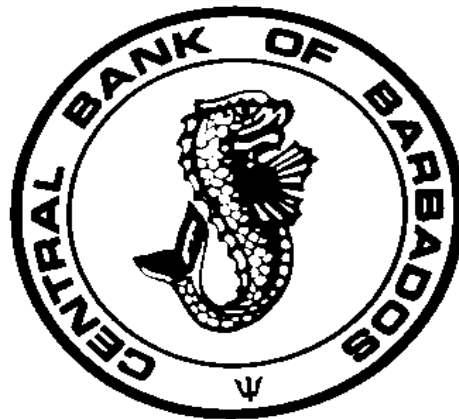


**BARBADOS' INTERNATIONAL COMPETITIVENESS**

BY

**DELISLE WORRELL, AND SHANE LOWE**



**CENTRAL BANK OF BARBADOS**  
Research and Economic Analysis Department

## Barbados' International Competitiveness

DeLisle Worrell<sup>1</sup>, and Shane Lowe<sup>2</sup>

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### ***Abstract***

This study investigates the competitiveness of the Barbadian economy relative to its regional counterparts. The analysis incorporates the relative rankings of the Global Competitiveness Report 2013-2014, relative market shares and productivity gains, as well as a novel price competitiveness index by Worrell, Greenidge and Lowe (2013). The results suggest that Barbados is competitive both regionally and globally, ranking ahead of its peers in key areas such as the strength of its institutions and the quality of its health care and primary and higher education. In addition, despite some declines in tourism post-crisis, the island has maintained market share in most of its key foreign exchange earning sectors, while seeing improved price competitiveness of its internationally traded goods and services over the past decade.

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<sup>1</sup> Central Bank of Barbados

<sup>2</sup> Central Bank of Barbados

## ***Introduction***

As a small economy, Barbados is a price taker, selling at prices that are targeted at the prices charged by competitors selling goods and services of comparable quality. To remain competitive, Barbadian producers keep their prices in line with the competition and aim to reduce costs and increase productivity, product quality and product differentiation, branding and customer loyalty.

Price competitiveness is essential for any small, internationally engaged firm; the small firm must achieve profitability by selling its product at a price which matches that of its international competitors, if it is to remain viable. The small producer attains viability by paying scrupulous attention to product and service quality, continuously improving levels of productivity, and enhancing its products and services so as to make them stand out from the competition. Sophisticated marketing, including the penetration of new markets and niches, and the use of information and communications technologies, are additional tools in the small firm's armoury. Government plays an important role in strengthening the ability of Caribbean firms to penetrate international goods and service markets, through business facilitation, providing adequate infrastructure, promotion of diversification of export products, productivity enhancements and institutional reform and development (see Tsikata et al, 2009; Caribbean Trade and Adjustment Group, 2003). Measures such as an economy's regional or global market share (McIntyre, 1995; Worrell and Craigwell, 2008), revealed comparative advantage (Balassa, 1965), the level of local and foreign investment, technological improvement (Monteagudo and Montaruli, 2009; Magnier and Toujas-Bernate, 1994 and Agénor, 1997) and educational advancement all provide indications of a country's non-price competitiveness.

International agencies and organisations have commented on what they perceive to be a lack of external competitiveness of Caribbean countries. The latest Regional Economic Outlook by the International Monetary Fund (IMF) (October 2013) described the tourism dependent economies of the region as suffering from "chronically weak competitiveness." However, the IMF, in its 2011 Staff Report on Barbados, admitted that the island's Real Effective Exchange Rate (REER) was not misaligned based on the fundamental equilibrium exchange rate (FEER) approach, and that alternative approaches suggested that the size of the misalignment was in the region of 7 to 11 percent (IMF, 2011)<sup>3</sup>.

This paper undertakes a comprehensive analysis of Barbados' competitiveness relative to its regional counterparts of comparable size offering similar goods and services. It assesses the island's overall competitiveness using the Global Competitiveness Report (2013-2014), an independent and wide-ranging examination into a country's key areas of global competitiveness. Next, we take a look at a number of indicators of market share and productivity and finally assess Barbados' price competitiveness, adopting the approaches of Worrell, Greenidge and Lowe (2013) and other relevant studies.

### ***1. Analysis of the Global Competitiveness Index; Barbados and the Caribbean***

The Global Competitiveness Report prepared by the World Economic Forum evaluates the determinants of productivity and competitiveness of 148 countries. These 12 determinants, referred to as pillars, are classified under three main headings, and each of these sub-indexes is weighted to give an overall score and ranking of competitiveness. The three classifications are: Basic Requirements (key for factor-driven economies), Efficiency Enhancers (key for efficiency-driven economies) and Innovation and

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<sup>3</sup> An updated staff report is expected to be published in February 2014.

Sophistication factors (key for innovation-driven economies). “Basic Requirements” is made up of pillars 1 – 4, which include Institutions, Infrastructure, the Macroeconomic environment and Health and Primary Education. “Efficiency Enhancers” include Higher education and training, Goods market efficiency, Labour market efficiency, Financial market development, Technological readiness and Market size, while “Innovation and Sophistication” factors are Business sophistication and Innovation.

The Global Competitiveness Report (GCR) 2013-2014 (WEF, 2013) captures 148 countries across the globe. Barbados is included in a group of 22 transitional economies, defined as those moving from efficiency-driven economies to economies led by innovation (the highest stage of development). Costa Rica and Panama are the other small Caribbean representatives in this group.

Table 1 below shows that in 2013-2014, Barbados ranked 47th in the world in terms of overall competitiveness and 3<sup>rd</sup> in the group of Caribbean and Central American countries of similar size. Only Puerto Rico and Panama have better scores than Barbados, and the island has been able to maintain an average ranking of 44<sup>th</sup> over the last four years.

Table 1: Overall Caribbean Rankings from the Global Competitiveness Report 2013/14  
(2010/11 – 2013/14)

	Score 2013/14 <sup>4</sup>	Ranking in 2013/14	Ranking in 2012/13	Ranking in 2011/12	Ranking in 2010/11
<b>Puerto Rico</b>	4.67	30	31	35	41
<b>Panama</b>	4.50	40	40	49	53
<b>Barbados</b>	4.42	47	44	42	43
<b>Costa Rica</b>	4.35	54	57	61	56
<b>Guatemala</b>	4.04	86	83	84	78
<b>Trinidad &amp; Tobago</b>	3.91	92	84	81	84
<b>Jamaica</b>	3.86	94	97	107	95
<b>El Salvador</b>	3.84	97	101	91	82
<b>Nicaragua</b>	3.84	99	108	115	112
<b>Guyana</b>	3.77	102	109	109	110
<b>Dominican Republic</b>	3.76	105	105	110	101
<b>Suriname</b>	3.75	106	114	112	n/a
<b>Honduras</b>	3.70	111	90	86	91
<b>Haiti</b>	3.11	143	142	141	n/a

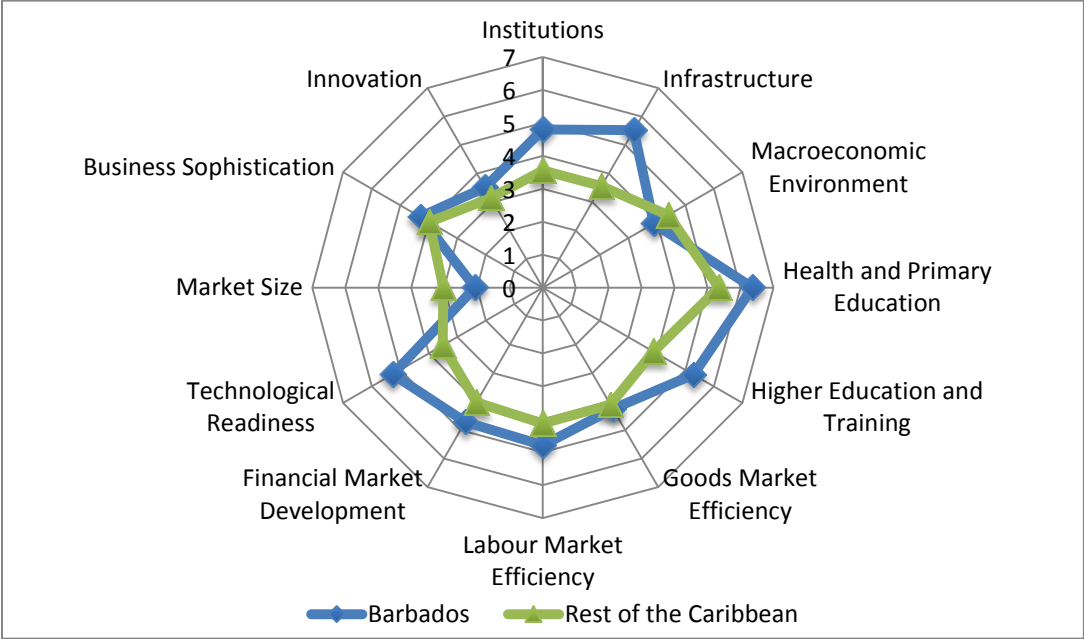
Source: Global Competitiveness Report 2013 – 2014

Figure 1 below provides a diagrammatical representation of Barbados’ competitive pillars relative to the rest of the Caribbean and Central America<sup>5</sup>. The island is superior to the region in all areas except for the state of the current macroeconomic environment and market size, while we are on par with the rest of the Caribbean in relation to goods market efficiency.

<sup>4</sup> Scores are given from 1 to 7, with 7 being the highest.

<sup>5</sup> See Appendix 1 for a more detailed analysis of Barbados’ performance in each pillar relative to the Caribbean and the world.

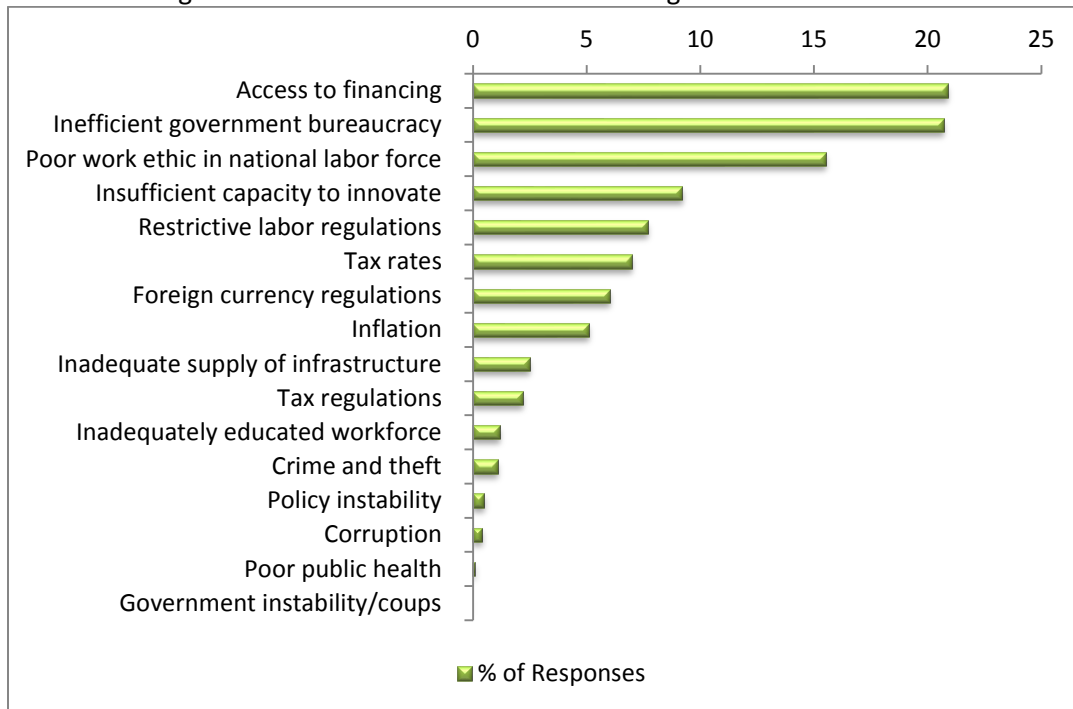
Figure 1: Barbados' Scores in the 12 Pillars of Competitiveness Relative to the Caribbean and Central America 2013/14



Source: Global Competitiveness Report 2013 – 2014

Finally, GCR 2013-2014 highlights the responses of local survey participants to the most problematic issues when conducting business in Barbados. Figure 2 ranks these areas by the frequency of their responses and the degree of difficulty and shows that access to financing through local equity markets, loans or venture capital, inefficient government bureaucracy and a poor work ethic in the national labour force are the three main areas which may be hindering the local private sector from propelling the economy into further development. These issues highlight the need for a more efficiently functioning financial sector, further public sector reform and consolidation as well as a greater drive at productivity enhancing measures in both the public and private sectors.

Figure 2: Most Problematic Factors In Doing Business In Barbados

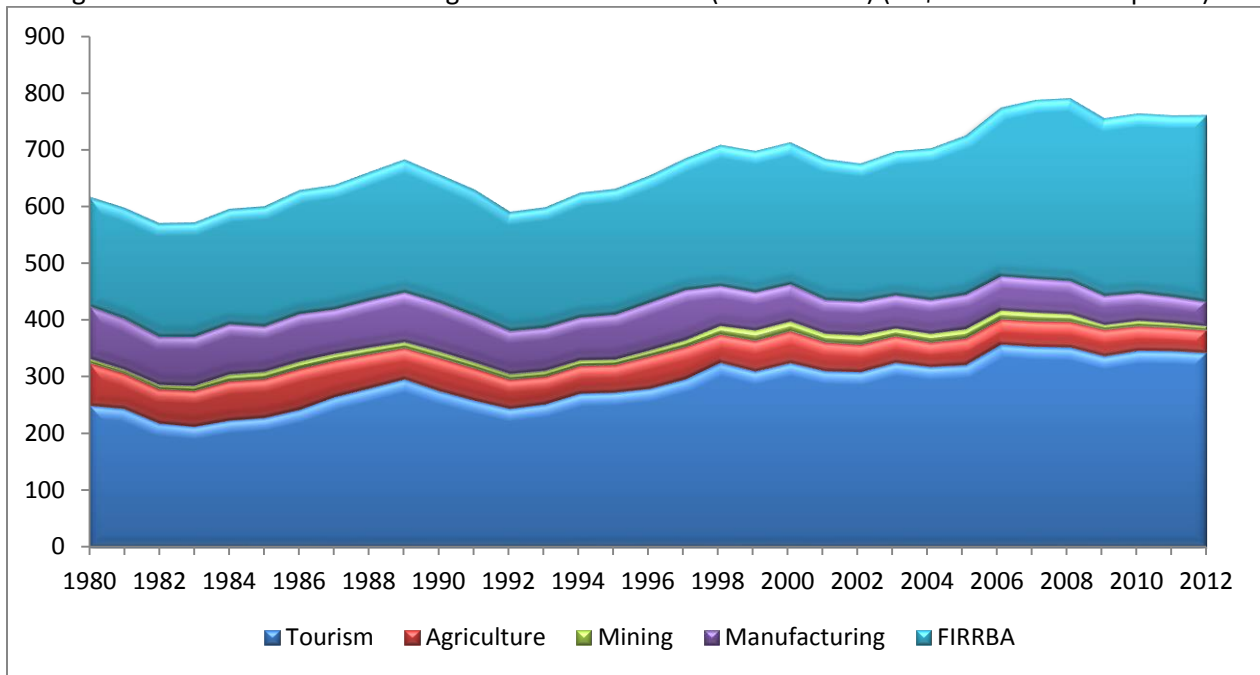


Source: Global Competitiveness Report 2013-2014

## 2. Market Shares and Centrality

The viability of the foreign exchange (FX) earning sectors is the manifestation of the competitiveness of the Barbadian economy. Viability is ensured by selling at prices comparable to competitors that sell products and services of equivalent quality. Over time, Barbadian producers retain competitiveness by ensuring that they increase productivity and raise product quality so that their prices do not run ahead of the competition. As Figure 3 highlights, the foreign exchange earning sectors of the economy are principally Tourism, Agriculture, Mining, Manufacturing, and Financial Intermediation (which is included with Real Estate, Rental and Business activities, FIRRBA). Overall, these sectors have experienced growth since 1980, led primarily by Tourism and International Business and Financial Services (IBFS). Tourism and IBFS are the largest sectors in terms of output contribution and are mutually dependent on each other. Over time agriculture, oil and gas production and manufacturing have shrunk to the point where these sectors now make up a tiny share of overall output.

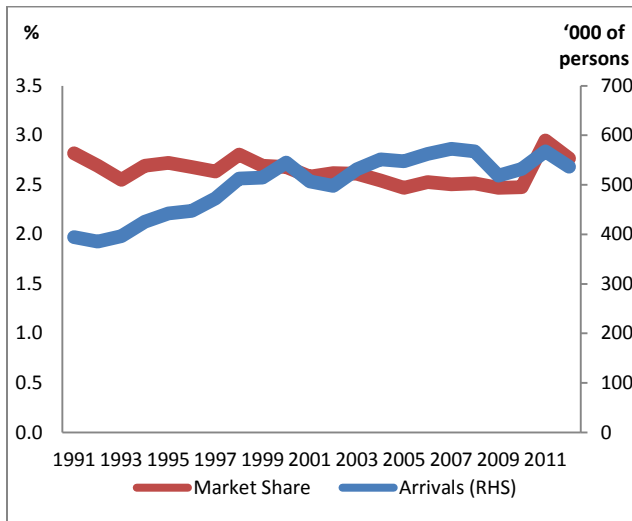
Figure 3: Growth in the FX Earning Sectors of Barbados (1980 – 2012) (US\$ millions – 1980 prices)



Source: Economic Commission for Latin America and the Caribbean

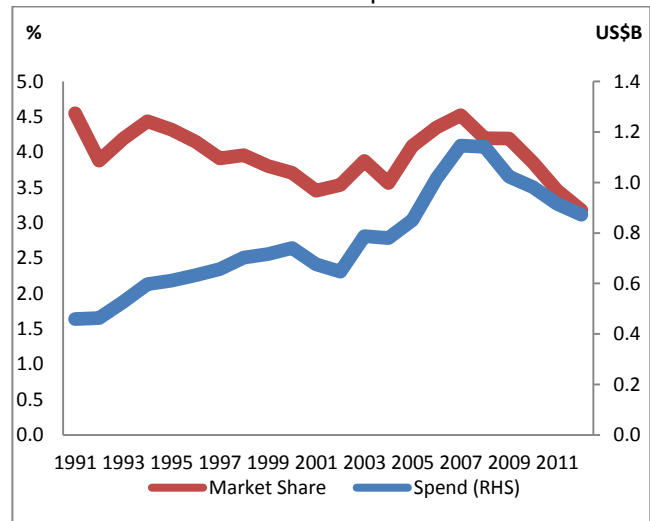
Since the onset of the global economic recession in 2008, Barbados' share of tourist expenditure in the Caribbean has declined, even though the island has maintained its share of arrivals (See Figures 4 and 5).

Figure 4: Barbados Tourism Market Share – Caribbean Arrivals



Source: Caribbean Tourism Organisation

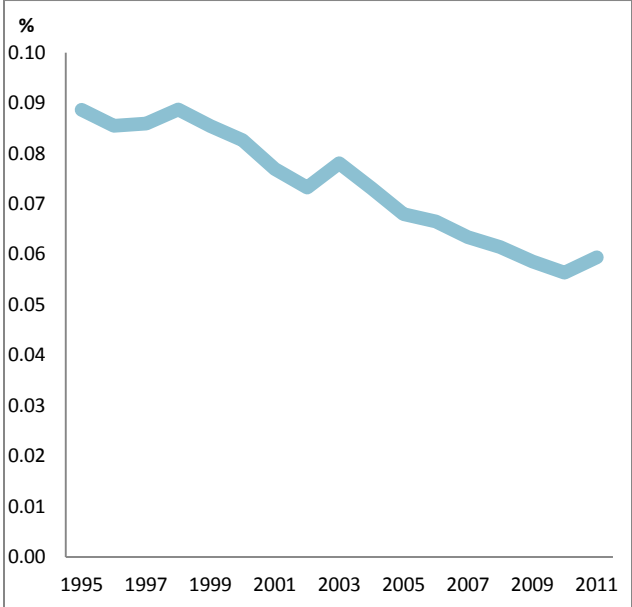
Figure 5: Barbados Tourism Market Share – Caribbean Spend



Source: Caribbean Tourism Organisation

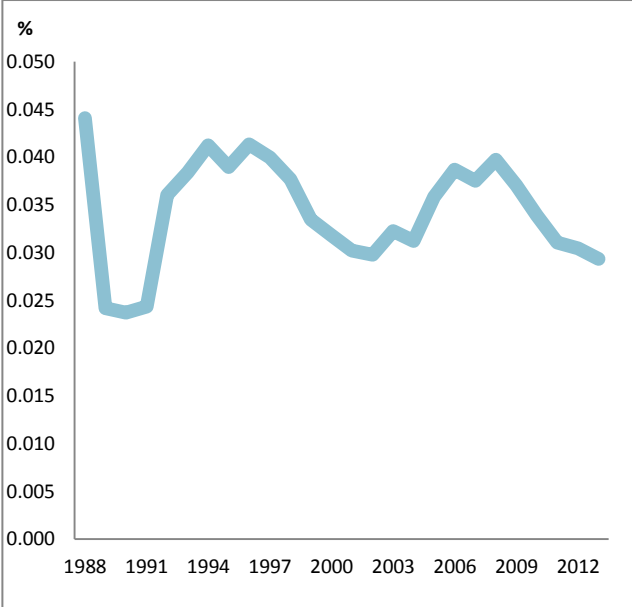
Barbados has also continued to lose share in both arrivals and expenditure in the global tourism market (see Figure 6 and 7).

Figure 6: Barbados Tourism Market Share – World Arrivals



Source: World Bank DataBank

Figure 7: Barbados Tourism Market Share – World Spend



Source: WTTC World Travel and Tourism Council

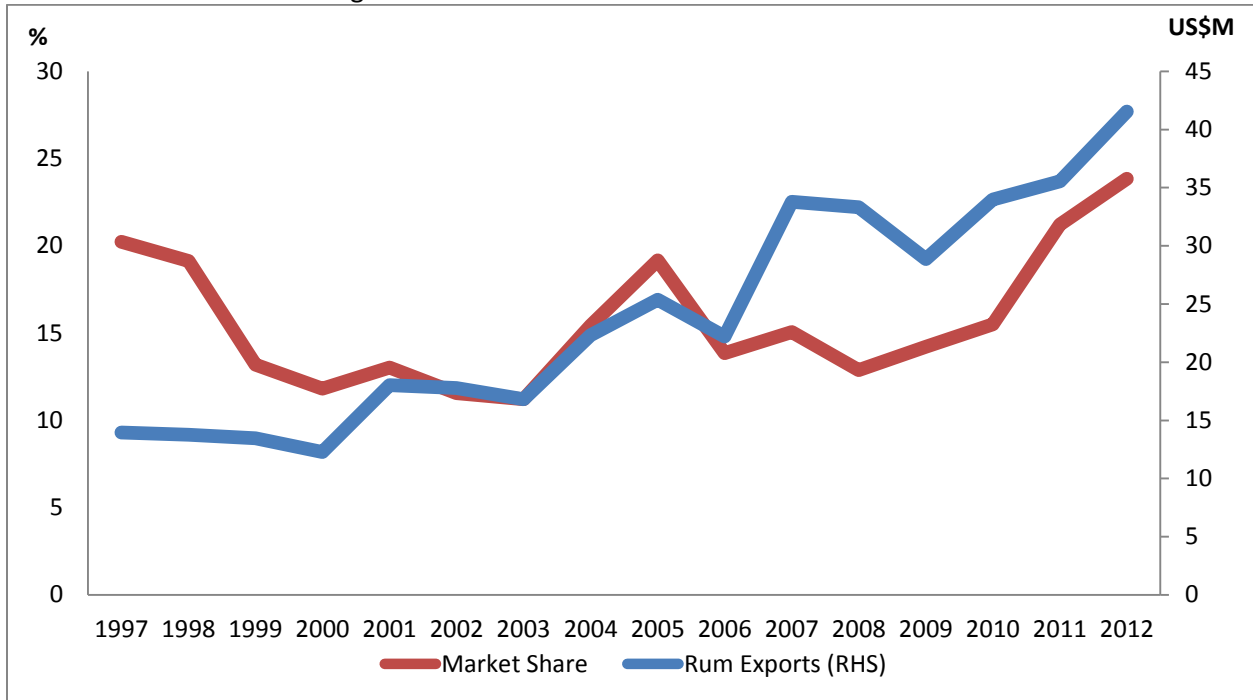
Barbados has developed a tourism strategy which is geared to first maintaining and then improving its competitiveness and ultimately market share in the regional and global tourism markets. Its strategy is based on a collaborative approach to decision-making and performance monitoring based on good information, improving the visitor experience by developing niches such as heritage, nature, culture and the environment, and increasing average expenditure per visitor by attracting world class brands to the island and maintaining a quality tourism plant and experience. In addition, value added in the sector must be improved by changing the mindset of those whose productivity is below par and enabling the efficient delivery of tourist services<sup>6</sup>.

In the manufacturing sector, Barbados has improved its market share in the global export of rum (Figure 8). The rum industry in Barbados has expanded mainly because of the export of high quality rums, which are aged, blended, packaged and labeled in Barbados, maximising the value added in the local economy.

<sup>6</sup> See Barbados Tourism Master Plan 2013-23, draft final, September 2013.



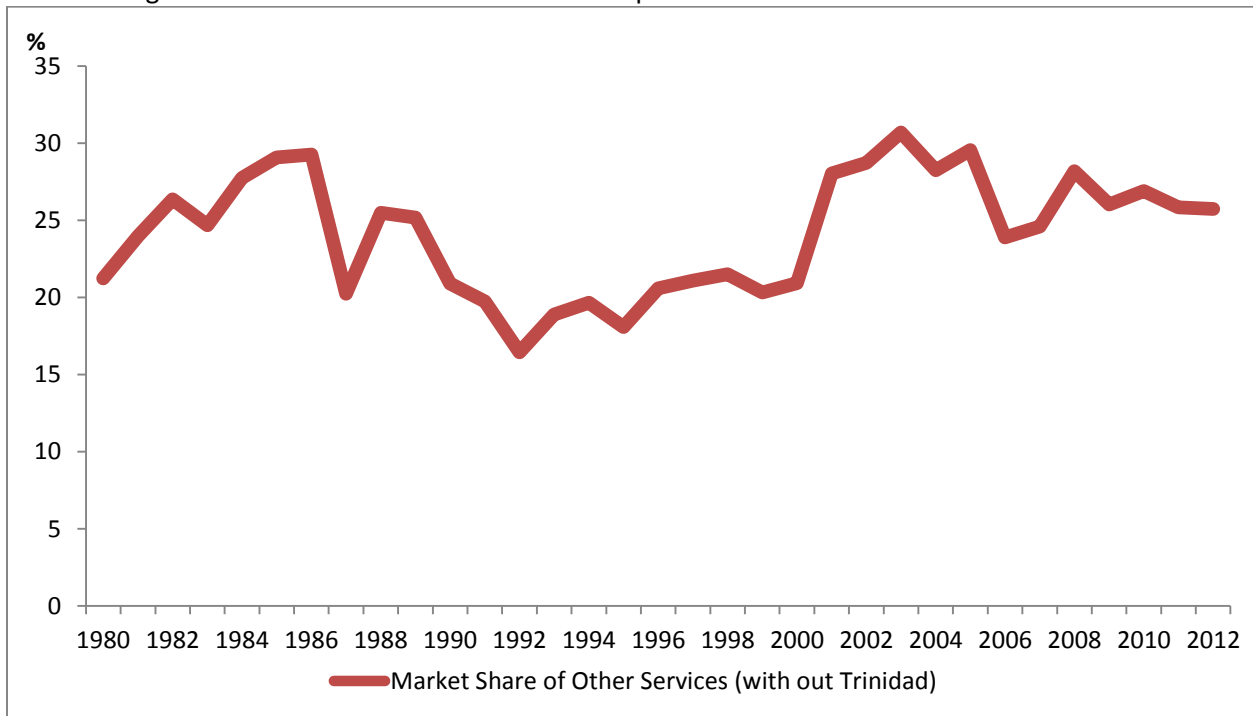
Figure 8: Barbados Rum Market Share – Caribbean



Source: United Nations Commodities Trade Database – HS:220840 Rum and Tafia

Moreover, Barbados has maintained market share in the provision of services other than tourism (see Figure 9).

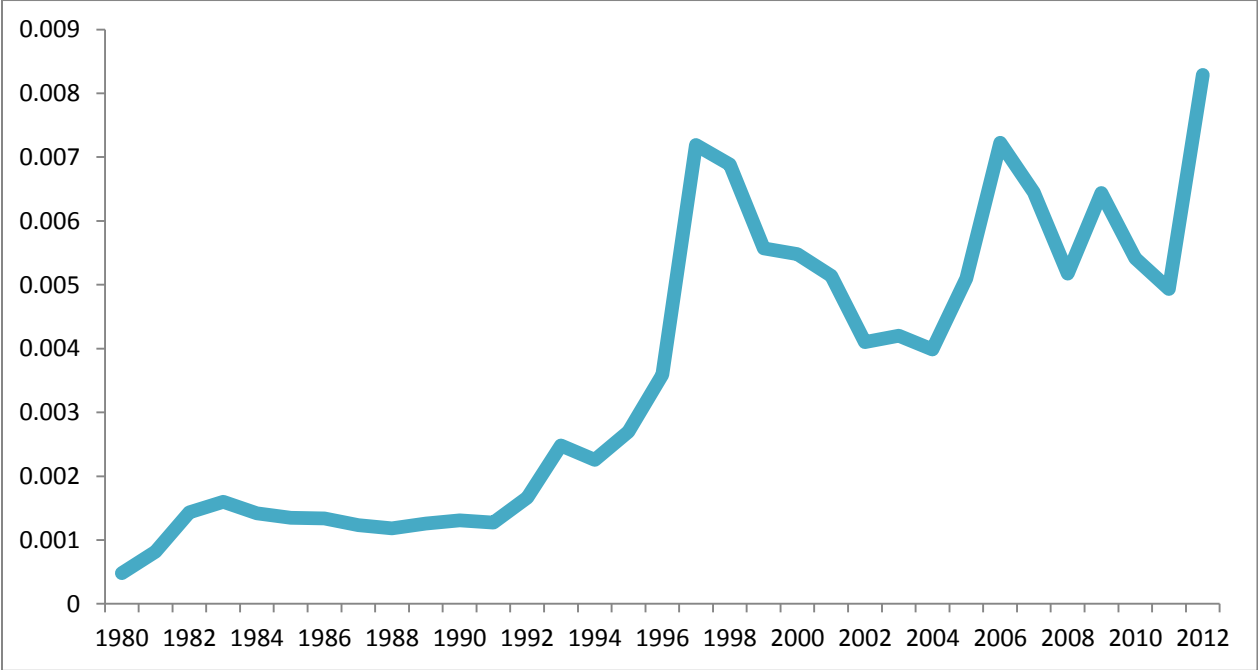
Figure 9: Barbadian Market Share In the Export of Other Services from the Caribbean



Source: Economic Commission for Latin America and the Caribbean

Barbados ranks as one of the major players in the IBFS sector, as evidenced by its increased penetration into, and centrality to the global banking system relative to other competing international financial centres (IFCs)<sup>7</sup> (see Figure 10).

Figure 10: Barbados’ Degree of Centrality to Global Banking Relative to other Small IFCs (1980 – 2012)



Sources: Bank for International Settlements; Authors’ calculations

Further efforts are being made to increase the island’s market share and presence as a world class international business and financial services centre within the global economy. These include the exploration of new markets, particularly via the expansion of the island’s already wide network of double taxation treaties, workshops to improve the skills of those working in the sector, a revised charter of service for investors, building and maintaining relationships in key target markets, further skills enhancement, and the use of ICT and green energy to improve efficiency and reduce the costs of doing business.<sup>8</sup>

**Non-price competitive strengths**

Barbados enjoys many competitive advantages in the global markets for the goods and services in which it specializes. Barbados is well established and widely known as an aspirational tropical tourism destination, with high quality accommodations and facilities, a variety of sports and cultural activities, and interesting historical sites and artifacts. Barbados’ tourism and related products are biased towards the most remunerative segment of the market, with golf, polo and yachting as the main sporting attractions, and a new high fashion shopping and entertainment complex. Barbados has a well-developed niche market in the Barbadian diaspora and in the Caribbean, centred on the mid-year Cropover festival. Two UNESCO World Heritage sites, an internationally recognised museum, and the

<sup>7</sup> See Cihak et al (2011) for details on the calculation of the degree of centrality.  
<sup>8</sup> Barbados International Business Sector Strategic Plan 2014-19 Draft, Sep 2013

preservation and restoration of historical residential and commercial buildings further enrich the tourism product.

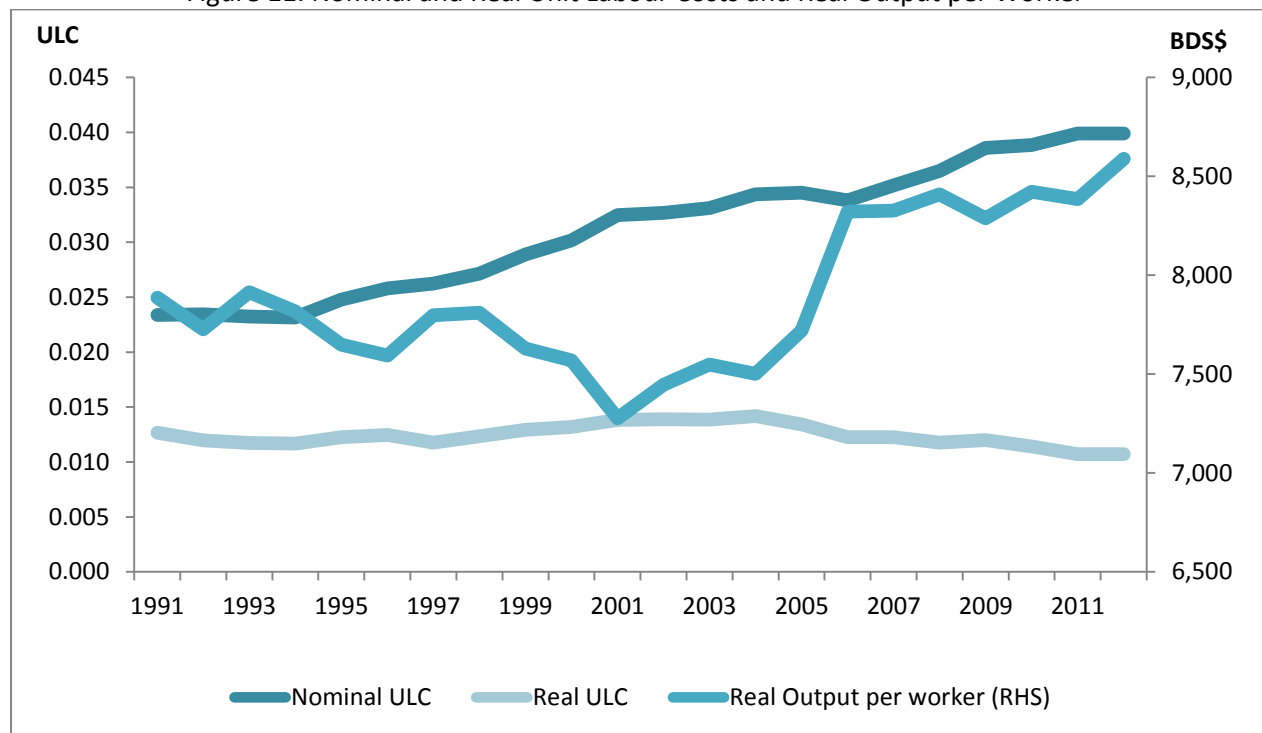
In the IBFS sector Barbados offers highly educated professional workforces, adequate infrastructure, and multiple bilateral trade and tax agreements (see Worrell and Lowe 2011a). The Barbados brand is highly regarded, and our financial regulatory systems are of a high standard, by international comparison. Barbados just concluded its third Financial Sector Assessment Programme, and the country is active in the Caribbean Financial Action Task Force against money laundering and the Global Forum on Transparency and Exchange of Information for Tax Purposes.

### 3. Unit Labour Costs and Real Output per Worker

Increasing the level of service quality and productivity in the macro economy is essential to maintaining and improving Barbados' overall external competitiveness. Getting more out of our limited resources for the same or lower costs ensures that both the private and public sector remain viable and firms in our foreign exchange earning sectors generate an adequate return on their investment.

A look at the trends in aggregate productivity in the economy reveals that real gross domestic product (GDP) produced by each worker employed in the labour force has continued to improve, particularly over the last decade (Figure 11). This growth in productivity has kept pace with the rise in nominal wages paid per unit of output produced (or unit labour cost). The real wage per unit of output (taking account of the impact of inflation on the nominal wage) has declined steadily since 2000.

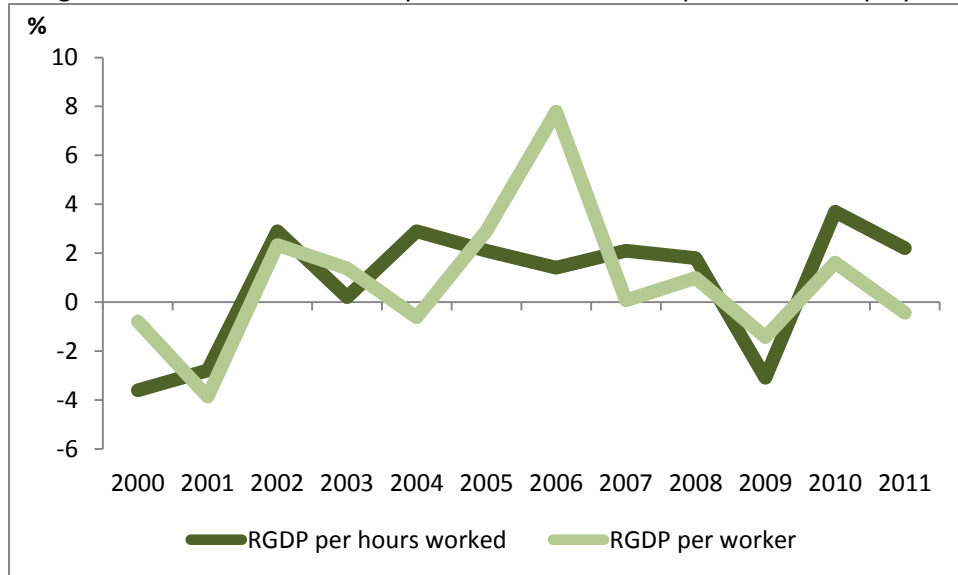
Figure 11: Nominal and Real Unit Labour Costs and Real Output per Worker



Source: Central Bank of Barbados

An alternative labour productivity measure, the National Productivity Council’s estimate of growth in macro-productivity (growth in real output per hours worked) confirms the improvement in real output per worker since 2000, though the annual changes are somewhat different (see Figure 12).

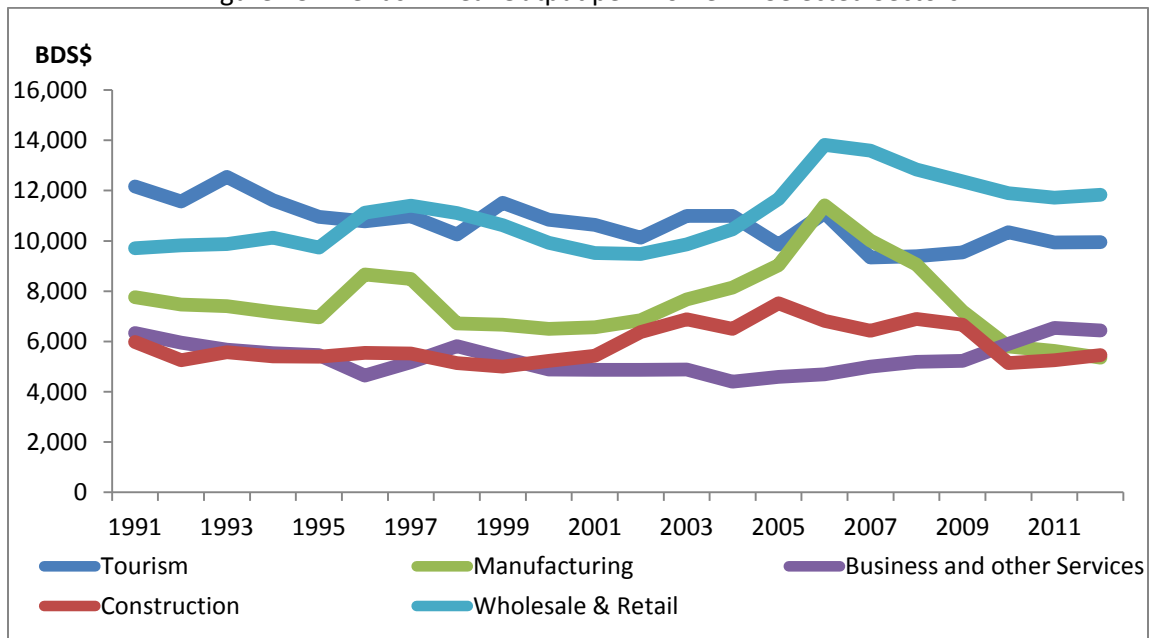
Figure 12: Growth in Real GDP per Hours Worked and per Worker Employed



Sources: Central Bank of Barbados, Barbados Statistical Service, National Productivity Council

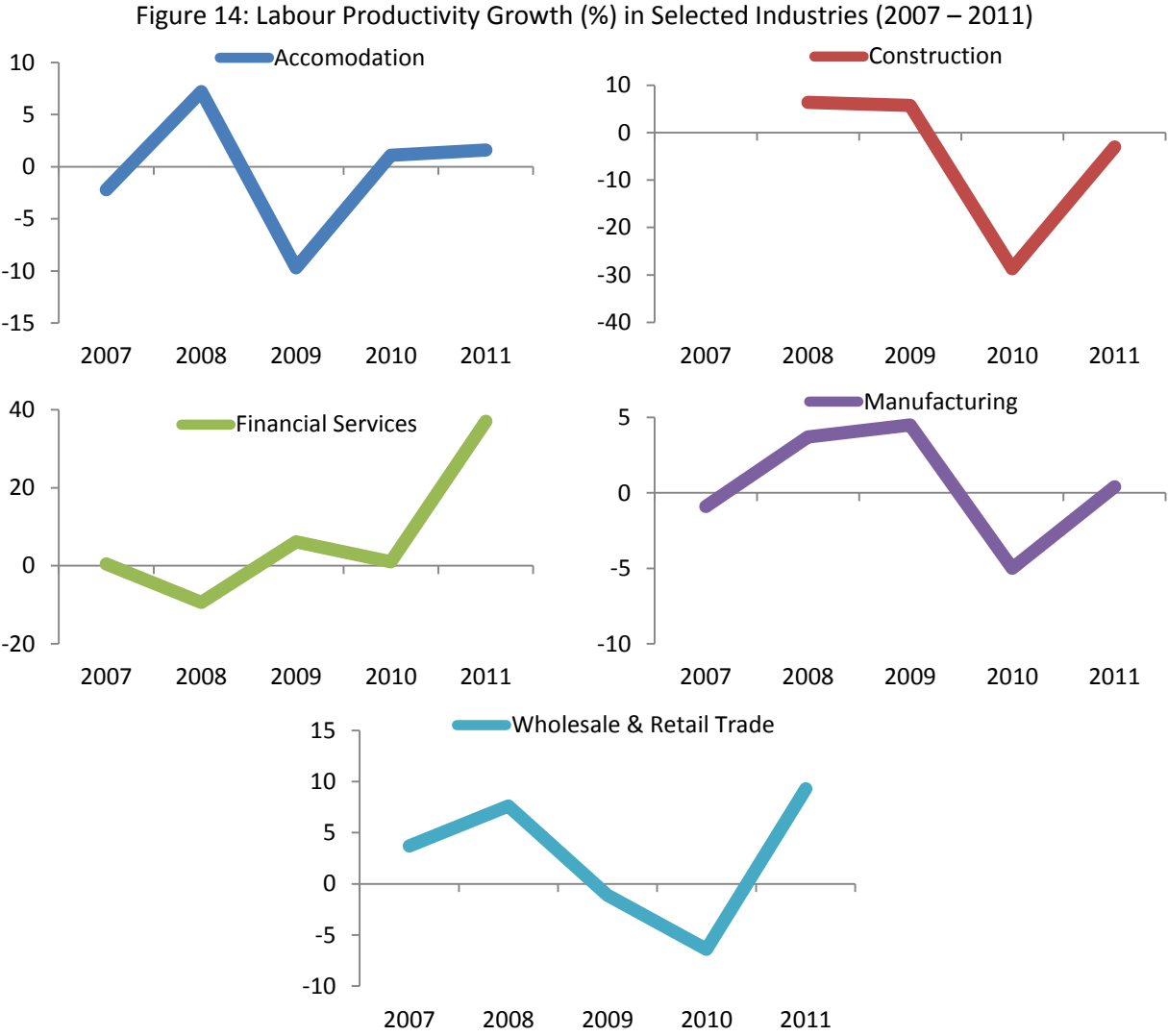
At the sectoral level, Real GDP per worker has not increased in the tourism sector since 2000, but there has been an improvement in labour productivity in business and other services (see Figure 13).

Figure 13: Trends in Real Output per Worker in Selected Sectors



Source: Central Bank of Barbados

In addition to this macro-economic approach to productivity measurement, The National Productivity Council conducts surveys of productivity trends in Barbados. The 2012 edition of the survey captured companies in the accommodation (41), construction (18), wholesale & retail (187), financial services (44) and manufacturing (190) sectors for a total sample size of 480 firms<sup>9</sup>. Output per hours worked in the enterprises sampled increased in most sectors during 2011, after some decline in 2010 (Figure 14). The previous three years also witnessed growth in labour productivity. While the estimates of growth in real



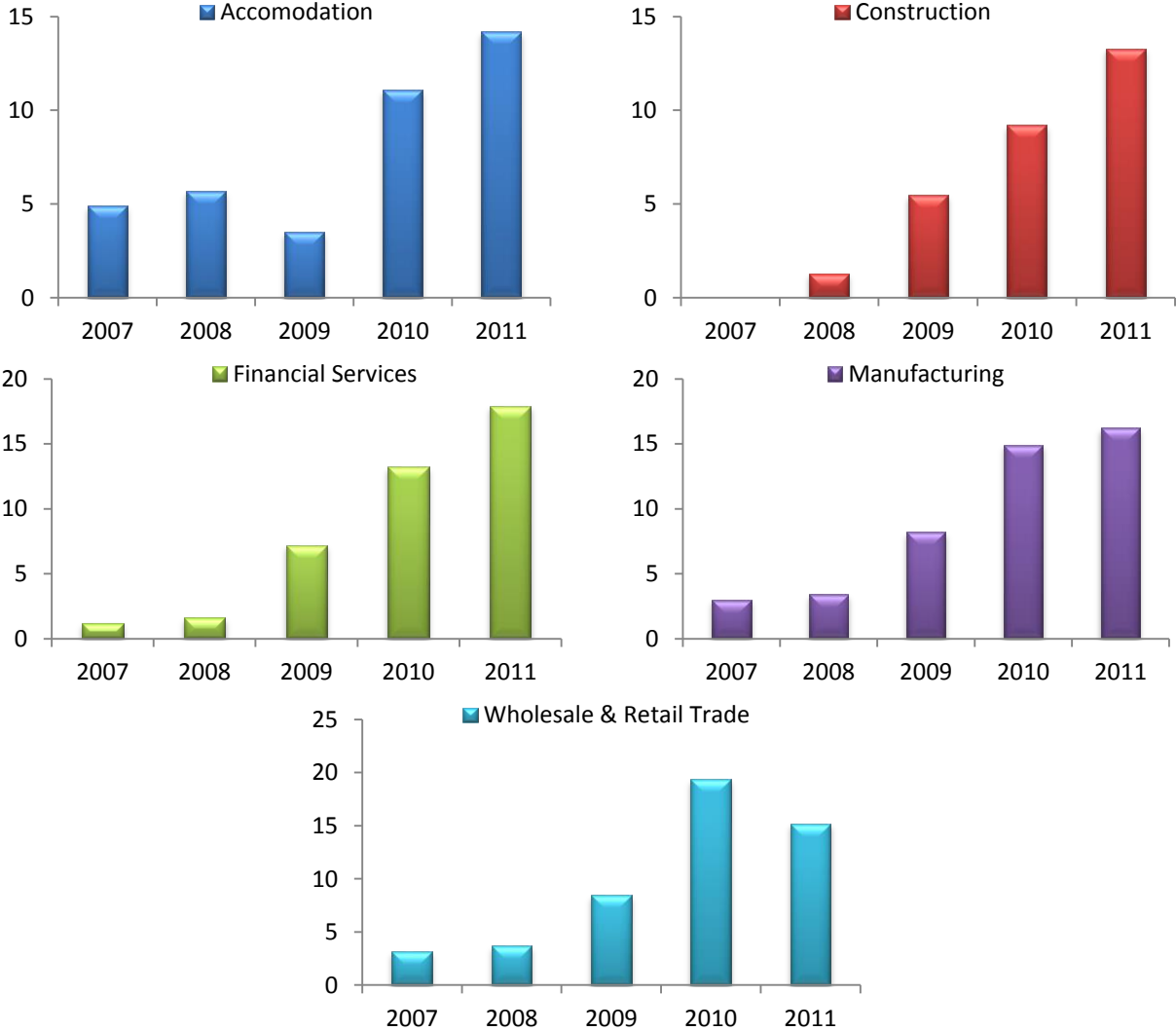
Source: National Productivity Council Macro-productivity Indicators Project (2012)

GDP per worker and output per hours worked are consistent across sectors in 2010, 2011’s estimates diverge at the aggregate and sectoral levels with the exception of business and other services/financial services.

<sup>9</sup> Here we use accommodation and financial services as proxies for tourism and business & other services respectively

However, Figure 15 shows that the rate of absenteeism of Barbadian employees continues to rise, averaging 15% of required hours worked in 2011, up from 3% in 2007. As a result, while the number of employed workers increased across the economy between 2010 and 2011 (Table 2), the number of hours lost from unauthorized leave has increased in all sectors apart from wholesale & retail. The gain in productivity in 2011 is therefore more substantial than appears in Figure 14, because the actual hours worked were lower, when one takes account of rates of absenteeism in the region of 15%.

Figure 15: Absenteeism Rate (%) (2007 – 2011)



Source: National Productivity Council Macro-productivity Indicators Project (2012)

The Barbados Statistical Service’s Continuous Household Labour Force Survey shows that the number of under-employed individuals in the workforce has increased by only 1,000 individuals since 2008.

Table 2: Employment Statistics (2007 – 2012)

	2007	2008	2009 <sup>10</sup>	2010	2011	2012
<b>Average Under-employed (000's)</b>	2.0	1.6	2.3	2.3	2.6	3.0
<b>Under-employed (% of Employed)</b>	1.5%	1.2%	1.8%	1.8%	2.0%	2.4%
<b>Workers Employed (000's)</b>	133.0	132.2	128.5	126.8	128.3	125.3
<b>Total Labour Force (000's)</b>	143.7	143.8	142.7	142.1	144.5	141.7

Source: Barbados Statistical Service

Overall labour productivity appears to have increased across the economy in recent years, despite shorter working weeks and increased absenteeism from the workplace.

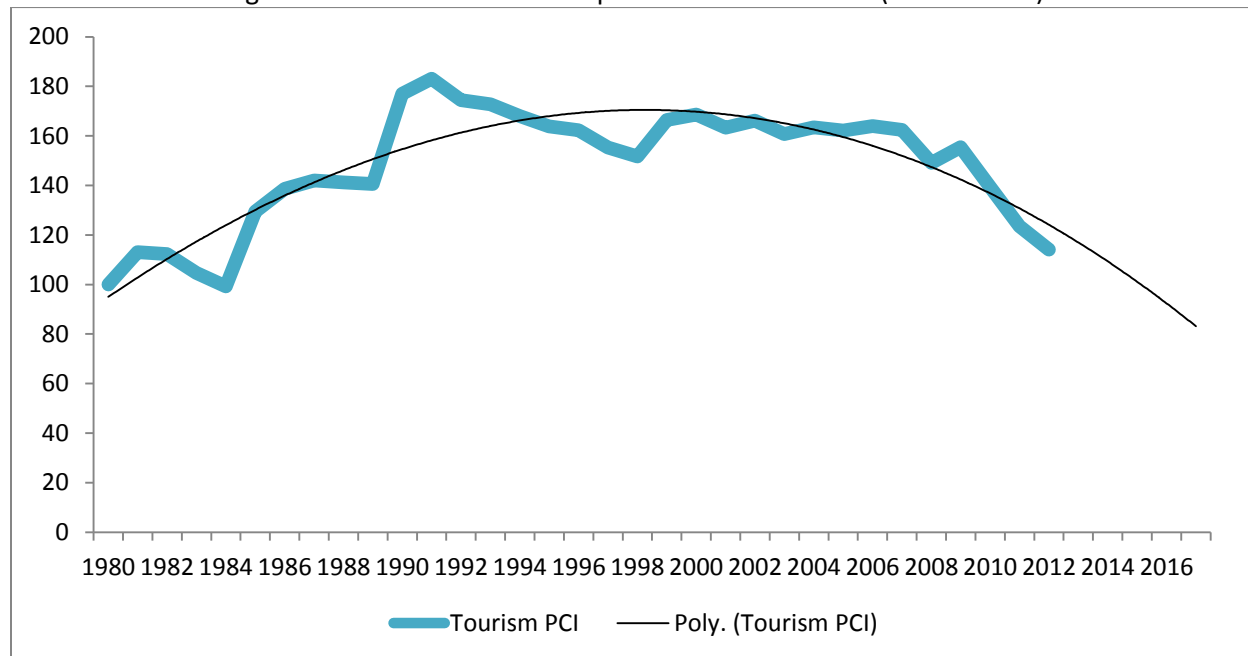
#### 4. Price Competitiveness Indices

In this section, we examine the relative price competitiveness of the major foreign exchange earning sectors of the Barbadian economy using the Price Competitiveness Index (PCI) developed by Worrell, Greenidge and Lowe (2013). This novel price index is based on the relative prices of tradable goods applied to a group of Central American and Caribbean countries who compete directly with each other (see Appendix 2 for a brief description of the calculation).

##### Tourism

Figure 16 shows how Barbados' price competitiveness in tourism has varied over the past two decades. After peaking in 1991, the island has become increasingly cost effective in the provision of tourism services, and prices have been on a downward trend since the start of the new millennium. Trends evident since 2000 suggest improvement in competitiveness beyond 2013.

Figure 16: Barbados' Price Competitiveness in Tourism (1980 – 2012)



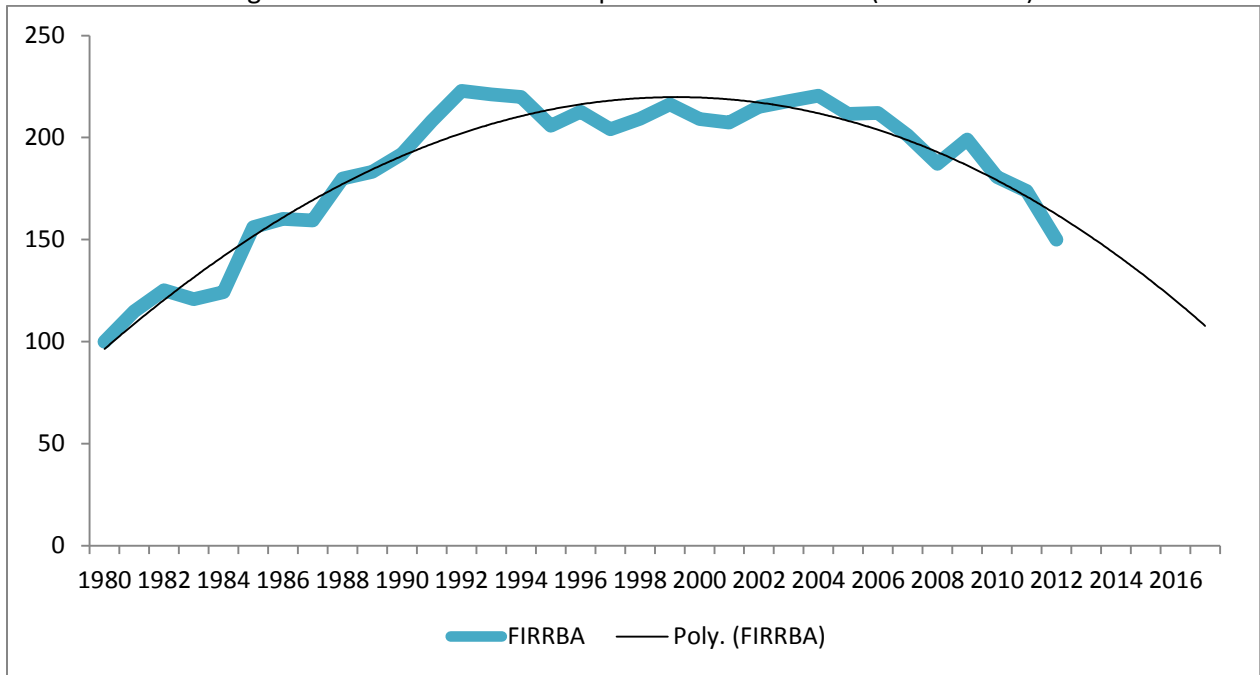
Source: Authors' Calculations

<sup>10</sup> Excludes survey statistics for September – December 2009.

*Financial Intermediation, Real estate, Renting and Business Activities (FIRRBA)*

In the absence of a sufficiently long time series on nominal and real output/prices in the IBFS sector, we use output from Financial Intermediation, Real estate, Renting and Business Activities as a proxy for IBFS output, recognizing that a significant portion of this category may represent non-traded activities. Figure 17 shows that Barbados has become increasingly more competitive in the provision of financial and business services since the early 2000s. On current trends, the sector should continue to improve price competitiveness relative to its Caribbean neighbours.

Figure 17: Barbados' Price Competitiveness in FIRRBA (1980 – 2012)



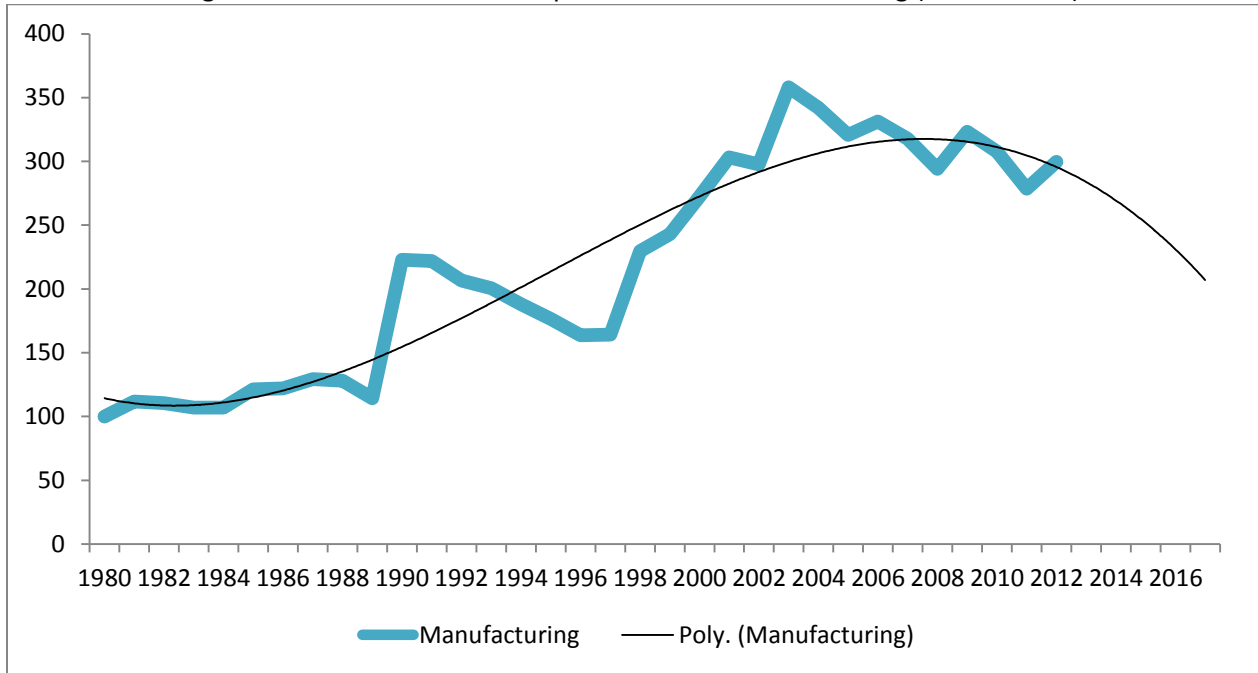
Source: Authors' Calculations



## Manufacturing

The price competitiveness of Barbados' manufacturing had been declining over many years, but that trend has been reversed since the early 2000s and on current trends, price competitiveness should improve going forward (see Figure 18). However, the Barbados manufacturing sector has yet to regain the ground lost between 1980 and 2000, in terms of its price competitiveness.

Figure 18: Barbados' Price Competitiveness in Manufacturing (1980 – 2012)

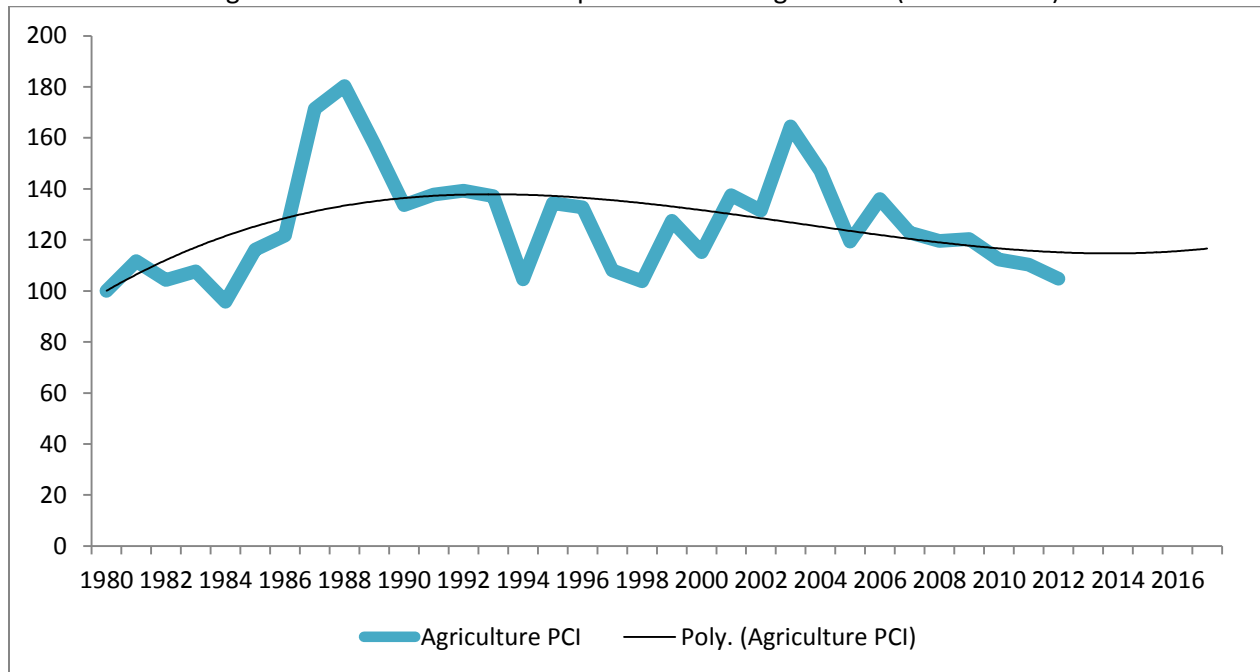


Source: Authors' Calculations

## Agriculture

Price competitiveness in the agriculture sector in Barbados has not changed much over the last thirty years with the exception of two major price shocks in 1988 and 2003 (see Figure 19). During the past decade, relative prices have been on a downward trend but the long-term tendency suggests that relative prices may stabilize over the next 5 years.

Figure 19: Barbados' Price Competitiveness in Agriculture (1980 – 2012)

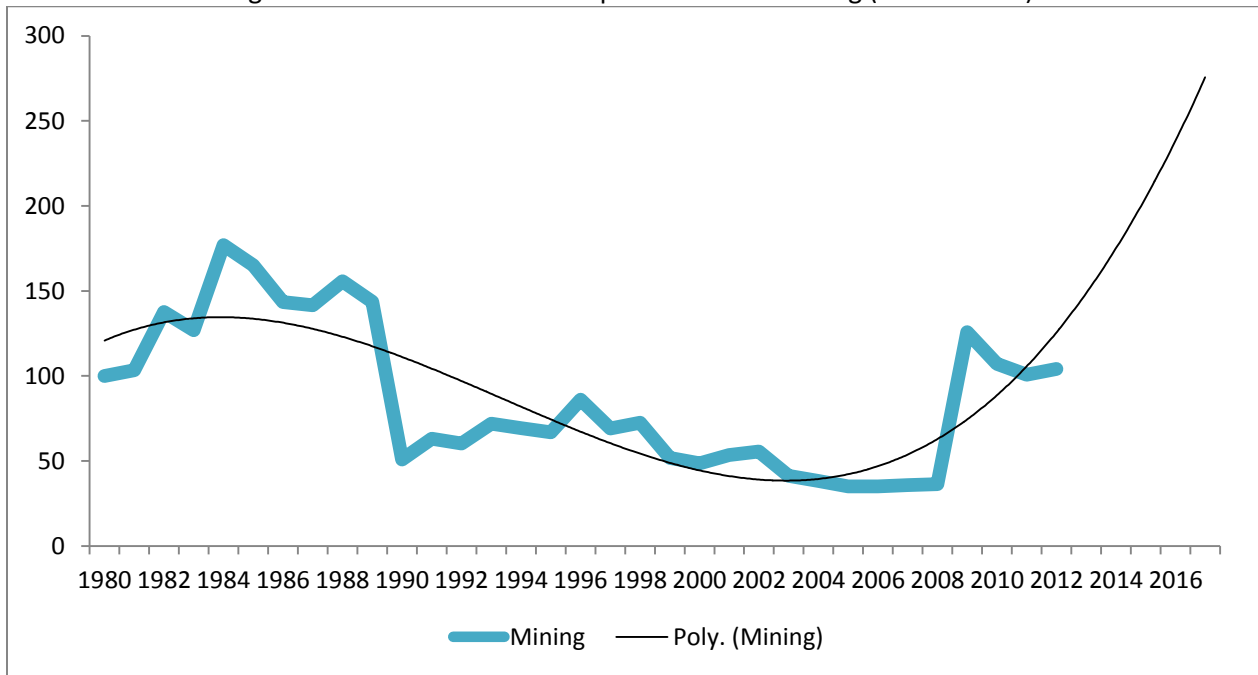


Source: Authors' Calculations

## Mining

Mining is the least important of the five foreign exchange earning sectors. The sector consists of a small amount of crude oil production, accounting for approximately 8% of domestic consumption in Barbados (Moore et. al, 2012). There has recently been a fall in price competitiveness relative to the rest of the Caribbean and selected Latin American countries (Figure 20).

Figure 20: Barbados' Price Competitiveness in Mining (1980 – 2012)

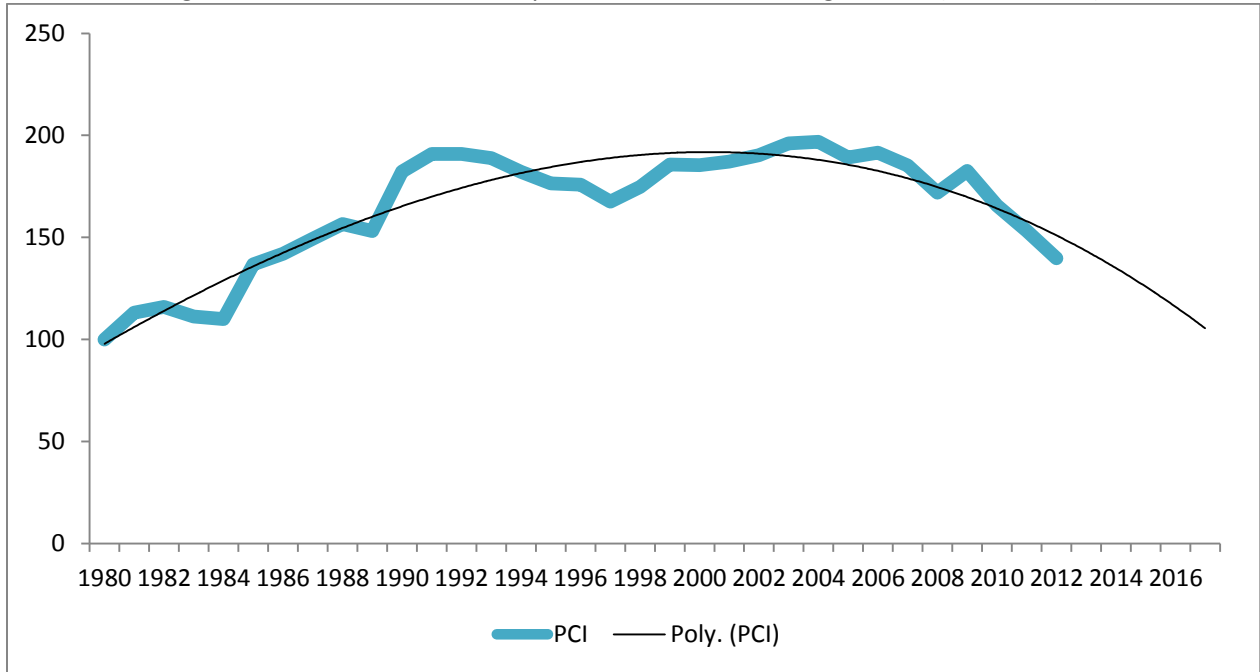


Source: Authors' Calculations

*Overall Price Competitiveness*

Taking the foreign exchange earning sectors together, Barbados continues to improve its competitive position (see Figure 21).

Figure 21: Barbados' Price Competitiveness in FX Earning Sectors (1980 – 2012)



Source: Authors' Calculations

Since 2000, Barbados has improved its level of competitiveness in tourism by 32%, agriculture by 9% and FIRRBA by 28%, with the greatest improvement coming in tourism, which accounts for 45% of current account credits and FIRRBA, which accounts for 15%. This has translated into overall improvements in the country's external price competitiveness. Barbados is competitive in all major FX earning sectors, relative to its regional counterparts, with the exception of manufacturing.

## 5. Elasticities

A reduction in a firm's offer price of five percent involves in a loss of total revenue if the resulting increase in sales is less than five percent. Conversely, the firm will increase revenue if it increases prices by five percent, provided the loss of sales is less than five percent. Price reduction strategies become useful only if the elasticity of response is greater than one, and price increases are beneficial, so long as the elasticity of response is smaller than unity. Table 3 shows published estimates of tourist price elasticities for Barbados. Only one of the three studies finds an elasticity of response to prices that is greater than one, and it is a study that uses the general consumer price index (CPI) as its measure of tourism prices in Barbados. However, estimates<sup>11</sup> prepared for this paper, using the price competitiveness index for tourism, confirm Worrell et al (1997)'s findings that tourism demand is inelastic for Barbados. Data in Table 4 show that a 5 percent reduction in the CPI or the PCI provokes an increase in arrivals which is less than 5 percent, and so the overall revenue inflows decline when the relative price falls<sup>12</sup>.

Table 3: Short-run Price Elasticities in Tourism for Barbados

	<b>Dependent Variable</b>	<b>Price Measure</b>	<b>UK</b>	<b>USA</b>	<b>Canada</b>
Worrell et al (1997)	Arrivals	CPI	-0.696	0.700	-0.212
Worrell & Craigwell (2006)	Global Market Share	CPI	-1.543	n.a.	-1.292
Estimates for this study	Arrivals	Tourism PCI	-0.657	-0.124	-0.317

Table 4: Short-run Impacts of 5 percentage point Price Changes

	<b>Dependent Variable</b>	<b>Price Measure</b>	<b>UK</b>	<b>USA</b>	<b>Canada</b>
Worrell et al (1997)	Arrivals	CPI	3.5%	3.5%	1.1%
Worrell & Craigwell (2006)	Global Market Share	CPI	7.7%	n.a.	6.5%
Estimates for this study	Arrivals	Tourism PCI	3.3%	0.6%	1.6%

<sup>11</sup>  $\Delta \ln(Arrivals)_t = \beta_0 + \beta_1 \Delta \ln(Arrivals)_{t-1} + \beta_2 \Delta \ln(Income)_t + \beta_3 \Delta \ln(PCI)_t + \beta_4 \Delta \ln(CPI)_t + \varepsilon_t$

<sup>12</sup> See Appendix 4 for a further look into the effects of price competitiveness on tourist arrivals from select markets.

A brief review of the literature reveals that the demand facing other small tourism exporting economies is also price inelastic. Aslan, Kaplan and Kula (2008) estimate that the short- and long-run price elasticities of demand for arrivals from nine major source markets to Turkey are -0.23 and -0.32 respectively. Lee (2011) found long-run price elasticities ranging from -0.35 (Australia) to -0.98 (Taiwan) for intra-regional arrivals to Hong Kong. Similar short-run inelastic estimates were found for tourists to the Canary Islands (Garin-Munoz, 2006) and Spain (Garin-Munoz and Perez-Amaral, 2000) from the rest of the world. However, for the large economy of the USA, that has the capacity to influence international prices for traded goods and services, Vogt (2008) finds that estimates of tourism elasticity for total tourism receipts using relative prices are greater than one (see also Garin-Munoz, 2007 who find that long-run estimates for Spain for German tourists are in excess of one).

## **6. Conclusion**

Data and analysis presented in this study show that Barbados has competitive strengths in the markets where it earns most foreign exchange, that is, tourism, IBFS and agro-processing. The Global Competitiveness Report 2013-2014 shows that Barbados is competitive with its Caribbean neighbours, and with emerging economies globally. The country has institutions, infrastructure, health and primary and higher level education levels, labour market efficiency, financial market development, technological readiness, business sophistication and innovation which exceed those of its regional peers. Nevertheless, there is room for improvement, and inefficient government bureaucracy, difficulties in accessing financing, and a poor work ethic represent constraints to growth for the private sector.

Barbados has been able to maintain its market share relative to the Caribbean in its key foreign exchange earning sectors, while overall productivity has increased in line with unit labour costs. The island's external price competitiveness, based on appropriate measures, has been improving in recent times. The focus for improving external competitiveness will continue to be increased productivity, improved product quality, product enrichment, and the development of new products and services. Barbados' medium term growth and development strategy, articulated in strategy documents prepared by Government in consultation with the Social Partners, will emphasize sectoral growth and adjustment strategies for tourism, IBFS, agriculture, manufacturing, SMEs, cultural and sports activities, and non-traditional services, initiatives for competitiveness, productivity and service excellence, promotion of the green economy, labour market, public sector and institutional reform, HR development, and improvements in business facilitation.

## References

- Agénor, P.-R. (1997). Competitiveness and External Trade Performance of the French Manufacturing Industry. *Weltwirtschaftliches Archiv*, 133(1), 103 - 133.
- Aslan, A., Kaplan, M., & Kula, F. (2008). International Tourism Demand for Turkey: A Dynamic Panel Data Approach. *Munich Personal RePEc Archive*, 1 - 13.
- Balassa, B. (1965). Trade liberalisation and 'revealed' comparative advantage. *The Manchester School*, 33, 99 - 123.
- Barbados Productivity Council. (2012). *Macro-productivity Indicators Project 2012*. Bridgetown: Barbados Productivity Council.
- Barbados Statistical Service. (2007 - 2013). Continuous Household Labour Force Survey. Bridgetown. Retrieved January 12, 2014, from Barbados Statistical Service: <http://www.barstats.gov.bb/publications/>
- Caribbean Trade and Adjustment Group. (2003). *Improving Competitiveness for Caribbean Development*. Caribbean Regional Negotiating Machinery, RNM. Ian Randle Publishers.
- Cihak, M., Munoz, S., & Scuzzarella, R. (2011). The Bright and the Dark Side of Cross-Border Banking Linkages. *IMF Working Paper WP/11/186*, 1 - 41.
- Garin-Munoz, T. (2006). Inbound international tourism to Canary Islands: a dynamic panel data model. *Tourism Management*, 27, 281-291.
- Garin-Munoz, T. (2007). German demand for tourism in Spain. *Tourism Management*, 28(1), 12-22.
- Garin-Munoz, T., & Perez-Amaral, T. (2000). An econometric model for international tourism flows to Spain. *Applied Economics Letters*, 7(8), 525-529.
- Harberger, A. (2004, June 4-5). The real exchange rate: issues of concept and measurement. *IMF conference in honour of Michael Mussa*.
- International Monetary Fund. (2011). *Barbados 2011 Article IV Consultation*. Washington, D.C.: International Monetary Fund.
- International Monetary Fund. (2011). *Regional Economic Outlook Update*. Western Hemisphere Department. Washington, D.C.: International Monetary Fund.
- Lee, K. N. (2011). Estimating demand elasticities for intra-regional tourist arrivals to Hong-Kong - the 'bounds' testing approach. *Applied Economics Letters*, 18, 1645 - 1654.

- Magnier, A., & Toujas-Bernate, J. (1994). Technology and trade: empirical evidences for the major five industrialised countries. *Weltwirtschaftliches Archiv*, 130, 494 - 520.
- Marsh, I., & Tokarick, S. (1994, March). Competitiveness indicators: a theoretical and empirical assessment. *IMF Working Paper*.
- McIntyre, A. (1995). *Trade and Economic Development in Small Open Economies: The Case of the Caribbean Countries*. Praeger.
- Monteagudo, J., & Montaruli, F. (2009). *Analysing non-price competitiveness in euro area countries*. European Commission, Directorate General for Economic and Financial Affairs.
- Moore, A., Jones, J., & Walkes, C. (2012, December). Import Substitution: How Practical is it in Barbados? *Central Bank of Barbados Economic Review*, 38(2), 44 - 60.
- Tsikata, Y., Pinto Moreira, E., & Coke Hamilton, P. (2009). *Accelerating Trade and Integration in the Caribbean. Policy Options for Sustained Growth, Job Creation, and Poverty Reduction*. Washington, D.C.: The World Bank/Organisation of American States.
- Vogt, M. G. (2008). Determinants of the demand for US exports and imports of tourism. *Applied Economics*, 40, 667 - 672.
- World Economic Forum. (2013). *The Global Competitiveness Report 2013-2014*. World Economic Forum.
- Worrell, D., & Craigwell, R. (2006). The Competitiveness of Selected Caribbean Tourism Markets. *Presented at the 27th Annual Review Seminar*.
- Worrell, D., & Craigwell, R. (2008, June). The competitiveness of selected tourism markets. *Social and Economic Studies*, 57(2).
- Worrell, D., & Lowe, S. (2011, June). International Business and Financial Services Centres in the Caribbean. *Central Bank of Barbados Economic Review*, 37(3), 23 - 45.
- Worrell, D., & Lowe, S. (2011, December). Priorities for International Financial Reform, from a Caribbean Perspective. *Central Bank of Barbados Working Papers*, 1 - 24.
- Worrell, D., Greenidge, K., & Lowe, S. (2013). Competitiveness in the Caribbean and Central America. *International Research Journal of Finance and Economics*(109), 61 - 87.
- Worrell, D., Greenidge, K., Downes, D., & Dalrymple, K. (1997). Forecasting Tourism Demand in Barbados. *Presented at the 17th Annual International Symposium on Forecasting*, 11-27.



### Appendix 1: Global Competitiveness Report 2013-2014 Pillar Rankings

In this appendix, we take a detailed look at Barbados' performance in each of the three sub-indexes and 12 pillars which determine the country's regional and global competitiveness ranking.

With respect to the three sub-indexes, Barbados holds a consistently high rank in all areas, most notably Basic Requirements (ranking 35<sup>th</sup>) (see Table A1). Despite being in a transition phase between an efficiency-led and innovation-driven economy, Barbados ranks 1<sup>st</sup> in the Caribbean in having the basic requirements for success. Its global ranking of 43<sup>rd</sup> in efficiency enhancing factors is nonetheless enough to place it 2<sup>nd</sup> in the Caribbean, while the island ranks 3<sup>rd</sup> behind Puerto Rico and Costa Rica in Innovation and Sophistication factors.

Table A1: Sub-indexes 2013/14 Caribbean Rankings from the Global Competitiveness Report 2013 – 2014

	Basic Requirements		Efficiency Enhancers		Innovation and Sophistication Factors	
	Rank	Score	Rank	Score	Rank	Score
<b>Puerto Rico</b>	54	4.82	33	4.58	22	4.71
<b>Panama</b>	46	4.89	50	4.33	43	3.99
<b>Barbados</b>	35	5.14	43	4.39	48	3.91
<b>Costa Rica</b>	64	4.62	59	4.18	31	4.14
<b>Guatemala</b>	89	4.29	80	3.91	64	3.66
<b>Trinidad &amp; Tobago</b>	60	4.70	82	3.90	92	3.39
<b>Jamaica</b>	111	3.86	79	3.92	75	3.53
<b>El Salvador</b>	98	4.20	106	3.62	73	3.56
<b>Nicaragua</b>	101	4.12	116	3.44	113	3.25
<b>Guyana</b>	107	3.92	103	3.65	56	3.76
<b>Dominican Republic</b>	116	3.81	90	3.79	91	3.40
<b>Suriname</b>	82	4.43	121	3.34	120	3.10
<b>Honduras</b>	109	3.88	114	3.51	112	3.26
<b>Haiti</b>	143	3.25	142	2.94	147	2.55

Source: Global Competitiveness Report 2013 – 2014

Barbados' high ranking in Basic Requirements is fueled by the success of the four pillars identified in Table A2 below. Barbados ranks in the top 30 globally in the level of its institutions, infrastructure and its health and primary education, with only 19 countries globally being better off in the provision of the latter. In all of these pillars the island ranks number 1 in the Caribbean. The GCR 2013-2014 attributes these high rankings primarily to low levels of organized crime, strong auditing and reporting standards and a low burden of government regulation (17<sup>th</sup>, 18<sup>th</sup> and 19<sup>th</sup> respectively), the high number of fixed telephone lines per 100 persons (10<sup>th</sup>) as well as the negligible impact and presence of malaria and tuberculosis (1<sup>st</sup> and 2<sup>nd</sup> respectively) and the quality of primary education (4<sup>th</sup>). Unfortunately, the current slow growth in the macro-economy has hindered the country's overall score in this area, ranking Barbados 121<sup>st</sup> in the world and 12<sup>th</sup> of the 14<sup>th</sup> countries identified below. The World Economic Forum (2013) references the government's fiscal position (129<sup>th</sup>), low national savings rate (125<sup>th</sup>) and high government debt level (121<sup>st</sup>) as three areas of primary concern.

Table A2: 2013/14 Caribbean Rankings in the Basic Requirements Pillars

	Institutions		Infrastructure		Macroeconomic Environment		Health and Primary Education	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
<b>Barbados</b>	30	4.80	24	5.52	121	3.89	20	6.36
<b>Costa Rica</b>	50	4.20	76	3.92	80	4.56	64	5.81
<b>Dominican Republic</b>	124	3.23	110	3.02	119	3.91	110	5.07
<b>El Salvador</b>	130	3.08	72	4.01	102	4.25	86	5.46
<b>Guatemala</b>	111	3.35	78	3.83	71	4.67	101	5.31
<b>Guyana</b>	87	3.64	112	2.91	122	3.84	103	5.30
<b>Haiti</b>	146	2.75	142	1.98	105	4.21	133	4.06
<b>Honduras</b>	134	3.05	115	2.81	103	4.25	90	5.42
<b>Jamaica</b>	85	3.66	93	3.49	141	3.14	106	5.16
<b>Nicaragua</b>	100	3.52	105	3.14	97	4.36	87	5.46
<b>Panama</b>	66	3.97	37	4.89	57	4.95	68	5.76
<b>Puerto Rico</b>	33	4.70	63	4.17	48	5.12	105	5.28
<b>Suriname</b>	99	3.54	81	3.69	66	4.87	78	5.60
<b>Trinidad &amp; Tobago</b>	94	3.58	52	4.37	52	5.06	63	5.81

Source: Global Competitiveness Report 2013 – 2014

The six pillars which determine a country's level of efficiency also make for favourable reading for Barbados relative to its closest peers (see Table A3). Of note, the island ranks 20<sup>th</sup> globally in the provision of higher education and training and no less than 28<sup>th</sup> in labour market efficiency, technological readiness and financial market development. The country ranks 1<sup>st</sup> in the Caribbean in each of the former 3 and 3<sup>rd</sup> in the latter. Of note are its performances in the quality of the education system and math and science education (6<sup>th</sup> and 9<sup>th</sup> respectively), cooperation in labour-employer relations (20<sup>th</sup>), the soundness of our banks (11<sup>th</sup>) and the percentage of fixed broadband internet subscriptions and the availability of the latest technologies (27<sup>th</sup> and 28<sup>th</sup> respectively). Barbados ranks 75<sup>th</sup> (6<sup>th</sup> regionally) in goods market efficiency (driven by the prevalence of foreign ownership, 15<sup>th</sup> but offset by a high level of trade tariffs, 146<sup>th</sup>) and 138<sup>th</sup> in market size (13<sup>th</sup> in the Caribbean). These areas are two which require significant improvement, and, particularly in the latter case, some efforts have already been made to penetrate new markets with new products by engaging in more sophisticated marketing efforts and improving the quality of products offered to consumers both at home and abroad.

Table A3: 2013/14 Caribbean Rankings in the Efficiency Enhancers Pillars

	Higher Education and Training		Goods Market Efficiency		Labour Market Efficiency		Financial Market Development		Technological Readiness		Market Size	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
<b>Barbados</b>	20	5.29	75	4.25	24	4.79	28	4.71	25	5.26	138	2.06
<b>Costa Rica</b>	33	5.01	65	4.30	53	4.48	96	3.75	53	4.16	84	3.41
<b>Dominican Republic</b>	96	3.65	99	4.03	118	3.92	86	3.85	76	3.61	68	3.71
<b>El Salvador</b>	100	3.55	77	4.23	121	3.88	101	3.71	109	3.05	90	3.28
<b>Guatemala</b>	105	3.51	66	4.30	90	4.15	43	4.48	84	3.45	76	3.59
<b>Guyana</b>	81	4.10	73	4.26	63	4.34	82	3.88	96	3.24	137	2.09
<b>Haiti</b>	128	2.77	144	3.07	77	4.23	142	2.69	135	2.50	132	2.38
<b>Honduras</b>	110	3.32	114	3.91	142	3.34	61	4.17	103	3.12	94	3.22
<b>Jamaica</b>	80	4.11	84	4.18	66	4.33	47	4.42	79	3.55	108	2.91
<b>Nicaragua</b>	109	3.36	122	3.85	107	3.99	104	3.61	119	2.85	102	2.98
<b>Panama</b>	68	4.26	35	4.65	75	4.25	16	5.00	47	4.35	81	3.50
<b>Puerto Rico</b>	30	5.09	26	4.83	38	4.59	18	4.86	40	4.60	82	3.49
<b>Suriname</b>	98	3.59	128	3.73	102	4.04	111	3.55	101	3.19	140	1.95
<b>Trinidad &amp; Tobago</b>	75	4.21	101	4.03	89	4.15	55	4.32	61	3.93	114	2.78

Source: Global Competitiveness Report 2013 – 2014

Table A4 speaks to the final 2 pillars of competitiveness - those which a more advanced and developed economy must strive to achieve. Indeed, in these areas, Barbados ranks 3<sup>rd</sup> and 4<sup>th</sup> in the region (and no lower than 48<sup>th</sup> globally) in the levels of business sophistication and innovation respectively. Specifically, Barbados achieves high standing in the nature of our competitive advantage (23<sup>rd</sup>), the number of applications for PCT patents (32<sup>nd</sup>) and university-industry collaboration in research and development (39<sup>th</sup>). However, our greatest concern in these pillars lies in the local supplier quantity (83<sup>rd</sup>), state of cluster development (76<sup>th</sup>), company spending on research and development (78<sup>th</sup>) and our capacity for innovation (81<sup>st</sup>). These four areas, which primarily focus on the local private sector, are essential factors that must be targeted and improved if Barbados is to move towards an innovation-led growth economy.

Table A4: 2013/14 Caribbean Rankings in the Innovation and Sophistication Factors Pillars

	<b>Business Sophistication</b>		<b>Innovation</b>	
	<b>Rank</b>	<b>Score</b>	<b>Rank</b>	<b>Score</b>
<b>Barbados</b>	46	4.30	48	3.51
<b>Costa Rica</b>	31	4.54	35	3.74
<b>Dominican Republic</b>	71	3.96	115	2.83
<b>El Salvador</b>	60	4.10	96	3.01
<b>Guatemala</b>	50	4.27	90	3.05
<b>Guyana</b>	59	4.12	57	3.41
<b>Haiti</b>	145	2.87	144	2.22
<b>Honduras</b>	90	3.76	123	2.76
<b>Jamaica</b>	72	3.95	86	3.11
<b>Nicaragua</b>	115	3.50	99	3.00
<b>Panama</b>	52	4.26	36	3.72
<b>Puerto Rico</b>	19	5.03	24	4.39
<b>Suriname</b>	118	3.49	125	2.70
<b>Trinidad &amp; Tobago</b>	79	3.86	107	2.92

Source: Global Competitiveness Report 2013 – 2014

## **Appendix 2: Price Competitiveness Index Calculations**

The Price Competitiveness Index (PCI) calculated in this paper is based on that conceptualized by Worrell, Greenidge and Lowe (2013) and is derived from data for real and nominal traded sectoral GDP for 18 Caribbean and Latin American countries over the period 1980 – 2012. The traded sectors are identified as Tourism, Agriculture, Mining, Manufacturing, and as an addition, Financial Intermediation, Real Estate, Renting and Business Activities. All series are converted to US\$ and the real traded GDP series are set at 1980 prices and exchange rates, so that each country's PCI begins at a base of 100.

The relative price of tradables for each traded sector is calculated as:

$$P_{in} = \text{Nominal traded } GDP_{in} / \text{Real traded } GDP_{in}$$

where  $i$  represents each sector and  $n$  the country.

For each traded sector, a group of reference countries is used as the benchmark to which all others are compared. These groups are chosen as those countries that rank highest in each sector based on the real size of their current output<sup>13</sup>. The weighted average price of tradables for the reference countries, for each sector is based on the relative size of each country's sector and is calculated as:

$$BP_i = \left( \sum_{j=1}^{n-1} P_{ij} \times a_{ij} \right) / \sum_{j=1}^{n-1} a_{ij}$$

where  $j$  represents each reference country,  $BP$ , the weighted average price of the benchmark countries and  $a$ , real output.

The reference countries for each sector are given in Table A5 below:

Table A5: Reference Countries for FX Earning Sectors

<b>Tourism</b>	<b>Agriculture</b>	<b>Mining</b>	<b>Manufacturing</b>	<b>FIRRBA</b>
Barbados	Barbados	Antigua & Barbuda	Barbados	Barbados
Belize	Belize	Barbados	Belize	Honduras
Costa Rica	Costa Rica	St Lucia	Costa Rica	Costa Rica
Dominican Republic	Dominican Republic	Dominican Republic	Dominican Republic	Dominican Republic
El Salvador	El Salvador	Belize	El Salvador	Guyana
Honduras	Guyana	Guyana	Jamaica	Jamaica
Jamaica	Jamaica	Jamaica	Panama	Panama
Panama	Panama	Panama	St Lucia	St Lucia
Trinidad & Tobago	Trinidad & Tobago	Trinidad & Tobago	Trinidad & Tobago	Trinidad & Tobago

The PCI for each sector is then measured as:

$$PCI_{in} = P_{in} / BP_i$$

<sup>13</sup> Nicaragua and Suriname are excluded because the large depreciations of their currencies in the early 1990s resulted in large outliers in the calculations.

while the overall measure of price competitiveness, weighted by the size of each FX earning sector is calculated as:

$$PCI_n = \left( \sum_{i=1}^4 PCI_{in} \times a_{in} \right) / \sum_{i=1}^4 a_{in}$$

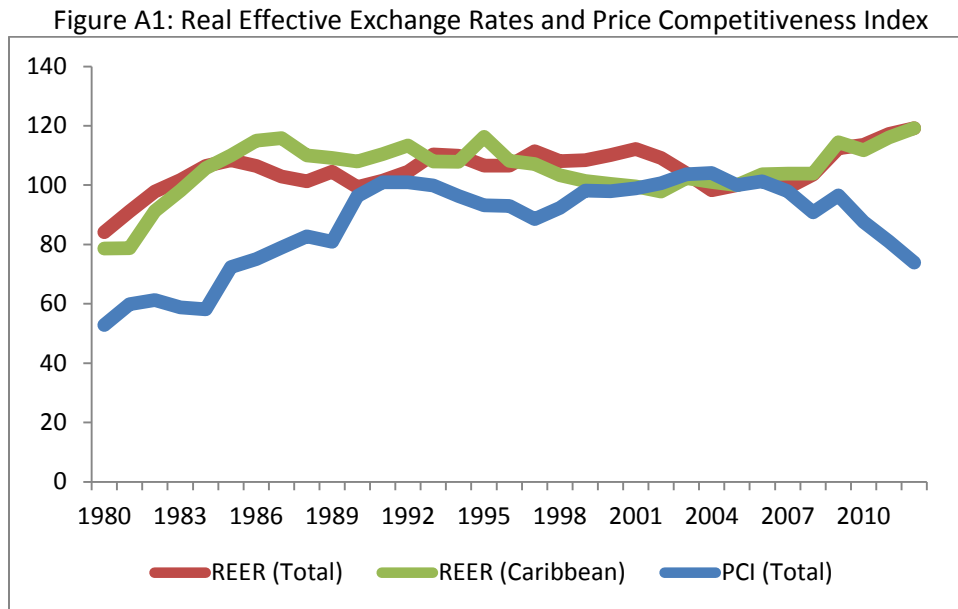
In this approach, the country's price competitiveness index reflects the composition of its tradable sector and allows for direct comparison with a country's immediate competitors based on the price of goods and services produced only in those sectors in which it competes internationally.

### Appendix 3: Real Effective Exchange Rate and the Price Competitive Index

The International Monetary Fund's preferred measure of price competitiveness and external vulnerability is the real effective exchange rate (REER). This rate weights the price adjusted nominal exchange rates of a country relative to its trading partners, using the degree of bilateral trade to determine the importance of each exchange rate in the calculation.

However, in this paper, and in Worrell, Greenidge and Lowe (2013), we show that price competitiveness is more appropriately measured by the Price Competitiveness Index (PCI) which compares an economy's cost of producing its tradable goods and services to those of its closest competitors.

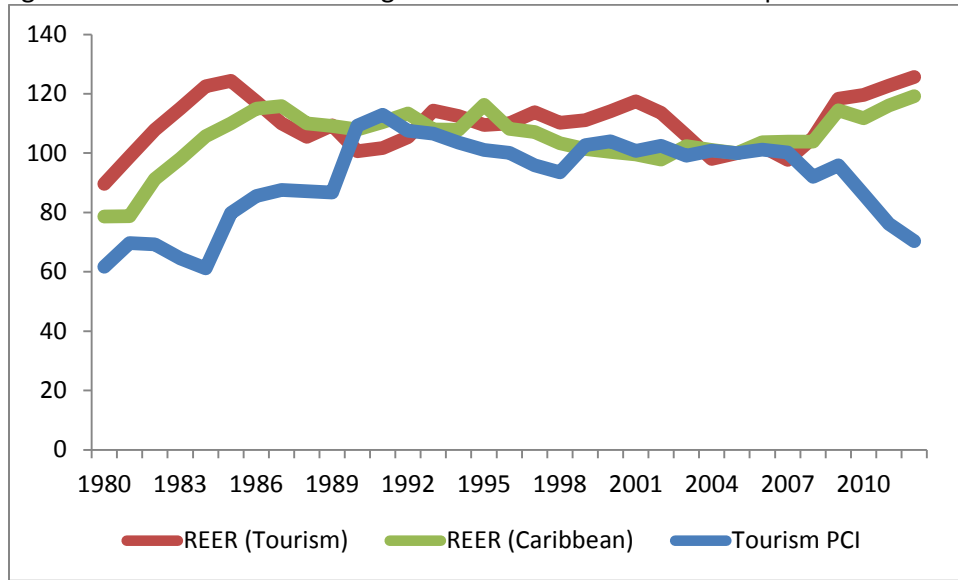
Figure A1 below charts the REERs for Barbados relative to the world and its Caribbean tourism competitors respectively. The graph shows that, based on the real effective exchange rate, Barbados has lost price competitiveness, particularly since 2007, as the number of units a Barbadian dollar can buy have increased in both cases. However, a look at the more appropriate price competitiveness index suggests just the opposite. Barbados has become more cost effective in the provision of its tradable sectors relative to its regional counterparts. Worrell, Greenidge and Lowe (2013) show that the PCI and the REER give opposing policy prescriptions for Caribbean and Central American countries approximately 50% of the time.



Source: International Monetary Fund; Authors' calculations

Figure A2 shows that Barbados' cost of providing tourism services relative to Central and Caribbean counterparts has fallen since 2005. In contrast, Barbados' REER has appreciated over that period, giving an erroneous picture of the relative movement of tourism prices.

Figure A2: Real Effective Exchange Rates and Tourism Price Competitiveness Index



Source: International Monetary Fund; Authors' calculations



#### **Appendix 4: Does Price Competitiveness Matter for Barbados?**

In this Appendix, tourism demand equations are estimated for tourist arrivals to Barbados from its three main source markets: the United Kingdom, the United States of America and Canada, primarily to determine the relative impact of price competitiveness on arrivals from outside of the region. Previous attempts at estimating price elasticities have focused on using domestic price measures such as the consumer price index to determine the effects of changes in prices to consumer demand for tourism services. However, Worrell, Greenidge and Lowe (2013) show that the CPI is not the appropriate measure of price competitiveness, as it includes both prices in the traded and non-traded sectors, while the PCI captures just prices in the FX earning sectors relative to a country's main competitors in the export of that good or service. As such, we use the PCI for tourism as our measure of price competitiveness in our tourism demand equation.

The relevant equation used to estimate the impact of the PCI on tourist arrivals is specified as follows:

$$\begin{aligned} \Delta \ln(Arrivals)_t &= \beta_0 + \beta_1 \Delta \ln(Arrivals)_{t-1} + \beta_2 \Delta \ln(Income)^{14}_t + \beta_3 \Delta \ln(PCI)_t + \beta_4 \Delta \ln(CPI)_t \\ &+ \varepsilon_t \end{aligned}$$

The regressors chosen are selected from Worrell et al. (1997)'s earlier work on this issue and include the CPI to test the relative importance of changes in total domestic prices and relative traded prices to growth in tourism arrivals<sup>15</sup>. Having logged each variable and conducted Augmented Dickey Fuller tests to determine that each is integrated of order 0, the following results followed from our OLS estimations (see Table A6).

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<sup>14</sup> Here, income is proxied by real GDP of the source country.

<sup>15</sup> The correlation coefficient between  $\Delta \ln(PCI)_t$  and  $\Delta \ln(CPI)_t$  is only -0.087; insufficient to raise any issues of substantial multicollinearity

Table A6: OLS Results from Tourism Demand Regressions (1980 – 2012)

	Tourist Arrivals		
	UK	US	Canada
Regressors:			
Constant	0.022 (0.057)	0.001 (0.027)	-0.060 (0.065)
$\Delta \ln(Arrivals)_{t-1}$	0.133 (0.100)	0.313** (0.115)	0.144 (0.174)
$\Delta \ln(Income)_t$	2.452*** (0.873)	0.526 (0.586)	1.959 (1.470)
$\Delta \ln(PCI)_t$	<b>-0.657***</b> <b>(0.138)</b>	<b>-0.124</b> <b>(0.101)</b>	<b>-0.317***</b> <b>(0.109)</b>
$\Delta \ln(CPI)_t$	<b>-1.764</b> <b>(1.231)</b>	<b>-0.382</b> <b>(0.533)</b>	<b>0.359</b> <b>(0.581)</b>
Dummy <sup>16</sup>	0.424***	0.394***	
Adj. R-squared	0.544	0.564	0.178
Jarque-Bera Statistic	2.863	0.456	0.142
Q-Statistic (Lag 1)	0.896	0.298	0.926

\*\*\*, \*\*, \* denote statistical significance at 1%, 5% and 10% levels respectively; standard errors are in brackets

The results suggest that improving price competitiveness has a positive, yet negligible impact on growth in tourist arrivals from all three markets, as a 1% fall in prices, relative to competitors, would lead to at best a 0.657% improvement in arrivals: insufficient to result in an improved revenue performance for local hoteliers. The impact is smallest in the US, but largest for the furthest away destination of the United Kingdom. Nevertheless, the tourism PCI is statistically significant in two of the three equations, but, contrary to previous studies, at no time do domestic prices have a statistically significant impact on arrivals from any of Barbados' major source markets. Finally, changes in economic conditions or income levels in the UK seem to have the largest impact on their citizens' propensity to visit Barbados, with the Americans being less sensitive to growth or declines in economic activity at home.

<sup>16</sup> Dummy captures a large outlier and is required to ensure normality of the residuals