**CBB Working Paper No. WP/13/8** 

The authors would welcome any comments on this paper. Citations should refer to a Central Bank of Barbados Working Paper. The views expressed are those of the author(s) and do not necessarily represent those of the Central Bank of Barbados

## AFTER CLIMATE CHANGE: LESSONS FOR THE BARBADOS ECONOMY FROM ICELAND

BY

## JAY R. MANDLE



**CENTRAL BANK OF BARBADOS** Research and Economic Analysis Department JAY R. MANDLE

# After Climate Change

# Lessons for the Barbados Economy From Iceland

Colgate University 6/28/2013

Prepared for Central Bank of Barbados 33rd Annual Review Seminar 2013

L

Barbados is currently listed in the Human Development Index (HDI) produced by the United Nations Development Programme among those with "very high human development" (ranked number 38 of 186).<sup>1</sup> It is in that grouping because its economy earns a relatively high per capita income level, which in turn has been used to secure important gains in educational attainment and life expectancy. It is a significant achievement that almost three-quarters of respondents in a 2010 survey, rated their current living standard as either much better or better compared that that of their childhood.<sup>2</sup> There are, of course, important limits to what the country has accomplished. Between 1996/97 and 2010 there has been an increase in income inequality.<sup>3</sup> Nevertheless, the evidence supports Worrell's comment that "in the space of two generations Barbadians have transformed this country from the third world to the first world."<sup>4</sup>

These achievements have been secured with an economy that is heavily dependent on tourism. Over the period 2005-2012 tourism alone was responsible for almost 60 percent (58.8) of the tradables produced in the economy, constituting 11.7 percent of the country's gross domestic product.<sup>5</sup> As Lorde, Francis and Drakes concluded in an econometric study of the role played by the industry, there is a "stable, long-run relationship between tourism activity and output."<sup>6</sup>

Tourism's period of most rapid growth occurred during the late 1960s and early 1970s when long stay arrivals grew by about 16 percent per year. Since then the industry's expansion has slowed. The growth rate of arrivals averaged 2.7 percent between 1974 and 2009. Nevertheless, the industry's relative size means that its performance continues to determine the direction of movement of the Barbados economy as a whole. Furthermore because the industry is by far the most important means by which Barbados' extremely open economy earns foreign exchange, local economic conditions are greatly influenced by economic business cycles overseas.

At the moment, with Great Britain and the United States still recovering from the financial crisis of 2007, and with the Euro zone economies deeply depressed, tourist arrivals in Barbados have been in decline. As a result, recent economic growth in Barbados has been negligible at best.<sup>7</sup> But demand side "shocks" such as these have occurred in the past. In each case when economic growth was restored in the metropolitan countries, arrivals in Barbados recovered to their pre-crisis levels and then resumed

<sup>&</sup>lt;sup>1</sup> United Nations Development Programme, *Human Development Report 2013 The Rise of the South: Human Progress in a Diverse World* (New York: United Nations Development Programme 2013\_, Table 1

<sup>&</sup>lt;sup>2</sup> Caribbean Development Bank, *Barbados Country Assessment of Living Conditions 2010, Volume I: Human Development Challenges in a Global Crisis: Address Growth and Social Inclusion* (Sir Arthur Lewis Institute of Social and Economic Research, University of the West Indies, Cave Hill Campus (December 2012) Table 20, p. 32. <sup>3</sup> Ibid., Appendix I, p. 72

<sup>&</sup>lt;sup>4</sup> DeLisle Worrell, "Growing the Economy," p. 3

<sup>&</sup>lt;sup>5</sup> Central Bank of Barbados, *Press Release*, March 2013, Table 2.

<sup>&</sup>lt;sup>6</sup> Troy Lorde, Brian Francis and Lisa Drakes, "Tourism Services Exports and Economic Growth in Barbados," *The International Trade Journal*, Volume 25, no. 2 (April-June 2011) p. 228.

<sup>&</sup>lt;sup>7</sup> The estimated annual growth rate for the first quarter of 2013 was -0.4. Ibid., Table 1.

growing.<sup>8</sup> As a result, so too did the Barbados economy. The Barbados tourist industry produces an attractive product at competitive prices to which consumers are drawn. Thus it is reasonable to infer that if economic growth were restored in the tourist industry's principle markets, and in the absence of an exogenous shock, there would likely be a reversion to trend and the relatively slow rate of economic growth characteristic of a mature industry would be resumed.

#### Ш

The problem is that a powerful exogenous shock is in the offing. Global climate change will introduce a supply side disruption whose damage will be devastating. Specifically, rising sea levels make a continuation of Barbados' tourist-led growth strategy untenable. In the absence of the emergence of new sectors of economic activity, even a partial dismantling of the tourism sector – something that is all but inevitable – will threaten the country's human development accomplishments. Alternatives to tourism will be required if a substantial downward movement in living standards is not to be experienced. The shock associated with global climate change has not yet been experienced. But planning for the time that it does arrive cannot start too soon.

The CARIBSAVE Partnership was commissioned by the United Nations Development Programme and the UK Department for International Development to model the impact of climate change on the nations of the Caribbean, including Barbados. The results with regard to sea level rise (SLR) are devastating. The authors note that coastal areas in Barbados are already under pressure. They write, "the impacts of climate change, in particular SLR will magnify these vulnerabilities and accelerate coastal erosion." To make matters worse, the areas that are at the greatest risk of beach loss are concentrated on the west and south west coasts of the country, precisely where tourist facilities are most heavily concentrated. It reports "tourism resort infrastructure is highly vulnerable to SLR inundation and related beach erosion. Moreover, beaches are critical assets for tourism in Barbardos, with a much greater proportion of beaches being lost to inundation and accelerated erosion long before resort infrastructure will be damaged."<sup>9</sup>

The estimates of the costs of the damage caused by SLR are at best only approximate, but the magnitudes involved are huge. The Caribsave report suggests that "the tourism sector in Barbados will incur annual losses of between US \$283 million in 2050 to over US \$850 million in 2080 (based on a mid-range scenario)." The order of magnitude involved in rebuilding damaged facilities is also staggering - judged to be over US \$400 million in 2050 and up to US \$946 in 2081. What is involved is brought vividly to life when the report indicates that the smallest iteration of SLR in its model (a rise of 0.5 meters) suggests a loss of 37-72 percent of the Sandy Lane and Holetown beach. In a mastery of

<sup>&</sup>lt;sup>8</sup> DeLisle Worrell, Anton Belgrave, Tiffany Grosvenor and Alexis Lescott, "An Analysis of the Tourism Sector in Barbados," *Economic Review*, Volume XXXVII, Number 1, p. 53

<sup>&</sup>lt;sup>9</sup> The CARIBSAVE Partnership, *The Caribsave Climate Change Risk Atlas: Climate Change Risk Profile for Barbados* (Bridgetown and London: Caribsave, March 2012), p. 75

understatement, the authors write that SLR threatens "very significant economic losses for the country and its people."<sup>10</sup>

The question that arises is what Barbados will have to do differently if it is to shift from successful tourist- dependent development to growth built on alternative foundations. There are two different elements to this problem. The first concerns the need to identify the policies and institutions that have served the country well in the past and which should be retained under the changed circumstances. The second involves the need to define the institutional and policy innovations required for the country to move successfully to a new development path.

In considering the future, it is useful to examine the success achieved with non-tourist dependent development by a comparable country. Because size is a constraining variable, the comparison country should be one that shares with Barbados not only an elevated ranking in the human development index, but that as well possesses a comparably small population.

It might seem incongruous that the country that best fits the comparative role is Iceland. But it does so because it is a nation whose population size is similar to Barbados' (Iceland, 319,000; Barbados 274,000 according to the World Bank)<sup>11</sup> and, just as importantly, it has achieved an even higher development status. Despite a very serious financial crisis in 2008, the most recent Human Development Report ranks Iceland as number 13 in its HDI, 25 places higher than Barbados.<sup>12</sup> Obviously Iceland differs from Barbados in numerous ways, not least in its cold climate and availability of geo-thermal energy. But in looking for an alternative development model, the fact that merchandise exports in Iceland in 2010 stood at 37.3 percent of GDP compared to Barbados' 6.1 percent is of particular relevance.<sup>13</sup> Insight into what Barbados should do next can be gained by examining the context in which Iceland developed a manufacturing sector of importance.

#### III

The data set I use to compare Barbados and Iceland is The Executive Opinion Survey reported in *The Global Competitiveness Index* produced by the World Economic Forum. In that survey, managers and executives are asked to respond about their country with regard to 79 issues on a scale of 1-7. For example the respondents were asked "How would you assess general infrastructure (e.g. transport, telephony and energy in your country [1 = extremely underdeveloped; 7 = extensive and efficient by international standards]." The mean score for each response provides the basis for ranking the country on each question. The country with the highest score is ranked first (1) followed in serial order to the worst country (144). In Barbados, 72 executives of large and small firms responded to these questions while the corresponding number in Iceland was 93.

Not all of the questions that were asked are useful in casting light on Barbados' past successes and the nature of the changes it needs to make in the future. But many do. I selected 45 questions that elicit

<sup>&</sup>lt;sup>10</sup> Ibid. p. 120.

<sup>&</sup>lt;sup>11</sup> World Bank, http://worldbank.org/data.

<sup>&</sup>lt;sup>12</sup> United Nations Development Programme, *Human Development Report*, Table 1.

<sup>&</sup>lt;sup>13</sup> Ibid., Table 10

#### Table 1

#### Country Ranking on Selected Variables from Global Competitiveness Index

Indicator	Barbados	Iceland
	Ddi DduUS	
Quality of Primary Education	2	12
Quality of Educational system	7	8
Quality of Math and Science	7	22
Education		
Quality of Management	21	18
Schools		
MEAN EDUCATION	10	15
Quality of Overall	21	7
Infrastructure		
Quality of Roads	33	31
Quality of Port Infrastructure	17	8
Quality of Air Transport	8	9
Infrastructure	l _ ,	+
Quality of Electricity Supply	24	2
MEAN INFRASTRUCTURE	21	11
Dreporty Dights		20
Property Rights	2/	39
Protection	30	26
	19	18
Efficacy of Legal Framework in	28	27
Settling Disputes	20	27
Efficacy of Legal Framework in	32	29
Challenging Regulations		
Reliability of Police Service	22	9
MEAN INSTITUTIONS	26	25
Business Costs of Terrorism	46	3
Business Costs of Crime and	74	5
Violence		
Organized Crime	16	9
MEAN CRIME	45	6
Availability of Latest	28	/
Firm Lovel Technology	27	
Absorption	37	2
Canacity for Innovation	Q1	21
Company Spending on R&D	72	27
Availability of Scientists and	54	17
Engineers		
MEAN TECHNOLOGY	57	15
Financial Market	47	28
Sophistication		
Financing Through Local Equity	66	42
Market	76	10
Ease of Access to Loans	76	21
	74	21
	00	27
	Indicator Quality of Primary Education Quality of Educational system Quality of Math and Science Education Quality of Management Schools MEAN EDUCATION Quality of Overall Infrastructure Quality of Port Infrastructure Quality of Port Infrastructure Quality of Air Transport Infrastructure Quality of Electricity Supply MEAN INFRASTRUCTURE Property Rights Intellectual Property Protection Judicial Independence Efficacy of Legal Framework in Settling Disputes Efficacy of Legal Framework in Challenging Regulations Reliability of Police Service MEAN INSTITUTIONS Business Costs of Terrorism Business Costs of Terrorism Business Costs of Crime and Violence Organized Crime MEAN CRIME Availability of Latest Technology Firm-Level Technology Absorption Capacity for Innovation Company Spending on R&D Availability of Scientists and Engineers MEAN TECHNOLOGY Financial Market Sophistication Financing Through Local Equity Market Ease of Access to Loans Venture Capital Availability	IndicatorBarbadosQuality of Primary Education3Quality of Educational system7Quality of Math and Science7Education21Quality of Management21Schools10MEAN EDUCATION10Quality of Overall21Infrastructure17Quality of Port Infrastructure17Quality of Air Transport8Infrastructure21Quality of Electricity Supply24MEAN INFRASTRUCTURE21Property Rights27Intellectual Property30Protection19Efficacy of Legal Framework in Settling Disputes28Efficacy of Legal Framework in Settling Disputes32Efficacy of Crime and Violence74Violence74Violence74Violence74Availability of Latest Technology28Availability of Latest Technology28Firm-Level Technology Absorption37Absorption54Engineers57MEAN TECHNOLOGY57Financial Market Sophistication47Financial Market Sophistication76Venture Capital Availability74MEAN FINANCIAL MARKET G666

Source: World Economic Forum, Global Competitive Report 2012-2013 (Geneva: World Economic Forum, 2012).

\*Data for Iceland taken from Global Competitive Report 2008-09

information on issues that have appeared prominently in the literature as determinants of success in economic development and grouped them under six headings: 1) Education, 2) Infrastructure, 3) Institutions, 4) Crime, 5) Technology, and 6) Financial Market Development.<sup>14</sup> The survey does suffer from important omissions. For example, there is no information provided concerning tertiary education. Similarly under the heading "institutions," the nature of the political system is not addressed. Nevertheless, the range of relevant variables that is considered is wide enough to offer important insights into what Barbados has to do to put itself on a new growth path.

To provide a basis for comparison between Barbados and Iceland, I computed an unweighted mean for the components of each of the six headings these groupings (Table 1). These comparisons reveal that Barbados ranks at a very high level with regard to three of the variables (Education, Infrastructure, and Institutions) but at a less elevated status with regard to three others (Crime, Technology, and Financial Market Development). As evaluated by its business community, Barbados' educational system is world class (Education is ranked 10<sup>th</sup> of 144 countries). Similarly, its Infrastructure and Institutions also score well (21 for Infrastructure and 26 for Institutions). On these measures, Barbados is comparable to Iceland. Indeed in the case of Education, Barbados' ranking is superior to that country's. Even in the case of Infrastructure where the gap is greatest among these three categories, Iceland is only 10 places above Barbados.

These results are consistent with Barbados's success in tourist-led development. A well-educated population, good infrastructure, and strong institutions have enabled the country to employ its natural factor endowments – sun, sea and sand – effectively. Barbados attractively produces the service for which it possesses a comparative advantage.

However, the pattern is entirely different with regard to the remaining three variables. Barbados' standing with regard to Crime, Technology, and Financial Market Development is relatively low, far below its ranking on the other three variables. Indeed on four of the questions listed under these three headings, the country fell below the 50<sup>th</sup> percentile: 1) business costs of crime and violence, 2) capacity for innovation, 3) ease of access to loans and 4) venture capital availability.

The contrast with Iceland on these three variables is substantial. Iceland's status with regard to crime is 6<sup>th</sup> best in the world; Barbados stands at 45<sup>th</sup>. A similar gap exists with regard to technology. Iceland's position is 15<sup>th</sup>, Barbados' 57<sup>th</sup>. And though Iceland's recent history may suggests that its financial system betrayed the country, nevertheless this 2011 assessment of that sector places it at 27, compared to Barbados' position at 66. On each of these, in short, Barbados lags Iceland by about 40 places.

<sup>&</sup>lt;sup>14</sup> The World Bank has discussed each extensively. Financial System Development: *World Development Report, 1989*, "Financial Systems and Development," (Washington DC: The World Bank, 1989); Crime: *World Development Report 2011*, "Conflict, Security and Development," (Washington DC: The World Bank, 2011); Education: *World Development Report 1989/99* (Washington DC: The World Bank, 1999); Infrastructure: *World Development Report, 1994*, "Infrastructure for Development," (Washington DC: The World Bank, 1994); Institutions: *World Development Report 2003*, "Sustainable Development in a Dynamic World: Transforming Institutions (Washington DC: The World Bank, 2003); Technology: The World Bank, "Science, Technology and Innovation Capacity Building Partnerships for Sustainable Development", *Global Forum Action Plan*, Compiled by Alfred Watkins and Joshua Mandell. September 1, 2010

That crime in Barbados is high relative to Iceland, financing limited, and its private sector lacks a high level of technological competence all act as impediments to growth. The extent to which these weaknesses have damaged tourism however is probably minimal. Informal observation suggests that crime in the country is not at a level that has seriously curbed demand. Similarly, limited technological capability probably has not been a binding constraint for tourism. The price and quality of the industry's services are not decisively influenced by the use of advanced technology. It does however seem to be the case that, especially recently, difficulties regarding financing have limited the expansion of the tourism sector.<sup>15</sup>

Though the effects of these weaknesses on tourism may not be great, they will loom as important as the country is compelled to adopt an alternative economic model. The problems associated with crime and limited financing may act to constrain economic structural change. If crime is not reduced, security costs might cause firms that would otherwise be profitable to fail. If financing is not more readily made available, start-up firms might never get off the ground. Compounding these difficulties is the issue of technology. Since labor is relatively expensive in Barbados, Barbadian firms that are not highly productive will find it difficult to compete successfully in global markets.

Furthermore, if left unaddressed crime, inadequate financing and limited technological competence can negatively reinforce each other. Lenders will be reluctant to extend credit to firms whose technology puts them at a competitive disadvantage in global markets, resulting in slow growth, high unemployment and most likely a growing rate of crime. The latter will impair profitability which in turn will further discourage the availability of loans.

But while it is easy enough to paint gloomy scenarios, what is important is not simply to identify why Barbados with its excellent education system, well developed infrastructure and advanced institutions could be exposed to this kind of negative dynamic. What needs to be articulated – before climate change makes it too late to do so – is a strategy that will reverse that circularity. The strategic issue is where and how to break into the flow in order to allow firms in the country to export profitably.

The relationship that holds out the most promise for a reversal of negative causality is the one that exists between Education and Technology. That this is so is suggested by the stark contrast that exists between Barbados and Iceland concerning that relationship. The rankings earned by Iceland's education system and its technology are quite similar. That association is not present for Barbados. Barbados is ranked 7<sup>th</sup> in the world with regard to the quality of its math and science education, but it is positioned 91<sup>st</sup> with regard to capacity for innovation. The corresponding rankings for Iceland are 22<sup>nd</sup> for the quality of math and science education and 21<sup>st</sup> for capacity for innovation. More generally, while Iceland's overall rankings for Education and Technology are identical (15<sup>th</sup> in the world for both), Barbados ranks 10<sup>th</sup> in Education but only 56<sup>th</sup> in Technology.

IV

<sup>&</sup>lt;sup>15</sup> The long delay in the Four Seasons project is illustrative.

The discrepancy between the two variables for Barbados is accounted by its high tertiary emigration rate.<sup>16</sup> Estimates for Barbados vary, but they agree that they are among the highest in the world a level not approximated by Iceland. The *2009 Human Development Report* reports Barbados' tertiary emigration rate at 47.3 and Iceland's at 18.0. More recent estimates provided by the OECD indicate a 90.7 rate for Barbados and 16.7 for Iceland.<sup>17</sup> Whichever estimate is the more accurate, it is clear that the loss of human capital from Barbados is far higher than in Iceland.

If Barbados' loss of human capital could be reduced, the negative causal flow among finance, crime and technology could be reduced or even reversed. Such a change could result in an improvement in technological capacity. Firms could become more productive and profitable. With that the case they could attract more venture capital. Exports could increase and with that employment and income would also rise. Such dynamism would at the same time contribute to a reduced crime rate. A virtuous cycle could be generated, putting the Barbados economy on the path to economic modernization.

It probably is not realistic to expect to achieve a major reversal of the emigration flow, though that of course would be desirable. But fortunately a new growth trajectory does not require such a reversal. What is both needed and more attainable is the enlisting on a temporary or part-time basis of the services of well-educated Barbadians who have made careers overseas. Their expertise is needed more than their physical presence. Returnees need not become permanent residents of Barbados. The phrase "brain circulation" is used in the literature on this subject to refer to individuals who divide their time and expertise geographically and to those who contribute to their home country without travelling but provide their expertise using modern communications media.<sup>18</sup>

The very beginnings of efforts to create a West Indian version of a "New Argonauts" flow –the flow of human capital from the North to the South - are underway. The Caribbean economist Jason Jackson has studied such an effort in Jamaica by interviewing participants in that country's biotechnology sector. He chose this sector because there had been "interest and willingness of members of the Jamaican scientific community to return or to remotely engage with development activities...much like many of the Taiwanese and Korean counterparts." Jackson reports that despite the fact that the biotechnology scientists and technologists in Jamaica and the diaspora know each other, there had been "...relatively little interaction between them." A substantial return flow of technically skilled personnel had not been generated. This failure Jackson attributes to the government's inability to construct "an appropriate institutional model of diasporic engagement."<sup>19</sup>

<sup>&</sup>lt;sup>16</sup> The tertiary emigration rate is the percentage of all native born individuals with a tertiary education living abroad as a percentage of all native born individuals whether living abroad or at home.

<sup>&</sup>lt;sup>17</sup> United Nations Development Programme, *Human Development Report 2009* (New York: United Nations Development Programme, 2009), Table 3; Organization for Economic Cooperation and Development, *Connecting with Emigrants: A Global Profile of Diasporas* (Paris: OECD, 2012), pp. 100 and 180.

 <sup>&</sup>lt;sup>18</sup> Andrés Solimano, "Causes and Consequences of Talent Mobility," in Andrés Solimano (ed.) *The International Mobility of Talent: Types, Causes and Development Impact*, ( (New York: Oxford University Press, 2008), p. 1
 <sup>19</sup> Jason Jackson, "Promoting Caribbean Science and Technology-Intensive Development through Brain Circulation:

The Case of Biotechnology in Jamaica, *Canadian Foreign Policy Journal*, Volume 17, no. 2, p. 123, 124

Three impediments seem to have slowed Jamaica's efforts at achieving a reversed flow of human capital. First, there have been misunderstandings between potential collaborators concerning "incentives and motivations". Second financial support for such collaborations has been inadequate. But, according to Jackson, "the third and in many way most critical issue given the wider context of Jamaica's competitiveness challenge concerns the absence of close connections between the scientific research community and the Jamaican private sector."<sup>20</sup> Specifically, the researchers believe that the business community is too short-sighted to see and take advantage of the opportunities a reversed flow could provide. This is a complaint that resonates widely in the Caribbean, where the private sector is seen as unwilling to adopt a Schumpeterian role that could propel the region forward.

But caution by the private sector is neither unique to the region nor impossible to overcome. Jackson notes that this same problem was confronted in Taiwan. Distrust and disinterest there were overcome as "policy makers and business people experimented in a process of learning about the needs of a young dynamic industry...." Jackson reports that there is "no ideal pre-existing blueprint or magic bullet for policy makers to adopt" for success in this effort. He concludes that creating institutions that foster "strategic interaction and reciprocal learning ... holds the key lesson for Caribbean economies."<sup>21</sup> What was done elsewhere could be accomplished in Barbados.

#### IV

And indeed it has been achieved in Iceland. In a recent social history of Iceland, Magnusson indicates that "until the 1980s [Iceland's] economy remained seriously over-reliant on a single industry, fishing...." But change occurred quickly in the 1990s. The fishing industry declined in relative importance and new sectors of economic activity emerged, particularly in high-tech services. Making an important contribution to this change was the return migration of well-educated Icelanders who had been working abroad. The triggering mechanism was establishment of the Iceland Centre for Research, a new institution charged with responsibility for funding academic research in the country. According to Magnusson, the Centre "made it possible for the large group of scholars and scientists who had gone abroad to work and study to return home, even after many years at universities and others institutions outside Iceland." He goes on, "a very large percentage of the people in question accepted the opportunity." Academic research flourished and that in turn resulted in "industry in Iceland becoming more varied and diversified, as well as more stable and dynamic." There was in a "growing importance of science and new technologies to the industrial landscape of Iceland," dating from the last years of the twentieth century.<sup>22</sup>

Barbados has not benefitted from a comparable return flow of technological expertise. As a result, it remains a country whose economy is dominated by a single industry that utilizes only a minimum of modern technology. But change will be imposed on the country in the not too distant future. Sea level

<sup>&</sup>lt;sup>20</sup> Ibid. p. 124.

<sup>&</sup>lt;sup>21</sup> Ibid., p. 124.

<sup>&</sup>lt;sup>22</sup> Sigurður Gylfi Magnússon, *Wasteland With Words: A Social History of Iceland*, (London: Reaktion Books Ltd, 2010) p. 244, 250

rise will damage the tourist industry. If living standards are to be protected, the leadership of the country will have to identify the means by which Barbados can embark on a new development path.

Barbados could do so by creating institutions that would attract the productive talent that resides in its diaspora. If "New Argonauts" could be induced to return to Iceland, a comparable flow to Barbados would seem to be easily within the realm of the achievable.