supplied by the same industry, that is, intra-industry trade.

Linder's theory suggests international exchange between two countries depends both on the volume of demand, and the demand for different products, in terms of structure, quality and brand. The "demand for difference" (Lassudrie-Duchene, 1971) may be particularly significant in international tourism. It is often geographical, cultural and linguistic differences that induce bilateral tourist flows between countries with similar levels of economic development.

The theory also highlights consumers' similarity in tastes as a cause of trade. Linder argues that the greater the similarity in demand for products supplied by different countries, the greater the likelihood of trade between them. Linder proposes that demand propensities between two countries become more similar as the similarities in their per capita incomes increase. Therefore, the more similar per capita incomes are between two countries, the greater the bilateral trade flows. Hence there is greater potential for trade flows between countries with similar levels than between those with dissimilar levels. Linder's hypothesis, typically modelled as the absolute value of the difference of per capita incomes, will have a negative effect, and is thus the diametric opposite of HOS theory, which predicts a positive effect.

Unlike HOS theory, Linder's theory helps to explain the high level of tourist movements between geographically proximate countries (Sinclair & Stabler, 1997), which have similar levels of income, and wealth (factor endowments). Linder's theory also predicts the quality range of tourism production but not the specific tourism products a country will supply (Sinclair & Stabler, 1997).

While early studies found little support for Linder's theory (Greytak & McHugh, 1977; Kennedy, 1980), others found evidence to substantiate the theory (Bergstrand, 1990; Hanink, 1988; Hirsch & Lev, 1973) by including geographic distance as a factor in their empirical specifications. Indeed, Fortune (1971) argues that geographic distance is a more important factor than income similarity in explaining trade flows.

Linder's hypothesis of economic similarity within the context of tourism highlights a dimension of distance critical to this research. If economic similarity between countries results in greater tourist flows between them than between countries that are economically dissimilar, then Linder's hypothesis is supported. On the other hand, if economic dissimilarity between two countries results in greater tourist flows than between countries that are economically similar, this will lend support for the theory of factor endowments as a determinant of tourist flows.

3.3 Microeconomic Formulations

Microeconomic formulations of tourism demand are theoretical models, derived from economic theory and act as foundations of modelling tourism demand at the disaggregated level. Consumer theory represents the main microeconomic theory underlying the microeconomic theories of tourism demand. At an individual level, consumer theory attempts to integrate the concept of Marshallian utility with the psychological and sociological influences in consumer behaviour. Within this framework, tourism demand is explained by the utility maximisation of an individual or household under constraints, given complete information.

Theoretical models of tourism demand can generally be classified into two groups: the neoclassical model, and the characteristics model.

3.3.1 Neoclassical Theory

The neoclassical approach has, so far, represented the theoretical cornerstone of tourism demand research. According to this theory, consumers allocate their money over the available goods and services in order to maximise utility. It is assumed consumers have complete information on all relevant prices and availability of goods and services and can rank the various possible combinations in order of the utility they provide.

Consequently, each individual demand originates from a budget allocation process, which maximises utility. The demand for each good or service is a function of all prices and the consumer budget; leisure time is assumed to be constant and given. The problem can be written as:

$$\begin{aligned} \max \quad & U(q_i) = v(p, y); \quad i = 1, 2, \dots, n \\ \text{s.t.} \quad & y = \sum_i p_i q_i \end{aligned} \quad (3.1)$$

where q_i is the quantity demanded of each good or service i ; $U(q_i)$ is the consumer's utility function which depends on q_i ; p_i is the price of each good or service i ;

$y = \sum_i p_i q_i$ is the consumer's budget constraint where y is income; p is a vector of the

per unit prices of goods or services; and $v(p, y)$ is the consumer's indirect utility

function. Solution of this problem results in the consumer's Marshallian demand function:

$$q_i(p, y) \quad (3.2)$$

Theory is silent as to the form of Equation (3.2). Although it can be written in linear form, Equation (3.2) is typically expressed in power form:

$$q_i = \beta p_i^{\beta_1} p_s^{\beta_2} p^{\beta_3} y^{\beta_4} u_i \quad (3.3)$$

where p_s is the price of a related good (substitute or complement); p is the general price level; β 's are parameters to be estimated; and u_i is a disturbance term. Equation (3.3) has the added benefit of being linear in logarithms:

$$\ln q_i = \beta_0 + \beta_1 \ln p_i + \beta_2 \ln p_s + \beta_3 \ln p + \beta_4 \ln y + \varepsilon_i \quad (3.4)$$

where $\beta_0 = \ln \beta$ and $\varepsilon_i = \ln u_i$. Another benefit of the power form is that the β 's are direct measures of (constant) demand elasticities, which are of great interest in demand studies.

In applying such neoclassical theory to tourism demand, it is assumed that individuals make their decisions in a two-stage budgeting process (Smeral, 1988; 1989). In stage one, the level of consumption of tourism goods is decided upon simultaneously with other goods and services. Prices of all goods and services along with each individual's income are relevant to the decision in this stage. Changes in the prices of non-tourism goods can affect the amount allocated for tourism. After the decision to consume travel goods and services has been made, the next stage involves the choice of travel good or service. It is in this second stage that the travel destination is chosen. It is important to note that destinations are assumed to provide a homogeneous tourism good. Only the tourism prices of the various destinations are relevant for the choice of destination, all other things constant.

Under the assumption of a two-stage decision process separable for each country, two separate equations can be derived: one for the first step to determine the volume of demand for domestic and foreign tourism goods and services from the consumer in

origin countries; and one for the second step to determine the country of destination according to prices of tourism goods in all possible destinations and the foreign travel budget restriction (Smeral, 1988). Therefore, the demand for tourism goods and services is a function of prices of non-tourism consumer goods and services, domestic tourism and foreign tourism goods and services, and disposable income.

An issue arises in that consumer theory makes reference to individual consumer demand for goods and services. In most cases, however, tourism data is highly aggregated. Thus demand studies involve aggregation problems; that is, the problems that arise from combining preferences at the micro level to arrive at a macro level of preferences. Thus, the aggregation problem is a specific example of the fallacy of composition. To address this problem, a representative consumer is assumed, who is interpreted as a statistical average of the micro units.

In spite of its persistent prominence, the traditional neoclassical approach has been challenged by some key contributions, such as Rugg (1973), Morley (1992), and Papatheodorou (2001). According to Papatheodorou, “the application of the traditional [neoclassical] demand theory ... [reveals] ... serious drawbacks, as it ignores the particularities of the product” (Papatheodorou, 2001, p.165). Traditional demand theory is unable to model the evolutionary features of tourism due to its static nature (Butler, 1980; Papatheodorou, 2001). The assumption of tourist who considers all destinations as undifferentiated is farfetched, as tourism goods and services are heterogeneous (Papatheodorou, 2001). In addition, the neoclassical demand model neglects the comparative advantage of countries that export tourism goods and services and their role take in attracting tourists.

Traditional models ignore measures of travellers' attitudes, including perceptions about different destinations. As a result, the models are insensitive to the wide range of influences that can motivate or change consumer travel behaviour (Seddigi & Theocharous, 2002). Finally, neoclassical theory operates in a competitive environment where producers are merely price-takers. The growing oligopolistic and oligopsonistic nature of tourism suppliers (Debbage, 1990) invalidates this assumption, and results in an identification problem in empirical research since it neglects the significance of the supply side entirely (Papatheodorou, 2001). The neglect of important tourism determinants thus casts serious doubts on the real usefulness of traditional neoclassical analysis (Athiyaman, 1997).

3.3.2 Lancaster's Characteristics Theory

The characteristics framework by Lancaster (1966a; 1966b; 1971) addresses many of the shortcomings of neoclassical demand theory outlined in the previous section. Lancaster expresses dissatisfaction with neoclassical theory by recognising that consumers gain utility from consumption of the intrinsic properties of the goods and services, namely characteristics, in contrast to neoclassical theory where goods and services are the object of utility themselves. More specifically, Lancaster assumes that goods and services are combined to create activities, which in turn generate characteristics. This allows a particular good or service to possess multiple characteristics depending on the other goods or services with which it is combined. Further, Lancaster (1966a) argues "[w]ith no theory of how the properties of goods affect the preferences at the beginning, traditional analysis can provide no prediction as to how demand would be affected by a specific change in one or more properties of the

goods, or how ‘new’ goods would fit into the preference pattern over existing goods”

(p.4). Supporting Lancaster’s arguments, Seddighi and Theocharous (2002) remark:

From the moment that the preference map is constructed, it is automatically assumed that all the information concerning the goods is incorporated within the map. This means that the physical properties of goods relevant to the consumer are presumed to have been taken into account by the consumer in deciding whether he/she prefers one combination of goods to another. If the goods had been different, the preference map would have been different. Since the traditional analysis starts with the preference map, it is implied that the properties/characteristics of goods have been swallowed up in the preference before the analysis even commences, and moreover there is no possibility of using information concerning these properties anywhere at a later stage (p.476).

Lancaster’s characteristics theory has given rise to two types of models for use in demand studies: hedonic pricing models, and discrete choice models.

Hedonic Price Theory

The etymology of the word “hedonics” is *hedonikos*, a Greek word denoting pleasure.

In an economic context, hedonics refers to the utility individuals derive from consumption of goods and services. Bartik (1987) claims that Court (1939) was the first application of hedonic price theory, although others, such as Colwell and Dilmore (1999), suggest that Haas (1922) preceded Court.

Despite the opposing claims, credit for the hedonic pricing model is typically given to Rosen (1974). Rosen’s approach, like that of Lancaster (1966a; 1966b; 1971), imputes characteristics’ prices based on the relationship between the prices of differentiated goods and the number of characteristics which these goods possess. Rosen’s model is also similar to the Lancasterian model in that it assumes that goods possess bundles of characteristics valued by the consumer; however, the models differ in some key ways. While Lancaster assumes that goods are members of a group and that individuals must consume the group members in combinations that will allow them to acquire their

preferred attributes, Rosen's model assumes that there is a range of goods from which consumers choose to obtain the requisite attributes.

Rosen's (1974) model is comprised of two stages. In the first stage, the marginal price of each characteristic is estimated from a regression of the price of the good on its characteristics. In stage two, the inverse demand function is estimated from the implicit price function derived in stage one. A consumer's willingness to pay for a characteristic depends on income and other influences on preferences.

A concern with estimation of hedonic price models is the choice of functional form. An incorrect functional form can result in inconsistent estimates (Bloomquist & Worley, 1981). Another area of concern is misspecification of variables, which may be unavoidable, since the hedonic price model is concerned with the implicit prices of characteristics. Butler (1982) recommends parsimonious models which consider only those attributes expected to yield utility.

Discrete Choice Models

In discrete choice modelling, individuals choose from a set of alternatives. The set of alternatives needs to exhibit three characteristics. They must be mutually exclusive, exhaustive, and finite in number.

In general, discrete choice models are derived in a random utility model framework in which individuals, n , are assumed to be utility maximisers (Train, 2007). The basic setup is that an individual n faces a choice among J alternatives. Each alternative j offers the individual a particular level of utility $U_{nj}; j = 1, \dots, J$. The alternative with the

highest utility is chosen, so that i is chosen if and only if $U_{ni} > U_{nj}, \forall i \neq j$. Although utility cannot be observed, some characteristics of the alternatives, $x_{nj} \forall j$, can be observed, and so can some characteristics of the decision maker, s_n . The individual's utility is denoted $V_{nj} = V(x_{nj}, s_n) \forall j$ and is called representative utility.

Since there are aspects of utility that the researcher cannot observe, $V_{nj} \neq U_{nj}$. As a result, utility is decomposed as $U_{nj} = V_{nj} + \varepsilon_{nj}$, where ε_{nj} captures the factors that influence utility but that are not in V_{nj} ; V_{nj} can be considered the systematic component of a decision maker's utility, and ε_{nj} can be thought of as the stochastic component. The joint density of $\varepsilon_n = \{\varepsilon_{n1}, \dots, \varepsilon_{nJ}\}$ is denoted $f(\varepsilon_n)$. The probability that decision maker n chooses alternative i :

$$\begin{aligned}
 P_{ni} &= \text{Prob}(U_{ni} > U_{nj}, \forall i \neq j) \\
 &= \text{Prob}(V_{ni} + \varepsilon_{ni} > V_{nj} + \varepsilon_{nj}, \forall i \neq j) \\
 &= \text{Prob}(\varepsilon_{nj} - \varepsilon_{ni} < V_{ni} - V_{nj}, \forall i \neq j)
 \end{aligned} \tag{3.5}$$

Equation (3.5) defines a cumulative distribution, that is, the probability that the stochastic component $\varepsilon_{nj} - \varepsilon_{ni}$ is no greater than the observed quantity $V_{ni} - V_{nj}$. Using the density function $f(\varepsilon_n)$, Equation (3.5) can be written as:

$$\begin{aligned}
 P_{ni} &= \text{Prob}(\varepsilon_{nj} - \varepsilon_{ni} < V_{ni} - V_{nj}) \\
 &= \int_{\varepsilon} I(\varepsilon_{nj} - \varepsilon_{ni} < V_{ni} - V_{nj}) f(\varepsilon_n) d\varepsilon_n
 \end{aligned} \tag{3.6}$$

where $I(\cdot)$ is an indicator function equal to 1 when $\varepsilon_{nj} - \varepsilon_{ni} < V_{ni} - V_{nj}$.

Discrete choice models have limited application in tourism demand studies because they are based on cross-sectional survey data. Thus the dynamic behaviour of tourists over time is ignored.

Applications of Lancaster's Theory

Rugg (1973) introduces Lancaster's characteristics model to tourism within a hedonic framework to cope with the latter's evolutionary structure. The model includes two constructs: a time constraint, and the transportation time and cost between alternate destinations to modify the time and budget constraints. Rugg's model is concerned with the choice of destination, assuming that the consumer has decided to take a tourist trip and made a budget allocation of time and money. The consumer has to solve the following problem:

$$\begin{aligned}
 & \max U = U(z_{tour}) \\
 & s.t. \quad z_{tour} = G(x_{tour}) \\
 & \quad Y \geq p_{tour} \cdot x_{tour} + p_{trans} \cdot v \\
 & \quad T \geq c \cdot x_{tour} + t \cdot w \\
 & \quad z, x_{tour}, p_{tour}, p_{trans}, v, c, t, w \geq 0
 \end{aligned} \tag{3.7}$$

where U is the consumer's utility function; z_{tour} is a vector of tourist characteristics in each destination; G is a function which describes the production of characteristics; x_{tour} is the number of days spent in each destination; p_{tour} is the price level in the destination; p_{trans} is travel costs between origin and destination respectively; v is a vector with elements equal to one or zero depending on whether the consumer does or does not travel between a particular origin and destination pair; c is a vector whose elements are all unity; t is transport time between the origin and each of the available destinations; w is a vector equal to one or zero depending on whether the consumer uses

a transportation link or not; Y is available expenditure; and T is time available for tourism. All elements are assumed to be non-negative.

Although the time constraint is meant to capture the frictional effects of distance between the origin and various destinations, nothing is implied about the distance among various destinations (Papatheodorou, 2001). Internal consistency requires the application of a discrete choice framework where the consumer travels only to the destination with the highest utility (Ben-Akiva & Lerman, 1985; Morley, 1994a; Papatheodorou, 2001).

Rugg (1973) assumes a log-linear relationship between variables to test his model:

$$T_{ij} = \alpha_0 P^{\alpha_1} Y^{\alpha_2} PD^{\alpha_3} PT^{\alpha_4} T^{\alpha_5} T_{24}^{\alpha_6} R^{\alpha_7} S^{\alpha_8} C^{\alpha_9} M^{\alpha_{10}} IM^{\alpha_{11}} \quad (3.8)$$

where T_{ij} is the number of scheduled airline passengers travelling in both directions between countries i and j ; P is the product of the populations of i and j ; Y is the weighted average of per capita disposable incomes of i and j ; PD is the weighted average of relative prices at i and j ; PT is the round trip price of transportation between i and j ; T is the weighted average of average paid vacation lengths in i and j ; T_{24} is the weighted average of the twenty-four average temperatures of i and j ; R is the weighted average of average monthly rainfall levels in i and j ; S is the weighted average of average hours of daily sunshine in i and j ; C is the absolute value of the difference of the proportion of residents in i and j who are Christian; M is the weighted average of the number of national museums in i and j ; and IM is the weighted average of the import proportions of i with j and j with i .

Notably, Rugg's empirical model closely resembles a gravity equation; this method is briefly described later in this chapter and will be extensively discussed in Chapter 5. His model includes income and price variables, which are to be expected in a demand model. Also noteworthy is that Rugg includes proxies for: culture distance (absolute value of the difference in proportion of Christians in each country), a construct discussed in greater detail in Chapter 4; and climate (temperature, rainfall, and sunshine). Rugg's results indicate that the most significant demand variables are climate, population in the source and destination countries, and attractions (specified as the number of national museums in *i and j*).

Morley (1992) and Papatheodorou (2001) both apply Lancaster's model to the examination of tourist flows. Morley's model is a hybrid of Lancaster's model in which utility is derived from the characteristics of goods, and the classical model in which the goods are directly the source of utility. Unlike the neoclassical model, Morley's model permits changes in incomes as well as the prices of non-tourism goods and services to influence tourists' behaviour. Papatheodorou's study focuses on the first stage of the hedonic pricing model for price competitiveness analysis, and not demand analysis, *per se*. Papatheodorou presents comparative exercises proving that Lancaster's approach can address the variety issue in tourism. Seddighi and Theocharous (2002) combine Lancaster's characteristic approach with Koppelman's (1980) consumer transportation model to shed light on consumers' travel choice behaviour. A more recent work by Tussyadiah, Kono and Morisugi (2006) applied the model to the case of multi-destination travel. Their work shows that packages of multiple destinations can create preferable combinations of characteristics for certain travellers.

Lancaster's characteristics approach conforms well to analysis of tourism because a traveller does not derive utility from possessing or consuming travel destinations; rather, travellers derive utility from being in a particular destination at some period of time, thereby consuming the destination's characteristics. However, the approach also has several limitations. First, the model is difficult to empirically apply and interpret. Second, the model does not deliver a tourism demand function directly exploitable in empirical applications, as they tended to be in unwieldy non-linear form (Stabler, 2013). Finally, another limitation relates to the neglect of tourism supply. Like most tourism demand models, a perfectly elastic tourism supply curve is implicitly assumed.

3.4 Measurement of International Tourism Demand

Economists typically focus on effective demand, defined as the quantities of a good or service that buyers in aggregate are willing and able to buy at any potential price over some specified period. This classical definition forms the basis for the concept of tourism demand (Song et al., 2010). The tourist product is composed of several heterogeneous goods and services supplied by firms belonging to different industries which are mainly, but not exclusively, located in the tourist destination. These goods and services (for example, accommodation, transport, shopping, attractions, events) are demanded in a relationship of complementarity and substitutability by tourists while in the destination. Another atypical feature of tourism demand is that consumption and production occur simultaneously, while the consumer is displaced to the point where these processes occur (Schulmeister, 1979). These characteristics highlight the special nature of tourism demand (Morley, 1992; Song et al., 2010).

There are several measures of tourism demand in the literature. Kim (1988) (as cited in Song, Li, Witt and Fei (2010, p.64)) classifies the criteria into the following groups: a doer criterion, for example, the number of tourist arrivals, the number of tourist visits or the visit rate; a pecuniary criterion, for instance, the level or share of tourist expenditure (receipts) in income; a time-consumed criterion, for example, tourist-days, tourist-nights; and a distance-travelled criterion, such as the distance travelled in miles or kilometres. Of these, the doer and pecuniary criteria are the most common measures of tourism demand (Song et al., 2010). The particular measure used has implications for devising effective tourism policies and strategies to increase tourism demand (Song et al., 2010). A summary of these measures based on reviews by Crouch (1994a), Lim (1997), and Li, Song and Witt (2005) respectively is shown in Table 3.1.

Table 3.1: Measures of Tourism Demand Identified in Previous Review Studies

	Crouch (1994a)	Lim (1997)	Li, Song and Witt (2005)
Tourist arrivals (departures)	51	51	53
Tourist expenditure (receipts)	40	49	24
Length of stay	3	6	0
Nights spent at tourist accommodation	6	4	1
Others	5	9	10
Number of studies reviewed	80	100	84
Period of review	1961-1992	1961-1994	1990-2004

Source: Adapted from Song, Li, Witt and Fei (2010)

Tourist Arrivals

Tourist arrivals measure the number of visits to a country. A person who makes several visits during the period of record will be counted as a separate arrival on each occasion. Similarly, a person who visits several countries in a single trip will be counted as a distinct arrival in each country. According to the UNWTO definition a visitor includes “tourists” staying 24 hours or longer and “excursionists” not staying overnight, and

should be counted, but travellers who do not leave the airport transit area and those who enter the country illegally should not be included.

This measure of tourism demand is the easiest to obtain. It is typically collected by frontier or border counts (inbound), based on bookings at entities offering accommodation to tourists (inbound) or sample surveys (inbound and outbound) (Witt & Witt, 1995). Depending on the method, the number of arrivals may be over- or underestimated. The number of transit passengers can inflate numbers in frontier counts. On the other hand, bookings at accommodations will provide an underestimate since it excludes tourists staying at friends and relatives, and unregistered accommodation. Sample surveys are perhaps the best method for measuring tourist arrivals but reliability is dependent on sample size.

Tourist Expenditure/Receipts

Tourist expenditure can be defined as the total consumption expenditure made by a visitor or on behalf of a visitor for and during his/her trip and stay at the destination (United Nations World Tourism Organization (UNWTO), n.d.). UNWTO offers separate definitions of international tourism payments for inbound and outbound tourism. International tourist receipts are used to measure expenditure of international inbound visitors, including payments to airlines for international transport. It also includes any payments made for goods/services purchased in the destination.

International tourism expenditure is used to measure the expenditure of outbound visitors in other countries including their payments to foreign airlines for international transport (United Nations World Tourism Organization (UNWTO), n.d.).

The bank reporting method or sample surveys are used to collect data on international tourist expenditure and receipts (Witt & Witt, 1995). In relation to the bank reporting method, data is collected from banks and other institutions authorised to buy and sell foreign currency. The challenges with this method include the difficulty in correctly designating a transaction as a tourism transaction, and non-reporting of relevant transactions (Witt & Witt, 1995). As with collection of tourist arrivals data, sample surveys provide more reliable data, but suffer from the same sample size problem.

Tourist Nights

The number of days or nights which visitors stay at a destination is another important measure of tourism demand. This measure is especially valuable to tourism planners who are working on public facilities for tourists, such as utility systems, parking and recreation areas. Likewise, private developers planning new hotels or other accommodation or services need information on visitor nights of stay.

The reliability of tourist nights as a measure of tourism demand is undermined by the exclusion of nights spent in alternative means of accommodation such as apartments, nights spent at friends and relatives, and so forth. The use of one price to represent all accommodation types also calls the measure into question (Bakkal, 1991).

This measure is rarely used to measure tourism demand due to its wide unavailability across destinations and over time. Known exceptions are Bakkal (1991) and Sorensen (1999).

3.5 Determinants of Tourism Demand

Consumer theory holds that income and prices are the primary determinants of demand for a good or service. However, the tourism literature indicates that demand for tourism also depends on other influences apart from income and prices; for example, social, psychological, political, demographic, and other factors. This section describes both sets of determinants.

3.5.1 Income

The income level of tourists from the origin country (or tourist expenditure in the destination if outbound tourism demand is examined) is a critical determinant of tourism demand. Consequently, most studies of tourism demand have included income variables. Lim (1997; 2006) argues that discretionary income is an appropriate proxy because consumers choose travel for recreational purposes after deducting expenditure for necessities. Data limitations means that the most frequently employed income proxies are nominal or real national income, gross domestic product, gross national product and real average wage per employee (Lim, 1997; 2006).

Income is expected to have a positive influence on tourism demand. However, the magnitude of the effect is dependent on the type of tourism (Bull, 1991), other things constant. Demand for general vacations or holidays, secondary vacations, or visiting friends and relatives (VFR), for example, is highly responsive to changes in income, relatively speaking, while demand for business travel is less responsive to changes in national income/economic conditions (see Section 3.7 for discussion about tourism demand elasticities).

3.5.2 Prices

Prices are another critical factor in tourism demand. There are three dimensions to consider: the costs of travel to the destination (travel costs), the cost of living for tourists in the destination, and exchange rates between destination and origin countries (Crouch, 1994a; Lim, 2006). Apart from the own-price effect, the impact of prices in substitute destinations on tourism demand should be considered (Martin & Witt, 1988). For this reason, most researchers now specify prices in relative form. Crouch (1995) finds that travel to less-developed destinations is less price-sensitive.

Travel Costs

Travel costs are the costs of round-trip travel between origin and destination countries. Crouch (1994a) argues that many potential tourists first consider the cost of travel before they make any travel decisions. Such costs have therefore become one of the more important demand determinants of international tourism demand.

An appropriate measure of travel costs is the weighted average costs of travel by different methods of transport (air, sea and land), where the weights are the shares of each method in total travel. The lack of the required data for this measure means that it is not used in practice. Proxies for international travel costs typically include real average airfare, real revenue per passenger mile/kilometre, geographic distance, indices of oil prices, and the price of a barrel of oil, among others. Proxies for relative travel costs raise concerns, because they are highly dependent on the price of oil, and are thus affected in a similar manner, rendering relative transport costs constant (Smeral & Witt, 1996). A further issue with a travel cost variable arises due to the transport pricing system. Within as well as between most forms of transport, there are different fares,

which vary according to such criteria as pre-booking time, times of travel and length of stay. Moreover, in many instances, a travel cost variable is excluded from the tourism demand function, either because of data unavailability, or possible multicollinearity problems (Uysal & Crompton, 1984).

Tourism Price

Conceptually speaking, tourism price is a complex variable, as it is a function of the basket of goods and services consumed by tourists (Vanegas Sr. & Croes, 2000). This implies that tourism price should thus be a function of the prices of the goods and services in this basket; in other words, a Tourism Price Index (TPI). Most studies use the destination's consumer price index (CPI) as a proxy for tourism prices. A major concern, however, is that the destination CPI may not reflect the prices of goods and services consumed by tourists. Martin and Witt (1987) investigated the appropriateness of a TPI, and conclude that the CPI and a specially compiled TPI performed more or less equally. Thus, although a TPI is theoretically superior, it appears that in most instances, a CPI is a reasonable alternative because the tourist mix of goods and services consumed is sufficiently similar to the local mix, or because the changes in the prices of the different goods are more or less the same. Given the difficulty in obtaining the relevant price information, for minimum gain in performance, the CPI continues to be the dominant proxy for tourism price.

Potential tourists' expenditure decisions in relation to tourism goods and services are made by measuring the costs of the goods and services in the destination in terms of their domestic currency, and thus a suitable proxy for tourism price is the destination price level, typically the CPI, adjusted by the nominal exchange rate between the origin

and destination (Song et al., 2010). The tourism price is expected to have a negative effect on tourism demand. This may occur because of a relatively higher rate of inflation in the destination versus the origin, or because the destination currency has appreciated in value relative to the origin currency.

The impact of competing destinations on tourism demand can be addressed in several ways. First, the cost of living of tourists may be specified as destination prices as a ratio to origin prices; second, as destination prices relative to weighted average prices in alternative destinations, including or excluding the origin; or third, weighted average substitute destination cost separate from the tourism price. Travel costs to substitute destinations may have an impact on tourism demand although they are typically excluded from demand functions because of data concerns (Song & Turner, 2006). The substitute price and travel costs are expected to increase tourism demand; that is, the higher are prices in substitute destinations, as well as the higher are travel costs to the latter, the more tourists will travel to and spend in the destination under consideration.

Exchange Rates

For international tourism studies, the exchange rate is sometimes directly included as a separate explanatory variable from the CPI in the tourism demand function, as tourists are perhaps more aware of the destination's nominal exchange rate with their home country as opposed to the destination's cost of living (Artus, 1970; Gray, 1966; Witt & Witt, 1995). With international travel, many of the costs of a trip are *ex ante* and consumers, because they are often paying for air travel and accommodation up front, are aware of the exchange rate-affected price differentials. In the short term, tourists are

thus more aware of the changes of exchange rates than inflation rates in the destination countries (Sinclair & Stabler, 1997).

The use of exchange rates as a separate explanatory variable in tourism demand functions is not without problems. It is possible that a favourable exchange rate in a destination could be offset by a relatively high inflation rate (Witt & Witt, 1992). It is also likely that multicollinearity could pose a problem if tourism prices, in relative or absolute form, are included in the demand specification along with nominal exchange rates, as they each are indicators of prices.

3.5.3 Tourism Marketing Expenditure

Tourism marketing and promotional expenditure may also have a positive influence on international tourism demand by introducing an image of the destination to potential tourists (Song et al., 2010). Travel services, including tour operators and travel agents, can also exert considerable influence on holiday decisions. Issues with data availability means that tourism marketing expenditure does not regularly appear as a variable in tourism demand functions. Thus far, only Kulendran and Divisekera (2007) and Ledesma-Rodriguez, Navarro-Ibanez and Perez-Rodriguez (2001) have incorporated such variables into their studies.

3.5.4 Expectations and Habit Persistence

Habit persistence or habit formation in tourism is a term used to describe the phenomena where individuals return to a destination that they had previously visited. This may occur because of the reduced uncertainty associated with a known destination. Tourists frequently return to a destination that they like. It is also possible for

individuals who have visited a destination to pass on their impressions of the destination to relatives and other acquaintances. This is known as the “word-of-mouth effect” (Simpson & Siguaw, 2008).

A lag, typically one period, of the tourism demand variable is included in the demand specification to model tourists’ expectations, habit persistence, and word-of-mouth effects. This variable is expected to have a positive influence on demand. Lagged explanatory variables are also included to capture the effect of supply constraints (Song et al., 2010) and the dynamic effects of other factors on tourism demand (Lim, 1997).

3.5.5 One-off Events

The occurrence of events can have an impact on tourism demand. Such events can be positive, such as hosting the Football World Cup, or negative, such as a terrorist attack or public health crisis. However, most research has focussed on the effects of bad as opposed to good news. As tourism policymakers tend to be more concerned about ascertaining the likely degree of demand decline due to adverse events, this is not unexpected. Knowledge regarding the effects of such events, both positive on negative, on tourism demand is a necessary first step in identifying their potential effects on the wider economy (Blake et al., 2003).

Dummy variables are typically included in tourism demand functions to model the impact of one-off events; it takes the value of 1 in the period when the event occurs and 0 otherwise. The challenge empirically is that the effects of the event may last for more than a single period. Thus, a dummy variable is unlikely to fully capture the event’s effect on tourism demand. In addition, it is not known with certainty for how long the

event will have an effect on tourism demand, nor the rate at which the effect will dissipate.

3.5.6 Other Demand Determinants

Tourist Motivations

Demand for tourism has been examined using the framework of motivation theory, usually within the context of push and pull factors. According to motivation theory, intrinsic and extrinsic motivations influence human behaviour and value evaluation (Davis et al., 1992; Mattila, 1999). Within the context of tourism research, push motivation is associated with the desire to travel and pull motivation to destination attributes (Dann, 1977; Yoon & Uysal, 2005). Examples of push motivation are rest and relaxation, getaway from routine, adventure, excitement and family unity/bond, while features of destination attractiveness include beaches, climate, cultural attractions, shopping and natural scenery, are associated with pull motivation (Lee et al., 2012).

Population and Leisure Time

Population and leisure time in the origin country are two important factors influencing tourist behaviours socially. The level of foreign tourism from a generation country is expected to depend upon the population (the higher the number of people resident in the country, the greater the number of trips taken abroad, *ceteris paribus*). However, only a few studies have considered population as a separate explanatory variable. Its effect is typically accounted for by modifying the variables in per capita form, such as per capita expenditure/receipts, per capita income, and so forth, in order to remove the effect of natural increase in arrivals due merely to population growth.

Although the population of origin countries is the source of tourist flows, the change in population structure is one of the long-term factors affecting demand (Lickorish & Jenkins, 1997). Compared to people living in rural areas, people living in urban areas tend to enjoy higher incomes (Wen, 1997). Thus the degree of urbanisation of an origin country can have an indirect impact on the level of tourism demand through its effect on income. The availability of free time is also a primary condition of tourism demand (Vellas & Becherel, 1995).

Personal Factors

Consumers' tastes or preferences are supposed to influence tourism demand. This factor operates on individual demand schedules and can affect a tourist's choice of travel destinations. Because suitable data is widely unavailable, this factor can be specified as a time trend (Witt & Witt, 1995), implying that tastes are moving at a constant rate towards or against the destination. Justification and interpretation of the latter presents some difficulty. This factor is often ignored in the analysis of tourism demand.

Lickorish and Jenkins (1997) explain that there is a correlation between the level of education and a person's cultural curiosity as well as income levels. People with a higher level of education tend to be more curious, and more importantly, have greater financial ability to travel. Therefore, many long-haul travellers, perhaps because of the expenses of the journey, are relatively wealthy people, often with a high level of education.

Other Factors

Demand behaviours do not change immediately with changes in income, price and other influencing factors due to psychological, technical and institutional reasons (Gujarati, 2004). The inclusion of lagged independent variables is used to model this inertia in human behaviour. Seasonality also has a significant effect on tourism demand. To model its effect, researchers usually include seasonal dummy variables.

Some tourism researchers are of the view that trade openness has some measure of influence on demand for tourism, in particular travel for business purposes. Kulendran and Wilson (2000) assert that countries characterised by openness of their economies offer international trade opportunities and the possibility of increasing business tourism demand.

Investment in tourism supply can promote growth in tourism demand (Naude & Saayman, 2005; Ouerfelli, 2008). An improvement in destination tourism infrastructure improves accessibility and convenience. Therefore, a significant increase in tourism supply could stimulate an increase in tourism demand.

Political conflicts, administrative issues, and other important features, such as the relationships between generation and destination countries, also influence international tourism demand. For instance, a government may seek to control both inbound and outbound tourists through passport and visa requirements, foreign exchange controls and other regulations.

3.6 Estimating Tourism Demand

The development of methods for modelling international tourism demand, in particular inbound tourism, has grown rapidly. Li, Song and Witt (2005) contend that there was significant advancement in the analysis of tourism demand in relation to the diversity of research, and improvements in research methodologies. From the 1960s to 1994, the most popular methods to estimate international tourism demand were static econometric techniques like Ordinary Least Squares (OLS) and Generalised Least Squares (GLS) (Gray, 1966; Loeb, 1982; Rugg, 1973; Sheldon, 1994). Subsequently, more sophisticated econometric models have been employed, such as, cointegration analysis (Kulendran, 1996; Kulendran & King, 1997; Lathiras & Siriopolous, 1998; Morley, 2000; Seddighi & Shearing, 1997; Webber, 2001); vector autoregression (VAR) modelling (Shan & Wilson, 2001; Song et al., 2000); the error correction model (ECM) (Gonzalez & Moral, 1995; Kulendran & King, 1997); time-varying parameters (TVP) (Kulendran & King, 1997; Song & Wong, 2003); and structural time series model (STM) (Gonzalez & Moral, 1995; 1996; Greenidge, 2001; Vu, 2006).

At the same time, there was also an expanding literature that employed non-causal time series models to model tourism demand, mainly for the aim for forecasting. A seminal paper by Martin and Witt (1989) introduced simple techniques, like naïve methods, autoregressive modelling, exponential smoothing, and trend-curve analysis, into the literature. This literature argues that such models are able to generate relatively better forecasts than their more sophisticated counterparts. These simple methods rely on the assumption that the past is the best predictor of the future. Expediency as opposed to theory drove their widespread usage (Witt & Witt, 1992). Since Martin and Witt's (1989) study, the literature has employed more advanced non-causal time series

methods, such as seasonal autoregressive integrated moving average (SARIMA) and conditional volatility models (Kim & Moosa, 2001; Kulendran & Wong, 2005; Shareef & McAleer, 2005; 2007).

Lim (1997) observes that a significant percentage of the research in tourism demand employs log-linear models because they provide elasticities which are easy to interpret. A concern is that application of log-linear models may be inappropriate because they assume elasticities that are time invariant. Indeed, several studies have found evidence that demand elasticities can vary over time (Crouch, 1994a; Morley, 1998). To account for dynamic demand elasticities, time series approaches, for example, the ECM, TVP, VAR, and ARIMA models augmented with explanatory variables (ARIMAX), were employed (Li et al., 2005). Applications of such approaches also improved the estimation of tourism demand models (Li et al., 2005); for example, TVP models are able to account for dynamic changes in tourists' behaviour (Li et al., 2006; Li et al., 2006; Song et al., 2011; Song & Wong, 2003).

Despite the increasing sophistication of the methods to model tourism demand, the majority are traditional single equation approaches (Crouch, 1994a). In the causal, single equation approach, the objective is to identify the relationship between tourism demand and possible economic and non-economic explanatory variables which can be used for policy analysis and forecasting purposes (Song & Witt, 2000). An advantage of causal models is that they demonstrate how changes in the explanatory variables influence tourism demand (Witt & Witt, 1992).

Single equation demand modelling has been criticised for being *ad hoc*, lacking theoretical support, yielding inconsistent parameter estimates (Sinclair, 1998; Sinclair & Stabler, 1997), thus leading to excessive fragmentation in empirical findings, and to a consequent impossibility to evaluate the systematic relationships concerning tourism (Li et al., 2004). The typical econometric model consisted of a single equation, aimed at estimating tourism figures for a specific destination (one equation for each major client of a given destination), and without theoretical justification for the functional form adopted. Explanatory variables were usually represented by origin's income, origin's price, destination's price, and a price index for competing destinations. Quite often, dummy variables to take care of special events, and time trends to consider changes in tourists' tastes, were also included.

The utility of single equation approaches to adequately model tourism demand is limited by the characteristics of international tourism (Divisekera, 2003; Eadington & Redman, 1991; Li et al., 2004). Their effectiveness in offering reasonably accurate forecasts has also been questioned (Song & Witt, 2000). Another serious limitation is that the symmetry and adding-up hypotheses in demand theories cannot be tested. Moreover, early studies did not conduct unit root tests prior to estimating regressions. Consequently, results from such studies are likely to be spurious and conclusions misleading.

Against this background, Eadington and Redman (1991) emphasise the need for further research to substantially advance the development of international tourism demand modelling and the identification of appropriate dependent and independent variables. They recommend the use of systems approaches because the decisions that tourists

make are part of an expenditure allocation choice over tourist-related goods and services. Specifically, they counsel the use of models incorporating systems of demand equations because of their consistency with economic theory. This led to a new class of models.

Beginning in the 1990s, this new class of models made their appearance in the tourism demand literature. Three common features characterise this group. First, the quest for a stronger consistency between empirical models and traditional neoclassical theory shifted the analytical focus away from destinations towards the origins. This emphasis resulted in a shift away from single equation towards systems of equations models. In these models interrelationships among a set of variables are explained when equations for each variable is simultaneously estimated.

Second, these models' functional form was often justified by reference to various theoretical demand systems: Structural Equations Modelling (Turner et al., 1998; Turner & Witt, 2001); the Linear Expenditure Demand System (Smeral, 1988; Smeral & Witt, 1996); and the Almost Ideal Demand System (De Mello et al., 2002; Divisekera, 2003; Durbarry & Sinclair, 2003; Han et al., 2006; Li et al., 2004; Papatheodorou, 1999; Syriopolous & Sinclair, 1993).

Third, these models shared the assumption of a multi-stage budgeting process. According to this assumption, the choice to consume the tourism product of a specific destination is part of the general allocation process where expenditure of travellers is allocated among goods and services or among destinations. Under certain hypotheses (Deaton & Muelbauer, 1980), it is possible to divide this process in a set of independent

stages (separability of the allocation process). The stage concerning the allocation of individuals' tourism disposable income among destinations (the so-called tourism stage) constituted the analytical focus of these new traditional neoclassical models (Divisekera, 2003).

The systems approaches have several weaknesses as previously noted: they ignore the particularities of the product (Papatheodorou, 2001); are unable to account for the evolutionary features of the tourism product due to their static nature (Butler, 1980; Papatheodorou, 2001); are insensitive to the wide range of influences that can motivate or change consumer travel behaviour (Seddigi & Theocharous, 2002); are only valid in competitive environments where producers are merely price-takers, an assumption which may not be valid (Debbage, 1990); and the very strong assumptions economic theory places on consumer behaviour—adding-up, homogeneity and symmetry—which do not allow for demand determinants other than prices and income in the demand function.

Another recent advance in tourism modelling is the gravity-based mode, which has its basis in physics; gravitation is the physical force that increases with mass and decreases with distance. The gravity model emphasises geographic and demographic factors of tourism demand, in addition to the traditional economic factors such as income and prices. In general, such models treat tourism flows as dependent on push and pull factors, and barriers between the origin and destinations (Crouch, 1992). The gravity model has been criticised for lacking theoretical foundations (van Doorn, 1984).

Additionally, Eichengreen and Irwin (1998) criticise the conventional gravity model for ignoring possible dynamic effects. However, wide applications of the model stem from

its solid microeconomic foundations (Bergstrand, 1985; 1989) and its flexible form which allows it to be augmented with additional factors. Therefore, augmented, dynamic gravity models are able to overcome the limitations of their conventional counterparts. Moreover, although the gravity model is a single equation model, Durbarry (2000) argues that the model will be appropriate for modelling tourism demand as long as it is applied within a proper theoretical context. A number of applications of augmented gravity models have been seen in the recent tourism demand literature, including Durbarry (2000), Eilat and Einav (2004), Gil-Pareja, Llorca-Vivero and Martinez-Serrano (2007a), and Vietze (2012) (see Chapter 5 for further review).

Panel data models have also been employed to estimate tourism demand. The advantages of the technique are that it combines cross-section and time series, providing greater degrees of freedom as a result, so is thus suitable for small samples and can allow for individual heterogeneity in the cross-sections. The panel data model is a multi-equation model, but unlike the systems models, the equations are linked together on the basis of their statistical interrelationships as opposed to economic interrelationships. In a comparison of the volume of econometric studies in the tourism literature, Song and Li (2008) observe that panel data approaches have rarely been employed. Some examples include Durbarry (2000), Garin-Munoz (2006; 2007), Inn Ng, Lee and Soutar (2007), Ledesma-Rodriguez, Navarro-Ibanez and Perez-Rodriguez (2001) and Naude and Saayman (2005).

Apart from time series and systems approaches, several artificial intelligence methods have been employed to model tourism demand, primarily for forecasting purposes.

These include the artificial neural network (ANN), rough set approach, the fuzzy time

series method, and genetic algorithms (GAs) (Song & Li, 2008). The primary advantage of these methods is that preliminary or additional information about data, for example, distributional assumptions, is unrequired. A lack of theoretical foundation and inability to interpret tourism demand from an economic standpoint limits the scope of AI techniques for analysis of tourism demand (Morley, 2000; Song & Li, 2008).

3.7 Tourism Demand Elasticities

Apart from identification of the determinants, tourism demand models provide elasticities critical for policymakers and planners. Demand elasticities, for example, price (own-price) elasticity, competitors' price (substitute price) elasticity, or income (expenditure) elasticity, measure the percentage change in the quantity of tourism demanded or demand accordingly in a destination, as a result of a one-percent change in one of the determinants, *ceteris paribus*. Elasticities greater than one in absolute value are considered inelastic, while those less than one are considered inelastic.

Positive substitute price elasticities result if price increases in an alternative destination cause tourists to reduce their demand for the alternative and increase their demand for the original destination under consideration. Negative substitute price elasticities can occur if the alternative destination is actually complementary to the destination under consideration. Income elasticities that are positive indicate that the tourism product in a destination can be considered a normal good. If the income elasticity is greater than one, then tourism in the destination can be considered a luxury good. Negative income elasticities would suggest that tourism in the destination is inferior.

Elasticities provide numerical estimates of tourism demand to changes in its determinants. Price and income elasticities are important for the development of policy within the context of pricing goods and services, exchange rates and taxation, and the development of marketing strategies. Income elasticities are also important for other reasons related to policy making (Han et al., 2006). Larger elasticities indicate that tourism demand rises significantly in origin countries as their incomes rise. This suggests that a destination is supplying tourism goods and services for which demand is rising as income rises to take advantage of long-run income growth in their source markets. The larger elasticities provide information for the source markets that countries may choose to pursue as significant sources of further growth. Smaller elasticities suggest that destinations should consider amending their tourism product to satisfy the preferences of tourists from such markets.

3.8 Summary

This chapter reviewed theories of demand for tourism from both macroeconomic and microeconomic perspectives. Both perspectives have their strengths and weaknesses.

From the macroeconomic perspective, several theories of international trade were discussed. The neoclassical trade theories and the new trade theory emphasise the role of a country's tourism-related resources in explaining tourist flows. These theories, along with Gray's (1970) model, are unable to fully explain international tourist flows, as they focus on the supply side. Linder's (1961) economic similarity hypothesis, a demand side trade theory, helps to explain the high level of tourist movements between

geographically proximate countries, which have similar levels of income and wealth, but like supply-side models, can only partially explain international tourist flows. With regard to the microeconomic perspective, the neoclassical theory of consumer choice is the dominant framework for analysing tourism demand in the literature. Neoclassical demand theory as a comprehensive framework for examining tourist flows has several weaknesses, as it overlooks several particularities of the tourism phenomenon, notwithstanding its theoretical foundations. Lancaster's characteristics theory, in which consumers derive utility from the characteristics of the goods and services as opposed to from the goods themselves, captures several important nuances which the neoclassical model is unable to do, but also has limitations. Chief among them is the model's empirical tractability and inability to deliver a tourism demand function, which can be exploited for policy analysis.

While real discretionary income and prices are clearly determinants of tourism demand, there are also supply factors and other demand factors which influence tourists to visit specific destinations. Results derived from models employing prices and income alone, regardless of the theoretical foundation of the approaches, cannot therefore be regarded as conclusive. All things considered, there is a *prima facie* case, conceptually and theoretically, for both supply-side as well as traditional and non-traditional demand-side perspectives in studies of international tourist flows.

Many approaches have been employed to estimate the determinants of tourist flows. Single equation causal approaches are generally not underpinned by theory. Non-causal time series models are mainly used for their forecasting performance and relative ease of estimation, but also lack theoretical support. While systems approaches are grounded

theoretically, they too have limitations, primarily their inability to account for factors other than prices and income. This weakness is significant, as it indicates that key features of the tourism phenomenon are being ignored.

To address shortcomings in existing studies of international tourist flows, this study conceptualises an approach underpinned by the concept of distance. This approach will further clarify the theoretical framework of this research of international tourist flows in order to provide a solution to the distance puzzle in tourism. It does so by placing significant effort into modelling the supply-side and non-traditional drivers of tourist flows, because conceptual clarification requires a broader understanding of international tourist flows beyond neoclassical economic theory. Chapter 4 addresses the concept of distance while Chapter 5 will discuss the conceptual and theoretical underpinnings of the gravity model and its relevance for studies of tourist flows.

4.1 Introduction

The neoclassical theory of consumer choice, the dominant framework for analysing tourism demand in the literature, overlooks several particularities of the phenomenon, notwithstanding its theoretical foundations. Archer (1976) criticises the analysis of tourism demand for its focus on traditional economic theory, despite the long established view that apart from economic determinants, demand is influenced by social, political, technological, and other non-economic factors. Indeed, Lipsey and Steiner (1981) note that at least thirty percent of the variation in the demand for goods and services are accounted for by factors other than price. Yet, many published articles continue to ignore the influence of non-income and non-price factors on tourism demand, despite several studies in the tourism literature having demonstrated the ability of such factors to affect destination choices.

The inability of the traditional neoclassical economic framework to account for the well-known characteristics of tourism goods and services makes it an incomplete approach for modelling tourism demand. This limitation needs to be addressed. The purpose of this chapter, therefore, is to draw from various theoretical, conceptual and empirical perspectives related to the concept of distance to assist in development of a framework to investigate international tourist flows to the Caribbean, which addresses the shortcomings of the traditional approach and other methods reviewed in Chapter 3.

The chapter starts with a review of the theory of travel motivation and its relationship to distance, focussing on push and pull factors. Following this, various concepts of

distance important for modelling tourist flows are discussed. First, the literature on the impact of geographic distance on tourist flows is discussed, inclusive of the differences between long and short-haul travel. Next, the chapter reviews socio-psychological concepts of distance: cognitive, cultural and psychic distance. The following section describes the importance of historical and contemporary colonial relationships between countries for international tourist flows. The chapter then discusses the causal relationship between diasporic links and tourist flows. This is followed by a review of climate's impact on tourist flows as a prelude to development of the construct of climate distance. A concept of distance derived from macroeconomic/international trade theory, economic similarity is outlined. Finally, approaches to estimating models with a primary focus on distance are described. The chapter will conclude with a summary of the key points.

4.2 Travel Motivation

The theory of consumer behaviour argues that motivations are individual internal forces that lead to action (Schiffman & Kanuk, 1978). Tourism demand can be considered the result of tourist motivation, strategic marketing, destination attractions, and contingencies associated with travellers' choice behaviour with respect to money, health and time (Morrison, 1989). Tourism demand may also be viewed as the combination of behavioural intentions to visit a destination (Pearce, 1993). It has also been widely suggested that tourist flows result from a destination choice process that is influenced by tourists' motivations and experiences (Lue et al., 1993; Um & Crompton, 1990). Consequently, the role played by motivations in helping to explain tourist flows is

integral, as motivations constitute personal cognitions that guide tourist behaviour towards particular outcomes (Nahab, 1975).

Several theories have been proposed to explain tourist flows. Implicitly, these theories recognise that the needs of tourists and the destination's attractiveness (Dann, 1977) are critical determinants of tourist flows. Relatively recent theoretical approaches prefer greater integration of both factors to explain tourism demand (Dann, 1996; Pearce, 1993).

Dann (1981) reviews several theories of travel behaviour. One theory, classified purpose, identifies the most important purpose of the trip as the motivation for travel. Another theory is based on two related behavioural theories. The first differentiates between sunlust and wanderlust tourists. The second, by Cohen (1974; 1984), classifies tourists into four dimensions: the drifter, explorer, individual mass tourist, and organised mass tourist. The latter offers valuable insight into the impact of institutionalised types of tourism on tourist behaviour, but is unable to clarify the nature of tourism demand.

McIntosh and Goeldner (1984) classify travel motivation into five primary tourist needs: physical, cultural, interpersonal, commercial and status/prestige. This classification is problematic as there is some degree of overlap among the needs that McIntosh and Goeldner identify. Moreover, it is debatable that tourists' aim is to satisfy one need as opposed to a combination of them at the same time (Pearce, 1993). Iso-Ahola (1982) argues that the motivation to travel is caused by disequilibrium in a person's socio-psychological environment. Unlike other theories of travel motivation,

this theory emphasises the relationship between tourists' needs and destination attributes.

Witt and Mountinho (1989) argue that there are three main features that pull visitors to destinations: static factors, which include destination climate, distance to the destination, and historical and cultural attractions; dynamic factors, which include accommodation and entertainment; and current factors, for example, marketing strategies, and relative prices. However, Mosteller (1998) argues that despite the validity of a theory of tourist motivation for certain destination characteristics, people are too sophisticated to be persuaded by destination marketing and amenities. Muzaffer and Hagan (1993) concur, suggesting that individuals' push motives are complemented by destination pull factors in motivating a visit to a destination.

Most tourism motivation studies suggest that tourists have differing travel motives, push and pull (Cohen, 1974; Crompton, 1979; Dann, 1981; Iso-Ahola, 1982; Mansfeld, 1992; Mosteller, 1998; Oh et al., 1995; Pearce, 1982). They also hope to experience more than one activity in a destination (Kozak, 2002). For example, international and domestic tourists differ in their motivation for travel (Efichiadou, 2001; Moscardo, 2001). Foreign tourists are more push-oriented, while domestic tourists are more interested in pull factors like the environment, and are less push-motivated.

Due to the complex nature of the motivation construct, push and pull factors are typically investigated either as distinct or related constructs (Prayag & Ryan, 2011). Moreover, there is a preference displayed towards pull factors in seeking to explain why tourists travel (Dann, 1977). Consequently, push factors are often given short shrift.

However, logically and temporally, push factors precede pull factors (Dann, 1977); that is, what makes tourists travel to a destination must of necessity first relate to push factors. If push factors can be discerned at the psychological level, then the theoretical framework of this research should reflect this. In addition, push factors are conceptually more consistent with the demand side of tourist flows. This is another way in which this study contributes to the broader literature.

An understanding of tourism motivation is clearly important for investigation of tourist flows. Motivation is the catalyst that triggers all of the events involved in travel (Holden, 2005). It corresponds to the “whys and the wherefores” of travel generally, or a specific choice particularly (Brown, 2005, p.483). Against the background of both individual needs and wants (push factors) and destination attractions (pull factors), this study models the influence of distance on tourist flows to the Caribbean.

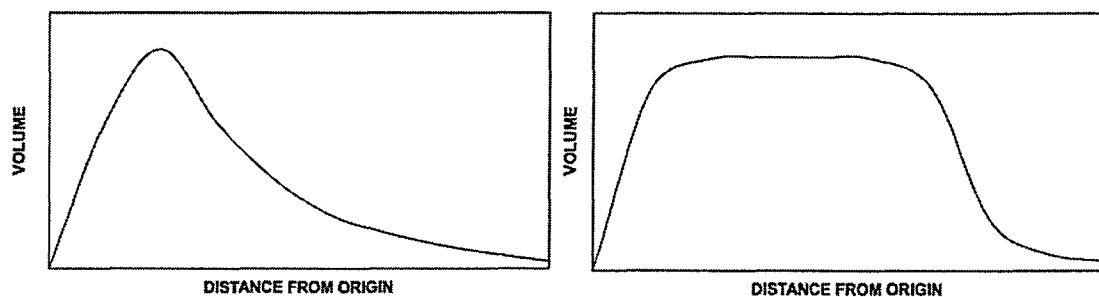
4.3 Geographic Distance

Distance has long been recognised as an important variable for explaining social phenomena (Tobler, 1970). Of the many destination attributes investigated in the tourism literature, distance stands out because of its greater interest by researchers and relative importance (Fesenmaier, 1988; Perdue, 1986). It has long been argued that geographic distance—physical location of the tourist origin relative to tourist destination—is a frictional element of destination choice, as this displacement involves physical, temporal (time distance) and monetary costs (economic distance) (Taylor & Knudson, 1973) that must be overcome. It is generally believed that one of the objectives of travel decisions is to minimise these frictional effects. Travel is presumed

to necessitate disutility that must be endured for the goal of reaching a desired destination, but that is to be minimised (Mokhtarian & Salomon, 2001). This belief is known as the “law of minimum effort” (Losch, 1954, p.184) or “principle of least effort” (Zipf, 1949, p.6).

Two types of distance decay relationships are consistent with the view of physical distance as a barrier to travel (Figure 4.1). The first panel, the classical or theoretical distance decay curve, suggests that tourism demand peaks at a displacement close to the origin and then declines exponentially as the perceived costs of distance and time to the destination increase (Bull, 1991). The cone shape is a function of declining demand with distance and geometrically increasing supply of opportunities for leisure as distance increases (Greer & Wall, 1979). The supply side assumes that the supply of recreational opportunities is distributed uniformly over space. The second panel, indicating a distance decay pattern with a plateau, was identified by McKercher (1998). In this model, demand only falls after a certain distance is reached. The plateau is a function of the limited destination choices along the travel route that results in a dispersal of demand (McKercher, 1998). These patterns recognise that individuals must travel for some minimum distance from their home environment to make travel worthwhile.

Figure 4.1: Classical and Plateauing Distance Decay Curves



Source: Adapted from McKercher, Chan and Lam (2008)

A tourist is said to exhibit inertial behaviour if out of habit they repeatedly visit the same destination, because less time and effort are required, as they do not have to go through a decision-making process on each occasion (Nicolau, 2010). Inertial behaviour in tourists is associated with nearby destinations because of proximity, familiarity, accessibility, loyalty or the existence of high costs related with the change to an alternative (Mehta et al., 2001), such as the greater monetary outlay from visiting distant destinations, new routines with which the tourist must become familiar, or the search costs of information, and so forth. Apart from the negative costs of switching destinations, there are also positive switching costs, such as benefits to repeat visitation that would be forgone if tourists altered their choice. For example, a holiday apartment owner is more likely to give a discount to visitors who return annually. Less tangible costs are the affective ties and emotional links between the owner and the family forged over time. Consequently, utility increases from repeat visitation.

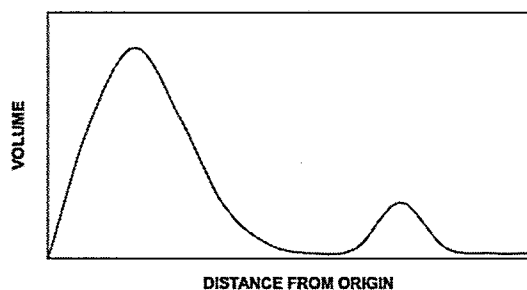
Some authors argue that inertial behaviour is difficult in the case of long-distance destinations unless the destination offers something that the tourist greatly values (Khadaroo & Seetanah, 2007). Supporting this view, Khadaroo and Seetanah's study of island economies finds that the majority of island destinations, which are relatively distant from the major origin countries, do not generate repeat visits, except for the top island destinations perceived as luxury products. They conclude that remote destinations do not feature the repeat phenomenon, as individuals prefer to broaden their experience by visiting other destinations and cultures. Thus, for a tourist exhibiting inertial behaviour, the probability of travelling to a faraway destination is lower.

In contrast, another school of thought holds that tourists can gain higher utility by travelling to distant destinations. Baxter (1979) demonstrates that longer distances are preferred when the journey is part of the tourism product, for example, safaris.

Likewise, Wolfe (1970; 1972) argues that distance is not always a deterrent to travel, as the associated frictions dissipate beyond a certain threshold and distance itself becomes a positive attribute of the destination. This argument is reasonable as there are individuals for whom travelling to faraway destinations is appealing; for example, a tourist might wish to visit an exotic but distant destination even though it implies significant travel.

Congruent with this school of thought, McKercher and Lew (2003) identify a third distance decay pattern with a secondary peak situated at a large displacement from the origin (Figure 4.2). This decay pattern recognises that some distant destinations may hold market appeal that supersedes the frictional effect of distance, distorting the decay curve as a result.

Figure 4.2: Distance Decay Curve with Secondary Peak

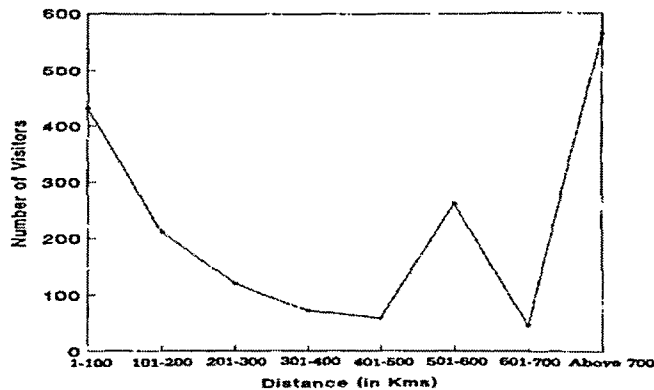


Source: Adapted from McKercher, Chan and Lam (2008)

Paul and Rimmawi's (1992) study of tourist flows to a resort in a national park in Saudi Arabia shows a bimodal profile, generally similar to that in Figure 4.2, except that the decay effect disappears altogether for very large distances (Figure 4.3). The distance

decay pattern observed by Paul and Rimmawi is classical in nature up to a distance of 500 km from the resort. However, the largest number of tourists arrives from a distance beyond 700 km. Paul and Rimmawi suggest that tourist flows are influenced more by the population size of the originating markets than distance from the resort.

Figure 4.3: Distance Decay Curve with Bimodal Profile



Source: Adapted from Paul and Rimmawi (1992)

Similar effects to those found by McKercher and Lew (2003) and Paul and Rimmawi (1992) occur when time distance is considered (Nicolau, 2008). The time a tourist spends travelling is an opportunity cost since they are not working (and thus not earning income) or spending all of their available time at the destination (time spent travelling takes away from time spent at the destination). In some cases, though, travel time offers tourists positive utility. A tourist may choose long-haul travel over short-haul travel because of the myriad leisure opportunities available on the destination route (Nicolau, 2008). In such circumstances, the opportunity costs of time distance could decline or even disappear altogether. Tourists may also choose their departure time and travel route in a manner that provides them with positive utility even if the time distance is large (Walsh et al., 1990). Improvements in transport also mean that less time is required to travel between two locations. Because of this improvement, places seem

nearer because less time is needed to get there. Janelle (1969) argues a convergence in time and space is taking place; however, geographic distance is unchanged, while time distance has declined.

Tourists might sometimes prefer to travel longer distances because of the greater likelihood of discovering new features. The “Ulysses factor” advanced by Anderson (1970) is an important psychological element in vacation planning through which people sense a deep “need to explore” and to discover what lies beyond the known horizon (p.19). Similarly, Mayo and Jarvis (1981) propose that the “need to explore” is due to the fact that travel fulfils a person’s intellectual curiosity. Within this context, some authors consider geographic distance to be a valid proxy for latent factors such as the “willingness or ability to engage with different cultures” (McKercher et al., 2008, p.223). The “need to explore” or “variety-seeking impulse” (Mokhtarian & Salomon, 2001, p.700) can have an influence on the distance travelled as it can increase the utility (or reduce the disutility) of more distant destinations (Mokhtarian & Salomon, 2001).

On occasion, travel for its own sake is desired. In the case of “undirected travel”, the journey is not a by-product of the activity, but itself constitutes the activity (Mokhtarian & Salomon, 2001, p.696). The motives for “undirected travel”, for example, a sense of speed, or enjoyment of beauty, may also motivate individuals to undertake distant travel, even for non-leisure trips (Mokhtarian & Salomon, 2001). An attribute of “undirected travel” is that the destination is ancillary to the journey, rather than the converse, as characteristically assumed. Individuals are likely to confuse their utility for activities conducted at the destination and while travelling, with their utility for travelling itself (Mokhtarian & Salomon, 2001).

Given the varying stances on the utility of long-haul travel, few studies have explicitly considered whether the antecedents differ from those of short-haul travel, or if they are the same, whether they have a different impact. Although no standard definition of long-haul travel exists, Bowen (2001, p.50) notes that a general guideline is that a distance of more than 3000 miles, or 6 hours of flight time, is considered long-haul. Similarly, Francis et al. (2007) point out that the Association of European Airlines considers the cut-off between medium- and long-haul travel to be 6 hours of flight time.

Crouch (1994b) maintains that long-haul travel to an overseas destination presents tourists with a set of issues that are somewhat different from those presented by short-haul travel. “The most obvious of these differences are the increased cost [economic distance] and increased time of travel [time distance] raising the monetary and psychological barriers [psychic distance] to travel” (Crouch, 1994b, p.3). As evidence of these differences, Lim, Min and McAleer (2008) find that income elasticities differ for outbound tourism from Japan to New Zealand and Taiwan respectively. Ho and McKercher (2014) compare long-haul and short-haul business tourists to Hong Kong. They observe that distance affects the relative share of business tourists, with long-haul markets more likely to provide a greater share of business tourists than short-haul markets. The demographic and trip profiles of the long-haul and short-haul visitors were also different. The dearth of research into the determinants of long-haul tourist flows is somewhat surprising considering the growth in long-haul travel that has accompanied the growth of mass tourism, and that geographic distance is a frequently discussed issue in attracting long-haul tourists (Burkart & Medlik, 1981; Smith, 1989).

Geographic distance is operationalised in various ways. Some studies use untransformed measures, such as the number of miles (Grosse & Trevino, 1996) or kilometres (Madhavan & Iriyama, 2009), between major cities. This measure can be refined by considering the Earth's sphericalness using the haversine formula (Aybar & Ficici, 2009). It calculates the distance between two points on a sphere using longitude and latitude coordinates, referred to as the great circle distance. Distances weighted by the population of the largest cities in each country have also been employed (Head et al., 2010). Some studies have transformed geographic distance using the logarithm of the distance between capital cities (Doh et al., 2009). Dummy variables for if two countries share a common border (McCallum, 1995), if a country is landlocked (Grigoriou, 2007), or if one or more of the countries in an origin-destination pair are islands (Montenegro & Soto, 1996), are other geographic distance constructs, typically used in international trade studies.

In relation to distance within a country, the concept of *internal distance* was introduced by Wei (1996), defined as a specific fraction of the geographic distance between two locations. Helliwell and Verdier (2001) develop a more refined measure of internal distance that accounts for the spatial distribution of the population within the country. Others, such as Nitsch (2001) and Melitz (2007), use land area to construct measures of internal distance.

4.3.1 Synopsis of Geographic Distance

Within the debate regarding the nature of the decay effect of geographic distance on tourist flows, there appears to be general consensus that if distance is understood to represent the economic and time costs of travel, then it will have a negative effect on

tourist flows. This points to the underlying nature of the debate being due to the latency of factors which geographical distance is intended to proxy (Crouch, 1994b), or the “implicit effect of distance” (McKercher, 2008a, p.367), likely because of the difficulty in measuring and operationalising such factors. While the effect of these hidden variables on tourist flows can be inferred to some extent from the decay patterns (McKercher, 1998; 2008a; 2008b; McKercher et al., 2008; McKercher & Lew, 2003), what happens more commonly is that the overall decay effect is solely or mostly attributed to geographic distance.

For the reasons mentioned, the models of tourist flows that rely on geographic distance as the sole dimension of distance will be underspecified. The existence of other factors is consistent with a multidimensional perspective of distance expected to yield a more informative and comprehensive picture of the determinants explaining tourist flows from a source to a destination. If reasonable proxies for the other dimensions can be constructed, a richer explanation can be advanced for the distance decay effect than what has obtained thus far.

Expanding the dimensionality of distance to include these “hidden” but related factors to geographic distance is an integral step in this study’s examination of the distance puzzle in tourism. The key will be in operationalising constructs to measure the various dimensions, an issue which the study will consider in the remaining sections in this chapter, as well as in Chapter 7.

4.4 Socio-Psychological Concepts of Distance

As stated in Chapter 1, distance has evolved from consideration in only physical or geographical terms to a broader concept, which includes socio-psychological dimensions (Hall, 2005; Kreisel, 2004). In a related context, Song, Romilly, and Liu (2000) maintain that apart from the geographic characteristics of the destination, tourism demand is determined by social and psychological factors of the tourist, for instance, social status, personal interests, and cultural background.

Push factors, described in Section 4.2, are *internal* forces that can be defined as “socio-psychological motivations that predispose individuals to travel” (Baloglu & Uysal, 1996, p.32) or “which play a significant role in causing a person to feel a disequilibrium that can be corrected through a tourism experience” (Kim & Lee, 2002, p.257). Pull factors are *external* forces that may influence an individual’s preference for a particular destination once they have made the decision to travel (Baloglu & Uysal, 1996). The latter are typically described in relation to destination attributes (Klenosky, 2002). Push factors are, therefore, more closely associated with the internal or emotional traits of the individual (Yoon & Uysal, 2005).

Stabler (2013) notes that “[t]hough motivations and preferences, in which images are embodied, are acknowledged as being important, they tend to be ignored by ‘main stream’ economists, because they are either assumed to be relatively stable and therefore do not influence the model, or are considered too complex to cope with” (p.137). The failure of researchers to define and construct appropriate measures for social-psychological factors, and to integrate them into models of tourism demand is responsible for their neglect in modelling the demand for tourism (Goh, 2012).

However, it is to be noted that the interrelationships among socio-psychological factors makes their inclusion into tourism demand models methodologically incorrect unless a sophisticated modelling approach is employed (Goh, 2012).

This section reviews the concepts of cognitive distance, culture distance and psychic distance to begin laying the foundation for operationalisation of distance beyond its geographic or physical meaning.

4.4.1 Cognitive Distance

Cognitive distance is a constraint formed by socio-psychological processes (Ankomah et al., 1996). The concept is quite complex and has several closely related interpretations. One interpretation holds that when judgements have to be made about the spatial separation of objects that people cannot see directly, they are forced to conceive or cognise these distances (Gatrell, 1983). Similarly, it is people's beliefs about distance between places which are far apart, and are not visible to each other (Montello, 1991). It is a mental image of actual distance shaped by an individual's social, cultural, and typical life experiences (Ankomah et al., 1996). In other words, an idea of distance is formed in the mind when the real distance cannot be observed.

Nooteboom (2000) defines cognitive distance as a difference in cognitive function. The difference can be in domain, range, or mapping. Wuyts et al. (2005) explains, "people perceive, interpret, understand, and evaluate the world according to mental categories that they have developed in interaction with their physical and social environment" (p.278). Because individuals' cognitions are developed in different environments—national, regional and organisational culture, customs/habits, social norms/values,

education, technologies, markets, and so forth—this results in a distance between their respective cognitions. This implies that the greater the difference in individuals’ “mental maps” the greater the cognitive distance between them (Wuyts et al., 2005, p.284). Therefore, unlike other distance dimensions, the unit of analysis in relation to cognitive distance is the individual.

Several studies operationalise cognitive distance as the difference between estimated and real distance. Such studies find that cognitive distance estimates differ significantly from actual distance (Cadwallader, 1982; Cook & McCleary, 1983; Mayo et al., 1988; McNamara, 1986). Physical or social barriers may be of some importance in the examination of deviations between cognitive and geographic distance (Cadwallader, 1976). Cognitive distance has also been shown to be positively related to cultural distance and geographic distance (Verbeke & Greidanus, 2009), but inversely associated with knowledge or experience (Massara & Severino, 2013).

The nature of the relationship between cognitive distance and choice of destination is ambiguous (Ankomah et al., 1996). It may be the case that geographic distance to a destination is underestimated because a particular destination is preferred.

Alternatively, the reason a destination is preferred may be because the cognitive distance to it is underestimated. In addition, these explanations can interact (Ankomah et al., 1996).

Cognitive distance is likely an important evaluation criterion used by tourists and can possibly increase or decrease tourists’ cognition of travel costs (Ankomah et al., 1996; Culpán, 1987), which includes the friction of geographic distance. Tourists are also apt

to have a geographic distance constraint, beyond which they may be unwilling to travel (Cook & McCleary, 1983), known as the “critical distance” (Getis, 1969, p.57). Some authors even hold the view that cognitive distance rather than actual distance may best depict individuals’ decision-making (Ankomah & Crompton, 1992; Ankomah et al., 1996; Cook & McCleary, 1983; Walmsley & Jenkins, 1992).

Error in tourists’ cognitive distance estimates will cause their decision-making process in relation to travel to be flawed. Problems can occur for both over- and underestimates of geographic distance. Overestimation may cause a perception of inflated costs, extended travel time and greater risk, which reduce the probability of travel (Ankomah et al., 1996). Underestimation may initially increase a destination’s attractiveness, and increase the likelihood of travel; however, underestimation can lead to unrealistic expectations of a destination. When such expectations are unmet, dissatisfaction will result (Ankomah et al., 1996). Indeed, when distance and travel time are highly relevant in the decision-making process, this dissatisfaction is amplified and the likelihood of negative word-of-mouth is increased (Ankomah et al., 1996).

The travel decision is complex and embedded with more risk elements than many other purchases (Morakabati et al., 2012). Consequently, risk perceptions associated with travel risk are even more complex because they are a combination of personal views, their exposure to hazards, and environmental signals such as the media (Morakabati et al., 2012). Slovic (2000) suggests that risk is associated with the environment and past experience forming the context within which individuals shape their perceptions (Caplin & Leahy, 2001). Eugenio-Martin, Martin-Morales and Sinclair (2008) state that tourists have three main concerns: fear about falling ill, suffering an injury, or being a victim of

crime. People resident in relatively high-risk countries are likely to perceive lower travel risk compared to people who live in relatively low risk countries (Morakabati et al., 2012). Eiser (1994) points out that risk perception is influenced by cognitive factors. Lue, Crompton, and Fesenmaier (1993) and Tideswell and Faulkner (1999) argue that risk-averse travellers typically travel shorter distances and make fewer stops. Hanink and White (1999) note that people with a higher risk tolerance travel farther, but spread the risk among multiple destinations.

Cognitive distance formed by risk perceptions is important for destination marketers as well. Their objective is to reduce the cognitive distance of potential tourists so that a given destination becomes more attractive. This is made more difficult if a tourist's cognitive distance estimates eliminates one or more destinations from his/her choices before he/she is aware of the actual distance (Cook & McCleary, 1983).

Research into distance cognition has highlighted the determination of a functional relationship between cognitive and actual distance and the various factors that are believed to modify this relationship. A psychophysical power function has been generally acknowledged as the underlying functional relationship between cognitive distance and its physical counterpart. This acceptance is based on empirical evidence (Bratfisch, 1969; Kunnapas, 1960; Phipps, 1979) as well as on a consensus among psychologists favouring the power function as the psychophysical law (Ekman & Sjoberg, 1965).

The relationship between magnitude estimates and the actual magnitude of the stimulus has come to be known as “Stevens’ ‘Law” after the psychophysicist Stanley Smith Stevens. The law can be expressed as:

$$\psi(S) = kS^n \tag{4.1}$$

where S is the size of the stimulus; $\psi(S)$ is the perceived magnitude of the stimulus; n , an exponent, is a function of the type of stimulation; and k is a constant of proportionality that depends on the units used (Stevens, 1957). Stevens’ Law has been demonstrated to hold for a large number of directly perceivable stimuli, for example, loudness, brightness, taste, visual area, and duration, among others.

In terms of distance, the power function has been shown by Briggs (1973), Bratfisch (1969), and Ekman and Bratfisch (1965) to provide the best explanation of the relationship between cognitive and actual distance. The parameter k in Equation (4.1) is believed to have little theoretical significance (MacEachren, 1980). Canter and Tagg (1975) suggest k may be a function of barriers between locations; barriers cause subjects to add a constant to their cognitive distance and is reflected in the parameter k . The exponent n has been more rigorously examined and in the majority of studies is observed to be less than 1, indicating that cognitive distance increases at a decreasing rate relative to actual distance. Stevens’ review of various stimuli suggests that the exponent, n , for visual distance is 0.67 (Stevens, 1957, p.166). Wiest and Bell (1985, p.465) report a value of 0.75 for studies in which the estimated distances were inferred. A more recent estimate by Friedman and Montello (2006, p.343) finds an average value for n of 0.78 and a value for k of 6.85. The latter also report other estimates for k , concluding that its value depends on whether the origin-destination pair belongs to the same or different cognitive regions.

Although the underlying assumption is that an individual's cognition of distance is based primarily on physical distance, MacEachren (1980) reasons that this assumption is unlikely, at least for intra-urban distance cognition in which time distance is thought to be more important than actual distance (Burnett, 1978). MacEachren presents evidence that cognitive distance is more likely based on travel time rather than actual distance. Travel time seems like it would be more appropriate for air travel as well, as tourists are more cognisant of the time it will take to reach a destination than the actual distance to the destination. Other factors affecting distance cognition include political and economic barriers (Canter & Tagg, 1975), which can increase cognitive distance estimates. Trip and destination familiarity are also possibilities (MacEachren, 1980); these would reduce cognitive distance.

4.4.2 Cultural Distance/Proximity

There are three main agreed characteristics about culture in the literature. First, culture is shared and learnt. According to Hanna and Wozniak (2000), there are over two hundred definitions of culture, and these may have doubled during the last few years with the intensive usage of the concept in different fields. Culture is the collective programming of the mind that distinguishes one group of people from those of another (Hofstede & Bond, 1988). Linton (1945) points out that "culture is the configuration of learned behaviour and results of behaviour whose component elements are shared and transmitted by the members of a particular society" (p.21). Guiso, Sapienza, and Zingales (2006) define culture as "those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation" (p.23). Because culture is learnt and shared, it is transmitted and reinforced from one generation to a

next by a group of people. People born into a cultural group learn from each other and the culture becomes a common and fixed pattern of activities in the group of people.

The second feature of culture is that it is human in origin and is interactive with the environment (Manrai & Manrai, 1996). It expresses the notion of varied identity of people in a social unit, reflects their feelings and emotions, accomplishes communications among each other, and establishes the human image which is different from anything else existing in the world (Segall, 1979). Within this context, culture and its social and physical environment interact and act as catalysts for progress.

The third feature is that culture has two basic forms and hence, a hierarchical order (Master & Prideaux, 2000). At a lower level, material culture usually includes tangible things, such as food or clothes (Triandis, 1977). However, these forms are not only physical existences, but also important for the conveyance of specific social meanings. At a higher level, ideological culture usually includes non-tangible things, such as language, a way of living, a value system and religion which are symbolic representations of a way of life to guide people's behaviours in different cultural groups (Rokeach, 1979; Triandis, 1977).

A major purpose of defining culture is to examine how cultural differences affect people's behaviours. The challenge is to operationalise its abstract nature so that specific human behaviour can be explained through exploration of their differences. The understanding of one culture must be inferred from another (Frederic, 1993); that is, an explanation of one culture is based on the comparative understanding of other cultures. Cultural difference is thus the diversity of the behaviour and activities

between groups of people who do things differently and perceive the world differently (Bowden, 2003; Potter, 1989).

The importance of cultural differences as a possible determinant of economic phenomena is growing (Fernandez, 2007; Guiso et al., 2006). These differences are typically examined using a construct referred to as cultural distance or its inverse, cultural proximity. Cultural distance (proximity) has been defined as the extent to which countries or regions are different (similar) along cultural dimensions (Hofstede, 1980; Hofstede & Bond, 1988; Inglehart & Baker, 2000). Other definitions suggest cultural distance (proximity) is determined by the degree to which certain norms and values dominate in some cultures but not in others (Reus & Lamont, 2009), or the extent to which a culture is considered different (similar) (Rao & Schmidt, 1998).

Cultural proximity is associated with the sharing of a common identity, the feeling of belonging to the same group, and the degree of affinity between two countries (Straubhaar, 1991; 2002). The construct is grounded primarily in language (Straubhaar, 1991; 2002). Language has been described as the mirror of culture (Czinkota et al., 2010). It is critical to culture as it is the primary way in which cultural information and ideas are transmitted. Culture has several other dimensions which include, for example, dress, ethnic types, gestures, body language, definitions of humour, music, and religious elements (La Pastina & Straubhaar, 2005).

Cultural proximity can also occur at multiple levels. There is the geographic or spatial level: local, subnational, regional, national, supranational regional, global (La Pastina & Straubhaar, 2005). Others are cultural or linguistic, such as when migrants' identity

remains strongly linked to their “home” country or culture (La Pastina & Straubhaar, 2005, p.274; Straubhaar, 1991; 2002). Additional levels might be ethnic or diasporic (La Pastina & Straubhaar, 2005); for instance, when people of African descent across the Americas feel common bonds because of their African heritage. Still another aspect may be religion (La Pastina & Straubhaar, 2005); for instance, when Catholic or Islamic messages appeal across geographical and cultural boundaries.

Cultural identity is also linked to local or subnational regions (La Pastina & Straubhaar, 2005). Dann (1993) argues that national culture provides a limited understanding of cultural identity as countries have strong intra-country differences, and residents of many nationalities. For example, people from the north of England will likely construct being English quite differently from those in the south of England. A similar difference will exist between urban and rural residents. Locality and local identity are complex constructs and subject to continual redefinition caused by interaction of global, national and local forces (Iwabuchi, 2002).

Cultural distance/proximity thus denotes the degree of variation/association of people from different cultural groups in general social interaction. They are measurements of cultural difference/similarity of people, namely the degree between value systems, national and cultural backgrounds. Cultural distance/proximity has the potential to not only reflect the difference/similarity of cultures, but also the *degree* of the difference/similarity. Additionally, cultural distance/proximity is able to operationalise cultural comparison at both individual and collective levels.

Culture represents a critical dimension of tourism, a fact not lost on the slowly growing number of researchers (Crotts & Pizam, 2003; Master & Prideaux, 2000; Pizam & Sussman, 1995) who include culture as a key variable in their studies. A better understanding of both individual and cultural differences among tourists is viewed as a means of attracting more international tourists in the long run (Reisinger & Turner, 1999).

The national culture of tourists has been used to explain differences in tourist behaviour and travel patterns (Dykba, 1988; Ritter, 1987), and desired tourist activities (Pizam & Jeong, 1996; Pizam & Sussman, 1995). Internalised cultural values may have an effect on the destination choices of tourists (Ng et al., 2007). Culture has also been cited as a destination attribute (O'Leary & Deegan, 2003), or reason for travelling to a destination (McKercher & du Cros, 2003).

Evidence has been found that cultural proximity increases tourists' intention to visit destinations (Chen, 2000a; Ng et al., 2007; Wong & Kwong, 2004). In fact, Basala and Klenosky (2001) observe that people's intent to take a trip to a new destination grows if their native tongue is spoken at that destination. This observation is supported by findings that tourists, on occasion, suffer from culture shock when visiting culturally distant destinations (Spradley & Philips, 1972). Similarly, Lepp and Gibson (2003), and Yang and Wong (2012) find that people's perception of risk is greater when they visit more culturally distant destinations.

In contrast, other researchers argue that tourists' cultural differences may drive destination choice, rather than cultural similarities (McKercher & du Cros, 2003;

O'Leary & Deegan, 2003). Indeed, the literature has had mixed findings in this regard. For example, Ryan (2002) finds that while geographic proximity reduces perceived cultural difference, the effects of cultural distance persist nonetheless. Thus, an issue of import to marketers is to ascertain whether cultural similarities or cultural differences better explain tourism destination choice (Ng et al., 2007). Naturally, marketers should also consider the cultural differences or similarities that may exist *among* source countries when designing marketing campaigns; for example, Pizam and Jeong (1996) find that American tourists prefer greater interaction with other nationalities than do tourists from Japan or Korea. Marketers should also consider the cultural differences *within* source countries (Dann, 1993; La Pastina & Straubhaar, 2005).

Some studies contend that geographic distance is an element of cultural distance/proximity (Arora & Fosfuri, 2000). Indeed, the two dimensions have found to be correlated (Cantwell et al., 2010)—the greater the distance geographically, the greater the distance culturally. This correlation is confirmed as long as the influence of colonial ties is controlled for (Dow & Karunaratna, 2006). However, Ryan's (2002) finding that the effects of cultural distance are persistent even after controlling for geographic proximity is instructive. It suggests that both geographic distance and cultural distance can be separately modelled to estimate their respective influence on tourist flows.

Despite the argument that national culture only provides a limited understanding of countries as strong regional differences within countries can exist (Dann, 1993; La Pastina & Straubhaar, 2005), cultural distance is typically measured at the national level (Clark & Pugh, 2001; Shenkar, 2001). Many constructs have been developed to provide

numerical measures of culture and, by extension, cultural distance/proximity, and the list continues to grow. Several of the most frequently employed are described below.

Hofstede's (1980) Cultural Dimensions

The most popular study on measurement of culture and its effects is Hofstede (1980).

The original study encompassed 40 countries, which was later expanded to 50 countries and 3 multi-country geographic regions (Hofstede, 2001; Hofstede & Bond, 1988).

Hofstede provides measures on four variables from his survey of International Business Machines (IBM) employees: individualism-collectivism—individualism, is defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families, while collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty; power-distance—this dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally; uncertainty avoidance—expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity; and masculinity-femininity—masculinity represents a preference in society for achievement, heroism, assertiveness and material rewards for success while femininity, stands for a preference for cooperation, modesty, caring for the weak and quality of life.

In a study parallel to Hofstede's work, Bond (1988) measures values across multiple cultures using the Chinese Value Survey, which centres on Chinese culture. Bond's research resulted in a fifth orthogonal dimension of cultural values, called Confucian Dynamism, or long-term/short-term orientation. Asian societies are characterised by

collectivism, acceptance of unequal power distribution and a long-term orientation, while Western societies are characterised by greater tolerance of uncertainty, less tolerance of unequal power distribution, individualism, and a short-term orientation (Lee et al., 2012).

Although many researchers have developed measures of culture, Hofstede's study is the most cited. A search on Google Scholar on April 13, 2014, indicates that the original work and its subsequent editions have been cited 32,913 times. One reason is likely the study's wide scope (West & Graham, 2004). Another is the ease of application of Hofstede's findings to various contexts. However, concerns have arisen as to whether values gleaned from respondents within IBM can be reflective of an entire population (West & Graham, 2004).

Kogut and Singh's (1988) Cultural Distance Index

Most studies use Kogut and Singh's (1988) cultural distance index to measure cultural distance (Ng et al., 2007). The index is calculated as the arithmetic average of the variance-adjusted difference between two countries using Hofstede's (1980) four cultural dimensions:

$$CD_j = \frac{1}{n} \sum_{i=1}^n [(I_{ij} - I_{ia})^2 / V_i] \quad (4.2)$$

where CD_j is the cultural differences of the j th country from the a th country; I_{ij} is Hofstede's score for the i th cultural dimension and j th country; I_{ia} is Hofstede's score for the i th cultural dimension for the a th country; V_i is the variance of the index on the i th dimension; and n is the number of cultural dimensions. The index can range in theory range from 0 (smallest cultural distance) to 17.93 (largest cultural distance).

The main advantage of Kogut and Singh's index is that it is simple to apply. One disadvantage is that the index is limited to the work-related dimensions of a particular corporation, thereby assigning more weight than is justified by Hofstede's findings (Clark & Pugh, 2001). Even though Hofstede's (1980) study surveys IBM employees in 40 countries, Hofstede also argues that the scores from the cultural dimensions in his study are probably underestimates of the actual difference between cultures, as IBM may, consciously or unconsciously, hire employees whose cultural traits may differ from those of the general population. Another issue is that Kogut and Singh's index oversimplifies estimation of overall cultural distance (Ng et al., 2007). It calculates cultural distance as the difference between home and foreign countries' indices. Because the differences between some dimensions in the index are not linearly additive (Hofstede, 1989; Ng et al., 2007), cultural distance may thus be underestimated. Another disadvantage is that Hofstede's values were obtained between 1968 and 1972 and may be very dissimilar from individuals' perceptions of cultural differences today (Ng et al., 2007).

A recent study by Kandogan (2012) points out that the Kogut and Singh (1988) index is a special case of the Mahalanobis (1936) distance under the assumption of zero covariances between different dimensions of culture. Kandogan demonstrates that this assumption is not valid in practice, and develops a modified version of the Kogut and Singh (1988) index which recognizes the non-zero covariances among the dimensions. Depending on the dimensions being used to investigate differences between countries, the original Kogut and Singh index can over- or underestimate cultural distance (Kandogan, 2012).

Clark and Pugh's (2001) Cultural Cluster Distance Index

Clark and Pugh (2001) develop a cluster approach derived from Ronen and Shenkar's (1985) work, which uses language, religion and geography to differentiate between countries. Ronen and Shenkar's analysis uncovers nine clusters, which they describe as: Anglo, Arab, Far Eastern, Germanic, Independent, Latin American, Latin European, Near Eastern and Nordic. This leads Clark and Pugh (2001) to define cultural distance as "the degree of difference of the cultural cluster to which the target foreign country belongs from the cultural cluster to which the home country belongs" (p.296).

To conduct their study, Clark and Pugh define five clusters based on the work by Ronen and Shenkar (1985) and Hickson and Pugh (1995), which they label: Anglo (Australia, Canada, Ireland, New Zealand, South Africa, USA), Germanic (Austria, Germany, Luxemburg, Switzerland), Latin (Argentina, Belgium, France, Italy, Mexico, Portugal, Spain), Nordic (Denmark, Finland, Netherlands, Norway, Sweden) and Rest of the World (Egypt, Greece, Hungary, India, Indonesia, Japan, Kuwait, Nigeria, Pakistan, Poland, Saudi Arabia, Singapore, Sudan, Taiwan, Thailand, Turkey, United Arab Emirates, Zambia, Zimbabwe). Countries were then coded according to the cluster into which they were assigned: Anglo countries were coded 1; Nordic countries were coded 2; Germanic countries were coded 3; Latin countries were coded 4; and Rest of the World countries were coded 5. A cluster's cultural distance was then calculated as its cultural difference from Great Britain, the home country in Clark and Pugh's study. So countries in the Anglo cluster would have the shortest cultural distance of 1, countries in the Nordic cluster would have a cultural distance of 2, and so forth.

While simple in its application, Clark and Pugh's (2001) cluster index has several weaknesses. First, the clusters by Ronen and Shenkar (1985) were not intended for measurement of cultural distance. Second, reduction of Ronen and Shenkar's nine clusters to five by Clark and Pugh was not scientifically done. Also, the coding of the clusters, which determined their cultural distance from Great Britain, was entirely subjective.

Linguistic Distance

The ideal measure of cultural distance might be one representative of an entire culture or country, and that could be applied to any such context (West & Graham, 2004). It has been argued that such a measure could be derived from language, as language is strongly associated with both national and cultural boundaries (West & Graham, 2004). The operationalisation of linguistic distance is not uncomplicated and requires an interdisciplinary approach based on linguistic research.

Many possibilities exist for determining linguistic distance, including lexical, typological or grammatical characteristics (West & Graham, 2004). West and Graham argue that the best approach is genealogical or genetic classification, which determines language dissimilarity from the existence of common linguistic ancestors, thus making it easy to operationalise for most languages. The authors use the hierarchy of languages tree developed by Chen, Sokal and Ruhlen (1995) to determine a country's linguistic distance from English, the focal language in their study. Linguistic distance is calculated by coding each language according to the number of branches connecting a country's main language to English. In the cases where countries speak several languages but none dominates, linguistic distance is calculated as a weighted average of

the official languages spoken in those countries. Linguistic distance using this measure varies between 0 (smallest distance) and 7 (largest distance) for the fifty-one cultures in West and Graham's study. Approaches that use language family trees to derive measures of linguistic distance have been criticised for relying on strong assumptions of cardinality, arbitrarily chosen parameters, low variability between different language pairs, and difficulties in implementation for isolated languages (Isphording & Otten, 2012).

Another measure of linguistic distance developed by Chiswick and Miller (1999), and later used by Hutchinson (2005) and Ku and Zussman (2010), uses average scores of students in a language test after they are instructed in a foreign language; a higher score indicates a lower linguistic distance between English and the foreign language, and *vice versa*. This approach also relies on the strong assumption that the difficulty of all non-English speakers to learn English is symmetric to the difficulty of English speakers to learn a foreign language (Isphording & Otten, 2012). Another strong assumption is that the average test score is not influenced by intrinsic or extrinsic motivations for learning a foreign language (Isphording & Otten, 2012).

Isphording and Otten (2012) use the Levenshtein distance to operationalise linguistic distance to overcome the shortcomings of West and Graham (2004) and Chiswick and Miller (1999). The basic approach uses pronunciation to compare word dyads from two different languages, but which have the same meaning. The average similarity across a specific set of words is used as a measure of the linguistic distance between the languages, which can then be interpreted as an approximation of the number of cognates between languages (Isphording & Otten, 2012). Cognates denote words with a common

historical origin. A larger number of cognates indicates closer common origins. Although restricted to differences in pronunciation, a smaller Levenshtein distance also indicates that two cultures might share other language characteristics (Serva, 2011).

Another measure of linguistic distance observed in the literature is based on the Berry Index, an entropy measure of industrial diversification (Jacquemin & Berry, 1979).

Boisso and Ferrantino (1997) define linguistic distance as:

$$L_{ij} = 10,000 - \sum_n s_{in} s_{jn} \quad (4.3)$$

where s_{in} and s_{jn} are the percentage shares of language n in the populations of countries i and j respectively. L_{ij} is equal to 10,000 when two countries languages are entirely dissimilar, and equal to 0 for two countries in which everyone speaks the identical language. A measure of linguistic similarity can easily be calculated by subtracting Equation (4.3) from 10,000.

Other Measures

Political and cultural environments influence the disposition of some countries' residents towards purchase of another country's exports. For example, Wong and Lamb (1983) observe that Americans are more likely to purchase goods from politically democratic countries. Similarly, Watson and Wright (2000) find that highly ethnocentric consumers prefer goods from culturally similar countries. Cultural similarity increases the volume of bilateral trade (Martinez-Zarzoso, 2003), as people from countries that are culturally proximate tend to consume similar goods.

Within this context, a recent approach by Disdier et al. (2010) uses trade in cultural goods to measure cultural proximity. Trade in cultural goods is informative about a broad concept of cultural proximity that is close to the definition used by sociologists (Straubhaar, 1991; Straubhaar, 2002). This concept allows for the evolution of bilateral attitudes and trends over time, and for asymmetries between countries. In this way, a country's residents can appreciate the cultural achievements of another country without this appreciation necessarily being reciprocated, or perpetual. Conventional measures of cultural proximity or distance like those described in previous sections are time-invariant and (by construction) symmetric, and can therefore not fully capture the broad notion of cultural proximity. The use of bilateral trade in cultural goods as a measure of countries' cultural proximity presents two main advantages over several measures of cultural distance: it can vary over time, and does not suffer from a problem of availability and coverage. Researchers employing this approach include Holloway (2013) and Maystre et al. (2009).

Rating scales have also been employed to measure perceived cultural distance (Rao & Schmidt, 1998; Wan et al., 2003). A survey is used to ask respondents about their perceptions of the cultural differences between their home country and other countries. Cultural distance to the home country is calculated using the respondents' mean score for each country. Such methods can be useful, but are time-consuming and costly.

4.4.3 Psychic Distance

The term "psychic distance" was first coined by Beckerman (1956, p.38) in his empirical research on intra-European trade flows, as an addendum to his study on the effects of relative "economic distance" (Beckerman, 1956, p.36) on trade patterns.

Beckerman reasons that countries are more likely to trade with others that are relatively closer psychically, than with those that are relatively distant psychically, even if the transport costs are the same in all instances. Psychic distance was thus introduced as a subjective variable moderating the effects of economic distance; however, its measurement or possible influence was not tested in the empirical paper. This study also established the first theoretical claim of the negative effect of psychic distance.

Subsequently, the concept of psychic distance was expanded, most notably by scholars at Uppsala University, Sweden (Johanson & Vahlne, 1977; Johanson & Wiedersheim-Paul, 1975). Clark and Pugh (2001) point out that a method for operationalising psychic distance was not discussed by the aforementioned authors but was later outlined by Vahlne and Wiedersheim-Paul (1977) and Vahlne and Nordstrom (1992).

Consequently, the concept has been variously defined and operationalised in the literature (Clark & Pugh, 2001).

Sousa and Bradley (2006) define psychic distance as “the individual’s perception of the differences between the home country and a foreign country” (p.51). Another definition is provided by Johanson and Vahlne (1977), who define psychic distance as the sum of factors preventing or disturbing the flow of information. These differences or factors include, but are not limited to, the emotional feeling caused by differences in culture, language, economic condition, education, and political system (Brouthers & Brouthers, 2001; Cuervo-Cazurra, 2006; Gray, 1997; Johanson & Vahlne, 1977; O’Grady & Lane, 1996). Trope, Liberman, and Wakslak (2007) argue that psychic distance relates to the perceived distance of an object or event in time, space, culture and probability.

Clark and Pugh (2001, p.289) note that the original study from Uppsala used seven indicators to operationalise psychic distance: “level of economic development in the importing countries; difference in the level of economic development between Sweden and the host countries; level of education in the importing countries; difference in level of education between Sweden and the host countries; difference in ‘business language’; difference in culture and local language; and existence of previous trading channels between Sweden and the respective host countries.” These indicators were calculated using publicly available information and expert opinion.

In many instances in the literature, measures of cultural distance have been used to operationalise psychic distance, and the concepts are widely considered as interchangeable (Dunning et al., 2007; Simonin, 1999; Yenyurt et al., 2009). This occurs possibly because of the assertion by Kogut and Singh’s (1988) that “cultural distance is, in most respects, similar to the ‘psychic distance used by the Uppsala school’” (p.430). Subsequently, Kogut and Singh’s (1988) index became a widely used metric of psychic distance. While related, it is probable that culturally distant countries are also psychically distant (Sousa & Bradley, 2005; 2006). Incomplete information and unfamiliarity with other cultures fosters psychic distance (Beckerman, 1956; Frankel et al., 1997) while cultural familiarity between countries reduces psychic distance. For example, research has shown that the volume of bilateral trade is higher between countries that share a common language or colonial past (Frankel et al., 1997; Hutchinson, 2002). Cultural distance is perhaps better considered as a component of psychic distance (Dow & Karunaratna, 2006; Ellis, 2008; Katsikeas et al., 2009; Trope et al., 2007), a narrower concept that focuses on a single element of the original Uppsala

definition, namely the cultural differences between the home country and foreign countries (Clark & Pugh, 2001).

Psychic distance is related to geographic distance, although the two concepts do not fully overlap (Arora & Fosfuri, 2000). Thus while geographic distance and language differences may be used to proxy psychic distance, they can do so only partially (Arora & Fosfuri, 2000). These two distance dimensions can also diverge greatly (Dow & Karunaratna, 2006). A small psychic distance is also typically associated with reduced uncertainty (Gillespie et al., 1999).

The concept of psychic distance has been applied in a variety of contexts in tourism research. However, in many cases, because of the multidimensional nature of the concept and the difficulty in operationalising it, studies investigate psychic distance indirectly, in the sense that one or more dimensions of the concept, as opposed to the concept itself, are analysed for their impacts on various aspects of tourism. A review of the tourism literature related to psychic distance from the top three ranked journals (Annals of Tourism Research, Tourism Management and Journal of Travel Research) by Massara and Severino (2013, pp.113-16) demonstrates this point. The papers reviewed investigated the singular impact of cognitive distance, socio-cultural distance/proximity, experiential distance, or geographic distance on some aspect of tourism; only geographic distance and socio-cultural distance were investigated simultaneously. The corpus of the evidence implies that as psychic distance decreases (more specifically, the dimensions analysed), the greater the attraction for the destination, or some aspect of the destination.

4.4.4 Synopsis of Socio-Psychological Distance

This review of various socio-psychological distance concepts and measures suggest there is some degree of overlap among them, as well as with geographic distance. The literature is ambiguous as to how to this issue should be addressed. Thus, researchers are left to determine how best to simultaneously operationalise multiple distance concepts in empirical studies. As Goh (2012) stresses, a complex modelling approach will be necessary to account for the interrelationships among socio-psychological factors. This issue will be addressed in Chapters 5 and 7.

4.5 Historical and Contemporary Colonial Relationships and Tourist Flows

Tourism economists, and indeed much research in tourism, have ignored the impact of historical and contemporary colonial relationships between source markets and destinations (McKercher & Decosta, 2007). From a theoretical perspective, tourism research has not considered in detail the body of knowledge related to colonialism and post-colonialism (McKercher & Decosta, 2007). Empirically, models of tourist flows and tourism demand typically include traditional economic variables such as income, price, travel cost, exchange rates, and so forth (see Chapter 3).

The enduring colonial relationships between current and former colonisers and colonies, (Etemad & Everson, 2007), comports with the concept of distance or proximity in the context of international tourist flows. These relationships that exist through shared language, history, culture, religious beliefs, education systems, legal systems, economic institutions, commercial and strategic relationships, and so forth, may enhance tourist flows in some instances, and discourage them in instances where they do not exist.

The following sections concisely review the dimension of colonialism, paying particular attention to colonialism's historical legacy. This will help in understanding the historical role of colonialism within the context of distance and its impact on international tourist flows.

4.5.1 Colonialism

A review of the tourism literature reveals a rather scant consideration of colonialism, although some discussions of the relationship between colonialism and tourism (Harrison, 2001) have led to a historical approach to tourism. In the ninth edition of *Tourism Principles, Practices, Philosophies*, Goeldner and Ritchie (2003) scarcely mention colonialism as a major relevant historical event, and in the twelfth edition of the same book, it is not mentioned at all. This suggests that tourism scholars may either take colonialism for granted or minimise its importance as a causal factor in formulating their approach to the subject. More likely, given the strong emotions that the subject evokes, it is perhaps unsurprising that tourism research has generally shunned it as an object of analysis.

In view of the paucity of information regarding colonialism in the tourism literature, any investigation into the inextricable relationship between tourist flows and the historical experience of colonialism therefore requires some understanding of the treatment of colonialism. This is an essential step towards appreciating the past and present roles played by colonialism and its remnants in the evolution of tourism patterns and trends.

Although colonialism has been paid significant scholarly attention by other disciplines, and has been applied to a broad range of situations, there is no widely accepted definition (Strausz-Hupe & Hazard, 1958), perhaps because of a lack of interest, or because the concept was taken for granted by scholars (Horvarth, 1972), despite the magnitude of the phenomenon. One criticism is that no possible definition could be comprehensive enough to embrace the wide array of implications and emotions that the term colonialism arouses (Stefaniszyn, 1972).

Horvath (1972) defines colonialism as “that form of inter-group domination in which settlers in significant number migrate permanently to the colony from the colonising power” (p.50). Curtin (1974) describes colonialism as “domination of people of another culture” (p.23). Fieldhouse (1983) views colonialism as “a general description of the state of subjection—political, economic and intellectual—of a non-European society which was the product of imperialism” (p.6). More recently, Osterhammel (1997) insists that colonialism is the operational dimension of imperialism, a system of domination that serves the interests of empire. Maunier (2002) argues that in its simplest interpretation, colonialism was the expansion of markets through the promotion of trade with colonies, which acted as sources of raw materials, or as markets that could absorb excess production from the colonising countries.

Two forms of colonialism are generally described by historians (Osterhammel, 1997): settler colonisation, which involves large numbers of colonists migrating to the colonised country, for example, the North American colonies before the American War of Independence; and exploitative colonialism, which involves a smaller number of colonists than settler colonisation, but emphasises resource extraction, for example,

European colonisation of Africa, the Caribbean, East and South East Asia, and South and Central America. A third form, called imperialistic colonialism, occurs when a power establishes colonies, primarily for nationalistic reasons (Osterhammel, 1997), for example, the overseas territories of the USA, Guam, Puerto Rico and the United States Virgin Islands.

Modern European colonialism was a widespread socio-geopolitical phenomenon that covered almost 85 percent of the earth's land surface by the 1930s (Loomba, 1998). Colonialism is recognised as a determining factor in the current geo-political and economic configuration of the globe (Maunier, 2002). It has also been used as a framework to describe most aspects of post-colonial social and economic development (Goldthorpe, 1996). Colonised countries were compelled to adopt, in part or whole, the coloniser's language, culture, religion, legal and economic systems (Etemad & Everson, 2007). This resulted in social systems that bore little resemblance to those of pre-colonial times (Kim & Prideaux, 2012).

4.5.2 Decolonisation

Decolonisation was manifested in a number of ways: disengagement, national liberation and negotiated bilateral agreements (McKercher & Decosta, 2007). While decolonisation presupposes a complete abolition of foreign domination and foreign influence, the legacies of colonialism are still firmly entrenched in various ways in both the former colonies and their colonisers (Bernhard et al., 2004), and many independent countries still maintain an intimate relationship with their former colonial powers. The political and economic structures inherited by former colonies after independence are necessarily colonial in nature (Bracking & Harrison, 2003). For instance, the political

institutions of most former British colonies are variations on the Westminster/Whitehall parliamentary model.

Decolonisation led to the creation of new types of commercial or strategic relationships (McKercher & Decosta, 2007). The British Commonwealth, now known as the Commonwealth, replaced the British Empire, while similar institutions were established by France, the Netherlands, Portugal and Spain (McKercher & Decosta, 2007). These organisations promote trade and investment that provide a continuing justification for the maintenance of colonial structures (Amin, 1973). Favourable immigration policies enable strong links that result in the establishment of large ethnic communities in the former coloniser. The latter will be further explored in Section 4.6.

4.5.3 Colonial Legacies and Tourist Flows

The nexus between tourism and colonialism has focussed on post-colonial economic transformation in former colonies from plantation-based economies to tourism-dependent nations (McElroy, 2003; Milne, 1992), tourism's perpetuation of historical colonial relationships as a form of neo-colonialism (Abbink, 2000; Palmer, 1994), and its role in reinforcing the master-servant relationship of the past (Erisman, 1983).

Colonial legacies contribute to the appeal of small island destinations (Craik, 1994; McKercher & Decosta, 2007). The contemporary image of former colonies through the creation of stereotyped ethnic and cultural images shapes tourists' view of these countries (Kim & Prideaux, 2012; Palmer, 1994). Perpetuation of colonialism's artefacts and symbols for marketing purposes influences how tourists and local citizens

interact (Palmer, 1994). Colonialism helps to create myths, stereotypes and fantasies that shape the coloniser's view (Said, 1978).

Two recent studies explicitly consider colonialism's impact on tourist flows. In a descriptive study of tourist flows to 56 current and former colonies, McKercher and Decosta (2007) observe that although the closest source markets produce the largest shares of visitors, current and former colonisers generate the largest share of long-haul visitors. They further assert that this pattern of tourist flows is the culmination of the process of tourism development, which is itself the end result of a colonial past. This, McKercher and Decosta contend, is not a coincidence but likely the result of a number of factors, including colonisation and decolonisation that entrenches a continuing historical relationship between current and former colonisers and colonies.

In the second study, Kim and Prideaux (2012) employ a modified two-track diplomacy approach by Kim and Crompton (1990) to examine bilateral tourist flows between Korea and Japan. In track one, there are official level government-to-government relations, and in track two, the introduction of people-to-people relations through tourism. Kim and Prideaux also consider the role of the commercial sector in track two, and the changes in the roles of tracks one and two that occurred after normalisation of relations between the Korea and Japan. Kim and Prideaux maintain that government-to-government relations were very important to tourism flows between Korea and Japan. As the mistrust between the two nations eroded, people-to-people and business-to-business flows grew, and less government-to-government intervention was required.

The extant literature, minimal as it is, suggests that contemporary tourist flows may be associated with colonial and post-colonial relationships in the tourist generating markets. Indeed, it has been shown that countries with historical colonial ties engage in more economic exchanges with each other than they do other countries (Sandberg et al., 2006). Such relationships between coloniser and colony, historical and contemporary, are a necessary element of distance to be investigated in modelling international tourist flows. The challenge is how to estimate colonialism's influence, an issue to which this study now turns.

4.5.4 Measurement of Colonialism

The complexity of colonialism as a subject of investigation lends to persistent methodological problems in measurement. Research tends to employ a case study approach (Armitage, 2000; Brown, 2000; Chamberlain, 1998). While there are advantages to the case study approach, it is not designed to estimate causal effects. On the other hand, when quantitative approaches are used, the problem is that colonialism is usually reduced to a single dimension, frequently a dummy variable recognising the predominant coloniser of a country (La Porta et al., 1999). Other approaches have employed a measure of "settler" versus "extractive" colonialism (Acemoglu et al., 2001, p.1370), or the number of years a country was under colonial control (Grier, 1999). These attempts to operationalise colonialism are drawn from the case study literature; however, it is clear that measurement of colonialism should be multidimensional.

The current state of the art means that colonialism's true effects may not be apparent from case study approaches that while informative, are not suited for the task at hand, or

approaches that reduce the topic to a single dimension, and may thus not be sufficiently discriminating. Therefore an approach that considers several aspects of colonialism appears to be a solution to tackling this complex issue. The study will develop such an approach in Chapter 7.

4.6 Diaspora, Transnationalism and Tourist Flows

Migrants, first-generation and their descendants, often feel an incessant urge to travel to their ancestral home to reconnect to their roots and culture (McCain & Ray, 2004). Such travel, known as “diaspora tourism”, is a niche market and sub-segment of heritage tourism (Huang et al., 2013).

“Diaspora” is a polyvalent concept with various definitions based on personal histories, disciplinary connotations, and political orientation. The word “diaspora”, originally derived from the Greek word *diaspeirein*, meaning “dispersal or scattering of seeds” (Banerjee, 2012, p.3), is “a connection between groups across different nation states whose commonality derives from an original but maybe removed homeland” (Anthias, 1998, pp.559-60). Historically, diaspora refers to the exiled Jewish population from Israel, but over time has come to denote migrants of varying ethnicities resident in a country where they were not born but who maintain strong emotional and material connections to the country from where they originated (Sheffer, 2006). More contemporary usage of the term has widened the definition of diaspora to include foreign workers, political refugees, overseas communities, and ethnic and racial minorities (Shuval, 2000), where diaspora is intended in the broadest sense of dispersed groups of people from a common origin (Cohen, 1997).

“Transnationalism” has been variously defined as processes through which immigrants maintain social relations that connect their home and host countries (Basch et al., 1994), “a set of sustained long-distance, border-crossing connections” (Vertovec, 2004, p.3), “belonging to two or more societies at the same time” (Vertovec, 2005, p.3), or “practices and relationships that link migrants and their children with the home country, where such practices have significant meaning and are regularly observed” (Levitt & Jaworsky, 2007, p.132). Migrants engage in different transitional activities, including social, familial, religious, cultural, economic and political activities; for instance, hometown celebrations, owning or investment in real estate, political donations and campaigns, and so forth (Portes et al., 2002). Transnational practices can be personal (Haller & Landolt, 2005), including keeping in touch with relatives, sending remittances or travelling as tourists (Huang et al., 2013), or collective (Haller & Landolt, 2005), including developing and redeveloping religious, civic and political institutions (Huang et al., 2013).

Differences between the meanings of diaspora and transnationalism emphasise the forced displacement of diaspora and the emotion the term connotes, while transnationalism is voluntary migration, and neutral from an emotional perspective (Castle and Miller, 2009). Transnationals tend to assimilate into the culture of their host country, while diasporic migrants maintain a certain level of social and psychological distance from the host society (Sheffer, 2006), typically living, working and establishing businesses in geographic clusters resulting in the formation of ethnic enclaves; hence, urban neighbourhoods have ethnic nicknames such as “Little Italy” or “Chinatown” (Timothy, 2002, p.138). Differences also exist with regard to diasporic and transnational motives for travel, which can be multifaceted and differ across

individuals, generations and cultural contexts (Ruting, 2012). Transnationals travel frequently back and forth between their host and homeland, in many instances for reasons unconnected to cultural or spiritual reconnection to their homeland (Huang et al., 2013), whereas for diaspora, as most have a desire to eventually return to their ancestral point of origin (Shuval, 2000), homecoming is emotional, particularly if it is a once-in-a-lifetime experience (Huang et al., 2013). Despite these differences, diaspora has become a catchall term for all migration, regardless of the circumstances surrounding these migratory movements (Braziel & Mannur, 2003; Cohen, 1997; Shuval, 2000).

In relation to tourist flows, first-generation migrants' travel to their ancestral home has been conceptualised as a tangible manifestation of the "myth of return" (Anwar, 1979, p.ix; Bolognani, 2007, p.60). More generally, it involves embracing and reinforcing cultural identities and nostalgic memories to maintain connections with places of ancestral importance (Baldassar, 2001). For migrant descendants, travel to the country where their parents originated is a way to better understand their ethnic origins by gaining first-hand experiences of their ancestral homeland (Kelly, 2000). This "ethnic reunion" (Fourie & Santana-Gallego, 2013a, p.411; Stephenson, 2002, p.379) or "rite of passage" (Baldassar, 2001, p.136) includes visiting friends and relatives (VFR), an increasingly significant form of tourism brought to the fore in a seminal article by Jackson (1990). VFR is also important for natives of the migrants' host country, who travel to visit their migrant friends and family living in other countries. In both instances, such travel permits reconnecting with distant relatives and rekindling of transnational family connections (Stephenson, 2002).

It is useful to note that not all experiences of visiting the homeland are positive. Return can highlight significant dimensions of social change (Baldassar, 2001; Kelly, 2000), compel a rethinking of one's ethnic identity (Voigt-Graf, 2008), or emphasise awkward obligations to relatives (Stephenson, 2002). This can lead to being considered a "foreigner" in your country of origin (Stephenson, 2002, p.410).

Surprisingly, the quantitative impact of diasporic and transnational relations on international tourist flows has been explored in only one study, Law, Genc and Bryant (2013) for New Zealand. The authors examine the effect of migrants (number of New Zealand residents who were born in the various source markets) and diaspora (number of native New Zealanders residing in the various source markets) on tourist inflows and outflows. Law, Genc and Bryant find that both variables have a strong positive effect on tourist inflows to, and outflows from New Zealand.

This section has highlighted some of the causal links between migrant identity and the propensity for travel in post-migration environments. While a brief picture has been painted, the connections between and among migrants and their homelands hold significance for their motivation to travel between host and homeland environments. Diaspora, in the broadest meaning of the concept, is an important dimension of distance, more accurately proximity, and a vastly under-researched factor in relation to international tourist flows and tourism demand. The current study intends to help close this large gap in the tourism literature.

4.7 Climate and Tourist Flows

Climate is an important consideration in tourist decision-making and the travel experience, and represents both a push and pull factor for tourists (Lohmann & Kaim, 1999). Climate has been identified as an important destination attribute (Hu & Ritchie, 1993), one of the most important determinants of international tourist flows (Boniface & Cooper, 2009), and is frequently the primary tourism resource, for example beach destinations (Kozak et al., 2008).

Climate is also an important factor in the timing of travel (Gossling & Hall, 2006; Kozak, 2002; Lohmann & Kaim, 1999). For example, seasonality is one of the main challenges of tourism's viability (Butler, 1998). Seasonal climate fluctuations are thus a key driver of tourism demand.

It might be expected that the importance of climate to tourists' decision-making and vacation experience might lead them to actively seek climatic information. As example, Hamilton and Lau (2005) report that 73 percent of German tourists had sought information on their destination's climate, most often temperature. Not surprisingly, climatic attributes of destinations are featured heavily in advertising campaigns (Gomez Martin, 2005).

While the climate of the tourist destination is a clear pull factor, the climate conditions at the point of origin are also important (Maddison, 2001). Unfavourable climate, either in the year of travel or the previous year (Agnew & Palutikof, 2006), is a push factor for tourists to travel to warmer conditions (Lise & Tol, 2002). For example, despite the expectation of reduced travel demand, the increase in foreign holiday bookings by UK

residents in 2009 over 2008 was attributed by the Association of British Travel Agents to the severe rainy conditions throughout the summer of 2008 (Hill, 2009). Similarly, demand for inclusive charter trips in the summer by Norwegians, “sun trips”, is influenced by weather conditions in the previous summer (Jorgensen & Solvoll, 1996, p.19). For winter tourism, analogous results are observed. Toglhofer, Eigner and Prettenhaler (2011) find a positive relationship between overnight stays and snow conditions in Austrian ski areas. Falk (2010) also uncovers a long-run relationship between the number of overnight stays and amount of snow depth.

This discourse suggests that the *difference* in climate between origin and destination countries acts to increase tourist flows. Tourists are driven to seek climatic conditions different from the ones that exist in their home country. This is the case whether tourists are seeking sun or winter activities. Difference in climatic conditions, referred to in this study as the “climate distance”, motivates tourists who are seeking certain climatic conditions unavailable at home. Consideration of “climate distance” is thus a requisite factor in modelling international tourist flows.

4.7.1 Measurement of Climate

The main drawback of most studies assessing the impact of climate on tourism demand is that they focus only on temperature as a measure of climate (de Freitas et al., 2008, p.400), for example, Abegg et al. (1998) and Lise and Tol (2002). An index approach to measuring and evaluating climate is necessary owing to the complexity in the way weather variables interact to give meaning to climate for tourism (de Freitas et al., 2008). A “good” index would allow tourists to select the best time and place for vacation travel or plan activities suitable to the expected climate (de Freitas et al., 2008,

p.400). A climatic index can give some indication of the suitability of a destination for specific touristic activities. Important climatic elements apart from temperature include wind chill effects, humidity, and radiation, and hours of sunshine, among others (de Freitas, 2003).

The Tourism Climate Index (TCI) by Mieczkowski (1985) is one such composite measure that assesses the climatic elements relevant to the quality of the experience of the average tourist. The TCI, based on theoretical considerations from the biometeorological literature related to human comfort, particularly with reference to tourism activities, is a weighted average of several climatic variables: temperature, relative humidity, precipitation, hours of sunshine, and wind speed. The TCI has been applied in different settings; for instance, beach environments (de Freitas et al., 2008), the impact of climate change on global tourism flows (Amelung et al., 2007), and climatic ranking of 17 North American cities (Scott & McBoyle, 2001). A limitation of the TCI is that the weights are based on the expert opinion of Mieczkowski (1985).

More recently, a second-generation index, the Climate Index for Tourism (CIT), derived from the climatic preferences of surveyed individuals, was advanced by de Freitas, Scott and McBoyle (2008). The CIT is based on thermal sensation (TSN), a function of temperature, humidity and wind speed. The CIT may be considered superior to the TCI because it is based on the climatic preferences of tourists. Notwithstanding the differences in both approaches, de Freitas, Scott and McBoyle (2008) and Mieczkowski (1985) affirm that climatic features important to tourism demand should be specified in the form of an index.

4.8 Economic Similarity

In Chapter 3, Linder's (1961) hypothesis that countries with similar preferences will engage in greater bilateral trade was discussed within the context of a macroeconomic theory of tourism demand, so a full review is not repeated here. In this section, Linder's hypothesis is conceptualised as a distance variable of importance for international tourist flows.

According to Linder, countries with similar GDP's per capita will trade more intensively than those with less similar GDP's per capita, assuming that similarity of preferences is associated with a common income level. This suggests that if the difference in per capita incomes between two countries is small, the volume of bilateral trade flows should be large, and *vice versa*. Economic similarity is thus inversely related to the volume of trade flows.

Hallak (2010) argues that studies which fail to control for geographical distance are flawed, as countries that are economically similar tend to be closer together.

Consequently, if trading costs (proxied by geographical distance) are not controlled for, then a finding of more intense trade between two countries may be due to lower bilateral trade costs, as opposed to economic similarity. This issue has been addressed by employing a gravity model with flows expressed as a function of trading partners' transport costs, typically geographic distance, and augmented by a proxy for Linder's hypothesis, a measure of economic similarity between countries. Product quality is also a key determinant in explaining flows (Linder, 1961).

In the current study, accounting for the degree of economic similarity between countries, will permit broad inferences to be drawn regarding the preferences of tourists from various origins in relation to the destination. For example, tourists may prefer to visit places with similar endowments of infrastructure and services, because it reduces their perception of the risk involved in travel to such destination. Economic similarity can also determine the range of destination countries that tourists consider (Morakabati et al., 2012), as economic similarity is indicative of underlying similarity in socio-economic values and perspectives. The relationship between economic similarity and international tourist flows will also provide indirect evidence of the impact of psychic distance on tourism demand. Countries that are economically similar are also psychically closer and *vice versa* (Beckerman, 1956). Therefore, the smaller the psychic distance, the greater the attraction for the destination. Economic similarity is, therefore, significant for a number of reasons relating to the motivation of tourists to travel to a destination.

4.9 Distance Models

The current chapter thus far has focussed explicitly on various concepts of distance and proximity as a basic framework for investigating tourist flows. The literature identifies several models for which distance is a key determinant in relation to tourist or travel flows. Of these, the distance decay, trip generation and travel cost models will be discussed in this section. The gravity model, the key theoretical and empirical framework that will be employed in this research, is discussed in detail in Chapter 5.

4.9.1 *The Distance Decay Function*

The earliest research on tourist flows concentrated on the simple relationship between geographic distance and travel intensity. Distance decay, “the attenuation of a pattern or process with distance” (Gregory et al., 2009, p.168), is a focal concept in a variety of modelling contexts, such as transportation, migration, and location theory (Olson, 1970). This tenet of central place theory was formalised in the work of Losch (1954), where the demand curve—reflecting declining demand for a good or service as distance from the good or service increased—was recognised as a feature of range (Hurst, 1972). Traversing distance is costly, so distance decay is taken as axiomatic in most models of spatial interaction. Even when actual costs of distance are minimal, uncertainty and ignorance of farther away places is expected to result in distance decay in interaction because nearby, more familiar, places are preferred destinations (Hanink & White, 1999).

Distance decay models have evolved so that distance is the only variable. The underlying assumption of the distance decay function within the context of tourist flows is that tourists will prefer to move shorter distances rather than longer distances in order to maximise utility (Clark & Avery, 1978). The basic mathematical form of the function is:

$$TF_{ij} = ae^{-bd} \quad (4.4)$$

where TF_{ij} is the volume of the tourist flow between origin i and destination j ; d is the geographic distance between origin i and destination j ; and a and b are constants.

The use of distance decay theory to predict the flow of tourists was mostly used in the early stages of tourism study (McKercher & Lew, 2003). Greer and Wall (1979) explain that the shape of the decay curve is determined by many different supply and

demand relationships. Several studies have demonstrated the theory's applicability in both domestic and international tourism (Greer & Wall, 1979; Hanink & White, 1999; Lee et al., 2012; McKercher et al., 2008; McKercher & Lew, 2003; Zhang et al., 1999), although the shape of the decay curve and its rate of decay (see Figures 4.1, 4.2 and 4.3) vary with the type of travel (land versus air), and the number of destinations and alternatives (McKercher, 2008a).

An advantage of using the distance decay function is that it helps to overcome the difficulty posed by the destination population's heterogeneity in terms of social and economic characteristics (Clark & Avery, 1978). However, the distance decay function is limited in its applicability to varying situations. One reason is that although the distance decay concept has an advantage for characterising short-haul travel, it has an inherent weakness in characterising medium to long-haul travel. For long-haul international tourists, the friction derived from distance disappears after passing a certain threshold (Wolfe, 1970; 1972), and there are many cases where the journey in itself holds value (Baxter, 1979; Hall, 2005). Thus, tourist flows do not demonstrate a decay effect as a result of increasing geographic distance in every instance. The decay function is unable to properly characterise such flows.

The second and most significant weakness of the distance decay framework is that apart from distance, it does not consider factors influencing tourist flows, not even other dimensions of distance. Therefore, the function described by Equation (4.4) cannot explain the plateaued decay curve (panel B of Figure 4.1), the decay curve with a secondary peak (Figure 4.2), or the decay curve with a bimodal profile (Figure 4.3). It is well known that tourist flows occur because of tangible and intangible attributes (see

Chapter 3). Models that account for these factors are needed to achieve better understanding of tourist flows. Nevertheless, the distance decay model is an important forerunner for more sophisticated models in the study of international tourist flows.

4.9.2 Trip Generation Models

Another family of models known as trip-generation models developed from the work of Wootton and Pick (1967) strives to predict the total number of trips generated and attracted to each zone of the study area. These models are used to predict how many trips originate at each zone using data on household and socioeconomic attributes. Given a set of N destination zones and M origin zones, separate models are developed to predict the number of trips originating and ending in each of these zones. A separate model predicts the number of trips originating in each of the M origin zones, and another model predicts the number of trips ending in each of the N destination zones. The first is a trip production model and the latter is a trip attraction model.

Two approaches are typically employed in trip generation modelling. The first uses a trip table. Several predictive variables are divided into categories and a mean number of trips is estimated. The main reason that trip tables are used is because of the non-linear nature of trips. Thus, unless a sophisticated non-linear model is used, sizeable error can be introduced in a prediction, and thus it is preferable to use a trip table approach (Ortuzar & Willumsen, 2001). Trip tables are not without their problems and have been subjected to various critiques (Shoup, 1999). They cannot be used in a travel demand model. Another problem with the trip table approach is it requires interpretation and some degree of arbitrariness.

The second approach is a regression framework. In this approach, the number of trips either originating or ending in each zone is estimated from zone characteristics. The typical method of estimation is OLS. OLS estimation, which assumes linear relationships between the dependent and respective independent variables, is problematic for predicting the number of trips generated for reasons such as skewness of trips, nonlinear causal variables or negative predictions, among others (Taaffe et al., 1996). Another popular method used, Poisson regression, is an improvement over OLS estimation, but it too suffers from problems, such as producing standard errors that are too small, resulting in spurious selection of variables (Jang, 2005).

4.9.3 Travel Cost Models

The travel cost method by Hotelling (1947) is another method employed to investigate travel demand that incorporates the influence of distance. Hotelling postulates that visitation rates should be inversely related to the distance travelled to reach a site. The travel cost method uses the cost of time and travel to define the value people place on something in the absence of a market price by observing actual human behaviour.

The method calculates willingness to pay by sampling data, using the time and travel cost expense incurred as a proxy for the price of access to the site. The average distance travelled, and the average travel cost to the destination, are used to create a visit rate curve. The visit rate curve is then used to obtain estimates for the number of visitors at a given cost to travel to the destination.

The empirical approaches most commonly employed are the zonal travel cost model (ZTCM) and the individual travel cost model (ITCM). The former uses aggregated

visitation rates and average trip costs from various geographic origin zones. The ITCM is conceptually similar to the ZTCM, but allows for individual visitors' inherent variation in socio-economic characteristics. The ITCM is preferred to ZCTM because of its statistical efficiency, theoretical consistency in modelling individual behaviour, accommodation of heterogeneity in the population that is not considered by the ZTCM, and avoidance of arbitrary zone definitions required in the ZTCM (Bowker & Leeworthy, 1998).

Other problems with the travel cost model include: problems in definition and measurement of the opportunity cost of time; differences between distances travelled are not always large enough to affect travel costs; differences in travel costs may not always influence the number of trips made; limitation of the method because it requires user participation; and, it cannot be used to assign values to environmental features and functions that users of the destination do not find valuable (Eberle & Hayden, 1991).

4.10 Summary

This chapter has drawn a nexus between travel motivation, various dimensions of distance, and tourist flows. It shows that the decay effect of geographic distance on tourist flows is moderated by other dimensions of distance that can alter the rate of decay, shape of the decay function, or even reverse the decay effect. This chapter, therefore, provides further support for the thesis that solution of the distance puzzle in tourism depends on decomposition of distance into its various dimensions.

Socio-psychological dimensions, cognitive, cultural and psychic distance, either increase or decrease tourist flows to a destination depending on their magnitude between origin and destination. Destinations that are proximate to source markets from these perspectives are perceived as less risky and thus more attractive to tourists. The literature on tourism demand suffers from a paucity of research in investigating the effect of these dimensions on tourist flows, likely because of the difficulty in operationalising these variables.

Colonialism left a profound effect on former colonies and current overseas territories of metropolitan countries. The enduring relationships that exist between these countries and their influence on international tourist flows are scarcely considered in the tourism literature, among the least of which is tourism demand. Since research on tourist flows needs to incorporate the impact of contemporary and post-colonial relationships, model development to empirically examine this dimension of distance is required.

Diasporic and transnational relationships between and among immigrants and their homelands are another significant dimension of travel. The strength of the bond between migrant residents and destinations which are also their ancestral home should influence the volume of international tourist flows. This dimension is another under-researched factor of international tourist flows and tourism demand.

Climate is a key determinant of the decision to travel and is considered, explicitly or implicitly, during travel planning. Climate distance between source and destinations acts to increase the volume of tourist flows, and should of necessity be considered when

investigating tourist flows. Economic similarity, reflecting a correspondence in tastes between countries, is expected to have a positive affect on tourist flows.

Finally, the chapter reviewed several models that incorporate distance. These models, while useful, suffer from various weaknesses, and are unsuitable for the purposes of this study.

In light of the literature reviewed in this chapter, this research is further justified from a theoretical perspective. A model that simultaneously combines various dimensions of distance is proposed to bring clarity to the confounding effect of geographic distance on the intensity of tourist flows. This proposal underpins the empirical research design that will be presented in Chapter 7. Before that, Chapter 6 will provide an overview of tourism in the Caribbean. First, however, the study turns to a review of the theoretical and empirical literature on the gravity model in Chapter 5, another integral component in the framework for solving the distance puzzle in tourism.

5.1 Introduction

This chapter will present the evolution of the gravity model, its theoretical foundations, and applications of the model to the study of tourist flows. The extensive derivations in this chapter emphasise that there is extensive theoretical support for the gravity model as a tool for empirical analysis. Yet, it is important to note that economists were searching for a theoretical basis for an already operational concept; that is, a theory was searched for to fit the model.

The chapter first describes the traditional gravity model, the framework upon which all tourism research employing the model in the last 30 years is based. Early prototypes of current gravity models are described in the following section. Next, the conceptual development of the gravity model from three schools of thought is presented. The theoretical foundations of the gravity model from work by several key contributors are then extensively reviewed. The penultimate section reviews applications of the gravity models to explain tourist flows/tourism demand. In the final section, the contributions of the chapter are summarised.

5.2 The Traditional Gravity Model

For roughly a century, the gravity model has been extensively used by social scientists. The model's origin has its roots in the concept of social physics (Comte, 1856) from the late nineteenth century and early writings on the economics of location and

transportation costs. Social physics uses analogues to the laws of natural science to explain social phenomena (Stewart, 1948; 1950).

The Newtonian framework (Newton, 1686) typically forms the basis for most gravity models and can be expressed as:

$$F = \frac{GM_iM_j}{d^2} \quad (5.1)$$

where F is the gravitational force between two bodies of different mass; M_i is the mass of body i ; M_j is the mass of body j ; d is the straight-line distance between the two bodies; and G is a gravitational constant. Equation (5.1) says that the attractive force between two masses is directly proportional to their masses, and inversely proportional to the square of the distance between them. Put another way, larger bodies exert a greater attraction on other bodies than smaller bodies, and the greater the distance between two bodies, the smaller their attraction for each other.

In the social sciences, geographical units, for example, regions, or countries, are typically the analogue of physical bodies in Equation (5.1). The masses of the two bodies, M_i and M_j , are commonly measured by their incomes or populations; F is a flow of some type from one geographic unit to another; and d is the geographic distance between them exerting a resistance to the force or social interaction in question.

The traditional gravity model, commonly attributed to Tinbergen (1951) and Poyhonen (1963a; 1963b), is premised on the notion that bilateral trade flows between two countries can be explained by factors that capture export potential and import propensity, and forces that attract or inhibit bilateral trade (Poyhonen, 1963a; 1963b;

Pulliainen, 1963). Further enhancement of the gravity model was undertaken by Pulliainen (1963) and Linnemann (1966). Incidentally, none of these authors refer to their models as “gravity models”. The nomenclature “gravity model” first appears in Hewett (1976, p.1) and Sattinger (1978, p.22), although Olsen (1971, p.33) attributes the name to the “school of social physics” led by John Q. Stewart at Princeton University in the 1940s.

A typical gravity model in the non-physical sciences takes the following stochastic form:

$$X_{ijt} = e^{\beta_0} Y_{it}^{\beta_1} Y_{jt}^{\beta_2} N_{it}^{\beta_3} N_{jt}^{\beta_4} D_{ij}^{\beta_5} e^{w\theta} e^{u_{ijt}} \quad (5.2)$$

where X_{ijt} is flows of some type from country i to country j ; Y_{it} and Y_{jt} are measures of the economic sizes, usually GDP, of countries i and j ; N_{it} and N_{jt} are the physical sizes of countries i and j ; D_{ij} is the geographic distance between the two countries; t is a time subscript; w is a vector of variables that captures facilitative or dissuasive factors to the flows X_{ijt} ; β 's and θ are parameters; and u is a normally distributed error term.

This specification varies from the strict gravity model of the physical sciences, as the exponents of 1 applied to the mass factors and 2 applied to distance in Equation (5.1) are allowed to be estimated from sample data to fit a statistical relationship between data on flows and the mass and distance variables in Equation (5.2). In addition, the error term u exists because there is no set of parameters for which Equation (5.2) will hold exactly for an arbitrary set of observations.

Economic size is a measure of the productive capacity of an exporting country (Sandberg et al., 2006). It is also a measure of product diversity as larger economies

usually have more highly developed productive bases (Sandberg et al., 2006). For an importer, on the other hand, economic size gauges their absorptive capacity for imports (Sandberg et al., 2006). Both countries' incomes would positively affect export activity (Hewett, 1976; Linnemann, 1966; Poyhonen, 1963a; 1963b; Pulliainen, 1963; Tinbergen, 1951). Countries with larger populations typically have more diversified economies, are more self-reliant, and trade less (Brada & Mendez, 1983; Hewett, 1976; Linnemann, 1966). Alternatively, countries with larger populations typically have large industrial bases that are able to capture greater economies of scale in production compared to smaller economies (Brada & Mendez, 1983; Linnemann, 1966). Therefore, population's impact on trade flows is ambiguous (Brada & Mendez, 1983; Linnemann, 1966). More generally, the exporter's income and population can be considered indicators of potential export supply, and the importer's income and population as indicators of potential import demand (Aitken, 1973; Linnemann, 1966; Sandberg et al., 2006).

Geographic distance, a proxy for transaction costs, is expected to have a negative impact on the volume of flows (Linnemann, 1966; Poyhonen, 1963a; 1963b; Tinbergen, 1951). It is also considered a measure of Beckerman's (1956, p.38) "psychic distance" between countries (Linnemann, 1966). The gravity model is frequently augmented with variables that either increase or reduce flows (Hewett, 1976; Linnemann, 1966; Poyhonen, 1963a; 1963b; Pulliainen, 1963; Tinbergen, 1951). Such variables include different measures of price for each country, the exchange rate, and binary variables for assessing the impact of sharing a common language, sharing a common border (adjacency), and so forth. Binary variables allow assessment of how flows under such qualitative factors vary from normal or baseline trade patterns (Hewett, 1976;

Linnemann, 1966; Tinbergen, 1951); normal or baseline flows occur when the qualitative factors have no influence. Baseline behaviour can be established when the binary variables are jointly equal to zero.

Expressing Equation (5.2) in natural logs and assuming that the dimension of the vector w is S yields:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln N_{it} + \beta_4 \ln N_{jt} + \beta_5 \ln D_{ij} + \sum_{s=1}^S \theta_s W_{sij} + u_{ijt} \quad (5.3)$$

where W is a set of variables that facilitate or reduce various types of flows captured by X_{ijt} , and all other variables are as previously defined in Equation (5.2). The β_s can be interpreted as elasticities.

5.3 Early Gravity Models

One of the earliest proponents of the social application of the law of gravity was Carey (1858). Building on the principle that molecules and matter are subject to physical laws, Carey considers humans the molecules of society and similarly, the laws of physics should apply to humans as well. He observes that people have a propensity to gravitate towards cities since they provide better economic opportunities, and that larger cities exerted a greater attraction than smaller ones. Ravenstein (1885) also reaches similar conclusions. A simple mathematical model of this idea can be found in Young (1924, pp.28-29) who posits that the movement of farm workers from one community to another is directly related to the attractiveness of the destination community and inversely related to the distance between the latter and their current location.

Reilly (1929) extends the concept of gravity to retail flows. He suggests that larger cities drew retail trade from a smaller intermediate city in direct proportion to some power of the populations of the larger cities and in inverse proportion to some power of the distance of each of these cities from the intermediate city. Reilly (1931, p.70) proposes a deterministic model that explained the “law of retail gravitation”:

$$\frac{B_a}{B_b} = \left(\frac{P_a}{P_b} \right)^N \left(\frac{D_a}{D_b} \right)^n \quad (5.4)$$

where B_a and B_b are the amounts of business that cities A and B respectively attract from the intermediate city; P_a and P_b are the respective populations of cities A and B ; and D_a and D_b are the respective distances of cities A and B from the intermediate city. N was assumed to be unity. Using retail data from the state of Texas, Reilly finds that in 35 percent of the cases the value of n falls between 1.5 and 2.5.

Sociologists also capitalised on the utility of gravity-style models for studying the movement and interaction of people; a detailed survey of these studies can be found in Carrothers (1956). Stewart (1948) introduces the demographic gravitational force F_{ij} between regions i and j as:

$$F = \frac{P_i P_j}{D_{ij}^2} \quad (5.5)$$

where P_i and P_j are their respective populations; and D_{ij} is the straight-line distance between them.

In the following years, there was explosive growth in applying the concept of gravity to a wide range of interactions, such as intercity phone calls (Hammer & Ikle, 1957), tourist flows (Alcaly, 1967; Crampon, 1966; Glejser & Dramais, 1969), traffic,

commuting, and automobile travel (Glejser & Dramais, 1969; Hammer & Ikle, 1957; Ikle, 1954; Zipf, 1946), migration (Beals et al., 1967; Glejser & Dramais, 1969), and the transportation of goods (Glejser & Dramais, 1969; Zipf, 1946).

The impact of geographic distance on flows of goods and services was also recognised by economists. Beckerman (1956), Isard and Peck (1954), and Isard (1954; 1956), among others, report that geographic distance has a strong negative impact on trade. Therefore, there would be greater trade flows between regions closer to each other than between regions farther apart. Beckerman (1956) and Isard and Peck (1954) point out, however, that geographic distance is not the sole determinant of trade flows; neither can it fully explain transaction costs. Rather, geographic distance needs to be considered in a broader context, taking into account such factors as language barriers and culture. The concept of “psychic distance” introduced by Beckerman (1956, p.38) and refined by Linneman (1966, pp.28, 32) emphasises the point. More recently, the concept of psychic distance has been coined “subjective resistance” (Garnaut, 1994, p.276).

5.4 Conceptual Bases for the Gravity Model

The flexibility of use and intuitive extension of gravity models fostered various conceptual approaches to explaining various types of flows, each from the perspective of trade. For the ultimate purpose of understanding the gravity equation, it can be noted that the literature diverged into two different paths. Sen and Smith (1995, pp.7-8) refer to these paths as the “deterministic” approach and the “probabilistic” approach. The deterministic approach may be further classified using a convenient nomenclature based on the geographic location of the contributors to the gravity framework: the Dutch

Approach based on the work of Tinbergen (1951) and Linnemann (1966); and the Finnish Approach centred on research by Pöyhönen (1963a; 1963b) and Pullianen (1963). The Probabilistic Approach stems from the work of Savage and Deutsch (1960), Goodman (1963) and Leamer and Stern (1970).

5.4.1 *The Dutch Approach*

Tinbergen (1951, pp.26-27) defines a “turnover equation” based on a Walrasian market framework in which market forces determine the equilibrium quantity sold in a given market. Later, Tinbergen (1962) presents a mathematical formulation of the “turnover equation” to explain bilateral trade flows from country i to country j :

$$X_{ij} = \alpha Y_i^{\beta_1} Y_j^{\beta_2} D_{ij}^{\beta_3} \quad (5.6)$$

where X_{ij} is the value of exports from country i to country j ; Y_i and Y_j are the respective countries' incomes; D_{ij} is the geographical distance between the two countries; α is a constant; and β_s are parameters of the model.

The final model estimated by Tinbergen (1962) is:

$$\log X_{ij} = \beta_0 + \beta_1 \log Y_i + \beta_2 \log Y_j + \beta_3 \log D_{ij} + \beta_4 \log A_{ij} + \beta_5 \log P_{ij} \quad (5.7)$$

where A_{ij} is a binary variable to capture the effect of adjacency (border effect); and P_{ij} is a binary variable which captures the existence of a trading agreement between two countries. Data on bilateral exports from 42 countries used to estimate the model shows that both adjacency and preferential agreements have positive effects on trade flows.

Linnemann (1966) (Tinbergen's graduate student) explicitly rejects the concept of social physics as a motivation for the gravity model. Instead, “potential supply” and

“potential demand” of trading partners determined bilateral flows via a quasi-Walrasian general equilibrium framework (Linnemann, 1966, p.10). Since bilateral transactions are not explicitly accounted for in a true Walrasian framework the system was considered quasi-Walrasian (Linnemann, 1966). Linnemann’s derivations (see Appendix A1) result in the traditional gravity model used in virtually all tourism studies:

$$X_{ij} = \alpha Y_i^{\beta_1} N_i^{\beta_2} Y_j^{\beta_3} N_j^{\beta_4} D_{ij}^{\beta_5} P_{ij}^{\beta_6} \quad (5.8)$$

where X_{ij} is the value of exports from country i to country j ; Y_i and Y_j are the respective country incomes; N_j is the population of country j ; D_{ij} is the geographical distance between the two countries; P_{ij} is a preferential treatment binary variable; α is a constant; and β_s are parameters of the model.

5.4.2 The Finnish Approach

Pöyhönen (1963a; 1963b) develops a model of bilateral trade flows independent of Tinbergen (1962). Pöyhönen’s model, based on an input-output framework, can be expressed as:

$$X_{ij} = \beta_0 \beta_i \beta_j \frac{Y_i^{\beta_1} Y_j^{\beta_2}}{(1 + \gamma D_{ij})^{\beta_3}} \quad (5.9)$$

where Y_i and Y_j are the respective country incomes; D_{ij} is the geographical distance between the two countries; β_0 is a constant; β_i and β_j are country-specific effects; β_1 and β_2 are income parameters; γ represents the transportation cost per unit of distance; and β_3 is an isolation factor. Although not referring to his equation as a gravity model,

Pöyhönen notes the relationship between his equation and the gravity formula from physical science (Poyhonen, 1963a, p.99).

Also building on the concept of physical gravity, Pulliainen (1963) argues that the volume of bilateral international trade is determined by push and pull factors of the respective countries. Pulliainen (1963) includes a factor that measures the difference between regional temperatures weighted by regional income to control for resource differences, but treats the distance variable conventionally. Pulliainen's model, like those of Pöyhönen (1963a; 1963b), performs well empirically; however, they both ignore the theoretical development of the models.

5.4.3 The Probabilistic Approach

A rarely cited justification for the use of gravity-style models is the probabilistic model of international trade by Savage and Deutsch (1960), Goodman (1963), and Leamer and Stern (1970). It assumes that exporters and importers are matched by a random process, and that world trade consists of a large number of independent transactions called "consignments" (Goodman, 1963, p.197; Savage & Deutsch, 1960, p.554).

Under this approach (see [Appendix A2](#) for derivation) the expected volume of exports from country i to country j , can be expressed as:

$$X_{ij} = \frac{X_i M_j}{T} \tag{5.10}$$

which is the product of country i 's export sector, X_i , and country j 's desire to import, M_j , in proportion to world trade, T . If Y_i and Y_j are used to substitute for X_i and M_j

respectively, and a trade resistance term added, a gravity-type model results. Sattinger (1978) employs a similar justification for the use of the gravity model.

5.5 Theoretical Derivation of the Gravity Model

Although the deterministic and probabilistic approaches conceptualised gravity-type models, a sound theoretical foundation was still lacking. This section presents various theoretical derivations of the gravity model.

5.5.1 Product Differentiation by Place of Origin

Credit for the first rigorous theoretical derivation of the gravity model is often attributed to Anderson (1979), who uses an international expenditure framework to derive the model. In Anderson's model, goods are differentiated according to their place of origin, the *Armington* assumption (Armington, 1969). Armington differentiates goods not only by kind, but also by place of production. Thus, the producer's location is a critical descriptor of the product. This means that similar goods originating from different countries are imperfect substitutes. Within a tourism context, this is a feasible assumption since the distance of the destination from the origin has implications for the costs of travel, even if the tourism products in both destinations could be perceived as identical.

Anderson assumes countries produce two goods, a traded and non-traded good; there are no transaction costs; and preferences are homothetic and identical across countries, so richer countries (those with greater income) will invest the same proportion in tradable goods relative to their total income as poorer countries (those with smaller

income) because of a constant marginal rate of substitution (Varian, 2006). Anderson models the traded good's share of each country's national product as a function of each country's income and population. He also allows for trade imbalances. This framework gives us the following gravity model (see [Appendix A3 \[A3.1-A3.5\]](#) for derivation):

$$M_{ij} = \frac{m_i \phi_i Y_i \phi_j Y_j}{\sum_j \phi_j Y_j} \quad (5.12)$$

where M_{ij} is the value of country j 's imports from country i ; and ϕ_i and ϕ_j represent the shares of country i and country j 's traded good in each country's national product respectively.

Anderson (1979) also demonstrates that the standard gravity equation [Equation (5.8)] will result if allowances are made for transportation costs. In this scenario, there are multiple differentiated traded goods. The import demand equation yields a model with a gravity structure (see [Appendix A3 \[A3.6-A3.18\]](#) for derivation):

$$M_{ij} = \alpha Y_i^{\beta_1} N_i^{\beta_2} Y_j^{\beta_3} N_j^{\beta_4} D_{ij}^{\beta_5} \quad (5.13)$$

where the variables are as defined for Equation (5.8). One can interchange between imports, M_{ij} , and exports, X_{ij} , on the left hand side of Equation (5.13) without loss of generality.

5.5.2 Monopolistic Competition

Helpman and Krugman (1985) assume production is characterised by increasing returns to scale (IRS) and that producers are monopolistic competitors. This approach is based on Krugman's (1979; 1980) work on the model of Chamberlinian monopolistic

competition. In Chamberlin's model, producers have a degree of monopoly power since no identical substitutes exist for their product. Market entry of new producers drives profits to zero in the long run (Chamberlin, 1962). Krugman (1979; 1980) assumes a model where labour is the only factor of production to eliminate differences in endowment and technology between countries; preferences and technologies are identical; and wages are equal due to symmetry in productivity as a consequence of identical technologies; therefore, prices for all products are the same. Trade among countries with similar demands is explained by economies of scale. Krugman's assumption of identical preferences among countries is comparable to Linder's (1961) income similarity hypothesis.

The theoretical model of monopolistic competition in international trade by Krugman (1979; 1980) can be useful towards understanding international tourist flows if some additional simplifying assumptions are made. Tourism can reasonably be considered a monopolistically competitive industry at the level of the country since there are many countries that provide similar products, but there is some degree of product differentiation in aspects including cultural heritage, location, climate, geography, and so forth, that influence the travel experience of a given destination.

In Helpman and Krugman's (1985) approach, goods in the same class are distinguished from each other by small characteristics. Countries, incentivised by economies of scale, do not produce every differentiated good; rather, they produce a set of goods and trade for the goods which they do not produce (Krugman et al., 2011). The value of bilateral trade between country i and country j , that is, the sum of bilateral exports from country i

to country j and bilateral exports from country j to country i can be expressed as (see Appendix A4 for derivation):

$$V_{ij} = 2s^i s^j (Y_i + Y_j) \quad (5.14)$$

where s^i and s^j are the relative economic sizes of the two economies i and j ; and $(Y_i + Y_j)$ is the combined economic size of the trading partners. Relative economic size, or economic dispersion, varies with relative size of the two countries' GDPs. Combined economic size, or the bilateral sum of GDPs, is expected to have a positive impact on trade volumes. Bilateral trade between country i and country j will be the greatest in volume when both economies are of equal relative size, that is, s^i and s^j are equal to 0.5 (Helpman & Krugman, 1985).

Building on the extensive work by Helpman and Krugman (1985), a formulation of the gravity model was provided by Helpman (1987). Helpman assumes a two country-two goods-two inputs world. One good is capital-intensive in production and the other is labour-intensive, one country is relatively capital-abundant and the other is relatively labour-abundant, the two goods are homogenous and tastes are homothetic and constant across countries. As Helpman's objective is to determine how resource endowments, combined economic size, and economic similarity affect the volume of bilateral intra-industry trade, Helpman (1987, p.76) suggests a gravity model for explaining the magnitude of intra-industry trade:

$$S_{k-k}^{ij} = \gamma_0 + \gamma_1 \log \left| \frac{Y_i}{N_i} - \frac{Y_j}{N_j} \right| + \gamma_2 \log(Y_i + Y_j) + \gamma_3 \log \left[1 - \left(\frac{Y_i}{Y_i + Y_j} \right)^2 - \left(\frac{Y_j}{Y_i + Y_j} \right)^2 \right] \quad (5.15)$$

where S_{k-k}^{ij} represents the volume of bilateral intra-industry trade as a percentage of total bilateral trade. The first bracketed term is the absolute value of the differences in

GDP per capita, which proxies the similarities in factor endowments. If countries with similar endowments trade less, this would support HOS theory; however, countries with similar factor compositions are expected to trade more (Helpman, 1987). Assuming that tastes can also be proxied by per capita incomes, then Helpman's hypothesis is also in agreement with Linder's (1961) hypothesis. The second bracketed term captures the effect of *combined* economic size; larger economies are expected to trade more than smaller ones. The final bracketed term is a dispersion index measuring the *relative* economic size of two countries (Helpman & Krugman, 1985). This index varies from 0 to 0.5: 0 indicates complete dissimilarity in economic size, and 0.5 indicates identical economic sizes. This variable is expected to have a positive effect on trade.

Helpman's (1987) empirical findings on 14 OECD countries indicate an inverse relationship between the volume of trade and difference in per capita incomes, supporting his hypothesis that countries with similar factor endowments trade more. It also lends support to Linder's (1961) hypothesis.

Notably, Helpman's (1987) model does not include geographical distance in its formulation, unlike the traditional gravity model. However, similar to the traditional gravity model, Helpman's model can be augmented with additional variables capturing any barriers or facilitating influences to trade.

Work by Bergstrand (1985; 1989) on the gravity model is also based on Krugman's assumptions of economies of scale in production and monopolistic competition. Bergstrand (1985) assumes that the underlying demand conditions can be modelled by constant elasticity of substitution (CES) utility functions and the supply conditions by

constant elasticity of transformation (CET) technologies; the world consists of N countries; and all consumers possess identical CES utility functions with a choice between imported goods and domestically produced goods. On the supply side, firms in each country are assumed to be profit maximisers. The endowment of a single internationally immobile productive resource available in each country is utilised in production according to CET. Bergstrand's framework results in a very generalised gravity model (see [Appendix A5 \[A5.1-A5.16\]](#) for derivation):

$$PX_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} D_{ij}^{\beta_3} A_{ij}^{\beta_4} u_{ij} \quad (5.16)$$

where PX_{ij} is value of the flows from country i to country j ; Y_i and Y_j represent country i and country j 's incomes; D_{ij} is the distance from the economic centre of i to j ; A_{ij} is any other factor aiding or resisting trade between i and j ; and u_{ij} is a log-normally distributed error.

Bergstrand (1989) extends the microeconomic foundations of the gravity equation by Bergstrand (1985) by incorporating factor endowments, in reference to HOS theory, and tastes, reflecting Linder's (1961) similarity hypothesis. The economic structure is multi-country, multi-industry (manufacturing and non-manufacturing), with two factors of production (capital and labour). The exporter's income is expressed in units of capital, thus providing insight into the capital-labour ratio in each country. Changes in the importer's income are considered as changes in purchasing power, which is necessary for a change in tastes. Bergstrand (1989) derives an industry-level gravity model (see [Appendix A5 \[A5.17-A5.25\]](#) for derivation):

$$PX_{ij} = \alpha_0 Y_i^{\alpha_1} (Y_i / L_i)^{\alpha_2} Y_j^{\alpha_3} (Y_j / L_j)^{\alpha_4} D_{ij}^{\alpha_5} A_{ij}^{\beta_3} \xi_{ij} \quad (5.17)$$

where Y_i / L_i and Y_j / L_j are the per capita incomes in i and j , and all other variables are as defined in Equation (5.16).

Bergstrand (1989) estimates Equation (5.17) for 16 industrialised countries and 9 different industries in various years. Key among his findings is that per capita income is a better indicator of supply capabilities than the absolute level of income. Similarly, on the demand side, per capita income gives a better indication of absorptive capacity of imported goods. Both income variables have positive signs. Distance has a negative impact on trade.

5.5.3 *Differences in Factor Endowments*

The model of factor endowments by Heckscher (1919), Ohlin (1933) and Samuelson (1949) uses the relative differences in factor endowments to explain trade (see Chapter 3.2.1). Deardoff (1998) derives various gravity models by applying the HOS approach under two trade scenarios: trade which occurs when there are no frictions and trade which occurs when there are barriers.

In the frictionless case, transport costs and trade barriers are nonexistent. Since goods are identical and there are no transportation costs, producers and consumers are indifferent to the location of the marketplace. Preferences are assumed to be homothetic and identical. This results in the following gravity model:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \quad (5.18)$$

where X_{ij} is the value of goods imported by country j from country i , and Y_w is world income. This is a special case of Equation (5.20), which is derived later.

With arbitrary as opposed to identical preferences, each country spends a different fraction of its income on good k . The gravity model derived from this scenario is:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left(1 + \sum_k \lambda_k \alpha_{ik} \beta_{jk} \right) \quad (5.19)$$

where λ_k is the share of world income spent on k , α_{ik} is the share of country i in production of k and β_{jk} is the share of country j in the consumption of k . Equation (5.19) shows the value of exports when preferences are arbitrary varies around the frictionless trade equilibrium of Equation (5.18).

In the scenario where trade takes place when barriers to trade exist, Deardoff assumes that there are “iceberg” transportation cost (Samuelson, 1954, p.268; 1983, p.1472) (that is, a cost of transporting a good that uses up only some fraction of the good itself, rather than using any other resources; it is based on the idea of floating an iceberg, which is costless except for the amount of the iceberg itself that melts), that there is complete specialisation, and preferences are homothetic and identical across countries. The resulting gravity model of the value of exports to country j from country i is (see [Appendix 6](#) for derivation):

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left(\frac{\rho_{ij}^{1-\sigma}}{\sum_{h=1}^H s_h \rho_{ih}^{1-\sigma}} \right) \quad (5.20)$$

where ρ_{ij} as the relative distance between country i and country j ; σ is the elasticity of substitution; and s_h is country h 's share of world income. The term $\rho_{ij}^{1-\sigma} / \sum_{h=1}^H s_h \rho_{ih}^{1-\sigma}$ estimates the distance between the importer j and exporter i as a ratio to the average distance of all importing countries from exporter i . If the numerator and denominator

are equal, then the relative distance is equal to unity and the gravity model given by Equation (5.20) will be consistent with the gravity model derived from the case of frictionless trade given by Equation (5.18). If the distance between country i and country j is greater (smaller) than the average distance of all importing countries from exporter i , trade between i and j will be less (more) than trade implied by the standard gravity equation (Deardoff, 1998, p.20). The term $\rho_{ij}^{1-\sigma} / \sum_{h=1}^H s_h \rho_{ih}^{1-\sigma}$ also describes a possible *multilateral* trade barrier in the sense that it considers not only the distance between countries i and j relative to the average distance of all importing countries from exporter i , but also considers prices which provide information about each country's market.

Equation (5.20) implies that the higher the elasticity of substitution, the greater the flows between countries closer to each other, and the smaller the flows between countries farther apart. It also implies that a reduction in transportation costs will increase trade flows between distant countries, while countries that are geographically closer will lose some of their advantage due to proximity (Deardoff, 1998, p.20).

Additional derivations of the gravity model were provided by Evenett and Keller (2002). They provide solutions for what they describe as a model identification problem. Evenett and Keller derive gravity models under various assumptions and test them to determine which is most consistent with the trade data. Four specifications are investigated: two under perfect specialisation in production and two under imperfect specialisation. In the first specification, Evenett and Keller assume that two goods are produced, each with n varieties, production takes place under IRS (Helpman and

Krugman (1985) assumption) and complete specialisation will prevail in each variety. Output prices are assumed the same for all varieties. They further assume that preferences are identical and homothetic across countries, that trade is free, and all transaction costs are zero. The resulting gravity model in this world (see [Appendix A7 \[A7.1-A7.4\]](#) for derivations) can be expressed as:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \quad (5.21)$$

where X_{ij} are exports from country i to country j ; Y_i and Y_j are incomes in country i and j respectively; and Y_w is world income. Thus, a simple gravity model is the result. This model allows for intra-industry trade in that countries are trading in different varieties of the same good. Evenett and Keller refer to this gravity model, Equation (5.16), as the “IRS model” (p.284).

In the second specification, Evenett and Keller (2002) derive a gravity model from a multi-cone HOS model with perfect specialisation; that is, a trade equilibrium in which prices are such that all goods cannot be produced within a single country, and instead there are multiple diversification cones. They assume homothetic and identical preferences, and a world with two countries, two factors and two goods. One country is capital-abundant and the other is labour-abundant. The goods are homogenous and produced under constant returns to scale (CRS). One good is relatively capital-intensive in production and the other is relatively labour-intensive in production. Bilateral exports (see [Appendix A7 \[A7.5-A7.10\]](#) for derivations) can thus be expressed as:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \quad (5.22)$$

Equation (5.22), the multi-cone HOS model, is identical to Equation (5.21), the pure IRS model. As transaction costs are zero and geographical distance is not a factor (see [Appendix A7 \[A7.5-A7.10\]](#)), Deardoff (1998) called Equation (5.22) the “simple frictionless gravity equation” (p.15).

Under the third specification, Evenett and Keller (2002) derive a gravity model from an IRS/uni-cone HOS model with incomplete specialisation; that is, a trade equilibrium in which prices are such that all goods can be produced within a single country, and there is only one diversification cone. Factor abundancies are the same as those under the multi-cone HOS model, that is, one country is capital-abundant and the other is labour-abundant. One good is relatively labour-intensive and produced under CRS while the other good is relatively capital-intensive and produced under IRS. As a consequence, the capital-abundant country produces both goods while the labour-abundant country produces only the labour-intensive good. Therefore, only the capital-intensive good is specialised in production. Thus, the gravity model (see [Appendix A7 \[A7.11-A7.14\]](#) for derivations) becomes:

$$X_{ij} = (1 - \gamma_i) \frac{Y_i Y_j}{Y_w} \tag{5.23}$$

where bilateral trade now also depends on the relative size of the capital-intensive sector in country i , $(1 - \gamma_i)$. It is also apparent that the volume of trade indicated by Equation (5.23), derived from the IRS/uni-cone HOS framework, is less than that suggested under the IRS and simple frictionless gravity equations, Equations (5.21) and (5.22) respectively.

The fourth and final specification tested by Evenett and Keller (2002) is based on a uni-cone HOS model with incomplete specialisation in both goods. Both goods are homogenous and produced under CRS; one is capital-intensive and the other labour-intensive. One country is capital-abundant and exports the capital-intensive good and the other is labour-abundant and exports the labour-intensive good. However, both countries produce the other good, that is, there is incomplete specialisation. Evenett and Keller argue that bilateral exports from country i to country j (see [Appendix A7 \[A7.14-A7.15\]](#) for derivations) can be expressed as:

$$X_{ij} = (\gamma_j - \gamma_i) \frac{Y_i Y_j}{Y_w} \quad (5.24)$$

where bilateral trade now also depends on the relative size of the labour-intensive sectors in countries i and j , $(\gamma_j - \gamma_i)$.

By inspection, the four gravity models imply:

$$\frac{Y_i Y_j}{Y_w} > (1 - \gamma_i) \frac{Y_i Y_j}{Y_w} > (\gamma_j - \gamma_i) \frac{Y_i Y_j}{Y_w} \quad (5.25)$$

Equation (5.25) implies the higher the degree of specialisation, the greater the volume of trade (Evenett & Keller, 2002). Using data from 58 countries, Evenett and Keller find evidence supporting gravity models based on the IRS/uni-cone HOS [Equation (5.23)] and the uni-cone HOS [Equation (5.24)] theoretical frameworks, and very marginal support for the IRS [Equation (5.21)] model. The data did not support the multi-cone HOS model [Equation (5.22)] as a theory of the gravity model. Overall, the gravity models derived from imperfect specialisation in production were more

consistent with the data. Evenett and Keller conclude, “models of perfect specialisation do not appear to be important in explaining the success of the gravity equation” (p.297).

5.5.4 Differences in Production Technologies

Ricardian theory assumes that trade between two countries occurs due to comparative advantage. Countries gain a comparative advantage due to differences in production costs or technologies (Krugman et al., 2011).

Eaton and Kortum (2002) derive a gravity model based on a Ricardian model of comparative advantage that arises due to differences in technology. Technology is heterogeneous across countries (which determines their comparative advantage), and labour, the only factor of production, is immobile. Production is CRS, transportation costs, are iceberg and individuals maximise a CES utility function. The price of goods in each country is reflective of the level of technology, cost of inputs and trade barriers. Bilateral trade flows are expressed as:

$$X_{ij} = \frac{\left(\frac{d_{ij}}{p_j}\right)^{-\theta} X_j}{\sum_m^N \left(\frac{d_{im}}{p_m}\right)^{-\theta} X_m} Q_i \quad (5.26)$$

where X_j is the total expenditure of country j on goods; Q_i is exporter i 's total sales;

d_{ij}/p_j is the geographic barrier between i and j deflated by the price level in the

importing country j ; the numerator, $\left(d_{ij}/p_j\right)^{-\theta} X_j$, is the market size of country j as

perceived by country i ; and the denominator, $\sum_m^N \left(d_{ij}/p_j\right)^{-\theta} X_m$, is the total world market

from country i 's perspective.

The sensitivity of trade depends on θ , which demonstrates the degree of comparative advantage. In this model, bilateral trade depends on production costs and distance. The final gravity model derived by Eaton and Kortum is:

$$\ln \frac{X'_{ij}}{X'_{jj}} = S_i - S_j - \theta m_n - \theta d_k - \theta b - \theta l - \theta e_h - \delta_{ij} \quad (5.27)$$

where X'_{ij}/X'_{jj} is a ratio of the imports of country j from country i to the sales of country j to itself (domestic sales); S_i measures the competitiveness of country i ; m_n is an overall destination effect for each country; d_k is the effect of distance between i and j lying in the k th distance interval ($k = 1, \dots, 6$) (see Eaton and Kortum (2002, p.1761) for the range of distance intervals); b is the border effect when i and j share a border; l is the language effect when i and j share a common language; e_h ($h = 1,2$) indicates the effect of i and j when both belong to a common trade area h ; and δ_{ij} captures the error term.

In a study of 19 OECD countries in 1990, Eaton and Kortum find that distance has a negative effect on trade flows at each distance interval, and its impact increases as the distance between two countries increases. The border effect, language and trade area variables all have a positive effect on trade flows while the destination effect and competitiveness indicators vary in sign depending on the pair of countries that trade.

5.5.5 Multilateral Resistance

In a seminal study, McCallum (1995) finds that trade is greater within a country than between countries. This tendency is coined the *border puzzle* since countries' borders appear to be a barrier to trade flows, even if the countries are culturally and

economically similar (McCallum, 1995, p.615). Anderson and van Wincoop (2003, p.170) develop the concept of “multilateral resistance” to provide a solution to the border puzzle. They demonstrate that trade resistance between two countries consists not only of the bilateral trade barriers and resistance between two countries, i and j , but also incorporates country i 's resistance in relation to the rest of the world, and country j 's resistance in relation to the rest of the world (Anderson & van Wincoop, 2003). These two factors are the so-called “multilateral resistance”.

Anderson and van Wincoop (2003) assume that each country specialises in the production of one good according to the Armington assumption, and that preferences are identical and homothetic across countries and follow a CES utility function.

Anderson and van Wincoop solve a general equilibrium problem (see [Appendix A8](#) for derivation), which yields a gravity equation:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left(\frac{t_{ij}}{P_i P_j} \right)^{1-\sigma} \quad (5.28)$$

where P_i and P_j are a price indices in country i and country j ; and t_{ij} is the transaction cost of trade between i and j . Equation (5.28) depends not only on bilateral trade resistance factors, but also on the trade resistance with respect to all trading partners through the P_i and P_j terms. Equation (5.26) is referred to as the structural gravity equation (Anderson & van Wincoop, 2003, p.180).

Therefore, inclusion of the composite price indices P_i and P_j in gravity equations is not optional, but a necessary condition of consistent estimation (Anderson & van Wincoop, 2003). If multilateral resistance in country i increases relative to the trade resistance

with country j , it means that the relative price of imports from j will decrease. As a consequence, the increase of multilateral resistance may increase bilateral trade.

Relatively recent studies, taking into account recommendations by Polak (1996), Deardoff (1998), and Anderson and van Wincoop (2003), utilise relative distance or remoteness measures. Remoteness is most commonly measured by the average geographic distance of a country to all its trading partners weighted by their respective GDP shares of world GDP (Melitz, 2007):

$$Remoteness_{it} = \sum_{j \neq i} d_{ij} \left(\frac{Y_{jt}}{Y_{wt}} \right) \quad (5.29)$$

where Y_w is aggregate world GDP in time period t . Another remoteness measure is the average of distance of a country from all of the rest (Melitz, 2007):

$$Remoteness_{it} = \frac{\sum_j d_{ij}}{J-1} \quad (5.30)$$

where J is the number of countries in the world.

An important question is why would remoteness of a country matter? A country that is located relatively remotely with respect to its trade partners will engage in more intensive trade with a country that is relatively close than would a country that is less remote in a relative sense (Frankel et al., 1997). Remoteness should have a positive impact on bilateral exports after controlling for bilateral distances and other factors (Polak, 1996); that is, the more remote a pair of countries is from the rest of the world, the lower are the costs of trading with each other, in which case, remoteness increases trade flows of partners within regional blocs (Frankel et al., 1997).

Previous studies have used the remoteness framework with some degree of success, for example, DiMauro (2000), Frankel, Stein and Wei (1997), Helliwell (1997), Polak (1996), and Soloaga and Winters (2001). However, either measure of remoteness, Equations (5.29) and (5.30), is considered inadequate in controlling for multilateral resistance (Anderson, 2011).

An alternative to modelling multilateral resistance is to use national price indices as controls in the model, on the assumption that the greater the multilateral resistance for a country, the higher its prices will be (Baier & Bergstrand, 2001). This second approach can be problematic if price levels are endogenous to trade flows (Feenstra, 2003). The use of country fixed effects is another method for modelling multilateral resistance (Eaton & Kortum, 2002; Rose & van Wincoop, 2001). This method is advantageous for cross-sectional data sets; it allows for estimation by OLS and specifications that do not require lots of data. However, the use of fixed effects estimation on panel data needs to be carefully considered; importer and exporter fixed effects should vary with time. With very large datasets, this can lead to computational issues.

5.5.6 Synopsis of Theoretical Foundations

Section 5.5 described the theoretical foundation of the gravity model under various assumptions. The assumptions and interpretation are shown in Table 5.1.

Table 5.1: Summary of Various Assumptions used to Derive Gravity Model

Model	Assumptions
Anderson (1979)	Differentiated products, homothetic preferences
<i>Helpman and Krugman (1985) Model:</i> Helpman (1987); Bergstrand (1985; 1989)	Monopolistic competition, differentiated products, increasing returns to scale, homothetic preferences
<i>HOS model:</i> Deardoff (1998); Evenett and Keller (2002)	Differences in factor endowments, differentiated products, homothetic preferences
<i>Ricardian Model:</i> Eaton and Kortum (2002)	Differences in production technology, homothetic preferences
Anderson and van Wincoop (2003)	Differentiated products, constant returns to scale, homothetic preferences

Source: Present author

Table 5.1 demonstrates that the gravity model can be theoretically derived from differing assumptions about the underlying economic structure of a country or industry. These assumptions can also be classified under either microeconomic or macroeconomic perspectives. The plausibility of multiple factors lends added credibility to the gravity equation. The various theoretical underpinnings of the gravity equation are what permit the approach its augmentative flexibility and use in many different empirical applications as a consequence.

5.6 Problems in the Application of Gravity Models

This section reviews some basic questions and problems concerning the application of gravity models. Even if these are normally given relatively little attention, they should not be disregarded.

5.6.1 The Functional Form

All empirical studies assume a log-linear functional form for gravity equations. The main reason is the convenience of the form:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln D_{ij} + \dots + u_{ijt} \quad (5.31)$$

This functional form is criticised by Sanso, Cuairan and Sanz (1993) who instead apply a Box-Cox transformation in order to test whether such a log-linear form is applicable at all. As is well known, the Box-Cox transformation (Box & Cox, 1964) assumes that for any variable X it is true that:

$$X^\lambda = \begin{cases} \frac{X^\lambda - 1}{\lambda} & \text{for } \lambda \neq 0 \\ \ln X & \text{for } \lambda = 0 \end{cases} \quad (5.32)$$

So it is possible to rewrite Equation (5.31) more generally as:

$$X_{ijt}^{\lambda_0} = \beta_0 + \beta_1 Y_{ijt}^{\lambda_1} + \beta_2 Y_{ijt}^{\lambda_2} + \beta_3 D_{ij}^{\lambda_3} + \dots + v_{ijt} \quad (5.33)$$

The log-linear form is a special case of Equation (5.33) when all $\lambda = 0$. If the latter is not the case, the data has to be transformed using the lambdas and only then is it possible to estimate the original form.

Sanso, Cuairan and Sanz (1993) reject the hypothesis that all lambdas are equal to zero, implying that the log-linear form is not always valid. Still, the Box-Cox transformation is not popular, as it is inconvenient and time-consuming to undertake. Indeed, even Sanso, Cuairan and Sanz note that the log-linear form of the gravity model, while not optimal, is a “fair and ready approximation to the optimal form” (Sanso et al., 1993, p.274).

5.6.2 *Interpretation of the Geographical Distance Coefficient*

Even though geographical distance is generally used as a proxy for transport costs, interpreting the distance coefficient is another problematic issue. Many researchers expect that transaction costs, including the cost of transport, have decreased in recent decades (Cairncross, 1997; Coombes et al., 2008), the so-called “death of distance” (Cairncross, 1997, p.209). Still, in empirical attempts to justify this hypothesis, the impact of distance appears to increase rather than decrease (Frankel et al., 1997). This “contradictory” behaviour of the geographical distance coefficient (Frankel et al., 1997, p.60) has become a focal point for several studies. Three basic explanations for this unexpected tendency have been advanced.

The first explanation argues that important variables are absent from empirical gravity models, which causes a biased estimation of the parameters (Brun et al., 2005). Work by Brun et al. (2005) using the traditional gravity model of trade, shows the distance coefficient increases rather than decreases over time. The inclusion of additional variables yields a decline in the estimate of the distance elasticity by 11 percent. However, this “death of distance” was confined to bilateral trade between rich countries only. This result suggests that omitted variables are not the sole source of the contradiction. It also draws attention to the view that further improvements of the gravity model are possible and necessary.

The second explanation notes that the log-linear functional form of the gravity model does not make it possible to directly interpret the distance coefficient as the impact of transport costs on trade flows (Frankel et al., 1997). In a log-linear model, the coefficients of continuous variables can be treated as *ceteris paribus* constant

elasticities. If the coefficient of geographical distance is found to be significant and negative, it only means that if the distance is 1 percent larger between two countries, bilateral flows are reduced by β_3 percent (see Equation 5.31), provided all other regressors are fixed. If this elasticity increases in absolute terms, it is not necessarily the case that average transport costs between trade partners have increased. If one accepts Frankel's argument, which is quite convincing, one should not use the geographical distance coefficients from a log-linear model at all for drawing conclusions about average transport costs. Further, it is also possible to hypothesise situations when average costs decrease, while marginal costs (and the coefficient of geographical distance) increase.

As indicated previously, when multilateral resistance terms are excluded in traditional gravity modelling, omitted variable bias arises. Country fixed effects estimation can take account of these terms and other omitted variables (Eaton & Kortum, 2002; Rose & van Wincoop, 2001). However, the greater the number of countries being investigated, the greater is the loss in degrees of freedom (Anderson, 2011, p.151).

Introduction of multilateral resistance is also a concern, because of the inability to observe multilateral resistance terms. Anderson and van Wincoop (2003) argue that generally, typically computed price indices are not truly representative of consumer price levels, because non-tradable goods also have an effect on consumer prices.

5.7 Applications of the Gravity Framework

In recent times, the application of gravity-based models in modelling tourist flows has attracted increasing attention. This stems mainly from its solid theoretical foundations, its flexibility, which allows it to be augmented with additional factors, and its excellent empirical performance in explaining various types of economic flows. Despite its increasing usage, very few studies exist in the literature.

5.7.1 Gravity Models of Tourist Flows

The earliest empirical work examining tourist flows using a gravity model was conducted by Crampon (1966) to predict the number of out-of-state visitors to 46 domestic destinations in the USA using data from 1958. He expresses his gravity equation as:

$$V_{od} = b_1 P_o T_{od}^{b_3} = b_2 V_d T_{od}^{b_3} \quad (5.34)$$

where V_{od} is the number of visitors from a given origin, o , to destination, d ; P_o is the population of o ; T_{od} is the travel distance between o and d ; V_d is the total number of visitors to d from all origins; and b_1 , b_2 , and b_3 are constants to be computed. The model is deterministic such that: $b_1 = V_{od} / P_o$ when $T_{od} = 1$; $b_2 = b_1 / V_d$ and b_3 represents the slope of the exponential curve (a negative value for b_3 indicates that distance limits the number of visitors from a given market).

The accuracy of the model was measured in terms of the variance between the estimated and observed number of visitors from the various markets to each destination area. In addition, the impact of several socioeconomic variables on out-of-state arrivals were also evaluated, using only Utah as the destination: per capita personal income,

automobile ownership rate, median number of years of school completed, percentage of population over 65 years of age, percentage of the population who were Caucasian, percentage of residents who had lived in another county 5 years prior to the study, and percentage of population from urban areas.

Crampon finds that income and age are significantly correlated with the number of visitors from each origin to Utah. The impact of advertising was also evaluated, using Colorado as the destination. This variable did not appear to perform significantly, but Crampon suggests that it should not be ignored. Unfortunately, Crampon did not provide the values of the constants in his gravity equation, the correlation coefficients for each market, or the variances between his estimates and the observed values, so one is left to wonder about the overall performance of his gravity equation. Nevertheless, Crampon concludes that a gravity model that considers only the population of a market and the distance between the market and destination is problematic.

Another early work was undertaken by Alcaly (1967) who also estimated a gravity model for travel within the USA, focussing on travel between cities in California using different modes of travel (air, rail, automobile), using a model similar to that of Equation (5.2) expressed in logarithms. The population variables were significant in all specifications; and geographic distance was significant for all modes of travel except by air. When tourist flows by all modes in aggregate is considered, Alcaly observes that the gravity model performs better than when the flows were considered by individual mode, lending support to his assumption that aggregation over modes would eliminate some of the peculiar characteristics of travel behaviour which manifest themselves in individual modes of travel.

Glejser and Dramais (1969) was another pioneering work in gravity model estimation of tourist flows. The authors investigate international tourist flows from 12 “rich” countries to 7 Mediterranean countries on a cross-sectional basis for each of 5 years (Glejser & Dramais, 1969, p.447). The gravity model employed was also similar to Equation (5.2), but augmented by the cost of airfare between origins and destinations, and dummy variables for: a common border between origin and destination to test for possibly lower travel costs; if origin is from North America (USA or Canada) to test for the effect of family links and higher price levels; and if the destination is Portugal, Spain, Italy, Greece, Turkey or Lebanon to, “account for the effects on the flow of the price levels in the country of destination” and their “attractiveness” (Glejser & Dramais, 1969, p.448).

Among Glejser and Dramais’ findings is that a common border increases tourist flows, and geographic distance is a significant deterrent. Significantly, they conclude that geographic distance is not merely a proxy for travel cost, but also reflects “sociological differences”, such as language and food (which can be interpreted as cultural distance), and “discrepancies in information in tourism” (Glejser & Dramais, 1969, p.447), although they did not elaborate on the latter. Notably, as far back as 1969, geographic distance was used to represent not only the costs of travel, but also other factors that are not directly observable, a point also made by Crouch (1994b) and McKercher (2008a).

After these initial early works, there is a virtual lull in gravity applications in studies of tourist flows until 2007, when such research increases somewhat markedly. Table 5.2 presents a summary of the results from these studies.

Table 5.2: A Summary of Empirical Research on Tourist Flows using Gravity Models

Authors	Purpose of Study	Origin(s) to Destinations	Period	Dependent Variable	Independent Variables	Method of Estimation	Empirical Results
Gil-Pareja, Llorca-Vivero and Martinez-Serrano (2007a)	To estimate the impact of embassies and consulates on international tourist flows	From G-7 countries (Canada, France, Germany, Italy, Japan, UK and USA) to 156 destinations	2001-2003	Average annual number of tourist arrivals for the period	Population sizes of origin and destination; real GDP per capita of origin and destination; geographic distance (great circle distance between capital cities of origin and destination); tourism price (relative purchasing power parity between origin and destination); number of embassies and consulates that origin has in destination; dummy variables: if origin and destination are members of the same free trade agreement, if origin and destination share a common language, if origin and destination share a common border, if destination is a landlocked country, and the number of island nations in origin-destination pair (0, 1, 2)	OLS, panel fixed effects (destination only, and in origin and destination simultaneously)	Embassies and consulates increase tourist flows to 156 destinations from G-7 countries by 30%. The increase for flows to developing countries only is 40%.
Gil-Pareja, Llorca-Vivero and Martinez-Serrano (2007b)	To analyse the effect of the euro on intra-EMU tourist flows	From 20 OECD countries to EMU countries (Austria, Belgium-Luxembourg, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain)	1995-2002	Annual number of tourist arrivals	Population sizes of origin and destination; real GDP per capita of origin and destination; geographic distance (great circle distance between capital cities of origin and destination); tourism price (relative purchasing power parity between origin and destination); competitiveness (monthly exchange rate volatility between origin and destination); dummy variables: if origin and destination are members of the same free trade agreement, if origin and destination share a common language, if origin and destination share a common border, the number of island nations in origin-destination pair (0, 1, 2), and if origin and destination belong to the EMU	Panel fixed effects	The euro has a positive and statistically significant effect on tourism in the EMU. The euro's effect increases tourist flows to EMU countries by 6.3%.
Durbarry	To analyse the impact of	From 11 countries	1968-1998	Annual	Real GDP per capita of origin and destination	Panel fixed	International tourist flows to the

(2008)	hypothetical tourism taxes on inbound tourism demand for UK	(Australia, Belgium, France, Germany, Republic of Ireland, Italy, Japan, Netherlands, Spain, Switzerland, USA) to the UK	number of tourist arrivals	destination (product of the two income variables also used as an alternative); real effective tourism prices in destination and competing destinations (exchange rate adjusted relative CPIs); dummy variables for: if origin is European, and if origin and destination share a common language	effects and random effects	UK are highly sensitive to changes in price (taxes).
Llorca-Vivero (2008)	To analyse the impact of terrorism on international tourist flows	From G-7 countries (Canada, France, Germany, Italy, Japan, UK and USA) to 134 destinations	Average annual number of tourist arrivals for the period	Population sizes of origin and destination; real GDP per capita of origin and destination; geographic distance (great circle distance between capital cities of origin and destination); tourism price (relative purchasing power parity between origin and destination); various terrorism activity variables (e.g., average number of terrorist incidents, average number of terrorist victims, average number of domestic terrorist incidents, average number of international terrorist incidents); number of embassies and consulates that origin has in destination; index of political rights; geography (elevation above sea level, distance from equator, distance to the nearest coastline or sea-navigable river, distance to nearest inland navigable river, percentage of land area in geographical tropics); dummy variables: if origin and destination are members of the same free trade agreement, if origin and destination share a common language, if origin and destination share a common border, the number of island nations in origin-destination pair (0, 1, 2)	OLS, panel fixed effects (destination only, and in origin and destination simultaneously)	Both domestic and international terrorism have a moderate but significant negative influence on tourist flows. Domestic victims and international terrorist events are the most robust measures of terrorist activity. The cost of terrorist actions in terms of tourist arrivals is higher in developing countries.
Khadaroo and Seetanah	To evaluate the importance of transport infrastructure in	Tourist flows among 28 countries: Australia, Austria,	Annual tourist arrivals	Population of origin only; real GDP per capita of origin and destination; geographic distance	Dynamic panel estimation using	Transportation infrastructure has a significant positive impact on tourist flows. This significance is

(2008)	determining the attractiveness of tourism destinations	Brazil, Canada, China, Egypt, France, Germany, Greece, Hong Kong, India, Italia, Jamaica, Japan, Kenya, Malaysia, Mauritius, Maroc, Nigeria, Poland, Singapore, South Africa, Spain, Switzerland, Tunisia, Thailand, UK and USA	1995-2004	Annual tourist arrivals	between capital cities of origin and destination; tourism price (CPI of destination adjusted by USD exchange rate); number of hotel rooms in destination; tourist arrivals lagged one period; transport infrastructure variables (length of paved roads in destination as a ratio to size of destination country, number of terminals in international airports in destination, and number of seaports in destination); dummy variables: if countries share a common language, if countries share a common border, if destination has a number of nearby alternative destinations	Arellano-Bond differences GMM estimator	more profound for travel to African and Asian destinations. African tourists are not sensitive to the availability of such infrastructure.
Santana-Gallego, Ledesma-Rodriguez and Perez-Rodriguez (2010)	To analyse the effect of exchange rate arrangements on international tourism	From OECD countries (excluding Slovakia) to 113 countries (including OECD countries)	1995-2004	Annual tourist arrivals	Population sizes of origin and destination; real GDP per capita of origin and destination; geographic distance (great circle distance between capital cities of origin and destination); real bilateral trade between origin and destination; competitiveness (real exchange rate between origin and destination); dummy variables: if origin and destination share a common language, if origin and destination share a common border, the number of landlocked nations in origin-destination pair (0, 1, 2), the number of island nations in origin-destination pair (0, 1, 2), if there was a colonial relationship between origin and destination, if origin and destination share a common currency, if origin and destination are members of a currency board, if either origin or destination currency is pegged to the other currency in the pair, if either the other currency in the pair with a clear trend to depreciation, if both origin and pair present	OLS, two-stage least squares fixed effects, two-stage least squares random effects	Currency union has a positive effect on international tourist flows of approximately 12%. Other intermediate exchange rate regimes, between completely fixed and completely flexible, increase tourist arrivals. The less flexible the exchange regime is, the greater the impact on tourism.

managed floating regimes

Keum (2010)	To assess whether the gravity model and Linder's (1961) income similarity hypothesis can explain international tourist flows	Bilateral tourist flows between South Korea and 28 countries (not stated)	1990-2002	Annual bilateral tourist arrivals	Real GDP of origin and destination; geographic distance (nautical miles between capital cities of origin and destination); proxy for Linder's (the square of the difference between real GDP per capita in origin and real GDP per capita in destination)	Panel two-way random effects	The gravity model performs well in explaining international tourist flows to and from South Korea. Geographic distance has the greatest impact on tourist flows. Linder's hypothesis had no impact on international tourist flows in South Korea.
Eryigit, Kotil and Eryigit (2010)	To analyse the factors affecting tourist flows to Turkey	From 11 countries (Austria, CIS, France, Germany, Greece, Holland, Iran, Israel, Italy, UK and USA) to Turkey	1994-2005	Annual tourist arrivals	Product of populations in origin and destination; product of real GDP per capita in origin and destination; tourism climate index (ratio of climate indices in destination to origin); bilateral trade volume between origin and destination; real effective tourism price in destination (exchange rate adjusted relative CPIs); geographic distance between capital cities of origin and destination; dummy variables for: 1999 earthquake in Turkey, the September 11 terrorist attacks, the start of the Iraq war in 2003, and the "neighbour effect"	Panel random effects GLS	The distance and the earthquake dummies are found to be detrimental to tourist flows, while bilateral trade volumes and tourism climate index have positive effects. Tourism prices are insignificant.
Sectanah, Durberry and Ragodoo (2010)	To analyse the determinants of inbound tourism demand for South Africa	From 38 countries (Angola, Argentina, Australia, Austria, Belgium, Botswana, Brazil, Canada, China, Congo (DRC), Egypt, France, Germany, Hong Kong, India, Italy, Israel, Japan, Kenya, Lesotho, Malawi, Malaysia, Mauritius, Mozambique, Namibia, Netherlands, Nigeria, Poland, Singapore, Spain, Swaziland, Sweden, Switzerland,	1985-2000	Annual tourist arrivals	Real GDP per capita of origin and destination; geographic distance between origin and destination; tourism price in destination and competing destinations (CPI of destination and competing destinations adjusted by USD exchange rate); number of rooms in destination; dummy variables for: if origin and destination share a common <i>first</i> language, if origin and destination share a common border, political instability (years before 1994)	Panel cointegration, FMOLS	Tourist flows to South Africa are price inelastic, except for flows from Asian countries. However, overall, price elasticity is close to unity. Competing destinations affect tourist arrivals marginally in South Africa. Tourist flows are highly sensitive to income. Geographic distance has a negative impact on its tourist arrivals. There is a significant border effect on tourist flows. The overturn of the apartheid regime increased arrivals to South Africa.

<p>Yang, Lin, and Han (2010)</p>	<p>To analyse the determinants of international tourist flows to China, with a special focus on World Heritage Sites</p>	<p>From 9 countries (Australia, Canada, France, Germany, Italy, Japan, Singapore, UK, USA) to 26 provinces in China</p>	<p>2000-2005</p>	<p>Annual overnight stays from tourist arrivals</p>	<p>Population of origin; relative per capita GDP of origin to destination province; exchange rate (ratio of foreign currency to Chinese Yuan); number of one-star-or-more international hotels in destination province; level of infrastructure (sum of operated railways and roads in destination province measured in kilometres); crime lagged one period (number of criminal cases defended per year in destination province); sanitary conditions (number of hospital beds in destination province); business tourists from origin (proxied by foreign direct investment from origin); number of world heritage sites in destination province; number of 3A or 4A sites excluding world heritage sites; linear time trend; dummy variables: SARS (year 2003), destination province where Beijing international airport is located, destination province where Shanghai international airport is located, destination province where Guangzhou international airport is located, if destination province has historical and cultural sites, if destination province has natural landscape sites, and if destination province possesses modern facilities</p>	<p>Panel fixed effects, pooled OLS</p>	<p>The empirical results show that the core variables of relative income, the population of countries of origin, and geographical distance are significant factors in foreign tourism. Tourism infrastructure, such as roads, railways and number of hotels are also important determinants of international tourist flows to China. Crime and sanitary conditions have some impact but are not as relevant. World Heritage Sites and 3/4A-class spots explain international tourist flows; World Heritage sites are more important than 3/4A-class spots in attracting international tourist arrivals. Cultural World Heritage Sites have a stronger impact on tourist arrivals than natural heritage sites. Modern facilities have a minor effect on international tourist flows to China. European and North American tourists are more sensitive to the impact of crime and level of sanitary conditions.</p>
<p>Fourie and Santiana-Gallego (2011)</p>	<p>To analyse the impact of sporting mega-events on international tourist arrivals</p>	<p>From 200 origin countries to 169 destination countries</p>	<p>1995-2006</p>	<p>Annual tourist arrivals</p>	<p>Populations of origin and destination; real GDP per capita in origin and destination; tourism price (relative purchasing power parity between origin and destination); geographic distance (great circle distance between capital cities of origin and destination); real bilateral trade</p>	<p>OLS</p>	<p>Sporting mega-events increase international tourist arrivals by 8 percent in the year of the event. The Summer Olympics, FIFA World Cup and to a lesser extent the Cricket World Cup and Lions Tour have a positive impact on arrivals, while the Winter Olympics and Rugby World Cup</p>

do not. Arrivals from countries participating in the event are higher than from those not participating. Events held during peak season crowd out tourist arrivals while events held during off-season increase arrivals. Countries which bid for the event and lost also benefit from the event, although the effect is lower than for those who won. Other significant variables are trade, real GDP per capita for origin and destination, population of origin, geographic distance, relative purchasing power parity, border effect, common language, colonial ties, and currency union.

(sum of exports and imports between origin and destination); dummy variables: if origin and destination share a common language, if origin and destination share a common border, if there was a colonial relationship between origin and destination, if origin and destination are members of a currency union, mega-events (Summer Olympic Games, Winter Olympic Games, FIFA World Cup, Cricket World Cup, Rugby World Cup, Lions Tour), legacy effects (time dummies for 3 years before, 3 years after and year of event), if origin country is participating in event, if event occurs in tourism peak season (summer), for host and candidate countries for a particular event in the year the event occurred

Chang and Lai (2011)	To investigate the determinants of bilateral tourist and tourism service trade	Tourist flows among 36 countries among the European, Asian and North American markets	2000-2005	Annual bilateral tourist arrivals	Population of origin and destination; GDP per capita in origin and destination; real exchange rate (exchange rate adjusted relative CPIs); geographic distance between capital cities of origin and destination; unemployment rate of origin; exports of origin; infrastructure index for destination; remoteness (Frankel, Stein and Wei (1997) measure; dummy variables: if origin and destination share a common language, if origin and destination share a common border, if origin and destination were colonies after 1945 with same coloniser, if origin and destination are members of the same regional trade association or trade agreement	Hausman and Taylor (1981) model, panel fixed effects, panel random effects	From the perspective of a global-wide analysis, economic size has significant positive effects on international tourist flows. The disaggregated continent-wide case shows that the home market effect exists in the Asian and European regions in regard to European and North American tourist arrivals, respectively. Real exchange rate appreciation in the destination leads to a decrease in international tourist arrivals. The home countries' travel services exports are inelastic to the appreciation of their own currencies. Asian arrivals to North America are negatively affected by geographical distance. Increased unemployment rates in Asia and Europe reduce tourist flows to North America. Increased exports in goods of origin has significantly positive effects for all pairs of regions apart from the Europe-
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North America and North America—Europe pairs of regions. Common borders and membership of regional trade agreements contribute significantly to Asian tourism service exports, but joint memberships of regional trade agreements have significantly negative impacts on arrivals to Europe and North America.

Cultural proximity between the country of origin and USA has a positive effect on tourist flows to the USA. Tourists from countries with the same language (English) and the same high governance rankings as the USA have a higher demand for travelling to the USA than people from other countries.

Pooled OLS

Real GDP in origin and destination; geographical distance between capital cities of origin and destination; tourism price (purchasing power parity conversion factor between origin and destination); climate difference (distance of country of origin to the equator in degrees of latitude); country size (square km); governance indicators for: corruption, government effectiveness, political stability, regulatory quality, rule of law, voice and accountability; dummy variables: if origin and destination share a common border (Canada and Mexico), geographical insularity (if origin is an island); fewer travel formalities (if origin is a participant in the USA Visa Waiver Programme plus Bermuda, Canada, Guam, Mexico, Puerto Rico, US Virgin Islands); cultural similarity dummies: religious preferences (if 60% or more of the origin population is Muslim, Christian, OTHER), strong religious fragmentation and competition (at least two religions are each 20% or more of the origin population), if 50 percent of the origin population or greater speaks English or English is the official language

Cultural distance has a significant

FGLS

GDP index; Chinese immigrant

Annual

1980-2007

From 18 countries

To investigate the

Yang and

Wong (2012)	influence of cultural distance on inbound tourism flows to China	(Australia, Canada, France, Germany, Italy, India, Indonesia, Japan, Korea, Philippines, Malaysia, Netherlands, New Zealand, Singapore, Sweden, Thailand, UK and USA) to China	tourist arrivals	population in origin; geographical distance; cultural distance (Kogut and Singh (1988) measure; uncertainty avoidance (Hofstede (1980) measure); real effective tourism prices in destination and competing destinations (exchange rate adjusted relative CPIs); dummies for each year	negative effect on inbound tourist flows to China. Uncertainty avoidance has a moderating effect on cultural distance. There are differences in impacts of cultural and geographical distances between Western and Eastern countries of tourist origin. There is a U-shaped distance decay effect on China inbound tourist flows.
Massidda and Eizo (2012)	To investigate the main determinants of Italian domestic tourism demand	Tourist flows among 20 Italian regions (Abruzzo, Basilicata, Calabria, Campania, Emilia Romagna, Friuli Venezia Giulia, Latium, Liguria, Lombardy, Marche, Molise, Piedmont, Apulia, Sardinia, Sicily, Tuscany, Trentino Alto Adige, Umbria, Veneto, Val d'Aosta)	Annual tourist arrivals	Population density of origin and destination; real GDP per capita of destination; tourism price (ratio of destination CPI to origin CPI); tourist arrivals lagged one period; outbound tourism (number of resident travellers in origin who made an international trip); relative endowment of touristic places index (ratio of destination total national endowment); public expenditure of destination on cultural activities and events; public expenditure on promoting destination (ratio between paying and non-paying visitors to museums); infrastructure (number of kilometres of highway); crime (ratio of minor crime to total crime); pollution (CO ₂ emissions in metric tonnes)	Domestic tourist flows in Italy are responsive to differences in relative prices between their region and other regions. Per capita GDP in the origin plays a significant role as well. Habit formation and environmental quality are also key factors. For Italian tourists, domestic destinations and international destinations act as substitutable goods. Local governments support to culture activities has a positive impact on domestic tourist arrivals. Tourist flows from the Southern regions are more responsive to per capita GDP changes while tourist flows Northern tourists are more sensitive to price differentials. Only tourists from the Southern regions are influenced by the environmental quality of their destinations, whilst the promotion and support of cultural activities turned out to be particularly attractive for tourists from Northern regions.
Fourie and Santiana-Gallego (2013a)	To investigate whether ethnic reunion (propensity to travel to ancestors originate) and cultural affinity (propensity to travel to regions that share some cultural similarities)	Tourist flows among 159 countries	Annual bilateral tourist arrivals	Population sizes of origin and destination; real GDP per capita of origin and destination; geographic distance; competitiveness (relative nominal exchange rate of origin to destination); cultural affinity (proportion of the ancestors in 1500 of the origin that were living	Dynamic panel estimation using Arellano-Bover systems GMM estimator Individual country fixed-effects OLS

are significant causes of tourism patterns at the global level

in the destination); ethnic reunion (proportion of the ancestors in 1500 of the destination that were living in the origin); dummy variables: if origin and destination are members of the same free trade agreement, if origin and destination share a common language, if origin and destination share a common border, if origin and destination had common colonisers after 1945, if origin and destination have ever had a colonial relationship, the number of landlocked nations in the origin-destination pair (0, 1, 2), the number of island nations in origin-destination pair (0, 1, 2), if origin and destination share a common currency

Europe and Asia, but a negative impact on tourist flows from America.

Fourie and Santana-Gallego (2013b)	To identify the determinants of international inbound and within Africa tourist flows to Africa	Tourist flows among 175 countries, of which 43 are African countries	1995-2008	Annual bilateral tourist arrivals	Real GDP per capita of origin and destination; geographical distance between origin and destination; share of capital investment in destination tourism sector in total capital investment; bilateral trade (exports plus imports between origin and destination); tourism price (relative purchasing power parity between origin and destination); tourist arrivals lagged one period; land area of destination country; length of coastline of destination; average annual temperature of destination; political stability index; life expectancy index; dummy variables: if origin and destination are members of the same free trade agreement, if origin and destination share a common language, if origin and destination share a common border, if origin and destination have ever had a colonial relationship, if origin and destination share a common currency, if origin and destination practice the same religion	Panel fixed effects OLS for static model and dynamic panel estimation using Arellano-Bover systems GMM estimator	Repeat tourism, income, distance, land area and the various dummies are significant determinants of global and OECD tourist flows. There is no significant difference between international Africa-inbound and within-Africa tourist flows.
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Balli, Balli and Cebeci (2013)	To analyse the impact of exported Turkish soap operas and visa-free entry on inbound tourism to Turkey	From 81 countries to Turkey	1995-2010	Annual tourist arrivals	predominately (60% or more) Population size of origin; real GDP per capita of origin; geographical distance between capital cities of origin and destination; tourism price (USD exchange rate adjusted CPI of destination); real bilateral trade (exports plus imports between origin and destination); number of hotel rooms in destination; number of hours of Turkish soap operas exported to origin from destination lagged one period; visa-free entry to destination (dummy variable); dummy variables: if origin and destination share a common language, if origin and destination share a common border, if origin and destination have ever had a colonial link, if origin and destination practice the same religion predominately	Pooled OLS and dynamic panel estimation using Arellano-Bond differences GMM estimator	Soap opera exports have a positive influence on the number of inbound tourists. The visa-waiving policies have also increased arrivals to Turkey.
Marroucu and Paci (2013)	To examine the combined effects of demand and supply on domestic tourist flows in Italy	Tourist flows among 107 Italian provinces	2009	Bilateral tourist flows	Population densities of origin and destination; real GDP of origin and destination; geographical distance between origin and destination province; tourism price (relative price indices and average cost of a meal); accessibility (by road, train, air and time to market: 1 = low to 5 = high accessibility); number of direct destinations; natural environment (number of protected natural areas; size of protected natural areas); cultural attractions (number of museum visitors; number of museums); recreational attractions (number of top class restaurants); coast (share of coastal municipalities); beach quality (number of beaches with certificate of quality)	OLS	All variables with the exceptions of population densities and geographic distance have positive effects on tourist flows. Population densities and geographic distance have negative effects.

Zhang and Findlay (2014)	To examine the impact of aviation policy on tourist flows in the Asia-Pacific region	Tourist flows among Australia, Bangladesh, Brunei, China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Maldives, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Vietnam	2011	Bilateral tourist flows	Real GDP of origin and destination; geographical distance between origin and destination; aviation indices; remoteness of origin and destination; land area of origin and destination; dummy variables: if origin and destination share a common language, if origin and destination share a common border, if there is a low cost carrier between two countries	Not stated	Restrictive aviation policies have a substantial negative impact on bilateral tourist flows.
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Source: Present author

Although not stated in Table 5.2, each paper employs the traditional gravity model of trade by Tinbergen (1962), Pöyhönen (1963a; 1963b) and Linnemann (1966). Another key point in relation to examination of tourist flows is that beyond the conventional gravity variables, such as income, population and geographical distance, several of the studies in Table 5.2 include variables commonly seen in international trade studies, such as sharing a common language, adjacency, colonial relationships, common membership of regional trade agreements, the number of islands or landlocked countries respectively in the origin-destination, or sharing a common currency. In this regard, each study implicitly assumes that gravitational variables designed to explain trade flows are also applicable for explaining tourist flows.

It is noticeable that with the exceptions of Eryigit, Kotil and Eryigit (2010), Seetanah, Durbarry and Ragodoo (2010), and Chang and Lai (2011), the focus of most studies is not the traditional determinants of tourist flows, such as prices and income, even though either all or a subset of these variables are specified. Additionally, even though the gravity model is the framework of analysis, there is also a noticeable lack of interest in the gravity variables, population and geographical distance. Nonetheless, the range of issues investigated demonstrates the ability of the gravity model to consider factors of tourist flows, which neoclassical demand models cannot.

Of the studies reviewed in Table 5.2, only Vietze (2012), Yang and Wong (2012), Balli, Balli and Cebeci (2013), and Fourie and Santana-Gallego (2013a; 2013b) explicitly consider the impact of cultural distance/proximity on tourist flows. Other distance variables in common among the studies are typically found in international trade studies; dummy variables for: sharing a common language, having a past colonial relationship,

the sharing of a common border, if one or both of the origin-destination pair are landlocked, or if one or both of the origin-destination pair are islands. These variables though were given scant attention in the analyses.

Tourism push and pull factors such as: climate (Eryigit et al., 2010; Massidda & Etzo, 2012; Vietze, 2012), level of criminal and terrorist activity (Llorca-Vivero, 2008; Massidda & Etzo, 2012; Yang et al., 2010), infrastructure (Balli et al., 2013; Khadaroo & Seetanah, 2008; Massidda & Etzo, 2012; Seetanah et al., 2010; Yang et al., 2010), attractions and events (Fourie & Santana-Gallego, 2011; Massidda & Etzo, 2012; Yang et al., 2010), visa-free travel (Balli et al., 2013; Vietze, 2012), and bilateral trade (Balli et al., 2013; Eryigit et al., 2010; Fourie & Santana-Gallego, 2011; Santana-Gallego et al., 2010), are the other broad categories of determinants considered.

In relation to the mass variables in the basic gravity framework, several authors exclude either the origin and/or destination population, or the origin and/or destination income. From the perspective of explaining tourist flows, only four studies, Khadaroo and Seetanah (2008), Seetanah, Durbarry and Ragodoo (2010), Massidda and Etzo (2012), and Fourie and Santana-Gallego (2013b) account for the dynamic nature of tourist flows. Seetanah, Durbarry and Ragodoo are the only authors to consider the possibility of a long-run relationship; however, they do not provide the short-run estimates. Another modelling deficiency is that several papers do not account for prices in both the origin and competing destinations, which are considered necessary for consistent estimation of gravity equations (Anderson & van Wincoop, 2003).

A weakness common to nearly all of the papers in [Table 5.2](#) lies in several of the variables of particular interest used to augment the gravity model; for example, taxes, terrorism, mega events, and so forth. The issue is that such variables are not motivated in relation to the conceptual foundations of the gravity model. In particular, they are not conceptualised as mass or distance variables by the authors. The augmented variables are also not constructs of multilateral resistance. Rather, the authors appear to employ the framework of gravity loosely, disregarding its underlying structure and meaning, and include any conceivable factor to improve model fit. Social science gravity models must contain elements of mass and distance, which provide the direct association with gravity in the physical sciences; that is, larger bodies exert a greater attraction on other bodies than smaller bodies, and the greater the distance between two bodies, the smaller their attraction for each other.

Another concern is the wholesale application of variables employed in gravity models of international trade flows in gravity studies of international tourist flows, without convincing arguments for their inclusion. These include variables to examine the impact due to: if origin and destination are members of the same free trade agreement, if origin and destination are members of a currency union or share a common currency, if origin and destination share a common language, if origin and destination share a common border, if destination is a landlocked country, and the number of island nations in origin-destination pair. Some of these variables have both theoretical and intuitive impacts on tourist flows. For example, common membership of a currency union or free trade area could intuitively enhance tourist flows, because of the ease of conducting monetary transactions in the first case, and increased business travel and facilitation of investment in tourism activities and trade in tourism services in the second case. A common

language or border can be considered indicators of cultural and geographical proximity respectively.

On the other hand, it is not readily apparent what impact being a landlocked or island destination should have on tourist flows. In the international trade literature, transportation costs to and from a landlocked or island country are expected to be higher than for other countries. However, there is no theoretical or intuitive justification for their impact on tourist flows. In short, the problem with these variables, and even the variables with theoretical or intuitive support, is that no convincing case is ever made for their inclusion. As evidence, Llorca-Vivero (2008) states, “it is usual to include dummies in gravity models aimed at measuring factors that influence transaction cost and, consequently, that may impact bilateral flows in a positive or negative manner” (p.176). Santana-Gallego, Ledesma-Rodriguez and Perez-Rodrigues (2010) note, “[g]ravity models used in international trade literature additionally include other relevant variables such as population, common language, colony, number of islands, or a common border” (p.30). The other studies employing these variables make no justification whatsoever. Again, the concern of authors seems to be merely improving model fit and less about the relevance of such variables for tourist flows.

5.7.2 Elasticities

In the interest of comparison, the elasticities of the common gravity variables from the various studies are presented in [Table 5.3](#). In cases where the authors ran several regressions, a range of elasticities from the study is provided.

Table 5.3: Elasticities of Common Gravity Variables in Studies of Tourist Flows

Authors	Income of Origin	Income of Destination	Population of Origin	Population of Destination	Geographical Distance	Price in Destination	Price in Alternative Destination	Common Language	Common Border	One of Origin-Destination Pair is Former Colonial Master of the Other
Gil-Pareja, Llorca-Vivero and Martinez-Serrano (2007a)	-1.181;	0.639;	0.533;	0.415;	-0.563;	0.034;	NA	0.932;	NSI	NA
	-0.502	0.652	0.884	0.436	-0.786	0.290		1.030		
Gil-Pareja, Llorca-Vivero and Martinez-Serrano (2007b)	0.172;	0.883;	0.550;	1.332;	UNR	-0.366;	NA	UNR	UNR	NA
	0.185	0.890	0.744	1.453		-0.364				
Durberry (2008)	0.803	NSI	NA	NA	0.676;	-2.305;	0.547;	0.183;	NA	NA
	NSI	0.622;	0.715;	0.528;	0.687	-2.043	0.580	0.188	NSI	NA
Llorca-Vivero (2008)		0.653	0.739	0.581	-0.712;	0.031;	NA	0.850;		
					-0.662	0.042		0.868		
Khadaroo and Sectanah (2008)	0.26;	NA	0.14;	NA	-0.36;	-0.79;	NA	0.11;	0.12;	NA
	0.98		0.36		-0.07	-0.14		0.17	0.32	
Santana-Gallego, Ledesma-Rodriguez and Perez-Rodriguez (2010)	0.289;	0.951;	0.038;	0.324;	-0.796;	NA	NA	0.376;	0.257;	0.507;
	0.733	1.285	0.459	2.578	-0.526			0.583	0.698	0.987
Keum (2010)	0.62;	0.32;	NA	NA	-2.07;	NA	NA	NA	NA	NA
	1.04	2.26			-0.90					
Eryigit, Kotil and Eryigit (2010)	(Product of Income Variables)	(Product of Income Variables)	(Product of Population Variables)	(Product of Population Variables)	-3.61;	NA	NA	NA	NA	NA
	1.05;	1.05;	-3.06;	-3.06;	-1.47					
Sectanah, Durberry and Ragodoo (2010)	0.24;	0.23;	NA	NA	-0.41;	-1.07;	0.12;	0.12;	0.78;	NA
	1.45	0.27			-0.23	-0.12	0.26	0.55	0.87	
Yang, Lin, and Han (2010)	0.292;	NA	0.516;	NA	-1.597;	0.101;	NA	NA	NA	NA
	1.143		0.676		-1.417	0.148				
Fourie and Santana-Gallego (2011)	0.170;	0.269	-0.074;	0.023;	-1.482	-0.032;	NA	1.075	1.184	0.918
	0.171		-0.075	0.028		-0.033				

Chang and Lai (2011)	-0.345: 0.685	0.186: 0.650	0.931: 1.564	-11.270: 8.203	-31.92: 1.233	-0.029: -0.001	NA	1.078: 1.398	2.010: 9.361	NA
Vietze (2012)	0.884: 0.966	-2.502: -2.005	NA	NA	-1.054: -0.894	-1.072: -0.724	NA	0.693: 0.872	1.173: 1.552	NA
Yang and Wong (2012)	2.498: 3.998	NA	NA	NA	-2.279: -2.458	-0.433: -0.218	0.251: 0.482	NA	NA	NA
Massidda and Elzo (2012)	NA	1.427: 4.889	NA	NA	-0.164: -0.076	-9.002: -7.462	NA	NA	NA	NA
Fourie and Santana-Gallego (2013a)	0.173: 0.314	0.174: 0.314	NSI	NSI	-1.544: -1.541	NSI	NA	0.682: 0.771	0.691: 1.160	0.682: 0.837
Fourie and Santana-Gallego (2013b)	0.116: 0.434	0.095: 0.720	NA	NA	-1.490: 0.190	-0.403: 0.226	NA	0.212: 1.152	0.445: 1.585	0.643: 1.603
Balli, Balli and Cebeci (2013)	0.21: 0.62	NA	0.21: 1.12	NA	NA	-0.46: -0.20	NA	NA	NA	NA
Marrouc and Paci (2013)	0.92	1.00: 1.05	0.07	-0.43: -0.37	-0.79: -0.78	UNR	NA	NA	NA	NA
Zhang and Findlay (2014)	0.586: 0.633	0.270: 0.321	NA	NA	-1.349: -1.239	NA	NA	1.220: 1.243	NSI	NA

Source: Present author

Notes: NA means "not applicable". NSI means "no significant impact". "UNR" means unreported.

Traditional Gravity Variables

The traditional gravity variables are income, population and geographical distance. The ranges of income elasticities for the origin are generally positive, and have an upper bound of less than unity with few exceptions. This indicates that tourist flows can be considered normal goods. Similarly, the ranges of the income elasticities for the destination are positive and bounded above by unity. Population variables of both origin and destination are positive and generally inelastic. Geographical distance elasticities are negative in nearly all cases.

Traditional Tourism Demand/Generalised Gravity Variables

Apart from income, prices are traditional determinants in tourism demand functions. Further, they are considered necessary for consistency in estimation of gravity models. Virtually all own-price variables are negative and less than unity while the substitute price variables are positive and also less than unity. So tourist flows to destination are price inelastic, and will decline if prices in alternative destinations are relatively cheaper.

Augmented Gravity/Distance Variables

In terms of the augmented variables, the majority of the studies consider the effect of sharing a common language and common border on tourist flows. Less than half investigated a possible effect due to colonial link. In all instances where a significant effect was observed, these factors act to increase the volume of tourist flows.

Table 5.3 demonstrates that the range of elasticities for gravity studies on tourist flows is wide; that is, significant variation exists. The signs of the coefficients generally agree with theoretical expectations, and the magnitudes are generally inelastic.

5.8 Summary

This chapter reviewed the gravity model, focussing on its conceptual and theoretical development. It demonstrates that the gravity model can be derived theoretically; however, its theoretical foundations cannot be attributed to one theory, but several theories.

The chapter also introduced another important concept within the framework of the gravity model; that is, multilateral resistance, by Anderson and van Wincoop (2003). Multilateral resistance demonstrates that in modelling the decay effect on flows between two countries, one must consider not only the frictional effect of distance between the two countries, but also the frictional across all possible countries. Failure to consider multilateral resistance results in inconsistent estimation because of omitted variable bias.

Although the model's theoretical foundations are important, the focus should also be on its empirical success and illuminating results. Indeed, Leamer and Levinsohn (1995) state that the gravity model provides "some of the clearest and most robust empirical findings in economics" (p.1384). Similarly, Rose (2000) notes that the gravity model is a "framework with a long track record of success" (p.11). Anderson and van Wincoop

(2003) concur, stating, “[t]he gravity equation is one of the most empirically successful in economics” (p.170).

In relation to tourist flows, the theoretical foundations of the gravity model and empirical structure of the gravity equation allow it to capture several particularities of the phenomenon of tourist flows. First, the push-pull theory of tourist motivation for travel is embodied in the concept of forces of attraction between two bodies and repulsion due to the distance between them. Second, the gravity framework is able to account for both demand-side and supply-side factors of tourist flows, which, as argued in Chapter 3, are necessary in accounting for the features of the phenomenon. The traditional gravity model nests the determinants of the neoclassical theory of demand (own-price [of tourism], cross-price [substitute price], and income of consumer [source market]), as well as other demand and supply factors of tourism (income of destination, and populations of the origin and destination). Third, distance, a determinant of tourist flows between two countries, is also a critical factor in the gravity model, which permits ready examination of the distance puzzle in tourism. Fourth, its flexibility allows the model to be augmented with other variables which influence tourist flows, although it is important for these to be properly conceptualised as either mass or distance variables, to maintain the association with the gravity model of the physical sciences from where it was adapted.

Several critical issues in relation to tourist flows are underlined. Despite the strong theoretical foundation and empirical success of the gravity model, very few studies of tourist flows have employed this approach, although the number is increasing. Of the studies that do employ the gravity model, several exclude both tourism own-price and

cross-price in their specifications, which are determinants of neoclassical demand theory, and also required for consistent estimation of the gravity model. Also, the majority of studies ignore the dynamic nature of tourist flows, and estimate static models. Further, many tourism gravity models are misspecified conceptually, as the variables used to augment the model are neither mass nor distance variables, undermining their association with the gravity model of the physical sciences. In other instances, the variables are borrowed from the international trade literature without compelling arguments for their inclusion in an empirical model of tourist flows. Finally, even though distance is specified in studies of tourist flows, as geographic distance and/or other distance variables, it is largely subordinated in the analyses, even though distance is the critical variable within the gravitational framework.

The current study will employ the gravity model as, conceptually and theoretically, it provides a framework for modelling international tourist flows to the Caribbean and examining the distance puzzle in tourism. In so doing, the study will also address the various shortcomings in tourism gravity studies. The next chapter will provide an overview of tourist flows in the Caribbean, the destination of interest in this research.

CHAPTER 6 TOURIST FLOWS IN THE CARIBBEAN

6.1 Introduction

The main tasks of this chapter are to illustrate, in a general sense, the characteristics and to identify themes that best describe tourist flows in the Caribbean in order to fully understand the destination under study. The chapter starts with a definition of “Caribbean” from both physical and political perspectives. Following this, the historical development of tourism in the Caribbean is presented. This section also discusses broad trends in tourist flows and tourism, and describes the main source markets.

6.2 Physiography of the Caribbean

The island states considered in this study can be referred to as the insular Caribbean, that is, those islands stretching from Cuba in the north to Trinidad and Tobago in the south ([Figure 6.1](#)), the Bahamas and Bermuda. Strictly speaking, the Bahamas, Barbados, Bermuda and the Turks and Caicos Islands are located outside of the Caribbean Basin, lying in the Atlantic Ocean. However, they share very similar colonial legacies and customs to the other islands, and have been historically considered Caribbean. In Bermuda, which lies farthest away from the Caribbean Basin, a large percentage of the population can also trace their ancestry to migration from St. Kitts and Nevis, another Caribbean country, in the early 20th century. Consequently, the continental countries of South and Central America with coastlines on the Caribbean Sea are outside the purview of this research.

Figure 6.1: Map of the Caribbean



Source: Adapted from Karl Musser; Licence at: <http://creativecommons.org/licenses/by-sa/3.0/legalcode>

As defined, the Caribbean region can be separated into two broad sub-regions. The Lesser Antilles (eastern and southern Caribbean) encompasses the United States Virgin Islands and British Virgin Islands in the north to Trinidad and Tobago in the South. The Greater Antilles (western and northern Caribbean) encompasses Cuba, the Cayman Islands, Jamaica, the Turks and Caicos Islands, Haiti, the Dominican Republic, and Puerto Rico.

Several geographic anomalies exist in the Caribbean. The Bahamas and Bermuda, located north of Cuba, are not classified as Lesser Antillean or Greater Antillean. The former Netherlands Antilles as a political designation, was defined by two geographic groups: the islands of Aruba, Bonaire and Curacao in the Southern Caribbean, and Saba, St. Maarten, and St. Eustatius in the north east. Aruba seceded from the Netherlands Antilles in 1986. The Netherlands Antilles was later dissolved in October 2010;

however, the group of islands remain part of the Kingdom of the Netherlands under a different legal status (see [Table 6.1](#)). St. Martin (French portion of the island shared with St. Maarten) is an overseas territory of France and administered with the island of Guadeloupe.

The Lesser Antilles can be subdivided geographically into the Leeward Islands group and the Windward Islands group. The Leeward group encompasses the British and United Virgin Islands in the north all the way to and including Guadeloupe in the south, and the Windward group includes Dominica, St. Lucia, Barbados, St. Vincent and the Grenadines, and Grenada. Trinidad and Tobago is not normally included in the Windward Islands grouping, but in the Lesser Antilles characterisation.

The geographic complexity exhibited through sub-regional designations is equalled by the political variability ([Table 6.1](#)). The Caribbean is home to British Commonwealth members, United States Commonwealth members, British dependencies, French dependencies, autonomous countries within larger kingdoms and independent republics.

6.3 Tourism in the Caribbean

Several historical and contemporary forces have combined to shape tourism in the Caribbean. Access to foreign capital for hotel investment, and a ready supply of imported food and luxuries essential to satisfy the tastes of affluent metropolitan consumers were facilitated by centuries of core-periphery commerce (McElroy, 2004). Long-term political ties played an integral role, then and now, as sixteen of the twenty-nine islands remain in some type of dependent relationship (see [Table 6.1](#)).

Table 6.1: Political Status of Caribbean Islands

Official Name	Status	Official Language	Land Area (sq. km.)
Anguilla	British Dependency	English	91
Antigua and Barbuda	Independent state within British Commonwealth	English	441
Aruba	Constituent country within Kingdom of the Netherlands	Dutch	193
Bahamas	Independent state within British Commonwealth	English	13,935
Barbados	Independent state within British Commonwealth	English	430
Bermuda	British Dependency	English	50
Bonaire	Special municipality within Kingdom of the Netherlands	Dutch	294
British Virgin Islands	British Dependency	English	95.4
Cayman Islands	British Dependency	English	260
Cuba	Independent Republic	Spanish	114,478
Curacao	Constituent country within Kingdom of the Netherlands	Dutch	444
Dominica	Independent Republic	English	749
Dominican Republic	Independent Republic	Spanish	48,442
Grenada	Independent state within British Commonwealth	English	311
Guadeloupe	French Dependency	French	1,780
Haiti	Independent Republic	French	27,749
Jamaica	Independent state within British Commonwealth	English	10,991
Martinique	French Dependency	French	1,079
Montserrat	British Dependency	English	102
Puerto Rico	Commonwealth of the USA	Spanish	8,997
Saba	Special municipality within Kingdom of the Netherlands	Dutch	13
St. Eustatius	Special municipality within Kingdom of the Netherlands	Dutch	21
St. Kitts and Nevis	Independent state within British Commonwealth	English	269
St. Lucia	Independent state within British Commonwealth	English	616
St. Maarten	Constituent country within Kingdom of the Netherlands	Dutch	34
St. Vincent and the Grenadines	Independent state within British Commonwealth	English	389
Trinidad and Tobago	Independent Republic	English	5,128
Turks and Caicos Islands	British Dependency	English	500
United States Virgin Islands	Commonwealth of the USA	English	346.4

Source: *CIA World Factbook*

National economic policy has also had a significant impact. Caribbean countries, habituated to economies characterised by high volume, low value-added monocultural exports from colonial times, offered a receptive market with attractive incentives to establish the development of mass tourism (McElroy, 2004). The convergence of the latter with growing incomes, growth in available leisure time, advent of paid vacations, and development of wide-body passenger jet aircraft created the tropical island getaway (Shaw & Williams, 2002), of sun, sea, and sand, the dominant tourism product in the Caribbean.

Geography is also integral to the growth of tourism across the Caribbean. The geographic proximity of the Caribbean to its source markets in North America, and to a lesser extent Europe, is a significant factor in their attractiveness. This proximity to the United States Atlantic seaboard, was chiefly responsible for the historical evolution of tourism from the north of the Caribbean to the south, and occurred in four waves (McElroy, 2004). In the latter part of 19th and early part of the 20th centuries, tourists from America formed the first wave of tourism in the Greater Antilles, mainly Cuba, Jamaica, and Bermuda. The second wave occurred in the 1950s and 1960s with the advent of jet travel—which had a significant impact on the propensity for travel to the region from key generating markets, such as those in North America and Europe (Bell, 2014)—and the United States embargo of Cuba. Consequently, Aruba, the Bahamas, Barbados, Puerto Rico, and the United States Virgin Islands became popular tourist destinations (Seward & Spinrad, 1982). A third wave of rapid growth swept across the Caribbean in the 1970s and 1980s. It included the British Virgin Islands, Cayman Islands, a resurgent Cuba, and the Dominican Republic in the Greater Antilles. This third wave later included St. Maarten, Antigua, Guadeloupe, Martinique, St. Lucia,

Trinidad and Curacao in the Lesser Antilles. The fourth and final wave encompassed the Turks and Caicos Islands as a mass tourism destination, achieving over 100,000 long stay arrivals in the 1990s.

Several other events in the 1950s and 1960s also facilitated the take-off into mass tourism in the Caribbean. During this period, many island states in the region, particularly those in the British Commonwealth, began to move towards political independence. Such independence spawned the desire to seize a certain degree of control over internal economic development. A deliberate focus on tourism meant that some island states could break away from existing colonial dependency arrangements in other economic sectors. One consequence of the changing political structure of the region was the introduction of “sensitive political psyches” that often conjured up images of neo-colonialism, as economic ties to former colonial nations were not severed completely (Bell, 2014, p.221). This was especially felt through tourism because most tourists were from Western countries (Crick, 1989).

Another significant event was the substantial number of migrants leaving the region at the same time as the region began to host increasing numbers of tourists (Patullo, 1996). Beginning in the 1950s, but continuing to the present day, many Caribbean nationals migrated voluntarily and sometimes out of economic necessity, to the UK, Canada and the USA, particularly on the Eastern seaboard. The consequence of this has been the creation of numerous Caribbean diasporas around the world. These communities now serve as important sources of tourists, as many Caribbean expatriates living abroad frequently travel “home” to visit family and friends (Stephenson, 2002).

The 1960s were characterised as “boom years” for tourism in the region (Holder, 1993, p.221). Growth rates of 10 percent or more were not uncommon. The management structure at the time, however, was largely in the hands of expatriates, particularly large-scale hotel properties (Sutty, 1998). Moreover, the success of tourism during this period was confined to those countries that featured stronger overall economies, for example, Barbados, Jamaica and Trinidad and Tobago (Prime, 1976). Growth declined in the 1970s because of instability created by the Arab oil embargo (McElroy, 2004). Declines in agriculture, mining, and manufacturing, mainstays of many Caribbean countries, have created a favourable climate for tourism growth. At present, and perhaps not unlike other countries in the developing world, many Caribbean governments rely on conventional mass forms of tourism to help offset failing manufacturing or agricultural sectors and, to act as a significant source of foreign exchange (Sharpley, 2002).

While many countries in the Caribbean are associated with a conventional mass tourism profile, the increasing concerns voiced over the unsustainable nature of mass tourism policies, operations and management (Weaver, 2001), have led many governments in the region to consider adopting more sustainable forms of tourism development and management strategies. For many small island states or dependencies, increased interest in alternative products and management strategies have been used as a means to embrace the wildly popular and politically correct mantra of sustainable tourism, although it is important to note that this has not come about at the expense of developing traditional mass forms of tourism (Weaver, 1995).

Whatever the impetus, the growth of alternative tourism in the Caribbean allows for some consideration of the maturation of the industry, to some degree at least, in terms of how it is managed by governments. On one hand it points to the recognition of new forms of tourist experience that are in demand by particular visitor segments, while on the other hand, it hints at the acceptance of a more responsible management regime.

6.3.1 Magnitude of Tourism in the Caribbean

The provision of data on regional visitor arrivals, expenditures and generating markets at the regional level falls largely under the purview of the Caribbean Tourism Organisation (CTO), although each island provides the organisation with specific indicators of tourism sector performance. This compilation can sometimes be problematic as some islands choose not to measure one or more indicators, or are tardy in providing the relevant statistics. The consequence of this is that in some cases, accurate comparisons between islands are difficult, if not impossible.

Table 6.2 outlines some broad trends in visitor arrivals for the years 1990, 2000, and 2010. Since 1990, long stay visitors to the Caribbean have increased by 85 percent. Total visitor expenditure for 2010 was over USD \$22 billion, compared to USD \$7 billion in 1990. The Dominican Republic received the highest quantum of visitor spending in 2010, although visitor spending per capita was highest in Barbados. Data for 2010 indicate that tourists spent an average of 8.8 days, up 1 day over 1990 and 2000 respectively, although there is some variation among countries.

Table 6.2: Selected Visitor Statistics 1990-2010

	Long Stay Visitors (000s)		Visitor Expenditure (USD mn.)		Length of Stay (days)	
	1990	2000	1990	2000	1990	2000
Anguilla	31	44	31	57	10.6	8.6
Antigua and Barbuda	206	237	314	291	NA	7.0
Aruba	433	721	396	638	7.8	7.7
Bahamas	1,562	1,596	1,193	1,814	5.7	6.5
Barbados	432	545	460	711	10.6	10.1
Bermuda	433	328	456	431	6.3	6.0
Bonaire	41	51	24	56	7.0	9.3
British Virgin Islands	160	281	109	315	9.3	9.1
Cayman Islands	253	354	276	559	4.9	6.5
Cuba	340	1,774	387	1,857	8.7	NA
Curacao	208	191	232	227	7.0	8.2
Dominica	45	70	28	47	9.0	9.2
Dominican Republic	1,305	2,973	889	2,860	9.7	10.0
Grenada	126	129	42	70	NA	7.2
Guadeloupe	288	807	234	454	6.1	5.2
Haiti	120	140	46	54	NA	3.0
Jamaica	841	1,323	764	1,333	10.9	10.1
Martinique	282	526	255	370	NA	13.2
Montserrat	19	10	10	9	NA	14.8
Puerto Rico	2,560	3,341	1,397	2,388	2.8	2.5
Saba	5	9	NA	NA	NA	7.0
St. Eustatius	7	9	NA	NA	NA	7.0
St. Kitts and Nevis	76	73	68	58	8.6	8.7
St. Lucia	138	270	173	277	10.7	9.6
St. Maarten	565	432	310	482	NA	5.0
St. Vincent and the Grenadines	54	73	53	75	9.6	10.0
Trinidad and Tobago	194	398	101	213	NA	7.0
Turks and Caicos	42	151	50	285	NA	7.5
United States Virgin Islands	370	607	778	1,157	4.5	4.5

Source: Caribbean Tourism Organisation

Note: NA means not available.

Table 6.3 presents a snapshot of the contribution which tourism makes to regional economies. The WTTC tourism satellite account indicates that tourism accounted for 10.5 percent of total employment in 1990, and 14.5 percent of the region's GDP. In 2010, tourism's contribution to GDP fell to 13.1 percent, although it generated a larger share of all jobs at 10.8 percent. The significance of tourism in the Caribbean exceeds the importance of tourism worldwide. For example, in 1990, tourism's contribution to GDP for the Caribbean was almost three times that of its contribution worldwide, and its contribution to employment in the region was one percentage-point higher. The gap between tourism's GDP's contribution in the Caribbean versus the world narrowed in 2010, although the gap in employment contribution widened by two percentage-points.

Despite the economic significance of tourism in the region, the tangible benefits of tourism have come under intense scrutiny (Archer & Davies, 1984; Wilkinson, 1989). In the first instance, the issue is whether the economic benefits of tourism are realised at the local level, as substantial foreign ownership of service providers such as airlines and hotels often mean a significant degree of leakage (Wilkinson, 1989). Second, the negative biophysical impacts such as pollution and damage to the marine environment have also been cited (Weaver, 1995; Wilkinson, 1989). Third, there is some concern about the community value gained from tourist expenditures (Wilkinson, 1989) and the impact on the indigenous cultural environments packaged and commoditised for foreign tourists (Slinger, 2000).

Table 6.3: Tourism's Total Contribution to GDP and Employment 1990-2010

	GDP Share (%)			Employment Share (%)		
	1990	2000	2010	1990	2000	2010
Anguilla	61.4	54.7	50.7	80.0	71.8	63.9
Antigua and Barbuda	98.0	62.7	68.2	109.5	70.8	64.5
Aruba	52.5	54.1	79.3	54.7	59.1	80.3
Bahamas	61.3	40.6	44.3	71.4	62.0	51.9
Barbados	34.0	34.6	39.2	34.6	35.7	40.7
Bermuda	33.5	16.6	15.2	46.6	22.6	19.5
British Virgin Islands	122.6	59.3	80.2	171.6	96.5	86.4
Cayman Islands	40.4	38.3	21.3	44.3	40.9	22.7
Cuba	3.9	11.8	10.1	3.6	10.7	9.0
Dominica	13.0	22.3	30.1	11.8	20.5	27.7
Dominican Republic	17.6	16.4	14.9	15.8	15.0	13.4
Former Netherlands Antilles	32.2	29.6	34.1	34.2	28.2	28.9
Grenada	16.9	20.7	20.5	15.3	19.1	18.6
Guadeloupe	11.5	21.8	14.9	10.9	21.4	15.1
Haiti	6.6	5.9	3.2	5.9	5.6	2.7
Jamaica	26.7	26.1	27.4	24.5	23.9	25.3
Martinique	11.7	14.9	9.8	11.3	15.2	10.6
Puerto Rico	7.7	6.3	5.4	6.1	5.6	4.7
St Kitts	41.7	15.6	20.3	39.3	15.1	20.2
St Lucia	42.4	45.9	34.4	44.4	47.7	37.4
St Vincent and the Grenadines	30.8	26.5	20.2	27.5	23.9	18.5
Trinidad and Tobago	NA	NA	NA	NA	NA	NA
US Virgin Islands	43.2	19.8	26.5	46.9	21.9	29.4
Caribbean	14.5	14.7	13.1	10.5	12.5	10.8
World	5.5	10.3	9.2	9.6	9.7	8.7

Source: World Travel and Tourism Council (WTTC)

Notes: These data include the contribution from both long stay and cruise tourism. NA means not available.

6.3.2 Caribbean Tourism Markets

During the 1980s, American tourists made up 57.8 percent of Caribbean tourists (Table 6.4), while European tourists were only 10.6 percent of the total. By the 1990s, the USA's had fallen to 50 percent at the same time that Europe's share increased to 20 percent. The increasing share in the European market was fuelled by very strong growth of 7.9 percent in the 1980s and 9.6 percent in the 1990s. In the 2000s, the American market held steady, recording a slight increase to 50.6 percent, even though there was an overall decline in the number of tourists from this market. During this period, the European market expanded its share appreciably, rising to 26.5 percent, even though it too recorded negative growth. Over the last three decades, Canada made up

between 6 and 9 percent of arrivals to the Caribbean, and has shown an increase in growth in the last decade. Caribbean tourists also constituted between 6 and 9 percent, but growth has been declining over time.

Table 6.4: Share and Growth in Long Stay Arrivals from Main Markets 1980-2009

	USA			Canada		
	<i>Average Share (%)</i>	<i>Total Growth (%)</i>	<i>Annual Growth (%)</i>	<i>Average Share (%)</i>	<i>Total Growth (%)</i>	<i>Annual Growth (%)</i>
1980-1989	57.8	55.2	5.1	6.8	43.4	4.4
1990-1999	50.0	28.7	2.9	5.5	27.1	2.7
2000-2009	50.6	-14.9	-1.4	8.9	101.3	8.3
	Europe			Caribbean		
	<i>Average Share (%)</i>	<i>Total Growth (%)</i>	<i>Annual Growth (%)</i>	<i>Average Share (%)</i>	<i>Total Growth (%)</i>	<i>Annual Growth (%)</i>
1980-1989	10.6	87.2	7.9	8.9	76.7	7.0
1990-1999	20.0	127.6	9.6	6.0	42.5	4.1
2000-2009	26.5	-5.09	-0.4	7.3	13.4	1.5

Source: Caribbean Tourism Organisation and present author.

Table 6.5 indicates that in 2010, the USA accounted for more than half of all tourists to Anguilla, Aruba, the Bahamas, Bermuda, the British Virgin Islands, the Cayman Islands, Haiti, Jamaica, Puerto Rico, St. Kitts and Nevis, St. Maarten, Turks and Caicos, and the United States Virgin Islands. With the exception of Aruba, these are all northern tier Caribbean countries, where proximity to the United States reduces the cost and time of travel. The availability of pre-clearance US customs facilities in Aruba helps to explain their large share of tourists from the USA. This eliminates the prospect of returning tourists having to face long lines and highly enhanced security when returning to the USA, primarily in Miami and New York. Another destination with pre-clearance facilities is the Bahamas. For the most part, the profile of USA dominance in tourist arrivals in these countries is unchanged from 1980.

Table 6.5: Share of Long Stay Arrivals by Main Markets 1980 and 2010

	USA (%)		Canada (%)		Europe (%)		Caribbean (%)	
	1980	2010	1980	2010	1980	2010	1980	2010
Anguilla	26.7	62.7	2.4	3.9	5.9	12.2	NA	19.1
Antigua and Barbuda	39.7	35.5	10.2	7.7	23.5	38.7	23.0	16.3
Aruba	58.7	64.9	2.9	4.6	3.5	9.2	1.2	3.6
Bahamas	74.8	80.1	11.0	8.7	9.7	5.7	NA	1.4
Barbados	23.2	25.4	23.0	13.6	25.6	39.9	24.1	18.5
Bermuda	86.5	71.5	7.1	13.1	5.1	12.3	NA	NA
Bonaire	32.4	35.3	3.4	3.0	11.3	39.2	2.8	8.0
British Virgin Islands	65.0	62.0	4.7	3.0	7.6	11	NA	22.0
Cayman Islands	74.8	79.3	6.1	6.8	4.7	6.9	12.8	4.6
Cuba	5.4	2.5	21.8	37.3	10.9	31.9	NA	15.4
Curacao	13.3	14.3	0.9	2.2	9.1	47.9	15.3	14.6
Dominica	15.9	25.2	5.6	3.7	23.9	14.0	41.7	54.8
Dominican Republic	69.4	29.7	3.0	16.0	8.0	28.7	7.3	2.0
Grenada	23.0	18.9	6.8	5.8	23.0	31.5	26.2	20.4
Guadeloupe	13.6	14.8	3.9	1.7	80.1	79.5	NA	3.7
Haiti	42.5	69.1	11.0	7.8	20.9	6.1	21.8	3.9
Jamaica	60.6	64.7	17.9	16.9	16.1	14.1	3.4	3.1
Martinique	24.7	1.4	6.2	2.0	59.0	81.4	10.7	14.0
Montserrat	38.3	27.8	11.1	6.8	11.4	26.3	31.0	37.8
Puerto Rico	72.0	89.9	1.7	1.4	1.1	1.8	3.5	2.3
Saba	42.5	30.6	3.2	8.6	40.5	48.6	NA	2.7
St. Eustatius	15.9	19.9	0.0	2.0	14.2	55.2	NA	5.7
St. Kitts and Nevis	32.7	56.6	5.4	5.8	8.1	12.1	NA	20.3
St. Lucia	17.7	42.2	16.3	10.5	38.8	28.0	21.5	17.7
St. Maarten	71.8	53.3	1.5	7.6	10.6	22.8	9.0	5.4
St. Vincent and the Grenadines	28.5	29.7	11.0	9.9	19.4	24.3	28.4	33.1
Trinidad and Tobago	27.7	45.8	14.1	11.4	14.7	14.5	32.2	20.1
Turks and Caicos Islands	52.6	68.3	6.3	12.0	11.8	10.0	NA	NA
United States Virgin Islands	88.1	93.0	1.1	0.9	1.7	1.9	12.4	4.6

Source: Caribbean Tourism Organisation

Note: NA means not available.

Europe is the largest market for Antigua and Barbuda, Barbados, Bonaire, Dominica, Grenada, Guadeloupe, Martinique, Saba and St. Eustatius. Antigua and Barbuda gets 75 percent of its European tourists from the UK, Barbados, 85 percent, Dominica, 43 percent, and Grenada, 77 percent; Bonaire receives 93 percent of its European tourists from the Netherlands, Saba, 77 percent, and St. Eustatius, 70 percent; and 80 percent and 96 percent of European arrivals to Guadeloupe and Martinique respectively are from France. These trends indicate that language affinity is very important for tourists from France, the Netherlands and, to a lesser extent, the UK. Overall, European tourists gravitate towards destinations with which they have historical and linguistic ties: 60 percent of visitors from the UK went to the Commonwealth Caribbean; 69 percent of French tourists went to France's overseas departments Guadeloupe and Martinique; 75 percent of Dutch visitors went to islands from the former Netherlands Antilles; and 84 percent of Spanish visitors went to Cuba and the Dominican Republic.

The Canadian market share in most Caribbean countries is under 10 percent, but still represents a significant source of tourists. Canadian tourists have a high propensity for travel to Cuba; its share of their market rose from approximately 22 percent in 1980 to 37 percent in 2010, a rise of 15 percentage points. This reflects the longstanding historical relationship between the two countries; Canada is one of only two countries (the other is Mexico) not to have broken diplomatic relations with Cuba following the Cuban revolution in 1959. Indeed, Canada is Cuba's largest source of tourists in the world, providing almost one million tourists annually. The other evidence does not point clearly to language or geographic distance playing a major role in Canada's travel to the Caribbean.

The Caribbean is a significant source market for most countries in the region. It is noticeably smaller market for Aruba, the Bahamas, the Cayman Islands, the Dominican Republic, Guadeloupe, Haiti, Jamaica, Martinique, Puerto Rico, Saba, St. Eustatius, St. Maarten, the Turks and Caicos Islands, and the United States Virgin Islands. These trends may be explained in part by language difference and geography. English is not the native language in Aruba, the Dominican Republic, Guadeloupe, Haiti, Martinique, Puerto Rico, Saba, St. Eustatius or St. Maarten. Thus, language differences are likely to pose a challenge for tourists from English-speaking Caribbean countries. Martinique, a French-speaking island, has a significant share of tourist from the Caribbean at 14.0 percent, but two-thirds of these are Guadeloupians, who are also French speakers.

Geographically, the Bahamas, the Cayman Islands, the Dominican Republic, Jamaica, Puerto Rico, the United States Virgin Islands, and the Turks and Caicos Islands are located in the western and northern tiers of the Caribbean region. Travel to several of these islands from the Eastern and Southern Caribbean is not by direct flight. In several cases, tourists from the Caribbean may even have to fly to the USA before connecting to northern tier Caribbean countries, for example, the Bahamas, the Cayman Islands, and the Turks and Caicos Islands. Cuba is an anomaly, in that it is in the northern region of the Caribbean, is a Spanish-speaking nation, and there is no direct flight from any Caribbean island (previously there was a direct flight from Jamaica, but this was cancelled; current travel to Cuba is either via Panama or Canada), but it still receives a large share of tourists from the Caribbean market.

6.4 Summary

As indicated at the outset of this study, one major gap in the study of tourist flows is the limited choice of countries or regions that have been studied, which suggests that previous findings may need to be carefully weighted in different geographical and social contexts. Thus the aim of the chapter was to concisely describe the main characteristics of the destination under study, the Caribbean, and of the international source markets in relation to tourist flows. The chapter provided an overview of the historical development of tourism in the Caribbean, and described broad trends in tourist flows to the destination countries, highlighted the significance of tourism to the region, and provided some insight into the nature of tourist flows from the main source markets.

The recognition of four separate main markets—an American market looking for no-hassle vacations involving minimum travel time; a European long-haul market with a tendency for travel to former and current colonies; a Canadian market with no obvious propensities except for Cuban travel; and a Caribbean market, where language differences and geography appear to be significant factors—has produced a transnational regionalisation of the Caribbean. In some cases, French-, Dutch-, and Spanish-speaking countries have strengthened colonial and post-colonial links, yet elsewhere, widespread use of English has proved attractive to a range of markets. Geographic proximity and ease of access is also a significant factor.

The tourist markets for Caribbean countries appear to have produced a new kind of regional spatiality, with a geography defined by flows of different groups of tourists. This geography further highlights the role of distance in its various dimensions in

relation to tourist flows. The next chapter will consider these and other related issues when it describes the design of the model for the empirical analysis.

CHAPTER 7 METHODOLOGY

7.1 Introduction

The preceding chapters of this thesis have outlined the conceptual and theoretical framework of this research. In this chapter, the methodological and philosophical stances of the research will be linked to the broader aspects, including ontology, methodology, and epistemology. This defines the common language on which the research is based and determines if it contributes to the base of knowledge. This chapter answers questions such as why a research method is chosen; why it is suitable; and how it will be justified and developed within this research.

The chapter opens with a discussion of the methodological and philosophical perspectives of the research. The methodological issues relevant to this research derive from the debate regarding the paradigmatic dichotomy between positivist and interpretivist views. When this aspect has been examined, specific research techniques and strategies will be addressed, including ways of measuring and operationalising the variables involved.

7.2 Methodological Issues in Research

Social researchers have long debated the relative merits of quantitative and qualitative methodologies. The source of the debate lies in the branch of philosophy known as epistemology. The choice of a particular epistemological base leads to a preference for a particular approach on the grounds of its appropriateness (Byrman, 1984).

Machlup (1978) notes that methodology has two main interpretations. According to the Merriam-Webster Dictionary methodology is: a body of methods, procedures, working concepts, rules, and postulates employed by a science, art, or discipline; the processes, techniques or approaches employed in the solution of a problem—a particular procedure or set of procedures; or, the theoretical foundations of a philosophical doctrine—the basic premises, postulates, and concepts of a philosophy. It can also be interpreted as the science or the body of methods. Machlup also states, “methodology is neither a study of ‘good methods’ nor a study of ‘method use’, but rather a study of the reasons behind the principles on the basis of which various types of propositions are accepted or rejected as part of the body of ordered knowledge in general or of any special discipline” (pp.55-56). Methodology is concerned with a scientific goal in knowledge increment and a rational way to undertake pursuit of the goal. It signifies a means of using abstract theories to bridge the view of social phenomena and social reality (Popper, 1959).

Differing from, but closely related to the concept of methodology, is method. It is a process for “investigating phenomena, acquiring new knowledge, or correcting and integrating previous knowledge” (Goldhaber & Nieto, 2010, p.940). It is a part of methodology, and a tool for transferring a methodology into an applicable way of doing things. Methodology directs the design of a research method and examines the coherence and clarity of various methods used by researchers.

The methodological issues further discussed in this section relate to the following aspects of this research: the paradigm; the analytical tools; and the advantages and disadvantages of making these selections.

7.2.1 Positivism versus Interpretivism

A paradigm is a general perspective and approach for decomposing the complexity of the real world. It is “universally recognised scientific achievements that for a time provide model problems and solutions to a community of practitioners” (Kuhn, 2012, p.10). A research paradigm takes account of three elements: ontology, epistemology, and methodology. The three elements operate as a guide for proposing, assessing and conducting research. A paradigm is important because it is the framework of a methodology. Most research in the social sciences falls on a spectrum between strict positivist and strict interpretivist epistemological paradigms (Walle, 1997).

Positivism is founded on the belief that “phenomena of the human social world are no different from those of the natural inorganic and organic world” (Unwin, 2013, p.31). As a result, the “father of positivism”, Auguste Comte, felt that social phenomena should be studied using more scientific methodologies (Kitchin, 2006, p.20). Kitchin explains that this approach focuses on facts and truths that can be empirically proven and observed.

It is generally acknowledged that the positivist philosophy of science upholds that there is an absolute reality in the world. Epistemologically, the investigator needs to be independent of that reality, and become an “objective outsider” (Denzin & Lincoln, 2011, p.521). The goal is to measure and analyse causal relationships between variables within a value-free framework (Denzin & Lincoln, 2011). Positivists think only that which is logically proposed and empirically verifiable is meaningful. Apart from this, all other observations are treated with doubt (Kitchin, 2006). On this basis, positivists have developed a logical path, which could lead to scientific explanations. Harvey

(1973) summarised the positivist approach as follows. Much of scientific knowledge is *a priori* in nature, established on the basis of intuitive speculation regarding the nature of reality. A theory is then postulated. The theory will enable the researcher to deduce sets of hypotheses, which could be tested empirically. After a process of testing and checking, if the hypothesis can be confirmed, the scientific law can be acknowledged and the explanation ascertained (Harvey, 1973, pp.34-35).

Although positivism is a powerful paradigm, one main criticism is that there is no reality that is completely independent from human perception (Sale et al., 2002; Smith, 1983). It is very difficult to separate them, particularly in social sciences, where society and human behaviour are the main concerns. This implies that reality does not exist before the investigation, and ceases to exist when it is no longer the focus (Smith, 1983). Because the positivist paradigm needs to abstract the reality, the complexity of the world is subjectively reduced. This leads to an alternative paradigm, interpretivism.

Ontologically speaking, interpretivism holds that multiple realities or truths exist based on how reality is constructed (Sale et al., 2002). Interpretivism “treats the reality as a subject, and encourages it to speak for itself” (Tribe, 2001, p.445). Researchers are active participants in these realities (Carson et al., 2001). Lincoln and Guba (1985) explain that the multiple realities are very difficult to interpret as they depend on other systems for meanings. The knowledge generated is perceived through socially constructed and subjective interpretations (Hudson & Ozanne, 1988).

A criticism of interpretive research is that it ignores the verification procedures of science and consequently results cannot be generalised; it is difficult to confirm cause-

effect relationships and thus logically predict. Another is that interpretivism demonstrates a view that it can offer a richer explanation of social phenomena than can be obtained from scientific data (Nudzor, 2009). Findings that lack reliability is another criticism (Nudzor, 2009).

Based on the previous discourse, an important question is what methodology ought to be used. Adler, Campbell, and Laurent (1989, p.61) note, “choosing a methodology determines what we can study as well as the range of possible results and conclusions”. In most cases the choice is whether to use a qualitative or quantitative approach.

Quantitative methods tend to be used by positivists. Such methods involve the use of systematic and sophisticated procedures to test, prove and verify hypotheses (Glaser & Strauss, 1967). Quantitative techniques ensure independence, randomisation and highly structured protocols. Sample sizes required for quantitative applications are much larger than those used in qualitative research to ensure representativeness (Carey, 1993). On the other hand, qualitative methods are commonly employed by interpretivists (Secker et al., 1995). Qualitative methods can be described as any research where the idea is to collect the data in as natural a setting as is possible (Wright, 1996). Wright includes an array of methods that include participant observation and case studies, content analysis, and formal and informal interviewing, among several others.

It is important to recognise that the adoption of a paradigmatic position does not entail the adoption of a corresponding methodological position (Harvey, 1973). While a paradigm is connected with philosophy, which is concerned with value judgements and with the philosophical underpinnings of our beliefs, methodology concerns the logic of

justification, and ensuring that the arguments of a research are rigorous, the inferences are reasonable and the method used is internally coherent. The separation of methodology and philosophy provides flexibility in tackling problems. This makes positivism and interpretivism paradigms philosophically exclusive, and quantitative and qualitative approaches operationally compatible (Howe, 1985). Although both paradigms and methodologies are subject to criticisms, their practical usefulness has not been greatly reduced. As long as their limitations are acknowledged they can all make a contribution from their special angles to the base of knowledge (Mayer, 1995).

No approach or paradigm is absolutely superior. Each is open to use as long as it can be shown that its use is reasonable under the circumstances of a study (Harvey, 1973, pp.6-8). The methodological approach chosen for any research, therefore, should be germane to the task at hand and obtain the optimal data and insight from available sources.

The current study employs a positivistic paradigm. Quantitative methods will thus be ideal in testing the generalisability of particular factors for the determinants of international tourist flows, as ultimately this will enhance the reliability of the conclusions and allow generalisation to a larger population. In addition, the scope of the study (29 destinations and 11 source markets) precludes the application of most, if not nearly all, qualitative techniques.

7.3 Model Specification

To model international tourist flows to the Caribbean, a framework with the flexibility to consider both supply-side and demand-side determinants is required. The framework

thus needs to go beyond the traditional economic determinants of income and prices. As one of the study's main aims is also to provide a solution to the distance puzzle in tourism, the study elaborates on the concept of distance within the context of tourism to recommend factors that can provide a more complete model of international tourist flows. As discussed in Chapter 4, such factors include socio-psychological dimensions of distance, historical and contemporary colonial relationships, and climate distance, among others. The need to include such factors in modelling tourist flows precludes the use of non-causal models which have good forecasting performance but are atheoretical, single equation models which can be easily estimated and interpreted but are usually *ad hoc*, neoclassical demand models which have solid theoretical underpinnings but ignore many features of tourist flows, and artificial intelligence models which lack theoretical sophistication and are not easily interpreted.

This study thus employs the gravity model, as it is able to address the aforementioned and other shortcomings described in previous chapters. The model, with its basis in the physical sciences, is designed to simultaneously handle both the supply and demand sides of tourist flows. The concept of a gravitational force that repels and attracts bodies (flows) based on their degree of separation (distance) provides a compelling conceptual framework to solve the distance puzzle in tourism. Chapter 5 demonstrated the strong theoretical foundations of the model. Its flexibility allows it to be augmented with additional variables grounded in the conceptual model of gravity. Finally, and perhaps equally as important, the gravity model has demonstrated its empirical *bona fides*.

In Chapter 4, this study demonstrated that conceptually, distance is defined by more than physical or geographical distance. Put another way, distance is a multidimensional concept. Within the context of modelling tourist flows, such recognition is important, as it provides the key pillar on which a solution to the distance puzzle in tourism can be provided. Accordingly, distance is decomposed into various elements in order to isolate their individual effects, which would otherwise be masked, and which will help to explain the confounding relationship between geographic distance and tourist flows. Various dimensions of distance, as well as other relevant variables will therefore be employed to augment the gravity model.

The own-price or “effective price of tourism” (Mangion et al., 2005, p.49) and the substitute price are included in the gravity model of international tourist flows. Price variables do not appear in the various gravity models derived in Chapter 5. However, they can be used to augment the gravity model for several reasons. First, and perhaps most importantly, the own-price and substitute price are dimensions of distance, so they maintain the conceptual correspondence with the gravity model of the physical sciences. The own-price reflects the cost of touristic activities in the destination relative to those in the origin, that is, the distance between the price levels in the destination and the origin, while the substitute price reflects the cost of similar activities in a competitor relative to those in the origin, that is, the distance between the price levels in a competing destination and the origin. Second, inclusion of prices addresses the issue of multilateral resistance, essentially the problem of omitted variable bias in estimation of gravity models, raised by Anderson and van Wincoop (2003). Third, inclusion of prices means that the neoclassical model of demand is completely nested in the gravity model,

and thus the performance of the gravity model for estimating tourist demand can be more readily compared to such models.

The tourism own-price is calculated as:

$$P_{ijt} = (P_{it} / P_{jt})(e_{it} / e_{jt}) \quad (7.1)$$

where P_{it} and P_{jt} are the consumer price indices prices in destination i and source market j respectively, e_{it} is the exchange rate between country i 's currency and the US dollar (USD), and e_{jt} is the exchange rate between country j 's currency and the USD. For the Caribbean, a trade-weighted exchange rate—a weighted average of exchange rates of each Caribbean country's currency and the USD, with the weight equal to each country's share in total trade—is a multilateral exchange rate index employed as the region's measure of e_{jt} . Tourism own-price is expected to have a negative impact on tourist flows.

The substitute price employed is a weighted average of the relative prices of selected substitute destinations and the calculation takes the form of Stone's price index as follows:

$$\log P_{jkt} = \sum_{k=1}^n w_{jkt} \log(P_{kt} / P_{jt})(e_{kt} / e_{jt}) \quad (7.2)$$

where n is the number of substitute destinations; P_{kt} is the price in the substitute destination k ; e_{kt} is the exchange rate between competitor k 's currency and the USD, and e_{jt} is the exchange rate between country/region j 's currency and the USD; and w_{jkt} is the share of international arrivals to country k and is calculated as

$$w_{jkt} = TA_{jkt} / \sum_{k=1}^n TA_{jkt} \text{ where } TA_{jkt} \text{ is international arrivals to substitute destination } k$$

from origin country/region j at time t . The weights for calculating the substitute price change over time to reflect the dynamic behaviour of the substitution effect (Song et al., 2010). In this study, the top 5 destinations in terms of arrivals are used to construct a representative competitor for the Caribbean: the Bahamas, Cuba, Dominican Republic, Jamaica, and Puerto Rico.

Stone's price index is an appropriate measure for substitute price in tourism demand studies, where logarithm transformation is applied to the demand function, and aggregate price levels for a region are highly correlated (Li et al., 2004). Domestic prices may not assign appropriate weights to goods which tourists consume, but are employed because of their wide availability, making comparison among countries less problematic. Further, domestic prices and tourism prices tend to be highly correlated (Morley, 1994b). The substitute price should have a positive influence on tourist flows.

Aggregating the prices in alternative destinations by use of a weighted average of prices is a trade-off (Li, 2004). Inclusion of all potential substitute and even complementary destinations as individual variables in the model is highly impractical, particularly when it is expressed in dynamic form. Too many degrees of freedom will be lost and, since many prices tend to move in the same direction, the risk of multicollinearity, which leads to higher standard errors and renders statistically insignificant parameter estimates, raises its head. Another concern with the weighted index is that there is a certain degree of arbitrariness in selection of the countries to include in its construction. It is not known with certainty whether the countries are all substitutes, all complements, or a combination of each. So it is possible for the combined effects to offset, resulting

in insignificant estimates, if it is the latter. If all alternative countries are either all substitutes or all complements, their degree of substitutability or complementarity is likely to vary from each other.

In relation to the socio-psychological dimensions of distance, cognitive distance is positively related to geographical distance (Bratfisch, 1969; Briggs, 1973; Ekman & Bratfisch, 1965). Also, cultural distance is positively associated with psychic distance (Sousa & Bradley, 2005; 2006). The non-orthogonality of these distance dimensions would result in the econometric problem of multicollinearity when estimating the gravity model if they were all included. Therefore, geographical distance, cognitive distance, cultural proximity and psychic distance cannot be simultaneously specified in the same gravity model.

Practical considerations remove psychic distance from direct consideration. First, measurement of the psychic distance in relation to each the destination would require collection of primary data from the population in each source market. Second, a method of aggregating the individual psychic distances of tourists would have to be devised as this research is a macro-scale study of international tourist flows. Third, since time is a dimension in the study, historical data on psychic distance would be required, or else it would have to be assumed invariant to time. However, the effect of psychic distance can be inferred indirectly from the effect of economic similarity—another distance dimension to be modelled in this study—on tourist flows. Psychic distance tends to be smaller between countries that are economically similar and greater for countries that are economically dissimilar; that is, greater economic similarity implies a smaller psychic distance. Thus, if a greater degree of economic similarity

between countries increases the volume of tourist flows, then it can be inferred that a smaller psychic distance increases tourist flows.

Geographic distance is measured between the capital cities of each country using the great circle formula which gives the shortest distance between two points on a sphere:

$$D_{ij} = 3962.6 \arccos[\sin(\text{latitude}_i) \cdot \sin(\text{latitude}_j) + \cos(\text{latitude}_i) \cdot \cos(\text{latitude}_j) \cdot \cos(\text{longitude}_j - \text{longitude}_i)] \quad (7.3)$$

where D_{ij} is distance between country i and country j 's capital cities in miles; and latitude and longitude are expressed in radians. To calculate the distance from the Caribbean source market to each Caribbean country, the latitudinal and longitudinal coordinates of the middle of the Caribbean Sea are used. International tourist flows are expected to have a negative relationship with geographic distance.

Because of the problem of multicollinearity, cognitive distance and geographic distance cannot be specified in the same model. One possibility might be to estimate the effect of cognitive distance in a separate specification which excludes geographic distance. This would involve use of the cognitive distance construct established by Stevens (1957) which specifies a relationship between cognitive and actual distance:

$$D_{ij}^G = kD_{ij}^n \quad (7.4)$$

where D_{ij}^G is cognitive distance between i and j ; D_{ij} is geographic distance between i and j ; n is an exponent related to cognitive estimates of geographical distance; and k is a proportionality constant. Expressed in logarithms, Equation (7.4) demonstrates clearly that geographic distance and cognitive distance are linearly related:

$$\log D_{ij}^G = \log k + n \log D_{ij} \quad (7.5)$$

Thus the effect of cognitive distance need not be directly estimated since it can be indirectly calculated using Equation (7.5) for given values of the parameters k and n .

Cultural proximity is measured following the approaches of Disdier et al. (2010), Holloway (2013) and Maystre et al. (2009). Real bilateral trade in cultural goods between the origin and destination countries is used to proxy cultural proximity:

$$CP_{ijt} = \frac{\sum^Z Exports_{ijt}^{Cul} + Imports_{ijt}^{Cul}}{GDPD_t^{USA}} \quad (7.6)$$

where $Exports_{ijt}^{Cul}$ are exports of cultural goods from country i to country j ; $Imports_{ijt}^{Cul}$ are country i 's imports of cultural goods from country j ; $GDPD_t^{USA}$ is the GDP deflator for the USA; and the summation is over Z cultural goods.

Cultural goods are defined by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) as “consumer goods which convey ideas, symbols and ways of life,... [such as] books, magazines, multimedia products, software, recordings, films, videos, audiovisual programmes, crafts and fashion design” (UNESCO, 2000, p.13). Such goods “convey and construct cultural values, produce and reproduce cultural identity” (UNESCO, 2000, p.9). However, cultural tendencies are dynamic; they change over time as cultures change, some across nations and supranational regions, some very localised (La Pastina & Straubhaar, 2005). Trade in cultural goods is able to capture at an aggregate level the nuances that arise from various cultural dimensions, as well as to demonstrate the evolution in these dimensions, and thus cultural proximity over time. International tourist flows should be greater between countries that are culturally proximate and *vice versa*, so there should be a positive relationship between

cultural proximity and international tourist flows. The categories of cultural goods can be found in [Appendix B1](#).

Two variables are used to capture three dimensions of the historical or contemporary colonial effect on international tourist flows: an ordinal variable which reflects if a destination is a former or current colony of a particular source market, and also indicates the level of current dependence; and a continuous variable which estimates the intensity of the colonial relationship. For the cases when a destination had more than one colonial power in its history, the last colonial power is taken as the coloniser. In most instances, the last coloniser is typically the country with the most years of colonial control. The impact of another important colonial dimension, the relationship between Caribbean countries which share(d) the same colonial power, on international tourist flows cannot be estimated because the arrivals data for the Caribbean source market is aggregated. [Appendix B2](#) provides the colonial profile of each destination.

The ordinal variable, *Col1*, is bi-dimensional. *Col1* takes a value of 1 if a destination is a former colony (that is, independent or sovereign territory), 2 if it is a partial colony, 3 if it is a full colony, and 0 otherwise (Putterman, 2003; Strang, 1991). It thus indicates if a colonial relationship existed or still exists, as well as the nature of the relationship. Larger values imply a greater level of dependence or a closer relationship than smaller values. As a number of destinations became independent or changed from full to partial colony during the period under investigation, *Col1* will toggle either from 3 to 1, or 3 to 2 in the year of the change; no countries changed from a state of independence to any level of dependence, or from partial to full colony. *Col1* should have a positive effect on international tourist flows.

Col2, which captures the intensity of the colonial relationship, is calculated as the ratio of the number of years a destination was/is under colonial rule to the number of years since it was colonised. This is a modification of Grier (1999) who uses the number of years a country was under colonial rule. The problem with Grier's measure is that it suggests that a country that is currently a sovereign nation but was under colonial rule for a lengthier period than a current colony (overseas territory) has a stronger dependent relationship with the colonial power, even though the nature of the relationship has changed. Values for *Col2* will thus decline over time for independent countries, to reflect the possible waning influence of the former colonial power, but will have a constant value of 100 for those countries that are still colonised. *Col2* is expected to have a negative effect.

Two variables are employed to measure diasporic and transnational effects on international tourist flows: one from the perspective of Caribbean-born migrants living in the various source markets, and the other from the perspective of migrants born in the source markets but living in the various destinations. The diasporic variable is measured as the stock of Caribbean-born residents in each source market. This variable captures the effect of the return home for ethnic reunion and VFR on international tourist flows. Similarly, the immigrant effect is based on the stock of foreign-born residents in each destination country from each source market. The latter variable captures the effect of travel for VFR reasons as well. This study's measures for both the diasporic and immigrant variables are consistent with those employed by Law, Genc and Bryant (2013). Whereas the diasporic variable is a push variable, the immigrant variable is a pull variable. For example, consider tourist flows from the UK to Barbados. The value of the diasporic variable will equal the stock of Barbadian-born

residents in the UK, while the immigrant variable will equal the number of UK-born residents in Barbados.

Estimates of the migrant stock in each country are based on data from 1960, 1970, 1980, 1990, 2000 and 2010. To calculate exact values for the intervening years, data on deaths and international movements by place of birth would be necessary, but are widely unavailable. Therefore, the number of foreign residents in each destination and source market in intervening years is estimated using a cubic spline. Cubic splines are a more convenient and simpler method of interpolation compared to general spline functions (Yoon & Rao, 1993), which allows for better estimates of where the missing points lie. Both the diaspora and immigrant variables should have a positive influence on international tourist flows. As the available data does not consider migrant generations beyond the first, the effect of both variables is likely to be underestimated.

Economic similarity is measured in two ways: the absolute value of the difference in GDP per capita between the destination and origin (McPherson et al., 2001), $|(Y_{it}/N_{it}) - (Y_{jt}/N_{jt})|$; and the absolute value of the difference in GDP per capita between the destination and origin as a ratio to the sum of the per capita GDPs in the destination and origin (Choi, 2002), $|(Y_{it}/N_{it}) - (Y_{jt}/N_{jt})| / [(Y_{it}/N_{it}) + (Y_{jt}/N_{jt})]$. If HOS theory holds, the greater the degree of similarity, the lower the volume of tourist flows. On the other hand, if Linder's hypothesis holds, the greater the degree of similarity, the greater the volume of tourist flows. So the expected impact of economic similarity on tourist flows is ambiguous. A positive relationship would support HOS while a negative relationship would support Linder's hypothesis. The results from this

distance variable should provide evidence for one of two macroeconomic theories of tourist flows.

The second-generation climatic index for tourism (CIT) by de Freitas, Scott, and McBoyle (2008, p.403) is employed to estimate climate distance. First, annual climate rates for all destinations and origins are calculated as follows:

$$CR = 6.4 + 0.4TSN - 0.281TSN^2 \quad (7.7)$$

where TSN is thermal sensation. TSN uses the standard 9-point scale of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE). The score on the ASHRAE scale is based on apparent temperature (AT) (see [Appendix B3](#)) calculated as follows (Steadman, 1994):

$$AT = Ta + 0.33e - 0.70ws - 4.00 \quad (7.8)$$

where Ta is the dry bulb temperature in °C; e is water vapour pressure/humidity measured in hectopascals; and ws is wind speed in metres/second. Different combinations of the underlying variables can thus result in similar levels of physiological stress as calculated by the CIT. The CIT is considered superior to the TCI by Mieczkowski (1985), as it is based on the climatic preferences of tourists.

The CIT implicitly assumes the existence of a climatic ideal for touristic activities; CR is highest when the ASHRAE/ TSN score is equal to one, and takes lower values with ASHRAE scores associated with greater physiological stress from a thermal perspective. In this regard, it is conceptually similar to the TCI, which also assumes a climatic ideal. Climate distance is measured in two ways: the absolute value of the difference in climate rates between the destination and origin, $|CR_{it} - CR_{jt}|$; and the absolute value of the difference in climate rates between the destination and origin as a

ratio to the sum of the climate rates in the destination and origin,

$|CR_{it} - CR_{jt}| / (CR_{it} + CR_{jt})$. These formulations account for both the push (climate of origin) and pull (climate of destination) dimensions of climate on tourism demand. The climate rate for the Caribbean, considered arid by the Köppen-Geiger climate classification (Peel et al., 2007), is calculated as a population-weighted average of the climate rates for all Caribbean countries, which assigns a higher weight to more populous countries and thus better reflects the average climate exposure for the region. These formulations also demonstrate that changes in climate distance can occur if the climate in the destination, origin or both change.

It is expected that the greater the difference in climate rates between destination and source country or region, the greater will be the tourist flows from the source to the destination. For example, individuals seeking to engage in touristic activities requiring climatic attributes unavailable in their country will be more inclined to travel to a destination with those attributes. Therefore, the greater the gap between tourism physiological comfort in the destination relative to that in the source market, that is, a large climate distance, the greater the volume of tourist flows. In contrast, a country with climatic attributes that generate physiological comfort levels similar to those of the home country—that is, a small climate distance—will hold less appeal on the basis of climate, leading to a smaller volume of tourist flows. A positive relationship between climate distance and tourism demand is thus expected.

Econometrically, the multidimensional distance variable is a combination of weighted geometric (when the dimensions are measured in percentage changes) and arithmetic (when the dimensions are measured in level changes) averages, where the weights are

regression coefficients and thus free to vary. The gravity model can thus be expressed econometrically as:

$$\begin{aligned} \ln TF_{ijt} = & \alpha_0 + \alpha_1 \ln Y_{it} + \alpha_2 \ln Y_{jt} + \alpha_3 \ln N_{it} + \alpha_4 \ln N_{jt} + \alpha_5 \ln P_{ijt} + \alpha_6 \ln P_{jkt} \\ & + \alpha_7 \ln D_{ij} + \alpha_8 \ln CP_{ijt} + \alpha_9 Col1_{ijt} + \alpha_{10} Col2_{ijt} + \alpha_{11} \ln DA_{ijt} + \alpha_{12} \ln IM_{ijt} \\ & + \alpha_{13} \ln ES_{ijt} + \alpha_{14} \ln CD_{ijt} + u_{ijt} \end{aligned} \quad (7.9)$$

where i and j are destination and source market respectively; t is a time subscript; TF_{ijt} represents total long-stay international tourist arrivals from source market j to destination i in time period t ; Y_{it} and Y_{jt} are the real GDPs of i and j respectively in time period t ; N_{it} and N_{jt} are the respective populations of countries i and j in time period t ; P_{ijt} and P_{jkt} are real tourism prices in i and k (competing destination) respectively in time period t ; D_{ij} is the geographic distance between countries i and j ; CP_{ijt} is cultural proximity between countries i and j at time t ; $Col1_{ijt}$ and $Col2_{ijt}$ are two colonial variables; DA_{ijt} is the stock of diaspora from country i in country j at time t ; IM_{ijt} is the stock of immigrant residents from country j in country i at time t ; ES_{ijt} is economic similarity between country i and country j at time t ; CD_{ijt} is the climate distance between countries i and country j at time t ; and u_{ijt} is a well-behaved error term, which captures all influences unaccounted for in the model.

Per capita real GDP is highly correlated with the quality of domestic infrastructure and thus captures the capability of the destination to provide tourism goods and services. It also captures the source markets' absorptive capacity for tourism services (Sandberg et al., 2006). Another reason for using per capita GDPs is that the populations of the

origin and destination already capture economies of scale in production. There are also econometric considerations for using per capita GDPs rather than aggregate GDPs. Aggregate GDP and population are likely to be highly correlated, as countries with larger populations typically have larger GDPs and *vice versa*. This would lead to problems associated with multicollinearity when estimating the gravity model. Per capita GDP is less likely to be highly correlated with population, as some countries with larger populations have relatively low per capita incomes, while other countries with relatively smaller populations have relatively high per capita incomes.

Some simple algebraic manipulation on Equation (7.9) can be performed to incorporate per capita GDPs which results in:

$$\begin{aligned}
 \ln TF_{ijt} = & \alpha_0 + \alpha_1 \ln \left(\frac{Y_{it}}{N_{it}} \right) + \alpha_2 \ln \left(\frac{Y_{jt}}{N_{jt}} \right) + \alpha_3^p \ln N_{it} + \alpha_4^p \ln N_{jt} \\
 & + \alpha_5 \ln P_{ijt} + \alpha_6 \ln P_{jkt} + \alpha_7 \ln D_{ij} + \alpha_8 \ln CP_{ijt} + \alpha_9 Col1_{ijt} + \alpha_{10} Col2_{ijt} \\
 & + \alpha_{11} \ln DA_{ijt} + \alpha_{12} \ln IM_{ijt} + \alpha_{13} \ln ES_{ijt} + \alpha_{14} \ln CD_{ijt} + u_{ijt}
 \end{aligned} \tag{7.10}$$

where $\alpha_3^p = \alpha_1 + \alpha_3$ and $\alpha_4^p = \alpha_2 + \alpha_4$.

7.3.1 Zero Observations

It is important to note that the sample contains a number of zero observations; that is, in some instances, reported tourist flows are zero. Zeroes do not necessarily reflect unobservable tourist flows but are the result of choices made by tourists. These observations present an empirical problem, as the dependent variable is in logarithms. One cannot take the logarithm of zero.

A first possibility is to ignore the zeroes. Omission of zeroes could significantly reduce the size of the sample and lead to considerable information loss, limiting the analysis positive tourist flows only and introducing sample selection bias, as the selected sample would not be random. Following Eichengreen and Irwin (1998), a value of one is added to tourist flows in each period prior to the natural logarithm being taken. The dependent variable thus becomes $TF_{ijt}^{\eta} = TF_{ijt} + 1$. In the cases where there are no tourist flows from a source market to a Caribbean destination, $\ln TF_{ijt}^{\eta} = 0$. When $TF_{ijt} > 0$ the dependent variable becomes $\ln TF_{ijt}^{\eta} = \ln(TF_{ijt} + 1)$, which is not significantly different from $\ln TF_{ijt}$. A similar transformation is applied to the variables DA and IM since there are several countries which do not have any foreign-born residents from some countries in the sample, and CP , as there are occasions when trade flows in cultural goods are zero.

The final model to be estimated is:

$$\begin{aligned}
 \ln TF_{ijt}^{\eta} = & \alpha_0 + \alpha_1 \ln \left(\frac{Y_{it}}{N_{it}} \right) + \alpha_2 \ln \left(\frac{Y_{jt}}{N_{jt}} \right) + \alpha_3^{\rho} \ln N_{it} + \alpha_4^{\rho} \ln N_{jt} \\
 & + \alpha_5 \ln P_{ijt} + \alpha_6 \ln P_{jkt} + \alpha_7 \ln D_{ij} + \alpha_8 \ln CP_{ijt}^{\eta} + \alpha_9 Col1_{ijt} + \alpha_{10} Col2_{ijt} \\
 & + \alpha_{11} \ln DA_{ijt}^{\eta} + \alpha_{12} \ln IM_{ijt}^{\eta} + \alpha_{13} \ln ES_{ijt} + \alpha_{14} \ln CD_{ijt} + u_{ijt}
 \end{aligned} \tag{7.11}$$

There are four specifications for Equation (7.11) since economic similarity and climate distance are each measured in two possible ways. Equation (7.11) addresses many of the shortcomings identified in the literature in relation to modelling international tourist flows, namely, modelling the supply side as well as the demand side, consideration of perspectives from various bodies of knowledge, such as, economics (microeconomics

and macroeconomics/international trade), geography, history, socio-psychology, and the impact of climate, and a sound conceptualisation of all variables in the final models. In addition, the final models are specified within the context of gravity, a theoretical and empirical framework that incorporates all of these elements simultaneously. The model also forms the penultimate step in examination of the distance puzzle in tourism.

For comparative purposes the negative exponential distance decay model from Equation (4.4) expressed in logarithms (the logarithm decay function) will be estimated:

$$\ln TF_{ijt}^{\eta} = \varphi_0 + \varphi_1 D_{ij} + \xi_{ijt} \quad (7.12)$$

where ξ_{ijt} is the error term. Other distance decay functions exist, for example, the quadratic and linear decay functions. However, there is not a great difference in applying different functions (Hammond & Youngs, 2011). A standard gravity model augmented by prices will also be estimated:

$$\begin{aligned} \ln TF_{ijt}^{\eta} = & \pi_0 + \pi_1 \ln \left(\frac{Y_{it}}{N_{it}} \right) + \pi_2 \ln \left(\frac{Y_{jt}}{N_{jt}} \right) + \pi_3^{\rho} \ln N_{it} + \pi_4^{\rho} \ln N_{jt} \\ & + \pi_5 \ln P_{ijt} + \pi_6 \ln P_{jkt} + \pi_7 \ln D_{ij} + \varepsilon_{ijt} \end{aligned} \quad (7.13)$$

where ε_{ijt} is the error term. The price variables are included as they are a necessary condition for consistent estimation of gravity models (Anderson & van Wincoop, 2003).

The final step, the econometric methods for estimating the gravity model, will be described in Section 7.5.

7.4 Data and Sources

There are 29 destination countries in this study of the Caribbean: Anguilla, Antigua and Barbuda, Aruba, the Bahamas, Barbados, Bermuda, Bonaire, the British Virgin Islands, Cayman Islands, Cuba, Curacao, Dominica, the Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Puerto Rico, Saba, St. Eustatius, St. Kitts and Nevis, St. Lucia, St. Maarten, St. Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos and the United States Virgin Islands. There are 11 source markets: Belgium, Canada, the Caribbean, France, Germany, Italy, the Netherlands, Spain, Sweden, the UK, and the USA. On an aggregate basis, these markets have averaged 87 percent of total long stay arrivals to the Caribbean for over 30 years, and are therefore very representative of international tourist flows to the region.

Data on long stay arrivals runs from 1980-2012 for Canada, the Caribbean, UK and USA. Arrivals from France, Germany, Italy, the Netherlands, Sweden, and Spain are from 1990-2012, and for Belgium from 1997-2012. Consequently the panel is unbalanced. The unbalanced panel allows for all available information to be efficiently used without arbitrarily eliminating observations in order to balance the sample, as this would result in sample selection bias, yielding inefficient estimates.

Annual arrivals data is collected from the Caribbean Tourism Organisation (CTO). Real GDP per capita in USD (2005 = 100), the GDP deflator (2005 = 100), population, and exchange rates relative to the USD are taken from the World Bank *World Development Indicators* (WDI); real GDP per capita and population data for Guadeloupe and Martinique are obtained from the National Institute of Statistics and

Economic Studies (INSEE) online database and the World Bank Atlas. CPI's (2005 = 100) are obtained from the International Monetary Fund (IMF) *International Financial Statistics* online database. Coordinates of latitude and longitude needed to calculate distances between capital cities using the great circle formula are obtained from the Central Intelligence Agency (CIA) *World Factbook*; coordinates for the Caribbean source market are estimated using latitudinal and longitudinal coordinates for the middle of the Caribbean Sea. Bilateral trade data in cultural goods and total trade in USD are taken from the United Nations COMTRADE online database. Historical climate observations on average annual temperature and vapour pressure are obtained from Harris et al. (2013), and daily wind speed observations from the National Oceanic and Atmospheric Administration (NOAA) online database are averaged to obtain annual figures. Bilateral migration data is obtained from the World Bank online database on migration and remittances. Information to construct the colonial variables is obtained from Strang (1991), Mayer and Zignago (2006), and McKercher and Decosta (2007).

7.5 Econometric Methods

In Chapter 5, the literature review found that only four gravity studies account for the dynamic nature of tourist flows: Khadaroo and Seetanah (2008), Seetanah, Durbarry and Ragodoo (2010), Massidda and Etzo (2012), and Fourie and Santana-Gallego (2013b). Of these, only Seetanah, Durbarry and Ragodoo, consider the possibility of a long-run relationship (using fully modified OLS), but fail to describe the short-run relationship. This study will address these methodological shortcomings by employing

panel cointegration techniques, and a dynamic estimation approach, the auto-regressive distributed lag (ARDL) framework.

Panel cointegration techniques have been employed very rarely in the tourism literature. Most studies test for a long-run relationship between tourism and economic growth, and whether tourism Granger-causes growth or *vice versa* (Dritsakis, 2012; Lee & Chang, 2008; Narayan et al., 2010). In terms of tourist flows, apart from Seetanah, Durbarry and Ragodoo (2010), the others are Moore (2010) and Seetaram (2010). Moore forecasted the future impact of climate change using an *ad hoc* specification of tourism demand estimated by panel ARDL techniques. Seetaram also estimated an *ad hoc* specification of tourism demand. Although, Seetaram tested for and found a cointegrating relationship among the variables, she did not construct an ECM, thus failing to simultaneously model the short- and long-run relationship. Instead, she estimated a short-run demand model with one lag of arrivals to account for the habituated tourist, using least squares dummy variable (LSDV) approaches and the Arellano and Bond (1991) generalised method of moments (GMM) estimator.

7.5.1 Auto-Regressive Distributed Lag (ARDL) Approach

The ARDL bounds test approach to testing for cointegration by Pesaran, Shin and Smith (2001) is appropriate irregardless of whether the underlying regressors are integrated of order zero, $I(0)$, order one, $I(1)$, or fractionally integrated; however, the dependent variable must be $I(1)$. In this regard, it is superior to all other cointegration tests, which require all variables to be integrated of the same order. Another advantage of the bounds test is that it is more efficient in finite samples. The long-run estimates from

application of the technique are unbiased. Further, this approach avoids issues related to omitted variables and serial correlation.

Consider the following model of tourist arrivals modelled as a conditional error correction model (ECM):

$$\Delta y_{ijt} = \alpha_0 + \alpha_1 t + \phi y_{ij,t-1} + \beta_i' x_{ij,t-1} + \sum_{s=1}^{q-1} \beta_s^{*'} \Delta x_{ij,t-s} + \sum_{s=1}^{q-1} \eta_s' \Delta y_{ij,t-s} + u_{ijt} \quad (7.14)$$

where y_{ijt} are tourist arrivals; α_0 is a drift term; t is a linear time trend; $x_{ij,t-1}$ is a $k \times 1$ vector of explanatory variables; p and q are the orders of the autoregressive and distributed lag components respectively; and u_{ijt} is stationary error term. The maximum number of lags for the ARDL model in this study will be determined by the Schwarz Bayesian Criterion (SBC); up to four lags, representing four years are tested for each model. To obtain valid coefficient estimates, the ECM must exist, the residuals must be uncorrelated and the explanatory variables strictly exogenous. The long-run coefficients are equal to $-\beta_i' / \phi$.

The bounds test is based on an F test of ϕ and β under a null hypothesis of no cointegration. The distribution of the test is non-standard and critical values are found in Pesaran, Shin and Smith (2001, pp.300-01). Another element of the bounds test involves a t test of ϕ . Critical values for the t are found in Pesaran, Shin and Smith (2001, pp.303-04). The nonstandard distributions for both tests depend on the number of regressors, and whether the ARDL model contains an intercept and/or a trend. Two sets of critical values for a given significance level are given. The lower bound is calculated on the assumption that all variables included in the ARDL model are $I(0)$, while upper bound is calculated on the assumption that the variables are $I(1)$. If either

statistic exceeds the upper critical value, this is evidence of a long-run relationship. If either statistic falls below the lower critical value, the null hypothesis of no cointegration cannot be rejected. A value of either statistic that lies within the bounds makes the test inconclusive.

7.5.2 Panel Unit Root Tests

Before conducting the ARDL cointegration technique, the order of integration of the variables needs to be determined, as some of the variables in the gravity models are likely to be non-stationary. Ignoring the non-stationarity of variables in regressions can lead to invalid inferences (Pesaran & Smith, 1998). In addition, the ARDL bounds test is based on the assumption that the variables are not $I(2)$. In the presence of $I(2)$ variables, the critical values provided by Pesaran, Shin and Smith (2001) cannot be employed.

This study employs three panel unit root tests to take advantage of the panel structure of the data: Levin, Lin and Chu (2002); Im, Pesaran and Shin (2003) and Hadri (2000).

The Levin, Lin and Chu (LLC) test has the following form:

$$\Delta x_{ijt} = \alpha_{ij} x_{ij,t-1} + \sum_{s=1}^{k_s} \beta_{ijs} \Delta x_{ij,t-s} + \varepsilon_{ijt} \quad (7.15)$$

where x_{ijt} are the variables under investigation; ε_{ijt} is a stationary error; and the lag orders for the difference terms are given by k_s . The LLC test assumes that $\alpha_{ij} = \alpha$; that is, there is a common unit root process. Estimates of α are derived from values for Δx_{ijt} and $\Delta x_{ij,t-1}$ that are standardised and free from autocorrelation and deterministic influences.

The Im, Pesaran and Shin (IPS) test permits the persistence parameter, α_{ij} , to vary across cross-sections. The test statistic is obtained from averaged and standardised t -ratios on α_i from separate augmented-Dickey Fuller regressions for each cross-section. For the LLC and IPS tests, the null hypothesis of a unit root process is rejected if the coefficient α is less than zero.

The null hypothesis of the Hadri (2000) test is that no unit root exists in any of the series in the panel. The test is based on the residuals from the individual OLS regressions of x_{ijt} on a constant, or on a constant and a trend. The test statistic is derived from an average of the individual test statistics.

7.6 Summary

It is important to consider the methodological choices available in social sciences research and the links between ontology and methodology. This chapter therefore covered several elements related to the methodological and philosophical justification of the research design. Both positivist and interpretivist paradigms are acknowledged as having their own strengths and weaknesses. However, the objectives of this research necessitate a positivist approach to our investigation. The specification of the gravity models which will be used in estimation were presented, along with explanation of the data that will be used to operationalise the variables, their sources and the method of estimation. The next chapter presents the results from estimation of the models outlined in the current chapter along with an analysis of the findings.

8.1 Introduction

The aim of this chapter is to present the empirical estimates and undertake a critical assessment of the findings from estimation of the various models of international tourist flows outlined in Chapter 7. The results will also be used to examine the distance puzzle in tourism.

8.2 Results

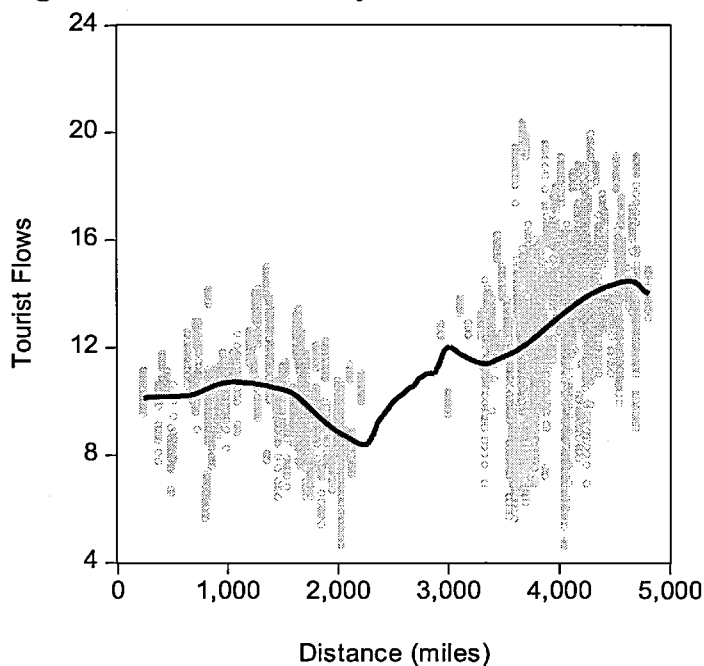
8.2.1 *Graphical Evidence of International Tourist Flows to the Caribbean*

Figure 8.1 presents a geographic distance decay plot of international tourist flows to the Caribbean to determine if any of the four distance decay patterns identified in Chapter 4 is representative of the case under study. To extract the signal between tourist flows and geographic distance from the cloud of observations, the Epanechnikov kernel smoother (Epanechnikov, 1969)—a statistical technique for estimating a real valued function by using its noisy neighbours when no parametric model for the function is known—is used to smooth the data. In essence, a kernel smoother represents a set of irregular data points as a smooth line or surface. The Epanechnikov kernel is employed due to its relative ease of estimation.

The overall decay pattern in Figure 8.1 suggests that international tourist flows to the Caribbean exhibit a bimodal distance decay profile, broadly representative of Figure 4.3. However, Figure 8.1 consists of two clouds of tourist flows observations. In the first cloud, there is an upward trend in tourist flows for destinations within 1000 miles

of the source markets, then a very noticeable decline for destinations located in the next 1200 miles. This cloud demonstrates the classical decay profile shown in the first panel of [Figure 4.1](#). Tourist flows in this cloud, which can be considered short-haul as the various destinations are within 3000 miles of the origins (Bowen, 2001), are from the Caribbean, Canadian and USA source markets. No Caribbean destinations lie between approximately 2200 to 3000 miles from the source markets.

Figure 8.1: Distance Decay for International Tourist Flows to Caribbean



Source: Present author

In the second cloud, which begins at a distance of roughly 3000 miles from the origins, the general trend in international tourist flows is positive, peaks at a distance of around 4800 miles from the origins, and shows signs of a decline thereafter. Tourist flows in the second cloud, which can be considered long-haul, derive from the European source markets.

At this juncture, the graphical evidence appears to show that geographic distance has a frictional effect to source markets relatively close to the destination. In contrast, it appears to be an attractive feature for source markets that are relatively distant from the destination. The latter suggests that factors other than geographic distance may be the cause. To investigate further, the study turns to estimation of the gravity models outlined in Chapter 7.

8.2.2 Estimation of International Tourist Flows to the Caribbean

The first step before the empirical models are estimated is to test the stationarity properties of all variables under consideration. The results of various tests are presented in [Table 8.1](#).

Table 8.1: Panel Unit Root Tests

	LLC		IPS		Hadri	
	Level	First Difference	Level	First Difference	Level	First Difference
$(y/n)_{it}$	1.176 (0.880)	-115.908 (0.000)***	-1.053 (0.146)	14.405 (0.000)***	27.864 (0.000)***	-0.147 (0.558)
$(y/n)_{jt}$	4.087 (1.000)	-12.796 (0.000)***	-1.844 (0.033)**	NA	16.221 (0.000)***	-8.036 (1.000)
n_{it}	8.169 (1.000)	-20.221 (0.000)***	-0.630 (0.264)	-8.136 (0.000)***	19.680 (0.000)***	0.738 (0.230)
n_{jt}	6.316 (1.000)	-10.547 (0.000)***	0.634 (0.737)	-6.277 (0.000)***	46.461 (0.000)***	3.185 (0.832)
p_{ijt}	-4.649 (0.000)***	NA	3.428 (1.000)	-67.149 (0.000)***	46.714 (0.000)***	-5.476 (1.000)
p_{jkt}	10.852 (1.000)	-64.717 (0.000)***	25.578 (1.000)	-59.256 (0.000)***	48.684 (0.000)***	-4.429 (1.000)
d_{ij}	-33.654 (0.000)***	NA	-45.124 (0.000)***	NA	0.863 (0.968)	NA
cp_{ijt}	-4.894 (0.000)***	NA	-2.023 (0.022)**	NA	39.114 (0.000)***	-4.287 (1.000)
$COL1_{ijt}$	-2.541 (0.001)***	NA	-7.3×10^{15} (0.000)***	NA	1.169 (0.763)	NA
$COL2_{jkt}$	-32.439 (0.000)***	NA	-107.358 (0.000)***	NA	2.984 (0.486)	NA
da_{ijt}	-28.498 (0.000)***	NA	-9.633 (0.000)***	NA	1.483 (0.379)	NA
im_{ijt}	-19.836 (0.000)***	NA	-10.355 (0.000)***	NA	2.845 (0.232)	NA
$es1_{ijt}$	-0.097 (0.461)	-26.740 (0.000)***	-6.678 (0.000)***	NA	21.260 (0.000)***	-2.770 (0.997)
$es2_{ijt}$	-2.328 (0.010)**	NA	-6.446 (0.000)	NA	-1.069 (0.858)	NA
$cd1_{ijt}$	0.591 (0.723)	-82.701 (0.000)***	-13.681 (0.000)***	NA	31.304 (0.000)***	1.057 (0.454)
$cd2_{ijt}$	-0.918 (0.179)	-82.669 (0.000)***	-12.998 (0.000)***	NA	34.022 (0.000)***	1.249 (0.623)

Source: Present author

Notes: All variables in lower case letters are in natural logarithms. $es1$ is $\ln \left| \left(\frac{Y_{it}}{N_{it}} \right) - \left(\frac{Y_{jt}}{N_{jt}} \right) \right|$ and $es2$ is $\ln \left(\left| \left(\frac{Y_{it}}{N_{it}} \right) - \left(\frac{Y_{jt}}{N_{jt}} \right) \right| / \left[\left(\frac{Y_{it}}{N_{it}} \right) + \left(\frac{Y_{jt}}{N_{jt}} \right) \right] \right)$. $cd1$ is $\ln |CR_{it} - CR_{jt}|$ and $cd2$ is $\ln \left[\left| CR_{it} - CR_{jt} \right| / (CR_{it} + CR_{jt}) \right]$. LLC and IPS are the Levin, Lin and Chu and Im, Pesaran and Shin panel unit root tests respectively. Values in parentheses are p-values. ***, **, and * indicate significance at the 1 and 5 percent levels respectively. NA means not applicable.

The tests indicate that international tourist flows are integrated of order one. There is disagreement between some tests for some series, which is a common occurrence. Despite the disagreement though, no series is integrated of order greater than one.

The next step is to conduct the bounds tests for cointegration by Pesaran, Shin and Smith (2001). Results from the tests of the various gravity specifications with extended distance variable, along with the distance decay model and standard gravity model augmented with prices are provided in Table 8.2, which are also being estimated for purposes of comparison. The bounds tests indicate that for each specification there is evidence of a long-run relationship; only Specification 1 didn't pass both tests. Accordingly, ECMs can be estimated for each specification.

Table 8.2: Bounds Test for Cointegration

Specification	F-Test	t-test
1	6.275***	-3.491
2	6.457***	-4.604*
3	6.450***	-4.647*
4	6.415***	-4.572*
Distance Decay Model	76.531 ***	-8.748 ***
Gravity Model Augmented by Prices	11.105 ***	-6.694 ***

Source: Present author

*Notes: ***, and * indicate the test is above the upper bound, indicating cointegration, at the 1 and 10 percent levels respectively. Model specifications are shown in Tables 8.3-8.5.*

Distance Decay Model

The results for the distance decay model are presented first in Table 8.3. Even though evidence of a cointegrating relationship was found between international tourist flows and geographic distance, the results from a static fixed effects model are also presented to be perfectly consistent with the original distance decay function, which does not consider the dynamic behaviour of tourist flows.

Table 8.3: Estimates for Distance Decay Model

Coefficients	Static FE Model	SR	LR
d_{ij}	-0.027 (0.792)	-0.002 (0.000)***	-0.198 (0.000)***
constant	3.424 (0.000)***	0.052 (0.000)***	4.750 (0.000)***
ECT	---	-0.011 (0.000)***	
Adjusted R ²	0.244	0.279	
SER	2.571	2.509	
SBC	4.729	0.444	
DW	0.018	1.832	
F-stat	0.069 (0.792)	46.627 (0.000)***	
Observations	6982	5348	

Source: Present author

Notes: All variables in lower case letters are in natural logarithms.

ECT is the error correction term. FE stands for fixed effects. SR and

LR are short run and long run respectively. SER is the standard error

of the regression. SBC is the Schwarz Bayesian Criterion. DW is the

Durbin-Watson statistic. Values in parentheses are p-values.

*** indicates significance at the 1 percent level.

The static distance decay model performs poorly in explaining international tourist flows to the Caribbean. The coefficient on the geographic distance variable is negative, but insignificant. Results from the error-correction distance decay function perform better in comparison. The error correction term (ECT) is negative and very significant. It implies that there is adjustment to long-run equilibrium at 1.1 percent each period. The short- and long-run distance coefficients are negative and also highly significant. Results for the long run imply that for every 10 percent increase in distance, there is decline in tourist flows of around 2 percent. However, the error correction distance decay function explains only 28 percent of the variation in tourist flows to the Caribbean. This result is unsurprising, as the basic functional form of the distance decay function, even in error correction form, would be unable to explain the shape of the decay curve shown in [Figure 8.1](#). This suggests that other factors possibly explain a greater proportion of the variation in tourist flows, a proposition that will be confirmed by the results of other model estimation.

Standard Gravity Model Augmented by Prices

This specification of the gravity model includes GDP per capita and population of both the origin and destination, as mass variables. Distance in this model is represented by the geographic distance between the origin and destination, and is augmented by tourism own-price and substitute price, which are also dimensions of distance as shown in Chapter 7. Inclusion of the price variables is also necessary for consistent estimation of the gravity model (Anderson & van Wincoop, 2003). Results are shown in Table 8.4.

Table 8.4: Estimates for Gravity Model Augmented by Prices

Coefficients	SR	LR
$(y/n)_{it}$	0.003 (0.000)***	0.227 (0.000)***
$(y/n)_{jt}$	0.016 (0.000)***	1.179 (0.000)***
n_{it}	0.007 (0.000)***	0.548 (0.000)***
n_{jt}	0.001 (0.037)**	0.099 (0.037)**
p_{jit}	-0.0004 (0.046)**	-0.027 (0.046)**
p_{jkt}	0.003 (0.000)***	0.242 (0.000)***
d_{ij}	-0.029 (0.000)***	-2.193 (0.000)***
constant	0.180 (0.000)***	13.882 (0.000)***
ECT	-0.013 (0.000)***	
Adjusted R ²	0.433	
SER	2.226	
SBC	0.455	
DW	1.840	
F-stat	14.418 (0.000)***	
Observations	5348	

Source: Present author

Notes: All variables in lower case letters are in natural logarithms. ECT is the error correction term. SR and LR are short run and long run respectively. SER is the standard error of the regression. SBC is the Schwarz Bayesian Criterion. DW is the Durbin-Watson statistic. Values in parentheses are p-values. *** and ** indicate significance at the 1 and 5 percent levels respectively.

All estimated coefficients have signs consistent with demand and gravity theory. All of the mass variables have positive signs, suggesting that per capita GDPs and populations of the origin and destination act to increase tourist flows to the Caribbean. The distance variables, geographic distance and tourism own-price are all negative, while the

substitute price is positive, demonstrating that they act to reduce the volume of tourist flows, as expected by the gravity framework. In particular, the long-run estimate of geographic distance is greater than unity, emphasising the high degree of sensitivity of tourist flows to changes in geographic distance. The ECT suggests that any disequilibrium among the variables in the short run is corrected at a rate of 1.3 percent each period.

This model explains a greater percentage of the variation in international tourist flows to the Caribbean than the error correction distance decay model, at 43 percent. This represents an improvement in model fit of 55 percent over the error correction distance decay function, which suggests that the gravity model is a more appropriate modelling framework than the latter, which considers geographic distance only to explain the variation in tourist flows. The model fit of 43 percent also implies that the gravity model augmented by prices only is not sufficient to explain the decay pattern shown in Figure 8.1.

As pointed out in Chapter 4, there are several factors with which geographic distance is associated that are likely to alter the rate of decay, shape of the decay function, or in some cases, reverse the decay effect. Since geographic distance was used and continues to be used as a catchall proxy for these other factors, some latent, others difficult to operationalise, this study contends that this is the reason for the paradoxical explanations of the influence of geographic distance on tourist flows. The distance puzzle in tourism, as this study coins the debate, will be examined in part by estimation of gravity models augmented by a multidimensional distance variable, intended to

explicitly uncover factors which may be the underlying cause of the puzzle, a task to which the study now turns.

Gravity Model with Multidimensional Distance Variable

There are four specifications of the gravity model presented in Table 8.5, since economic similarity and climate distance are each operationalised in two ways. The diagnostics indicate that the model is stable. All variables have the signs expected and are, with only one exception, significant at the 1 percent level; the single exception is significant at 5 percent. The magnitudes of the coefficients are also very consistent across the various specifications for the short-run and long-run results respectively, suggesting there is a high degree of robustness about the influence of each variable. Elasticity magnitudes are also very much in line with the elasticities shown in Table 5.3 for previous gravity studies of tourist flows.

Long-run Adjustment

The ECTs are all significantly negative at the 1 percent level, implying that the error correction mechanism operates in the short term to bring the system back into long-run equilibrium. The speed of adjustment at 1.3 percent each period is somewhat slow, but might be expected since it essentially represents average adjustment for the entire Caribbean; individual countries in the region are likely to adjust at different speeds, some slower and some faster than 1.3 percent. Overall, a shock to any variable in the system will cause the entire system to be out of equilibrium for a long period, since there is such a slow speed of adjustment.

Table 8.5: Estimates for Gravity Model Augmented by Multidimensional Distance Variable

Coefficients	Specification							
	1		2		3		4	
	SR	LR	SR	LR	SR	LR	SR	LR
$(y/n)_{it}$	0.002 (0.000)***	0.182 (0.000)***	0.002 (0.000)***	0.177 (0.000)***	0.001 (0.000)***	0.145 (0.000)***	0.001 (0.000)***	0.137 (0.000)***
$(y/n)_{jt}$	0.009 (0.000)***	0.858 (0.000)***	0.009 (0.000)***	0.869 (0.000)***	0.007 (0.000)***	0.692 (0.000)***	0.007 (0.000)***	0.706 (0.000)***
n_{it}	0.005 (0.000)***	0.467 (0.000)***	0.005 (0.000)***	0.461 (0.000)***	0.005 (0.000)***	0.462 (0.000)***	0.005 (0.000)***	0.456 (0.000)***
n_{jt}	0.001 (0.000)***	0.117 (0.000)***	0.001 (0.000)***	0.118 (0.000)***	0.001 (0.000)***	0.113 (0.000)***	0.001 (0.000)***	0.115 (0.000)***
p_{ijt}	-0.001 (0.005)***	-0.059 (0.005)***	-0.001 (0.000)***	-0.075 (0.000)***	-0.001 (0.000)***	-0.055 (0.000)***	-0.001 (0.000)***	-0.071 (0.000)***
p_{jkt}	0.002 (0.000)***	0.214 (0.000)***	0.002 (0.000)***	0.226 (0.000)***	0.002 (0.000)***	0.208 (0.000)***	0.002 (0.000)***	0.220 (0.000)***
d_{ijt}	-0.017 (0.000)***	-1.726 (0.000)***	-0.017 (0.000)***	-1.722 (0.000)***	-0.017 (0.000)***	-1.710 (0.000)***	-0.017 (0.000)***	-1.707 (0.000)***
cp_{ijt}	0.0003 (0.000)***	0.031 (0.000)***	0.0003 (0.000)***	0.030 (0.000)***	0.0003 (0.000)***	0.032 (0.000)***	0.0003 (0.000)***	0.031 (0.000)***
$COL1_{ijt}$	0.020 (0.000)***	1.959 (0.000)***	0.020 (0.000)***	1.972 (0.000)***	0.019 (0.000)***	1.952 (0.000)***	0.019 (0.000)***	1.964 (0.000)***
$COL2_{ijt}$	-0.052 (0.000)***	-5.207 (0.000)***	-0.052 (0.000)***	-5.244 (0.000)***	-0.052 (0.000)***	-5.207 (0.000)***	-0.051 (0.000)***	-5.244 (0.000)***
da_{ijt}	0.0002 (0.000)***	0.016 (0.000)***	0.0001 (0.000)***	0.011 (0.000)***	0.0002 (0.000)***	0.017 (0.000)***	0.0001 (0.015)***	0.012 (0.015)**
im_{ijt}	0.001 (0.000)***	0.110 (0.000)***	0.002 (0.000)***	0.110 (0.000)***	0.001 (0.000)***	0.110 (0.000)***	0.001 (0.000)***	0.110 (0.000)***
$es1_{ijt}$	-0.002 (0.000)***	-0.191 (0.000)***	-0.002 (0.000)***	-0.193 (0.000)***	---	---	---	---
$es2_{ijt}$	0.006 (0.000)***	0.552 (0.000)***	0.005 (0.000)***	0.496 (0.000)***	-0.002 (0.000)***	-0.156 (0.000)***	-0.002 (0.000)***	-0.158 (0.000)***
$cd1_{ijt}$	---	---	---	---	0.005 (0.000)***	0.548 (0.000)***	---	---
$cd2_{ijt}$	---	---	0.005 (0.000)***	0.496 (0.000)***	---	---	0.005 (0.000)***	0.491 (0.000)***
constant	0.308 (0.000)***	23.717 (0.000)***	0.314 (0.000)***	24.170 (0.000)***	0.310 (0.000)***	23.813 (0.000)***	0.315 (0.000)***	24.257 (0.000)***
ECT	-0.013 (0.000)***	---	-0.013 (0.000)***	---	-0.013 (0.000)***	---	-0.013 (0.000)***	---
Adjusted R ²	0.858	0.858	0.858	0.853	0.853	0.853	0.854	0.854
SER	2.070	2.064	2.064	2.072	2.072	2.072	2.066	2.066
SBC	0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.461
DW	1.874	1.874	1.874	1.874	1.874	1.874	1.874	1.874
F-stat	9.878 (0.000)***	9.874 (0.000)***	9.874 (0.000)***	9.871 (0.000)***	9.871 (0.000)***	9.871 (0.000)***	9.866 (0.000)***	9.866 (0.000)***
Observations	4764	4764	4764	4764	4764	4764	4764	4764

Source: Present author

Notes: All variables in lower case letters are in natural logarithms. $es1$ is $\ln |(Y_{it}/N_{it}) - (Y_{jt}/N_{jt})|$ and $es2$ is $\ln \left(\frac{|(Y_{it}/N_{it}) - (Y_{jt}/N_{jt})|}{\left[(Y_{it}/N_{it}) + (Y_{jt}/N_{jt}) \right]} \right)$. $cd1$ is $\ln |CR_{it} - CR_{jt}|$ and $cd2$ is $\ln \left[\frac{|CR_{it} - CR_{jt}|}{(CR_{it} + CR_{jt})} \right]$. ECT is the error correction term. SR and LR are short run and long run respectively. SER is the standard error of the regression. SBC is the Schwarz Bayesian Criterion. DW is the Durbin-Watson statistic. Values in parentheses are p-values. *** and ** indicates significance at the 1 and 5 percent levels respectively. The model specification number is in the first row.

Mass Variables

Per Capita Income

The response of tourist flows to a change in destination income indicates that when per capita income in the Caribbean rises by 10 percent, tourist flows to the region increase by between 0.01-0.02 percent in the short run and 1.4-1.8 percent in the long run.

Destination income is an indicator of the destination's ability to supply goods and services. Growth in income would thus be a signal to potential tourists that a destination can invest in infrastructure and services, especially those used by tourists. This would have a positive effect on tourist flows, particularly in the long run. So destination attraction capacity may be important in drawing tourists to the Caribbean.

In comparison, income elasticities of the source markets are significantly larger than those of the destination, varying between 0.07-0.09 percent in the short run and 6.9-8.7 percent in the long run, for a 10 percent rise in per capita income. This implies that changing economic conditions in the origin countries have a fairly substantial long-run effect on tourist flows. The source market income elasticity is less than unity, suggesting that the tourism services provided by the Caribbean could be considered a normal good. The latter is typical of studies employing the gravity framework (see Table 5.3).

Population

Table 8.5 indicates that the populations of the destination as well as the origins, the other mass variables apart from incomes, also attract tourist flows. The magnitudes of the coefficients are also in line with most previous findings employing gravity equations. As with income, the size of the Caribbean's population is indicative of its

potential to supply tourism goods and services. Since Caribbean countries have small populations, they tend to suffer from lack of economies of scale in production. An increase in the region's population size should thus improve their production potential in relation to providing tourism goods and services. This suggests that an increase in tourist flows as a result of an increase in population size occurs indirectly through its effect on supply potential. Further, as a significant proportion of the Caribbean's workforce is employed in the tourism industry (see [Table 6.3](#)), the positive relationship between destination population and tourist flows should be a welcome finding for regional countries. The positive sign of the coefficient on the origin population suggests that countries with larger populations will supply more tourists than countries with smaller populations, or alternatively that population growth will also result in growth in tourist flows to the Caribbean.

Gravitational Analysis of Mass Variables

Since the gravity model asserts that gravitational force is directly proportional to the mass of both interacting objects, as the mass of either object increases, then the force of gravity between them also increases. Looking at the origins in [Table 8.5](#), if its mass (the sum of the elasticities of per capita income and population) doubles, then the volume of tourist flows will also double in the long run, if Specifications 1 and 2 are considered (an F-test of the hypothesis that the sum of the elasticities of per capita income and population equals 1 cannot be rejected at any conventional level of significance; p -values are 0.600 for Specification 1 and 0.663 for Specification 2), or increase by 80 percent if Specifications 3 and 4 are considered (an F-test of the hypothesis that the sum of the elasticities of per capita income and population equals

0.8 cannot be rejected at any conventional level of significance; p -values are 0.858 for Specification 3 and 0.489 for Specification 4).

In relation to the destination, if its mass doubles, in the long run, tourist flows to the region will increase by 65 percent if Specifications 1 and 2 (an F-test of the hypothesis that the sum of the elasticities of per capita income and population equals 0.65 cannot be rejected at any conventional level of significance; p -values are 0.971 for Specification 1 and 0.577 for Specification 2) are considered, and by 60 percent if Specifications 3 and 4 (an F-test of the hypothesis that the sum of the elasticities of per capita income and population equals 0.6 cannot be rejected at any conventional level of significance; p -values are 0.775 for Specification 3 and 0.762 for Specification 4) are considered.

Distance Variables

Prices

Both the tourism own-price and substitute price are significant. An increase of 10 percent in price in the destination relative to the price in the origins results in a long-run decline in tourist flows of only 0.55-0.75 percent. So tourism demand for the Caribbean is highly price inelastic. A similar percentage increase in the price of tourism in an alternative destination relative to the price in the origins, results in a long-run increase in tourist flows to the Caribbean of approximately 2.1-2.3 percent, as tourists substitute away from the alternative destination. Tourist flows are therefore much more sensitive to changes in the substitute price than they are to changes in the destination own-price.

The insensitivity of tourist flows to changes in tourism own-price may be due to the fact that many Caribbean countries have fixed exchange rates with the USD. In addition, the USD is the official currency of Puerto Rico, the British and United States Virgin Islands, and the Turks and Caicos Islands, and the Bahamas and Bermuda are USD dollarised. Dollarised countries substitute the currency of another country in place of their own—partially, if they still maintain their own currency, or wholly, if they abandon their own currency altogether—in regular transactions, and also denominate domestic assets in the foreign currency. So variation in relative exchange rates is essentially variation with the USD. Second, the business cycles of Caribbean countries tend to follow that of their main trading partners due to their dependency on tourism. So there is also likely to be a similar co-movement in relative prices. If this is the case, then the own-price of tourism may be comparable to the price which tourists face at home.

The very small short-run price elasticities for the own and substitute price are supported by demand theory, which argues that tourists are unable to fully adjust to changes in price immediately due to asymmetric information and bounded rationality.

Geographic Distance

Geographic distance has the single largest impact on international tourist flows. Each specification in [Table 8.5](#) implies that international tourist flows to the Caribbean will decline by 17 percent over the long term, for every 10 percent increase in distance between source and destination. Interpreted as the economic and time costs of travel from the origin to the destination, this implies that tourist flows are very sensitive to any

changes in such costs. This is not unexpected, as travel costs typically represent one of the largest items in the travel budget, the other being accommodation.

In absolute terms, the long-run elasticity of -1.7 is much larger than the estimate of -0.2 in [Table 8.3](#) for the error correction distance decay model, but smaller than the estimate of -2.2 in [Table 8.4](#) for the gravity model augmented by prices. Interestingly, the coefficient of -1.7 corresponds closely to the value of -2 to be found in the gravity model from the physical sciences.

What is also apparent is that despite the overall negative relationship found between tourist flows to the Caribbean and geographic distance, geographic distance alone will be unable to explain the decay patterns shown in [Figure 8.1](#). Other factors are likely the cause of such decay patterns.

The effect of cognitive distance can be inferred using Equation (7.5) for given values of the parameter n , that is, $\log D_{ij}^G = \log k + n \log D_{ij}$, where D_{ij}^G is cognitive distance, and n is a measure of individuals' perception of actual distance; values closer to 1 imply a smaller error between actual and cognised distance. The elasticity of tourist flows with respect to cognitive distance is:

$$\frac{\partial \log TF_{ijt}^n}{\partial \log D_{ij}} * \left[\frac{\partial \log D_{ij}^G}{\partial \log D_{ij}} \right]^{-1} \quad (8.1)$$

For a value of n equal to 0.67 (Stevens, 1957, p.166), the long-run cognitive distance elasticity averages -2.562 across all specifications; for a value of n equal to 0.75 (Wiest & Bell, 1985, p.465) the cognitive distance elasticity averages -2.288; and for a value of

n equal to 0.78 (Friedman & Montello, 2006, p.343), the cognitive distance elasticity averages -2.200. These estimates imply that tourist flows are inversely related to cognitive distance. Moreover, tourist flows are more sensitive to tourists' perception of actual distance than to actual distance itself, but this sensitivity declines as n increases. If tourists respond to perceived rather than actual distance, as some scholars believe, then destination marketers would need to devise strategies to reduce this perception; implicitly, their aim is to reduce the gap between 1 and n . Strategies to reduce tourists' perception of distance could be devised which appeal to other socio-psychological attributes of tourists, aspects which the study will now consider.

Cultural Proximity

Cultural proximity, the inverse of cultural distance, has a positive effect on international tourist flows to the Caribbean. So, the closer the cultural connection between countries in the origin and the destination, the larger the volume of tourist flows. Care has to be taken in interpreting the coefficient, since it would be inappropriate to conclude that a 10 percent increase in the degree of proximity results in a 0.3 percent increase in tourist flows, since proximity is an intangible dimension. It is more accurate to state that a 10 percent increase in bilateral trade flows of cultural goods increases the volume of tourist flows by 0.3 percent in the long run. In this way, it can be inferred that increased trade in cultural goods is representative of a growing cultural affinity between the destination and origins, which is revealed in greater tourist flows.

The relatively small elasticity is not entirely unexpected, as the degree of cultural proximity will vary substantially between the large number of countries in the Caribbean and origins. However, the result is very robust across all specifications and

highlights the time-varying and asymmetric nature of culture for the determination of international tourist flows.

A question may be to what extent is the result driven by changes in bilateral migrant stocks or colonial links, both considered later. The first thing to note is that there is far less variation in stocks of Caribbean migrants than there is in bilateral trade in cultural goods. This is likely due to strict immigration policies in place in North America and Europe over the period under study. Another is that the sizes of the bilateral stocks are very small in proportion to the volume of trade in cultural goods, and likely cannot explain most of the variation in cultural trade. So the relationship between migration and trade in cultural goods is small (the correlations between cultural proximity and stocks of migrants in the origin and destination respectively are significant, but measure only 0.097 and 0.055 respectively).

Cultural proximity also has a small relationship with colonial linkages. The correlations between cultural proximity and the two colonial variables, *Col1* and *Col2*, are -0.003 and 0.068 respectively, the first insignificant and the second significant. The significance of cultural proximity to the second colonial variable is likely due to countries that maintain some type of dependent relationship (see [Appendix B2](#)).

It is important to note that the weak correlations do not mean there is little or no relationship between cultural proximity, and migrant stocks or colonialism. In general, these factors would be expected to be closely associated. However, it is not a major problem in this study, likely because of the ways in which the variables are operationalised.

Historical and Contemporary Colonial Legacies

The two colonial variables used to measure a very multifaceted phenomenon are both highly significant. Unlike all other variables, *Col1* and *Col2* are in levels. *Col1*, an ordinal variable, accounts for the existence, historical or contemporary, of a colonial relationship between the destination and source markets, and the nature of dependence. The coefficient indicates that historical and contemporary colonial relationships have a positive impact on international tourist flows. This finding agrees with past literature on the impact of colonialism on trade and economic growth (Frankel et al., 1997; Grier, 1999; Rauch, 1999; Sandberg et al., 2006) and tourist flows (McKercher & Decosta, 2007).

Col2, on the other hand, a measure of the intensity of the relationship, has a negative impact on tourist flows. This suggests that even though colonial links may have existed, and might still be in existence for some countries, as more time passes since a country has gained political independence, the impact of the colonial relationship on tourist flows becomes weaker. This finding is also in agreement with past studies which find that the attainment of independence erodes trade flows with former metropolises (Head et al., 2010) and that tourist flows decline the longer a destination has been independent (McKercher & Decosta, 2007).

Overall, the findings do suggest that historical and contemporary legacies have a positive impact on international tourist flows. On the other hand, as the length of time destination countries have been politically independent increases, indicating a gradual erosion of the relationship formed as a result of colonialism, the smaller the volume

tourists from the former colonial power. So former colonies will be increasingly unable to rely on their former colonial power as a source of tourists as time passes.

Diasporic and Immigrant Links

Table 8.5 indicates that diasporic and immigrant stocks have a positive impact on international tourist flows to the Caribbean. The long-run findings imply that for each 10 percent increase in the stock of Caribbean diaspora in the origins, there is a corresponding increase in tourist flows of 0.1-0.2 percent. A similar increase in the stock of immigrants to Caribbean destinations improves tourist flows to the Caribbean by 1.1 percent. Law, Genc and Bryant's (2013, p.600) results are very similar to those in the current study. Their findings imply that tourist arrivals to New Zealand will increase by 0.08 percent for a 10 percent increase in the New Zealand diaspora and by 0.5 percent for a 10 percent increase in immigrants to New Zealand.

In both studies, the immigrant variable has a greater impact than the diaspora variable. For the Caribbean, the implication is that immigrants to Caribbean destinations have a greater positive influence on tourist flows to the region, than does the Caribbean diaspora. It may be the case that immigrants are very knowledgeable about things that are important for tourism (Law et al., 2013). They might also transmit very positive images of the destination to their origin countries.

Economic Similarity

Estimates in Table 8.5 indicate that the greater the degree of economic similarity between the origins and the Caribbean, the greater the tourist flows. Expressed as the absolute difference in per capita incomes in logarithmic levels or as the relative absolute

difference, also in log levels, a smaller difference (greater similarity) implies larger tourist flows, and *vice versa*. The long-run elasticity implies that if economic similarity increases by 10 percent, there will be an increase of tourist flows to the Caribbean of approximately 1.6-1.9 percent. Like Fortune (1971) in the case of trade flows, this study finds that geographic distance is a more important factor than economic similarity, in this instance for explaining tourist flows.

The negative and significant coefficient of economic similarity lends support to the demand side trade theoretic proposition by Linder (1961) in explaining tourism demand, and rejects the theory of factor endowments (HOS theory) by Heckscher (1919), Ohlin (1933) and Samuelson (1949). The broad implication is that similarity in tastes, assuming per capita income differences are indeed representative of capturing the latter, is a determinant of international tourist flows. A further implication is that Caribbean destinations and their source markets should specialise in the production of certain high quality goods (Linder, 1961), in this case tourism goods and services. Finally, the significance of economic similarity for tourist flows implies that the quality of the tourism product in the Caribbean is important, as countries with high per capita incomes spend a larger fraction of their income on high-quality goods (Linder, 1961).

This study's finding that economic similarity is a significant determinant of tourist flows to the Caribbean is also indirect evidence of the effects of psychic distance. Because declining psychic distance is associated with increasing economic similarity, this implies that psychic distance would also be negatively associated with international tourist flows. That is, as the psychic distance between origins and destination declines, there should be a corresponding increase in international tourist flows.

Climate Distance

Climate distance, a new construct in the tourism literature for examining the impact of climate in the destination and origin, is a significant determinant of international tourist flows. Results in [Table 8.5](#) indicate that climate distance increases in the long run by 4.9-5.5 percent for a 10 percent increase in the difference between the average climatic conditions in the Caribbean and its source markets. Such a finding is expected since the Caribbean lies in the tropics, and is branded as a sun, sand and sea destination, while the majority of its tourists arrive from countries with cold or temperate climates on average, although there are regions in some of these source markets where the local climate is somewhat tropical, for example, the Mediterranean regions of France, Italy and Spain.

The variation in climate in the Caribbean region is relatively low, so climate distance between regional countries is small. Thus, the small climate distance from source markets within the Caribbean likely offsets the stronger influence of climate distance on tourism demand from extra-regional markets as a motivator for travel. Another issue is that the data are annual, so the seasonal variation in climate when climate distance would be greatest is masked by the use of averaged climate indicators used to construct annual climate distance.

Since the index used to calculate climate distance, the CIT, assumes a climatic ideal, that is a range of apparent temperatures ideal for touristic activities (see [Appendix B3](#)), it suggests that under a scenario of global warming brought on by climate change, that in the very long run, the average climate in the Caribbean could transition to ranges of high thermal stress unappealing for the average tourist, while other countries, including current extra-regional source markets, could transition to apparent temperatures that are

more appealing. Therefore, tourists motivated to travel to the Caribbean because of its climate might choose to spend their holidays elsewhere, even if the climate distance that currently obtains were to remain unchanged. If seasonal variation in climate still exists in the future, tourists might also travel at different times during the year. Further, unlike tourists who can more readily change their travel preferences, destinations, especially tourism-dependent destinations like those in the Caribbean, are less able to adapt to such changes. Thus in a scenario of global warming, Caribbean countries would be powerless to change the attractiveness of the region from a climate perspective. A caveat about this analysis is that it assumes that preferred vacation activities are unchanged in the future. Without scenarios about tourists' future preferences, predictions at this point are more indicative than conclusive.

Gravitational Analysis of Distance Variables

The law of gravity in the physical sciences posits that the gravitational force between two objects is inversely proportional to the square of the distance separating them. Greater separation will result in weaker gravitational forces. Within the context of international tourist flows, in this study the proportionate effect of distance on tourist flows (the gravitational force) is calculated by summing the long-run elasticities of the various dimensions. Two of the dimensions, *Col1* and *Col2*, provide a level effect as opposed to a percentage effect on tourist flows. So long-run elasticities for each dimension evaluated at their means are first estimated before they are included in the overall calculation of distance. Another issue is that the negative sign on economic similarity, due to the way in which it is measured, does not indicate a decline in tourist flows if it increases, but an increase. So its coefficient is taken in absolute value in calculating the distance factor of proportionality between destination and origins.

If distance doubles, then the volume of tourist flows will decrease by 75 percent in the long run if Specifications 1 and 3 are considered (an F-test of the hypothesis that the sum of the elasticities equals 0.75 cannot be rejected at any conventional level of significance; p -values are 0.928 for Specification 1 and 0.765 for Specification 3) and by 80 percent if Specifications 2 and 4 are considered (an F-test of the hypothesis that the sum of the elasticities equals 0.80 cannot be rejected at any conventional level of significance; p -values are 0.937 for Specification 2 and 0.611 for Specification 4).

Summary of Gravitational Analysis

The factors of gravitational proportionality represented by this study of international tourist flows to the Caribbean are summarised in [Table 8.6](#).

Table 8.6: Long-Run Gravitational Factors for International Tourist Flows to the Caribbean

Gravitational Variables	Specification			
	1	2	3	4
Mass of Destination	0.65	0.65	0.60	0.60
Mass of Origin	1.00	1.00	0.80	0.80
Distance	-0.75	-0.80	-0.75	-0.80

Source: Present author

The values in [Table 8.6](#) from the four specifications describe similar models of tourist flows gravitation for the Caribbean. While the magnitudes of the factors are dissimilar to the gravity model of the physical sciences, as might be expected, the model is conceptually consistent. The factors of gravitational proportionality for the masses of the destination and origin are consistent with reality, since the GDPs per capita and populations of the origins in this study exceed those of the destination. The factors of proportion for distance are less than 1, which are reflective of the fact that a multidimensional concept of distance is being considered in this study. If geographic

distance alone had been considered, then the factor of proportionality in Table 8.6 would be -1.7 (see Table 8.5), closer to -2, the value in the gravity model of the physical sciences.

Overall, for any origin-destination pair, the volume of tourist flows (the gravitational force) is directly proportional to the product of their masses—the larger the masses the greater the tourist flows—and inversely proportional to the distance between them—as distance increases, the volume of tourist flows decreases.

8.3 Explanation of the Distance Puzzle in Tourism

The confounding relationship between tourist flows and distance which manifests in tourist flows declining in response to distance in some cases, and increasing in others, has been termed the distance puzzle in tourism in this study. Explanations for the various patterns have focussed primarily on geographic distance. The focus on geographic distance has resulted in a lack of consensus regarding its true impact on tourist flows. This study argues that other factors in conjunction with geographic distance can explain the puzzle. Indeed, previous studies have noted that geographic distance is used to account for the effect of factors which are related to distance, but which are latent or difficult to measure.

First, this study contends that the number of dimensions is one explanation for the distance puzzle. In general, if distance has q dimensions, the number of decay curves possible will be equal to 2^q , if the subset that *none* of the dimensions has an impact is counted. A particular decay pattern is thus a function of the number of dimensions

that are operable. So the observed effect of distance on international tourist flows at any point depends on the number of relevant dimensions, alone or in conjunction with other dimensions. In this study the distance variable is decomposed into 10 dimensions. Therefore, there are 1024 distinct subsets of the distance dimensions. In theory, then, 1024 distinct decay curves are possible for the current study; some will be similar in shape, while others will be very dissimilar.

Another factor that may explain the distance puzzle in tourism is the magnitude and direction of the q dimensions. Some dimensions will affect the levels of tourist flows, while others may affect its rate of growth, some positively, some negatively. For example, of the ten dimensions modelled in the current study, four have negative coefficients, while six have positive coefficients. The level variables, *Col1* and *Col2*, shift the entire decay curve; *Col1* shifts it up, while *Col2* shifts it down, while the other dimensions modify the intensity of tourist flows according to their sign and magnitude. It is also possible for the direction of the dimensions to change depending on the scenario being studied. Varying signs and magnitudes in conjunction with the set of possible dimensional combinations increase the number of distinct decay patterns that can result.

The origin-destination pair is another key in explaining the distance puzzle. The volume of tourist flows from the origin to the destination pair depends on the identity of the countries in the pair. So tourist flows may decline with distance for a particular origin-destination pair but intensify with another. In many instances, the forces of attraction, or repulsion, between the origin-destination pair are sufficiently strong, that they overcome the powerful effects of geographic distance. The latter argument is not

new to the literature, but is convincingly demonstrated in the empirical component of the study, which operationalised and estimated several factors (see [Table 8.5](#)). In this study, it is shown that cultural proximity, diasporic and immigrant links, historical and contemporary colonial relationships, economic similarity and climate distance are significant determinants of tourist flows. While these dimensions may be relevant for the current context, they may be irrelevant for another. So the nature of the distance dimensions can also explain the distance puzzle.

It is also important to highlight the role that time plays in explanation of the puzzle. Changes in environmental factors over time, for example, development of alternative tourist destinations and availability of airlines, can affect the volume of tourists to a destination. Other factors of relevance that vary over time include tastes, prices, and income, among others. Such changes could have a large impact on the behaviour of tourist flows at different times. Thus the decay pattern observed will also be time-dependent. For example, the current study spans 33 years, so time is a critical dimension of the analysis. The empirical methods employed are able to capture the short-run and long-run patterns in tourist flows (see [Table 8.5](#)) that are not captured by cross-sectional or static models. The decay pattern implied by the short-run equation would look different from the pattern implied by the long-run equation. In addition, if a system of tourist flows is in a long-run relationship, but is thrown into disequilibrium by a shock, a decay curve constructed when the system is in disequilibrium is likely to differ from a decay curve constructed when the system is in equilibrium. So time is a key element in the distance decay relationship.

Finally, the previous explanations assume that all dimensions can be identified; even if it were possible to identify all dimensions, operationalisation is likely to pose challenges. Identification of all dimensions is unlikely, however. It is important to note that lack of identification does not refer to latent, but unobservable, variables whose effects can be inferred from the behaviour of observable variables, for example, psychic distance. Thus, unidentified, but possibly significant, factors may also act to modify the distance decay relationship.

8.4 Summary

This chapter presented the results from a comprehensive model of international tourist flows to the Caribbean using an augmented gravity approach. The secondary aim was to provide an explanation of the distance puzzle in tourism. The results in this chapter illustrate the superiority of the gravity framework over the distance decay framework for explaining various decay patterns in tourist flows, and in explaining the distance puzzle in tourism. The next, and final, chapter in the research will summarise all the main findings from the study and offer suggestions for future research.

CHAPTER 9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Introduction

The aim of this research was to model international tourist flows to the Caribbean with a secondary aim of explaining the distance puzzle in tourism. First, the thesis examines the disciplinary relationship between tourism and geography in order to clarify the key features of tourist flows, as a first step in building a conceptual model to achieve the aims of the study. Next, it reviews macroeconomic and microeconomic theories of tourism demand, the various ways in which international tourism demand is measured, the determinants that influence tourism demand along with their measurement, and an assessment of the econometric techniques that have been employed in modelling tourism demand. Following this, various theoretical, conceptual and empirical concepts are appraised, including the theories of travel motivation, especially push and pull factors, geographic distance, cognitive, cultural and psychic distance, historical and contemporary colonial relationships, diasporic relationships, climate distance, and economic similarity. The main approaches to estimating models with a primary focus on distance are also described and their limitations outlined. The thesis then introduces the gravity model, the framework used for the empirical analysis. A discussion of the historical development of the model, its conceptual development, theoretical foundations, and empirical applications are provided. The case under study, that is the Caribbean destination, is described next. Subsequently, the methodological and philosophical stances of the research, model specification, research techniques and strategies are addressed, including ways of measuring and operationalising the variables involved. Finally, the factors that influence international tourist flows to the Caribbean are estimated and discussed, and an explanation of the distance puzzle provided.

This chapter concludes the thesis by summarising the key issues in previous chapters and the main empirical findings. It also discusses the policy implications of the empirical findings and provides suggestions for further research in the area under study.

9.2 Summary of Findings

The lack of consensus regarding an explanation for the intensity of tourist flows in relation to distance provided the motivation for this study. The tourism literature notes that the volume of tourist flows declines the farther away a destination is from the source on one hand, but on the other hand, the literature also finds that relatively distant destinations may hold more appeal than nearby destinations. This study coins the confounding tourist flows-geographic distance relationship, the “distance puzzle” in tourism. The puzzle is further confounded by the lack of consensus. This study thus aimed to provide an explanation for the distance puzzle.

Until relatively recently, distance had only been considered in a purely geographic sense. However, since the mid 20th century, scholars have conceived multidimensional interpretations of distance, which include, economic, socio-psychological, and historical interpretations, among others, in addition to its original meaning. These interpretations recognise that people’s behaviour with respect to space does not always correspond to the metric properties of geographic space. Within the context of modelling international tourist flows to the Caribbean and providing an explanation for the distance puzzle in tourism, this recognition compels a conceptualisation and operationalisation of distance beyond its geographic meaning.

To understand the concepts relevant to the study, various bodies of knowledge must be considered: the attributes of international tourist flows; tourism demand; travel motivation theory; the multidimensional nature of distance; and the theory of gravity.

Tourist flows are one aspect of the broader concept of the spatial distribution of tourists. Its study is concerned mainly with identifying and quantifying the psychological, social, economic and environmental variables affecting the intensity or volume of tourist travel. As the study is concerned with investigating international tourist flows to the Caribbean region, it is macro scale research.

Various theories and perspectives have been advanced to explain the demand for tourism. From a macroeconomic or international trade perspective, neoclassical trade theories and the new trade theory emphasise the role of a country's tourism-related resources in explaining tourist flows. These theories, because of their focus on the supply side, are unable to fully explain international tourist flows. One demand side trade theory, known as Linder's hypothesis, helps to explain the high level of tourist movements between geographically proximate countries, which have similar levels of income and wealth, but ignores the supply side. With regard to the microeconomic perspective, the neoclassical theory of consumer choice is the dominant framework for analysing tourism demand in the literature. As a framework for examining tourist flows, neoclassical theory also has several weaknesses, as it overlooks several particularities of the tourism phenomenon, notwithstanding its strong theoretical foundations. Lancaster's characteristics theory, in which consumers derive utility from the characteristics of the goods and services as opposed to from the goods themselves, captures several important nuances which the neoclassical model is unable to do, but is

also limited. Taken together, there is a strong argument, conceptually and theoretically, for supply-side, as well as traditional and non-traditional demand-side perspectives, in modelling international tourist flows in general, and to the Caribbean specifically.

The challenge in modelling international tourist flows goes beyond consideration of the theoretical framework, but also involves the empirical method of analysis. The need to include both demand-side and supply-side factors precludes the use of non-causal but atheoretical models, single equation models which are easily estimated and interpreted but *ad hoc*, neoclassical demand models which are theoretically sound from an economic perspective but ignore many features of tourist flows, and artificial intelligence models which lack theoretical sophistication and are not easily interpreted.

The limitations of traditional neoclassical economic theory, the dominant framework for modelling tourist flows, and other methods, are first addressed. Various theoretical, conceptual and empirical perspectives related to the concept of distance are reviewed to assist in the development of a framework to investigate international tourist flows to the Caribbean and explain the distance puzzle in tourism. A nexus is drawn between travel motivation, various dimensions of distance, and tourist flows. First, it shows that the decay effect of geographic distance on tourist flows is moderated by other dimensions of distance that can alter the rate of decay, shape of the decay function, or even reverse the decay effect. Tourists are also motivated to travel for socio-psychological reasons. Socio-psychological reasons, cognitive, cultural and psychic distance, either increase or decrease tourist flows to a destination depending on their magnitude between origin and destination. Colonialism's profound effect on former colonies and current overseas territories left an enduring legacy. The strength of the relationship between former and

current metropolises and colonies is an important determinant of international tourist flows between them. The strength of the bonds that exist between and among the diaspora and their ancestral homes should also influence the volume of international tourist flows. Climate distance, the difference between climatic conditions at home and in the destination, is another key dimension of distance and a factor which can motivate tourists to travel. Economic similarity, reflecting a correspondence in tastes between countries, is expected to have a positive effect on tourist flows.

The study employs the gravity model as, conceptually and theoretically, it provides a framework for modelling international tourist flows and examining the distance puzzle in tourism. In doing so, the study also addresses various shortcomings in previous studies. The gravity model of tourist flows that is estimated specifies tourist flows as a function of GDP per capita in the destination and the origin respectively, populations in the destination and the origin respectively, relative price in the destination and an alternative destination respectively, geographic distance between origin and destination, cultural proximity, colonial, diasporic and immigrant links, economic similarity, and climate distance.

To estimate the empirical model, the study employed a panel of 29 destination countries from the Caribbean and 11 source markets. The destination countries are: Anguilla, Antigua and Barbuda, Aruba, the Bahamas, Barbados, Bermuda, Bonaire, the British Virgin Islands, Cayman Islands, Cuba, Curacao, Dominica, the Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Puerto Rico, Saba, St. Eustatius, St. Kitts and Nevis, St. Lucia, St. Maarten, St. Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos and the United States Virgin Islands. The 11

source markets are: Belgium, Canada, the Caribbean region, France, Germany, Italy, the Netherlands, Spain, Sweden, the UK, and the USA. The data on long stay arrivals runs from 1980-2012 for Canada, the Caribbean, UK and USA. Arrivals from France, Germany, Italy, the Netherlands, Sweden, and Spain are from 1990-2012, and for Belgium from 1997-2012.

An ARDL approach to estimating the gravity model is employed. This approach allows for the dynamic nature of tourist flows to be captured. The gravity model is also expressed in logarithmic form, which allows for the elasticities to be readily calculated and interpreted. For comparative purposes, a distance decay model and a basic gravity model are also estimated.

First, the results demonstrate that there is a long-run relationship among the variables in the system of international tourist flows to the Caribbean. The adjustment to long-run equilibrium from a shock to the system occurs at a rate of 1.3 percent each period. The gravitational mass variables, per capita income and population in the destination and origin respectively are both highly significant determinants of international tourist flows. The significance of destination income for tourist flows implies that destination attraction capacity may be important in drawing tourists to the Caribbean, as destination income is an indicator of its supply potential. Tourist flows are income inelastic, and thus tourism in the Caribbean could be interpreted as a normal good. An income elasticity less than unity could also indicate that the Caribbean should perhaps consider altering its tourism offer to meet the requirements of tourists from its source markets. An increase in the region's population size increases tourist flows. The positive sign of the coefficient on the origin population suggests that countries with larger populations

will supply more tourists than countries with smaller populations, or alternatively that population growth will also result in growth in tourist flows to the Caribbean.

With regard to the gravitational distance variables, tourist flows are own-price inelastic. So there is a disproportionately smaller response of tourist flows to changes in price in the destination. The cross-price elasticity indicates that tourists are more responsive to changes in the relative price of a competitor. When the relative price of a competitor's tourism product increases, tourists substitute away from the competitor and towards the Caribbean. Geographic distance has a negative influence on tourist flows. As an indicator of the economic and time costs of travel, this is unsurprising, since travel costs are one of the largest travel costs, the other being accommodation.

Tourist flows to the Caribbean are also increased by cultural proximity, historical and contemporary colonial relationships, despite evidence of gradual erosion in the relationship, the strength of diasporic and immigrant links, similarity in tastes, and the distance in climatic conditions between the Caribbean and its source markets.

The distance decay model assumes that tourist flows can be modelled exclusively by geographic distance, while the standard gravity model augmented by prices for consistent estimation considers only the geographic dimension of distance, along with the incomes and population. The performance of the gravity model augmented by the multidimensional distance variable is superior to the performance of both models. Its explanatory power is over 300 percent higher than that of the distance decay model and 200 percent higher than that of the standard gravity model augmented by prices.

The distance puzzle in tourism can be explained by the multidimensionality of distance. The number of dimensions, the combinations of dimensions that are operable, the magnitude and direction of the dimensions, the identity of the countries in the origin-destination pair, the nature of the dimensions, time, and unidentified but possibly significant dimensions, are able to explain the confounding relationship between tourist flows and geographic distance.

9.3 Contributions of the Study

This thesis makes contributions to the literature in several respects. First, it highlights the importance of the multidimensionality of distance for modelling international tourist flows. Initially, geographic distance was used as a measure of the frictions which tourists experience when travelling to a destination. However, decay patterns suggest that other factors, in conjunction with geographic distance, may influence the pattern and intensity of tourist flows. Moreover, these factors were not necessarily frictional. A comparison of models with and without the multidimensional distance variable convincingly demonstrates that interpretations of distance based only its physical meaning are not synonymous with the behaviour of tourist flows.

Second, the thesis shows that an interdisciplinary approach to modelling tourist flows is necessary to examine the phenomenon. This approach was necessitated by the limitations of existing approaches. The neoclassical theory of demand, notwithstanding its theoretical foundations, overlooks several particularities of the phenomenon. Macroeconomic perspectives emphasise the role of a country's tourism-related resources in explaining tourist flows, but are supply-side focussed. The synthesis

created between different disciplines in this study—economics, geography, sociology, psychology, and history—permitted conceptualisation and operationalisation of the intrinsic qualities of tourist flows so that a more holistic understanding and way of investigation could be achieved.

Third, the thesis illustrates the theoretical relevance and empirical representation of the gravity framework for modelling tourist flows. The push-pull theory of tourist motivation for travel is embodied in the gravitational forces of attraction that pull two bodies towards each other, but are pushed apart due to their degree of separation. The gravity framework is also able to account for both the demand-side and supply-side of tourist flows. It nests the neoclassical theory of demand, as well as other demand and supply factors of tourism. Distance, a determinant of tourist flows between two countries, is also a critical element of the gravity model. Flexibility of the gravity framework allows the model to be augmented with other variables which influence tourist flows.

The fourth major contribution of the thesis is development of a modern gravity model based on the enhanced concept of distance and advanced econometric techniques. Previous studies in the tourism literature employed the framework of gravity loosely, disregarding its underlying structure and meaning. Sound conceptualisation requires that gravity models in the social sciences must contain elements of mass and distance to maintain the correspondence with gravity in the physical sciences. To achieve one of the main aims of the thesis, distance is decomposed into various dimensions within the context of tourism in order to isolate their individual effects, which would otherwise be masked. Dimensions include socio-psychological elements of distance, historical and

contemporary colonial relationships, diasporic links, similarity in preferences, and climate distance. The thesis employed panel cointegration techniques and a dynamic estimation approach, the ARDL framework. Panel data estimation has been scarcely employed in modelling of tourist flows, and panel cointegration techniques even less so. Panel data estimation combines the benefits from the use of cross-sectional and time series data sets while panel cointegration techniques permit estimation of the short-run and long-run effects and the speed of adjustment of the system if a shock moves it out of equilibrium. The advantages of the ARDL cointegration approach over other methods, is that it does not require all variables to be integrated of the same order, long-run estimates from application of the technique are unbiased and it avoids issues related to omitted variables and serial correlation.

Fifth, the thesis provides an explanation for the distance puzzle in tourism. An explanation for the puzzle requires flexibility in how distance is conceived. A conceptualisation and operationalisation of distance in this study beyond its geographic meaning demonstrates that an expanded definition of distance offers an explanation for the confounding effects of tourist flows in relation to geographic or absolute distance. Therefore, previous explanations for the distance decay relationship were not necessarily incorrect. Instead they focussed on narrow interpretations to explain a phenomenon that required a more comprehensive interpretation of distance.

9.4 Management and Policy Implications

The Caribbean can be considered the most tourism-dependent region in the world. Studies on the Caribbean, particularly from a regional perspective are scarce. Although

a regional scope increases a study's difficulty, theoretically, conceptually and empirically, the complexity enhances the analysis, making it more representative. The current study thus provides an important input into Caribbean tourism geography and marketing, which can be of considerable value to tourism stakeholders in the region. Findings from this study can provide information for the development of policies or a policy framework which could enhance the tourism product in the region, or help to forestall any negative outcomes.

The study enables tourism marketers to be more knowledgeable of the characteristics that attract tourists to the Caribbean beyond sun, sand and sea, the international brand of the region. Evidence that tourists are motivated to travel to the Caribbean because of their cultural affinity with the region, relationships fostered by a colonial past, diasporic and transnational bonds, and similar tastes suggests strongly that the Caribbean travel industry should further explore the demand, preferences and experiences of these important niches, in order to cater to each segment. Further, even though the Caribbean's brand is climate-based, as already mentioned, the evidence that difference in climatic conditions is a significant driver of tourist flows to the region still holds potential for further market diversification. Strategic marketing of the Caribbean to countries that have a large climate distance with the region, particularly in traditional low season, could open markets currently under-represented in the visitor mix. Thus the study provides evidence to assist in diversification within current markets as well as development of new markets.

Destination countries often view their neighbours as competitors. However, the rapid pace of social, economic and technological change forces countries to constantly adapt

their offerings to meet tourists' needs and expectations. For smaller Caribbean countries with limited resources, this is a critical issue. In a regional tourism context, however, the tourism product of the Caribbean could be viewed as a single product where each component of the product is supplied by each destination in the region. The results from this study suggest that tourists would respond to marketing and promotion strategies that recognise the similarities between each Caribbean country. A regional marketing approach has the potential to increase the attractiveness of the Caribbean as a destination, by offering similar benefits and targeting the same market segments, or providing complementary products which increase the consumptive value of tourists. A regional approach would also provide other benefits that would redound to each destination country, such as lower costs of marketing and increased visibility in the marketplace.

Finally, even though the study was regional in scope, the results were able to detect that Caribbean tourist markets have produced a regional spatiality, with sub-regions defined by flows of different groups of tourists. This tourism geography reinforces the concept of developing products with complementarities to capture tourists who aim to maximise their touristic experience by bundling different destinations rather than restricting themselves to one part of the region.

9.5 Limitations and Recommendations for Future Research

Although this thesis has successfully modelled international tourist flows to the Caribbean and in so doing, provided an explanation for the distance puzzle in tourism, there are several areas in which future research should be directed.

Despite the large number of observations that were used in the empirical analysis, due to the panel structure which was large in both the cross-sectional and time dimensions, the data were annual. Thus, the highly seasonal nature of tourist flows to the Caribbean could not be captured as a determinant of tourist flows. In addition, since weather is seasonal, the effect of climate distance on tourist flows is likely to be understated. Future research should model international tourist flows to the Caribbean using quarterly or monthly observations.

Another consideration for future research is the use of tourist flows disaggregated by purpose of travel. The use of total tourist flows in this thesis obscures the effects of various factors, in particular the distance dimensions, on different market segments. Similarly, aggregation of the dimensions themselves also masks country-specific effects on tourist flows. Disaggregation of tourist flows and distance dimensions would provide more accurate information for academics, tourism planners and policymakers, regarding the motivation of tourists to travel to the Caribbean.

Possible non-linearities in the distance dimensions should also be considered. In this study, all distance dimensions were modelled under the assumption of linearity. However, there is no theoretical or conceptual reason why the dimensions might not have non-linear effects. Future research will experiment with various non-linear specifications to assess the impact on tourist flows.

Consideration of additional dimensions of distance, and also mass, in modelling international tourist flows to the Caribbean is another area for future research. The key will be not to over-specify the model, which has been a tendency in past studies. As

geographic proximity was a critical aspect of the study, research could also explore the differences and similarities between tourist flows from short-haul markets and long-haul markets.

It is hopeful that the results from this study can prove useful for tourism policymakers in the Caribbean in promoting the region. Other destinations can also adopt the framework to assist them in their search for a differential advantage, competitive positioning and growth in a global market.

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A1. Derivation of Linnemann (1966) Gravity Model

Consider the case where there are n countries and that each country exports only one good. As a result there are n traded goods in the world economy. Assume that the trade potential for each country is determined by its income, Y , and population, N and given by:

$$W_i = \lambda Y_i N_i^v \tag{A1.1}$$

where v represents the domestic market creating effect of population; and λ is a scale factor. Also assume that this function is the same for all countries. The demand for country i 's goods by country j 's consumers is:

$$X_{ij}^D = \gamma W_j^\delta p_i^\varepsilon t_{ij}^\rho \tag{A1.2}$$

where t_{ij} is a trade resistance measure; p_i is the supply price in the exporting country; γ is a constant; δ is the trade potential coefficient of demand; ε is the price coefficient of demand; and ρ is the trade resistance coefficient of demand.

If a country's export supply is defined as the difference between domestic production and consumption of the single good which is considered for export, then country i 's export supply can be expressed as:

$$X_i^S = \varpi W_i^\sigma p_i^\pi \tag{A1.3}$$

where ϖ is a constant; σ represents the trade potential coefficient of supply; and π is the price coefficient of supply.

Assume that trade is balanced and advances a trade balance equation given by:

$$X_i^S = \sum_{j \neq i}^n X_{ij}^D \quad (\text{A1.4})$$

Overall, each country has a system of $n+1$ equations: $n-1$ import demand equations; one export supply equation; and a trade balance equation. Solution of the system determines $(n-1)X_{ij}^D$, X_i^S , and p_i . Using the balanced trade condition, the price level can be solved:

$$p_i = \left[\frac{\gamma}{\omega} W^{-\sigma} \sum_{j \neq i}^n W_j^\delta t_{ij}^\rho \right]^{\frac{1}{\pi - \varepsilon}} \quad (\text{A1.5})$$

Substituting Equation (A1.5) into Equation (A1.2) yields:

$$X_{ij} = \gamma^{\left(1 + \frac{\varepsilon}{\pi - \varepsilon}\right)} \omega^{\left(\frac{-\varepsilon}{\pi - \varepsilon}\right)} W^{\left(\frac{-\varepsilon \sigma}{\pi - \varepsilon}\right)} W_j^\delta t_{ij}^\rho \left(\sum_{j \neq i}^n W_j^\delta t_{ij}^\rho \right)^{\left(\frac{-\varepsilon}{\pi - \varepsilon}\right)} \quad (\text{A1.6})$$

Using Equation (A1.1) and assuming the trade resistance factor can be defined as:

$$t_{ij} = D_{ij}^\theta P_{ij}^\vartheta \quad (\text{A1.7})$$

where P_{ij} is a preferential treatment binary variable; D_{ij} is the bilateral distance; and θ and ϑ are parameters, we obtain:

$$X_{ij} = \gamma^{\left(1 + \frac{\varepsilon}{\pi - \varepsilon}\right)} \omega^{\left(\frac{-\varepsilon}{\pi - \varepsilon}\right)} \left[\lambda_i Y_i N_i^{\nu_i} \right]^{\left(\frac{-\varepsilon \sigma}{\pi - \varepsilon}\right)} \left[\lambda_j Y_j N_j^{\nu_j} \right]^\delta \left[D_{ij}^\theta P_{ij}^\vartheta \right] \left(\sum_{j \neq i}^n \left[\lambda_j Y_j N_j^{\nu_j} \right]^\delta t_{ij}^\rho \right)^{\left(\frac{-\varepsilon}{\pi - \varepsilon}\right)} \quad (\text{A1.8})$$

Simplifying gives:

$$X_{ij} = \alpha Y_i^{\beta_1} N_i^{\beta_2} Y_j^{\beta_3} N_j^{\beta_4} D_{ij}^{\beta_5} P_{ij}^{\beta_6} \quad (\text{A1.9})$$

A2. Derivation of Gravity Model using Probabilistic Approach

Let P_i be the probability associated with the event that country i is the exporter, and Q_j be the probability that country j is the importer. Let S be a correction factor to exclude the possibility of domestic trade, so that

$$S = \left(1 - \sum_k P_k Q_k\right)^{-1} \quad (\text{A2.1})$$

where k is the number of countries involved in world trade. The probability of movement of goods from country i to country j is:

$$P_{ij} = SP_i Q_j \quad (\text{A2.2})$$

If T is total world trade—the sum of all consignments—and X_i the sum of all consignments originating in country i , and M_j the sum of all consignments destined for country j , then P_i and Q_j can be approximated respectively by:

$$\hat{P}_i = \frac{X_i}{T} \quad (\text{A2.3})$$

and

$$\hat{Q}_j = \frac{M_j}{T} \quad (\text{A2.4})$$

P_i and Q_j are considered measures of country i 's and country j 's respective shares of world trade.

Define the probability that trade flows from country i to country j as the joint probability of each country participating in world trade:

$$P_{ij} = P_i Q_j \quad (\text{A2.5})$$

Assume that world trade is made up of N consignments and that each bilateral trade transaction is of size β . Total world trade is thus:

$$T = NB \quad (\text{A2.6})$$

Taking into account Equations (A.25) and (A.26), X_{ij} , the expected volume of exports from country i to country j , can be expressed as:

$$X_{ij} = N\beta p_{ij} = T \left(\frac{X_i M_j}{T^2} \right) = \frac{X_i M_j}{T} \quad (\text{A2.7})$$

which is the product of country i 's export sector and country j 's desire to import in proportion to world trade. If Y_i and Y_j are used to substitute for X_i and X_j respectively, and a trade resistance term added, a gravity-type model results.

A3. Derivation of Anderson (1979) Gravity Models

Assume countries produce two goods, a traded and a non-traded good; there are no transaction costs; and preferences are homothetic and identical across countries. The traded good's share of each country's national product, ϕ , is defined as a function of each country's income, Y , and population, N :

$$\phi_i = F(Y_i, N_i) \quad (\text{A3.1})$$

and

$$\phi_j = G(Y_j, N_j) \quad (\text{A3.2})$$

Country j 's demand for country i 's exported good is:

$$M_{ij} = \theta_i \phi_j Y_j \quad (\text{A3.3})$$

where M_{ij} is the value of j 's imports from i ; and θ_i represents the expenditure share on country i 's traded good by country j , as a percentage of j 's income. If an allowance for trade imbalances is made, a trade balance relation can be found:

$$m_i \phi_i Y_i = \left(\sum_j \phi_j Y_j \right) \theta_i \quad (\text{A3.4})$$

where m_i is a current account correction factor. Equation (A3.4) says that the value of i 's aggregate imports and spending on its own non-traded goods has to be equal to i 's aggregate exports and spending on its own non-traded goods, taking into account temporary current account imbalances by the correction factor, m_i . Solving for θ_i in Equation (A3.4), and substituting into the demand function results in a gravity model:

$$M_{ij} = \frac{m_i \phi_i Y_i \phi_j Y_j}{\sum_j \phi_j Y_j} \quad (\text{A3.5})$$

The standard gravity model will result if allowances are made for transportation costs. Relaxing the assumption that i and j produce only two goods, consider transaction costs, τ_{ijk} , which encompass both transportation costs and trade barriers, for shipments of good k from country i to country j . If θ_{ik} is the share of i 's expenditure on j 's tradable good k as a function of the transaction cost factor specific to j , τ_j , then:

$$\theta_{ik} = \theta_{ik}(\tau_j) \quad (\text{A3.6})$$

If transaction costs are iceberg in nature, the value of any shipment of good k from i to j , can be expressed as:

$$M_{ijk} = \frac{1}{\tau_{ijk}} \theta_{ik} \phi_j Y_j \quad (\text{A3.7})$$

where τ_{ijk} is the specific transaction cost factor for shipment of good k from i to j .

Thus, as transaction costs are in proportion to the quantity shipped, some of the shipment “melts” away during transit from i to j . Aggregate imports of j from i can be found by summing over industries k , such that:

$$M_{ij} = \sum_k M_{ijk} = \phi_j Y_j \left[\sum_k \frac{1}{\tau_{ijk}} \theta_{ik} \right] \quad (\text{A3.8})$$

The trade balance constraint therefore becomes:

$$m_i \phi_i Y_i = \sum_j M_{ij} = \sum_j \left[\phi_j Y_j \left(\sum_k \frac{1}{\tau_{ijk}} \theta_{ik} \right) \right] \quad (\text{A3.9})$$

Assuming that transaction costs, τ_{ijk} , are constant across all goods for any pair of trading partners, they can be expressed as an increasing function of the distance between two countries, d_{ij} , such that:

$$\tau_{ijk} = \tau_{ij} = f(d_{ij}) \quad (\text{A3.10})$$

Country j 's demand for country i 's traded goods, can thus be rewritten as:

$$M_{ij} = \phi_j Y_j \frac{1}{f(d_{ij})} \sum_k \theta_{ik} \quad (\text{A3.11})$$

and the trade balance condition becomes:

$$m_i \phi_i Y_i = \sum_j \phi_j Y_j \frac{1}{f(d_{ij})} \sum_k \theta_{ik} \quad (\text{A3.12})$$

Therefore the expenditure share is:

$$\sum_k \theta_{ik} = \frac{m_i \phi_i Y_i}{\sum_j \phi_j Y_j} \left[\frac{1}{\sum_j \left(\frac{\phi_j Y_j}{\sum_j \phi_j Y_j} \right) \frac{1}{f(d_{ij})}} \right] \quad (\text{A3.13})$$

Substituting Equation (A3.13) into the import demand equation yields:

$$M_{ij} = \frac{m_i \phi_i Y_i \phi_j Y_j}{\sum_j \phi_j Y_j} \frac{1}{f(d_{ij})} \frac{1}{\sum_j \left(\frac{\phi_j Y_j}{\sum_j \phi_j Y_j f(d_{ij})} \right)} \quad (\text{A3.14})$$

If the number of countries is large and the average distance between them is relatively similar, the last term in the product can be ignored since it would be essentially the same for all countries. The denominator in the first term can be considered constant since it holds basically the same value across countries. Assume that the current account factor and traded goods shares were functions of income and population.

Imposing a log-linear functional form, the current account factor can be expressed as:

$$m_i = k_m Y_i^{\delta_1} N_i^{\delta_2} \quad (\text{A3.15})$$

and the traded goods shares for country i and country j as:

$$\phi_i = k_\alpha Y_i^{\alpha_1} N_i^{\alpha_2} \quad (\text{A3.16})$$

and

$$\phi_j = k_\gamma Y_j^{\gamma_1} N_j^{\gamma_2} \quad (\text{A3.17})$$

Substituting Equations (A3.15), (A3.16) and (A3.17) into the import demand equation yields a gravity model:

$$M_{ij} = (k_m k_\alpha k_\gamma) Y^{(1+\delta_1+\alpha_1)} N^{(1+\delta_2+\alpha_2)} Y^{(1+\gamma_1)} N^{(1+\gamma_2)} \frac{1}{f(d_{ij})} \quad (\text{A3.18})$$

If the parameters are simplified and a log-linear functional form imposed for the transaction cost term, an expression resembling the standard gravity model is obtained.

A4. Derivation of Helpman and Krugman (1985) Gravity Model

Assume a two-country (country i and country j), two goods (Z_1 and Z_2), and two inputs (L and K) world, where L denotes labour and K denotes capital. Further assume that Z_1 is capital-intensive in production and Z_2 is labour-intensive in production, and that country i is relatively capital-abundant and country j is relatively labour-abundant. As per HO theory, country i will export (and country j will import) Z_1 , and country j will export (and country i will import) Z_2 . Assuming that the two goods are homogenous and that tastes are homothetic and constant across countries, the value of bilateral exports from county i to country j can be expressed as:

$$X_{ij} = p_{Z_1} (Z_1 - s^i \bar{Z}_1) \quad (\text{A4.1})$$

where Z_1 is the domestic output of good 1 in country i , s^i is the share of country i 's spending (or country i 's GDP); and \bar{Z}_1 is the world output-level of good Z_1 . Similarly, the value of bilateral exports from country j to country i can be expressed as:

$$X_{ji} = p_{Z_2} (Z_2 - s^j \bar{Z}_2) \quad (\text{A4.2})$$

where Z_2 is the domestic output of good 2 in country j , s^j is the share of country j 's spending (or country j 's GDP); and \bar{Z}_2 is the world output-level of good Z_2 . In a two-country world, world GDP is simply the sum of the two countries' respective GDPs such that:

$$s^i = \frac{Y_i}{(Y_i + Y_j)} \quad (\text{A4.3})$$

and

$$s^j = \frac{Y_j}{(Y_i + Y_j)} \quad (\text{A4.4})$$

If trade is balanced, bilateral trade can be expressed as:

$$V_{ij} = X_{ij} + X_{ji} = p_{Z_1} (Z_1 - s^i \bar{Z}_1) + p_{Z_2} (Z_2 - s^j \bar{Z}_2) \quad (\text{A4.5})$$

Under product differentiation, it is assumed that each firm, n , is producing a unique variety of the differentiated good. The output per variety is the world output level of a particular good divided by the number of varieties. Under this scenario, there is two-way trade in both products, that is, both countries export and import goods. The value of bilateral trade between country i and country j , that is, the sum of bilateral exports from country i to country j and bilateral exports from country j to country i , can be expressed as:

$$V_{ij} = s^i (p_1 Z_1^j + p_2 Z_2^j) + s^j (p_1 Z_1^i + p_2 Z_2^i) \quad (\text{A4.6})$$

where Z_1^j is the output of good 1 in country j ; Z_2^j is the output of good 2 in country j ; Z_1^i is the output of good 1 in country i ; Z_2^i is the output of good 2 in country i ; and p_1 and p_2 are output prices. Since the GDPs of country i and j respectively can be expressed as:

$$Y_i = p_1 Z_1^i + p_2 Z_2^i \quad (\text{A4.7})$$

$$Y_j = p_1 Z_1^j + p_2 Z_2^j \quad (\text{A4.8})$$

Equation (A4.6) thus simplifies to:

$$V_{ij} = s^i Y_j + s^j Y_i \quad (\text{A4.9})$$

This is equivalent to:

$$V_{ij} = 2s^i s^j (Y_i + Y_j) \quad (\text{A4.10})$$

A5. Derivation of Bergstrand (1985; 1989) Gravity Models

Bergstrand (1985)

Assume that demand can be modelled by CES utility functions, that the world consists of N countries, and that all consumers possess identical CES utility functions with a choice between imported goods and domestically produced goods, the utility function for consumers in country j is expressed as:

$$U_j = \left[\left[\left(\sum_{\substack{k=1 \\ k \neq j}}^N X_{kj}^\theta \right)^{\frac{1}{\theta_j}} \right]^{\psi_j} + X_{jj}^{\psi_j} \right]^{\frac{1}{\psi_j}} \quad (\text{A5.1})$$

where X_{kj} is the amount of goods produced in country k demanded by country j 's consumers; and X_{jj} is the amount of domestically produced goods demanded in j . ψ is defined as:

$$\psi_j = \frac{(\mu_j - 1)}{\mu_j} \quad (\text{A5.2})$$

where μ is the CES between imported and domestically produced goods. θ is defined as:

$$\psi_j = \frac{(\mu_j - 1)}{\mu_j} \quad (\text{A5.3})$$

where σ is the CES among imported goods. Equations (A5.2) and (A5.3) permit consumers to first decide between domestically produced or imported goods, and for

those who chose imported goods to then select from potential suppliers on the world market.

The budget constraint of consumers is:

$$Y_j = \sum_{k=1}^N \bar{P}_{kj} X_{kj} \quad (\text{A5.4})$$

given that

$$\bar{P}_{kj} = \frac{P_{kj} T_{kj} C_{kj}}{E_{kj}} \quad (\text{A5.5})$$

where Y_j represents country j 's income; P_{kj} is the currency price of country k 's good in country j ; T_{kj} is a tariff factor imposed by country j on country k 's products; C_{kj} is a transportation cost factor; and E_{kj} is the exchange rate measured as the number of country k 's currency units per unit of country j 's currency. For the case of domestically produced goods, T_{jj} , C_{jj} , and E_{jj} are all unity.

Maximising the utility function subject to the budget constraint yields:

$$X_{ij}^D = Y_j \bar{P}_{ij}^{-\sigma_j} \frac{\left[\left(\sum_{k \neq j}^N \bar{P}_{kj}^{1-\sigma_j} \right)^{\frac{1}{1-\sigma_j}} \right]^{\sigma_j - \mu_j}}{\left[\left(\sum_{k \neq j}^N \bar{P}_{kj}^{1-\sigma_j} \right)^{\frac{1}{1-\sigma_j}} \right]^{1-\mu_j} + \bar{P}_{jj}^{1-\mu_j}}, \quad i, j = 1, \dots, N (i \neq j) \quad (\text{A5.6})$$

The N demand functions for domestically produced goods, X_{jj}^D , can be ignored since these goods do not enter the gravity framework.

On the supply side, firms in each country are assumed to be profit maximisers whose profit function is:

$$\Pi_i = \sum_{k=1}^N P_{ik} X_{ik} - W_i R_i, \quad i = 1, \dots, N \quad (\text{A5.7})$$

where Π_i denotes profit of firms in country i ; R_i is the amount of a single internationally immobile productive resource that is employed; and W_i is the money rental rate for that immobile factor in country i 's currency. The endowment of R available in each country is utilised in production according to a CET technology as:

$$R_i = \left[\left[\left(\sum_{\substack{k=1 \\ k \neq i}}^N X_{ik}^{\phi_i} \right)^{\frac{1}{\phi_i}} \right]^{\delta_i} + X_{ii}^{\delta_i} \right]^{\frac{1}{\delta_i}}, \quad i = 1, \dots, N \quad (\text{A5.8})$$

The parameter δ is expressed as:

$$\delta_i = \frac{1 + \eta_i}{\eta_i}, \quad 0 \leq \eta_i \leq \infty \quad (\text{A5.9})$$

where η_i represents the CET between production for home consumption for foreign consumption. The parameter ϕ_i is expressed as:

$$\phi_i = \frac{1 + \gamma_i}{\gamma_i}, \quad 0 \leq \gamma_i \leq \infty \quad (\text{A5.10})$$

where γ_i is the CET among international markets. Substituting R_i into the profit function and optimising results in N^2 first-order conditions which can be solved for $N(N-1)$ bilateral export supply relations:

$$X_{ij}^S = Y_i P_{ij}^{\gamma_i} \frac{\left[\left(\sum_{\substack{k=1 \\ k \neq j}}^N P_{ik}^{1+\gamma_j} \right)^{\frac{1}{1+\gamma_j}} \right]^{-(\eta_i - \eta_j)}}{\left[\left(\sum_{\substack{k=1 \\ k \neq j}}^N P_{ik}^{1+\gamma_i} \right)^{\frac{1}{1+\gamma_i}} \right]^{1+\eta_i} + P_{ii}^{1-\eta_i}}, \quad i, j = 1, \dots, N (i \neq j) \quad (\text{A5.11})$$

Similar to the demand side, the supply functions for the domestically produced goods intended for domestic consumption, X_{ii}^S , can be ignored since these goods do not enter the gravity framework.

There are N^2 equilibrium conditions such that:

$$X_{ij} = X_{ij}^D = X_{ij}^S \quad (\text{A5.12})$$

The latter constrains trade to be balanced on a bilateral level. Applying the above constraint to the import demand and export supply functions yields N^2 partial sub-systems of a general equilibrium set-up. Each sub-system consists of four equations with four unknown variables $(X_{ij}, X_{ij}^D, X_{ij}^S, P_{ij})$. As the objective of the gravity model is to explain the volume of exports from one country to another, solutions for X_{ij} and P_{ij} are needed. Using the N^2 equilibrium conditions, X_{ij} and P_{ij} can be expressed as:

$$X_{ij} = \frac{\left[Y_i^{\sigma_j} Y_j^{\gamma_j} E_{ij}^{\gamma_j \sigma_j} \left(\sum_{k \neq j}^N \bar{P}_{kj}^{1-\sigma_j} \right)^{\frac{\gamma_i(\sigma_j - \mu_j)}{1-\sigma_j}} \right]^{\frac{1}{\gamma_i + \sigma_j}}}{\left[C_{ij}^{-\gamma_i \sigma_j} T_{ij}^{\gamma_i \sigma_j} \left(\sum_{k \neq j}^N P_{ik}^{1+\gamma_i} \right)^{\frac{\sigma_j(\gamma_i - \eta_i)}{1+\gamma_i}} \right]^{\frac{1}{\gamma_i + \sigma_j}}}$$

$$= \frac{1}{\left[\left(\sum_{k \neq j}^N P_{ik}^{1+\gamma_i} \right)^{\frac{1+\eta_i}{1+\gamma_i}} + P_{ii}^{1+\eta_i} \right]^{\sigma_j} \left[\left(\sum_{k \neq j}^N \bar{P}_{kj}^{1-\sigma_j} \right)^{\frac{1-\mu_j}{1-\sigma_j}} + P_{jj}^{1-\mu_j} \right]^{\frac{1}{\gamma_i + \sigma_j}}}$$
(A5.13)

and

$$P_{ij} = \frac{\left[Y_j E_{ij}^{\sigma_j} \left(\sum_{k \neq j}^N P_{ik}^{1+\gamma_i} \right)^{\frac{\gamma_i - \eta_i}{1+\gamma_i}} \left(\sum_{k \neq j}^N \bar{P}_{kj}^{1-\sigma_j} \right)^{\frac{\sigma_j - \mu_j}{1-\sigma_j}} \left(\sum_{k \neq j}^N P_{ik}^{1+\gamma_i} \right)^{\frac{1+\eta_i}{1+\gamma_i}} + P_{ii}^{1+\eta_i} \right]^{\frac{1}{\gamma_i + \sigma_j}}}{\left[Y_i C_{ij}^{\sigma_j} T_{ij}^{\sigma_j} \left(\sum_{k \neq j}^N \bar{P}_{kj}^{1-\sigma_j} \right)^{\frac{1-\mu_j}{1-\sigma_j}} + P_{jj}^{1-\mu_j} \right]^{\frac{1}{\gamma_i + \sigma_j}}}$$
(A5.14)

Assuming that utility functions and technologies are the same across countries, that is, the CET parameters in X_{ij} and P_{ij} are the same for all country pairs, in combination with a small country assumption, thereby exogenising foreign prices on the world market, multiplying X_{ij} and P_{ij} yields the value of bilateral exports from country i to country j :

$$P_{ij} X_{ij} = P X_{ij} \tag{A5.15}$$

Equation (A5.15) implies the following generalised gravity model:

$$PX_{ij} = \frac{\left[Y_i^{\left(\frac{\sigma-1}{\gamma+\sigma}\right)} Y_j^{\left(\frac{\gamma+1}{\gamma+\sigma}\right)} E_{ij}^{\sigma\left(\frac{\gamma+1}{\gamma+\sigma}\right)} \left(\sum_{\substack{k=1 \\ k \neq j}}^N \bar{P}_{kj}^{1-\sigma} \right)^{\frac{(\gamma+1)(\sigma-\mu)}{(1-\sigma)(\gamma+\sigma)}} \right]}{\left[C_{ij}^{\sigma\left(\frac{\gamma+1}{\gamma+\sigma}\right)} T_{ij}^{\gamma\left(\frac{\gamma+1}{\gamma+\sigma}\right)} \left(\sum_{\substack{k=1 \\ k \neq j}}^N P_{kj}^{1+\gamma} \right)^{\left(\frac{\sigma-1}{1+\gamma}\right)\left(\frac{\gamma-\eta}{\gamma+\sigma}\right)} \right]}$$

$$\mathbf{x} \left[\frac{1}{\left[\left(\sum_{\substack{k=1 \\ k \neq j}}^N P_{ik}^{1+\gamma} \right)^{\frac{1+\eta}{1+\gamma}} + P_{ii}^{1+\eta} \right]^{\frac{\sigma-1}{\gamma+\sigma}} \left[\left(\sum_{\substack{k=1 \\ k \neq j}}^N \bar{P}_{kj}^{1-\sigma} \right)^{\frac{1-\mu}{1-\sigma}} + P_{jj}^{1-\mu} \right]^{\frac{\gamma+1}{\gamma+\sigma}}} \right]} \quad (\text{A5.16})$$

After simplifying, Equation (A5.16) results in a gravity-type structure with prices and the exchange rate included as exogenous.

Bergstrand (1989)

Assume that the economy is multi-country, multi-industry (two sectors for simplicity), with two factors of production. Each consumer l in country j is assumed to maximise a nested Cobb-Douglas CES Stone-Geary utility function subject to a budget constraint:

$$U_{jl} = \left[\left(\sum_{n=1}^N \sum_{h=1}^{H_{An}} X_{Ahnj}^{\theta^A} \right)^{\frac{1}{\theta^A}} \right]^{\delta} \left[\left(\sum_{n=1}^N \sum_{h=1}^{H_{Bn}} X_{Bhnl}^{\theta^B} \right)^{\frac{1}{\theta^B}} - \bar{X}_B \right]^{1-\delta} \quad (\text{A5.17})$$

where θ^A , θ^B and δ are parameters; $-\infty < \theta^A$; $\theta^B < 1$; $0 < \delta < 1$; \bar{X}_B represents the minimum consumption requirement of the good produced in sector B required by any consumer; and the indices A and B refer to the manufacturing and non-manufacturing sector, h identifies the firm, n the country of production, j the country of consumption,

and l the individual consumer. Therefore, X_{Ahnl} represents the quantity consumed by consumer l of the good produced in the manufacturing sector A , from firm h in country n . Likewise, X_{Bhnl} represents the quantity consumed by consumer l of the good produced in the manufacturing sector B , from firm h in country n . As a result, each consumer's utility depends on all goods consumed, manufactured and non-manufactured, produced domestically or imported from abroad.

Consumers maximise utility subject to their income. All consumers are assumed to be identical, and aggregated to obtain country j 's inverse demand curve for the output of a particular firm h , in a particular sector, A or B , in country i . Consequently, the inverse demand function by country j 's consumers for the output of firm g in the manufacturing sector, A , produced in country i can be expressed as:

$$P_{Aij} = \frac{\delta^{\frac{1}{\sigma^A}} A_j^{\frac{1}{\sigma^A}} (1 - y_j^{-1})^{\frac{1}{\sigma^A}} E_{ij}}{X_{Agij}^{\frac{1}{\sigma^A}} T_{Aij} \left[\sum_{n=1}^N \sum_{h=1}^{H_{An}} \left(\frac{P_{Ahjn} T_{anj}}{E_{nj}} \right)^{1-\sigma^A} \right]^{\frac{1}{\sigma^A}}} \quad (\text{A5.18})$$

where y_j is the per capital income of country j in terms of the minimum consumption of the non-manufactured good; and σ , E , P , and T , have the same definitions as in Bergstrand (1985); however, industry identifier subscripts on P and T and firm identifier subscripts on P are added.

Each firm h produces a differentiated good under increasing returns that is sold in monopolistically competitive markets. A feature of this approach is that goods are differentiated on the firm level and not only by country of origin. Production depends on two factors, labour, L , and capital, K . Technology is linear such that:

$$L_{agi} = \alpha_{La} + \beta_{La} X_{agi} \quad (\text{A5.19})$$

and

$$K_{agi} = \alpha_{Ka} + \beta_{Ka} X_{agi} \quad (\text{A5.20})$$

$$g = 1, \dots, H_{ai}; a = A, B; i = 1, \dots, N$$

where the α s represent fixed set-up requirements of each factor; and the β s are the unit input requirements for the output in industry a (A or B) by firm g in country i .

Output is divided between domestic consumption and exports according to the CET frontier:

$$X_{agi} = \left[\sum_{n=1}^N (C_{ain} X_{agin})^{\phi^a} \right]^{\frac{1}{\phi^a}} \quad (\text{A5.21})$$

$$1 < \phi^a < \infty; g = 1, \dots, H_{ai}; a = A, B; i = 1, \dots, N$$

where C is a transportation cost factor. Given the labour wage rate, w , and the rental rate of capital, r , each firm determines their export supply to N foreign markets by maximising the profit function:

$$\begin{aligned} &= \sum_{n=1}^N P_{ain} X_{agin} - (w_i \alpha_{La} + r_i \alpha_{Ka}) - w_i \beta_{La} \left[\sum_{n=1}^N (C_{ain} X_{agin})^{\phi^a} \right]^{\frac{1}{\phi^a}} \\ &\quad - r_i \beta_{Ka} \left[\sum_{n=1}^N (C_{ain} X_{agin})^{\phi^a} \right]^{\frac{1}{\phi^a}} \end{aligned} \quad (\text{A5.22})$$

$$1 < \phi^a < \infty; g = 1, \dots, H_{ai}; a = A, B; i = 1, \dots, N$$

Firms supply exports to the world based on their marginal cost relationships derived from the profit maximisation process. An industry level gravity model can be found by finding the reduced forms and summing across all firms in a particular industry:

$$\begin{aligned}
PX_{Aij} &= \delta \left(\frac{y^A+1}{y^A+\sigma^A} \right) \left(Y_i^K \right)^{\left(\frac{y^A+1}{y^A+\sigma^A} \right)} \left(Y_j \right)^{\left(\frac{y^A+1}{y^A+\sigma^A} \right)} \left[\beta_{LB} - \beta_{KB} \frac{1}{\left(\frac{K_i^*}{L_i^*} \right)} \right]^{\left(\frac{y^A+1}{y^A+\sigma^A} \right)} \\
&\times \frac{\left(1 - \frac{1}{y_j} \right)^{\left(\frac{y^A+1}{y^A+\sigma^A} \right)} E_{ij}^{\sigma^A \left(\frac{y^A+1}{y^A+\sigma^A} \right)}}{C_{Aij}^{\left(\sigma^A-1 \right) \left(\frac{y^A+1}{y^A+\sigma^A} \right)} T_{ij}^{\left(\frac{y^A+1}{y^A+\sigma^A} \right)}} \\
&\times \frac{1}{\left[\left[\sum_{n=1}^N \left(\frac{P_{Ain}}{C_{Ain}} \right)^{1+\gamma^A} \right]^{\frac{1}{1+\gamma^A}} \right]^{\gamma^A \left(\frac{\sigma^A-1}{y^A+\sigma^A} \right)} \left[\sum_{n=1}^N \left(\frac{P_{Ain} T_{Ain}}{E_{nj}} \right) \right]^{1-\sigma^A}} \right]^{\left(\frac{y^A+1}{y^A+\sigma^A} \right)} \tag{A5.23}
\end{aligned}$$

$$1 < \phi^a < \infty; g = 1, \dots, H_{ai}; a = A, B; i = 1, \dots, N$$

where Y_i^k is country i 's income expressed in units of capital; $\left(\frac{K_i^*}{L_i^*} \right)$ is the net capital-labour ratio of the exporting country; and y_j is the per capita income of country j in terms of the minimum consumption of the non-manufactured goods.

A6. Derivation of Deardoff (1998) Gravity Model

Each country is assumed to produce one good, and goods are differentiated by country of origin. The consumers in the importing country, j , maximise the following CES utility function given products from N potential trading partners:

$$U_j = \left(\sum_{i=1}^N \beta_i x_{ij}^{\left(\frac{\sigma-1}{\sigma} \right)} \right)^{\left(\frac{\sigma}{\sigma-1} \right)} \tag{A6.1}$$

where β is a distribution parameter and σ is the CES. Assume that consumers are indifferent between imported and domestically produced goods. Given that p_i is the money price of goods in country i , $t_{ij}p_i$ is the price of imported goods from country i in country j inclusive of any transaction costs.

Subject to a linear income constraint, the amount of goods produced in country i demanded by utility maximising consumers in country j can be expressed as:

$$x_{ij} = \frac{1}{t_{ij}p_i} Y_j \beta_i \left(\frac{t_{ij}p_i}{p_j^I} \right)^{1-\sigma} \quad (\text{A6.2})$$

p_j^I is a price index for imported goods from country i in country j :

$$p_j^I = \left(\sum_{i=1}^N \beta_i t_{ij}^{1-\sigma} p_i^{1-\sigma} \right)^{\frac{1}{1-\sigma}} \quad (\text{A6.3})$$

Consequently, the value of imports to country j from country i is:

$$X_{ij} = Y_j \beta_i \left(\frac{t_{ij}p_i}{p_j^I} \right)^{1-\sigma} \quad (\text{A6.4})$$

To obtain an expression for the distribution parameter, β_i , the definition of country i 's share of world income, s_i , and the latter equation are used to arrive at:

$$s_i = \frac{p_i x_i}{Y_w} = \frac{1}{Y_w} \sum_{j=1}^N \beta_i p_j x_j \left(\frac{t_{ij}p_i}{p_j^I} \right)^{1-\sigma} = \beta_i \sum_{j=1}^N s_j \left(\frac{t_{ij}p_i}{p_j^I} \right)^{1-\sigma} \quad (\text{A6.5})$$

β_i can explicitly be solved for:

$$\beta_i = \frac{Y_i}{Y_w} \left(\frac{1}{\sum_{j=1}^N s_j \left(\frac{t_{ij} p_i}{p_j^I} \right)^{1-\sigma}} \right) \quad (\text{A6.6})$$

Substituting Equation (A6.6) into Equation (A6.4) yields:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left(\frac{\left(\frac{t_{ij}}{p_j^I} \right)^{1-\sigma}}{\sum_{h=1}^N s_h \left(\frac{t_{ij} p_i}{p_j^I} \right)^{1-\sigma}} \right) \quad (\text{A6.7})$$

By normalising money prices, p_i and p_j , to equal unity, the price index term, p_j^I ,

simplifies to:

$$\delta_j^s = \left(\sum_{i=1}^N \beta_i t_{ij}^{1-\sigma} \right)^{\frac{1}{1-\sigma}} \quad (\text{A6.8})$$

where δ_j^s can be interpreted as country j 's relative distance from its trading partners.

Define:

$$\rho_{ij} = \frac{t_{ij}}{\delta_j^s} \quad (\text{A6.9})$$

as the relative distance between country i and country j . Thus, using the concept of relative distance, the gravity model of the value of exports to country j from country i is:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left(\frac{\rho_{ij}^{1-\sigma}}{\sum_{h=1}^N s_h \rho_{ih}^{1-\sigma}} \right) \quad (\text{A6.10})$$

A7. Derivation of Evenett and Keller (2002) Gravity Models

Gravity Equations with Perfect Specialisation of Production

Specification 1: IRS Model with Perfect Specialisation

Assume that two goods are being produced, Z_1 and Z_2 , each with n varieties, production takes place under increasing returns to scale (IRS) and complete specialisation will prevail in each variety. Output prices are assumed the same for all varieties, preferences are identical and homothetic across countries, trade is free, all transaction costs are zero, and trade takes place in final goods only. Therefore, the output of any country j can be expressed as:

$$Y_j = p_{z_1} n_{z_1}^j z_{1j} + p_{z_2} n_{z_2}^j z_{2j} \quad (\text{A7.1})$$

where p_{z_1} is the price of good 1 for all varieties; p_{z_2} is the price of good 2 for all varieties; $n_{z_1}^j$ and $n_{z_2}^j$ represent the number of varieties of good 1 and good 2 respectively in country j ; and z_{1j} and z_{2j} represent the outputs of each variety of good 1 and good 2 respectively in country j .

Countries import goods in proportion to their national incomes. Let s^j be the share of country j 's national income in world income. As a consequence, j 's consumers demand a fraction, s^j , of the world economy output; this implies that $(1-s^j)$ of the output produced in j is exported. Similarly, s^j is the share of any country's domestic output exported to country j . Exports from i to j , X_{ij} , can be expressed as:

$$X_{ij} = s^j [p_{z_1} n_{z_1}^j z_{1j} + p_{z_2} n_{z_2}^j z_{2j}] = s^j Y_j \quad (\text{A7.2})$$

If trade is balanced:

$$X_{ij} = s^i Y_j = X_{ji} = s^j Y_i$$

(A7.3)

Using the definition of the income shares, bilateral exports can be expressed as:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \tag{A7.4}$$

where Y_w is world income.

Specification 2: Multi-cone HOS Model with Perfect Specialisation

Assume homothetic and identical preferences, and a world with two countries, two factors and two goods. Also assume that the goods, Z_1 and Z_2 , are homogenous and produced under CRS. Let country i be relatively capital-abundant and good Z_1 be relatively capital-intensive in production. On the other hand, let country j be relatively labour-abundant and good Z_2 be labour-intensive in production.

Recall that HOS theory predicts that country i and country j will specialise in the production of good Z_1 and good Z_2 respectively. If there is perfect specialisation, world production of each good, Z_{1w} and Z_{2w} respectively, can be expressed as the domestic output of the good in the country that possesses a comparative advantage in its production:

$$Z_{1i} = Z_{1w} \tag{A7.5}$$

and

$$Z_{2j} = Z_{2w} \tag{A7.6}$$

where Z_{1i} is the output of good 1 in country i , which equals world production of good 1; and Z_{2j} is the output of good 2 in country j , which equals world production of good 2.

2. Using Equations (A7.5) and (A7.6), national income of each country can be defined as:

$$p_{Z_1} Z_{1i} = Y_i \quad (\text{A7.7})$$

and

$$p_{Z_2} Z_{2j} = Y_j \quad (\text{A7.8})$$

where p_{Z_1} and p_{Z_2} represent output prices of good 1 and good 2 respectively. If trade is balanced and there are no transportation costs or trade barriers, bilateral flows can be expressed as:

$$X_{ij} = s^i p_{Z_2} Z_{2j} = s^i Y_j = s^j p_{Z_1} Z_{1i} = s^j Y_i = X_{ji} \quad (\text{A7.9})$$

where s^i is the share of country i 's national income in world income; and s^j is the share of country j 's national income in world income, a gravity model is obtained:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \quad (\text{A7.10})$$

Gravity Equations with Imperfect Specialisation of Production

Specification 3: IRS/uni-cone HOS Model with Imperfect Specialisation

Assume Good Z_2 is labour-intensive and produced under CRS; factor abundancies are the same as those under the multi-cone HOS model, that is, country i is capital-abundant and country j is labour-abundant; however, good Z_1 , while still capital-intensive is produced under IRS. As a consequence, country i produces both goods while country j produces only Z_2 . Therefore, only the capital-intensive good is specialised in production.

Defining γ_i as the share of the labour-intensive good in country i 's GDP:

$$\gamma_i = \frac{p_{z_2} Z_{2i}}{Y_i} = \frac{p_{z_2} Z_{2i}}{p_{z_1} Z_{1i} + p_{z_2} Z_{2i}} \quad (\text{A7.11})$$

implies that $(1 - \gamma_i)$ represents the share of the capital-intensive good in country i 's

GDP. Assume balanced trade and define exports from i to j as:

$$X_{ij} = X_{ji} = s^j p_{z_1} Z_{1i} = s^j (1 - \gamma_i) Y_i = \frac{Y_j}{Y_w} (1 - \gamma_i) Y_i \quad (\text{A7.12})$$

Thus, the gravity model becomes:

$$X_{ij} = (1 - \gamma_i) \frac{Y_i Y_j}{Y_w} \quad (\text{A7.13})$$

where bilateral trade depends on the relative size of the capital-intensive sector, $(1 - \gamma_i)$, in country i .

Specification 4: Uni-cone HOS Model with Imperfect Specialisation

Assume both goods, Z_1 and Z_2 , are homogenous and produced under CRS; Z_1 is capital-intensive and Z_2 labour-intensive. Country i is capital-abundant and exports the capital-intensive good and country j is labour-abundant and exports the labour-intensive good. However, both countries produce the other good, that is, there is incomplete specialisation. Therefore bilateral exports from country i to country j , X_{ij} , can be expressed as:

$$X_{ij} = [(1 - \gamma_i) - (1 - \gamma_j)] \frac{Y_i Y_j}{Y_w} \quad (\text{A7.14})$$

which would simplify to the following gravity model:

$$X_{ij} = (\gamma_j - \gamma_i) \frac{Y_i Y_j}{Y_w} \quad (\text{A7.15})$$

A8. Derivation of Anderson and van Wincoop (2003) Gravity Model

Assume that each country specialises in the production of one good and that preferences are identical and homothetic across countries and follow a CES utility function. The utility of consumers in country j is:

$$U_j = \left(\sum_{i=1}^N \beta_i^{\frac{1-\sigma}{\sigma}} c_{ij}^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} \quad (\text{A8.1})$$

where c_{ij} is the consumption of goods originating in country i ; and β is a distribution parameter.

Let the price of country i 's goods to country j 's consumers be expressed as:

$$p_{ij} = p_i t_{ij} \quad (\text{A8.2})$$

where p_i is the supply price in country i and t_{ij} is the transaction cost of trade between i and j . Thus, the value of bilateral exports can be expressed as:

$$X_{ij} = p_{ij} c_{ij} \quad (\text{A8.3})$$

Assuming that consumers maximise their utility subject to a linear income constraint, the following demand function results:

$$X_{ij} = \left(\frac{\beta_i p_i t_{ij}}{P_j} \right)^{1-\sigma} Y_j \quad (\text{A8.4})$$

where P_j is a price index of country j such that:

$$P_j = \left[\sum_{i=1}^N (\beta_i p_i t_{ij})^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \quad (\text{A8.5})$$

Imposing market-clearing behaviour combined with the derived demand for foreign goods, the following is obtained:

$$Y_i = \sum_{j=1}^N X_{ij} = \sum_{j=1}^N \left(\frac{\beta_i p_i t_{ij}}{P_j} \right)^{1-\sigma} Y_j = (\beta_i p_i)^{1-\sigma} \sum_{j=1}^N \left(\frac{t_{ij}}{P_j} \right)^{1-\sigma} Y_j \quad (\text{A8.6})$$

Solve for $\beta_i p_i$, that is, scaled prices in country i , from Equation (8.6 and substitute into the bilateral export demand function [Equation (A8.4)] yields:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left(\frac{t_{ij}}{\Pi_i P_j} \right)^{1-\sigma} \quad (\text{A8.7})$$

where

$$\Pi_i = \left[\sum_{j=1}^N \left(\frac{t_{ij}}{P_j} \right)^{1-\sigma} s_j \right]^{\frac{1}{1-\sigma}} \quad (\text{A8.8})$$

and

$$P_j = \left[\sum_{i=1}^N \left(\frac{t_{ij}}{\Pi_j} \right)^{1-\sigma} s_i \right]^{\frac{1}{1-\sigma}} \quad (\text{A8.9})$$

Imposing symmetric trade barriers on the bilateral level, $t_{ij} = t_{ji}$, the following holds:

$$\Pi_i = P_i \quad (\text{A8.10})$$

with the implication:

$$P_j^{1-\sigma} = \sum_{i=1}^N P_i^{\sigma-1} s_i t_{ij}^{1-\sigma} \quad (\text{A8.11})$$

Substituting P_i for Π_i in the bilateral export demand function yields a gravity-like structure:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left(\frac{t_{ij}}{P_i P_j} \right)^{1-\sigma} \quad (\text{A8.12})$$

APPENDIX B

B1. Core and Related Cultural Goods (UNESCO Classification)

Core Cultural Goods	Related Cultural Goods
<i>Cultural heritage</i> <ul style="list-style-type: none">• Collections and collectors' pieces• Antiques of an age exceeding 100 years	<i>Equipment/support material</i> <ul style="list-style-type: none">• Musical instruments• Sound player recorded and recorded sound media• Cinematography and photographic supplies• Television and radio receivers
<i>Books</i> <ul style="list-style-type: none">• Books, brochures, leaflets, etc.• Children's pictures, drawing/colouring books	<i>Architecture plans and drawing trade and trade advertisement material</i>
<i>Other printed matter</i> <ul style="list-style-type: none">• Printed music• Maps• Postcards• Picture, designs and photographs	
<i>Recorded media</i> <ul style="list-style-type: none">• Gramophone records• Discs for laser-reading systems for reproducing sound only• Magnetic tape (recorded)• Other recorded media for sound	
<i>Visual arts</i> <ul style="list-style-type: none">• Paintings• Other visual arts (statuettes, sculptures, lithographs, etc.)	
<i>Audio-visual media</i> <ul style="list-style-type: none">• Video games used with a television receiver• Photographic and cinematograph films, exposed and developed	

Source: UNESCO (2005, p.15)

B2. Colonial Profile of Caribbean Countries

Official Name	Coloniser	Year Colonised	Current Status
Anguilla	Britain	1650	Dependent
Antigua and Barbuda	Britain	1632	Independent since 1981
Aruba	Netherlands	1636	Semi-independent since 1986
Bahamas	Britain	1717	Independent since 1973
Barbados	Britain	1627	Independent since 1966
Bermuda	Britain	1707	Dependent
Bonaire	Netherlands	1816	Dependent
British Virgin Islands	Britain	1672	Dependent
Cayman Islands	Britain	1670	Dependent
Cuba	Spain	1511	Independent since 1902
Curacao	Netherlands	1816	Semi-independent since 2010
Dominica	Britain	1763	Independent since 1978
Dominican Republic	Spain	1492	Independent since 1865
Grenada	Britain	1762	Independent since 1974
Guadeloupe	France	1635	Dependent
Haiti	France	1697	Independent since 1804
Jamaica	Britain	1655	Independent since 1962
Martinique	France	1635	Dependent
Montserrat	Britain	1632	Dependent
Puerto Rico	USA	1898	Semi-independent since 1948
Saba	Netherlands	1816	Dependent
St. Eustatius	Netherlands	1816	Dependent
St. Kitts and Nevis	Britain	1623	Independent since 1983
St. Lucia	Britain	1814	Independent since 1979
St. Maarten	Netherlands	1648	Semi-dependent since 2010
St. Vincent and the Grenadines	Britain	1673	Independent since 1979
Trinidad and Tobago	Britain	1820	Independent since 1962
Turks and Caicos Islands	Britain	1678	Dependent
United States Virgin Islands	USA	1917	Dependent

Sources: McKercher and DeCosta (2007), Strang (1991), CIA World Factbook and United Nations List of Non-Self Governing Territories.

Notes: Dependent indicates a full colony. Semi-independent indicates a partial colony. Independent indicates a former colony.

B3. Thermal Sensitivity According to ASHRAE Scale and Apparent Temperature

Thermal Sensitivity	Grade of Physiological Stress	ASHRAE	Apparent Temperature (AT)
Very hot	Extreme heat stress	+4	> 41°C
Hot	Strong heat stress	+3	35°C - 41°C
Warm	Moderate heat stress	+2	29°C - 35°C
Slightly warm	Slight heat stress	+1	23°C - 29°C
Comfortable	No thermal stress	0	18°C - 23°C
Slightly cool	Slight cold stress	-1	13°C - 18°C
Cool	Moderate cold stress	-2	8°C - 13°C
Cold	Strong cold stress	-3	4°C - 8°C
Very cold	Extreme cold stress	-4	< 4°C

Source: Matzarakis and Mayer (2000, p.158)