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Research Team



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Macroeconomic Indicators and Wellbeing/wellness Indicators: Is There a Strong Link?

Presenter

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OUTLINE

- 1. BACKGROUND/MOTIVATION
- 2. OBJECTIVE
- 3. IMPORTANCE
- 4. CONTRIBUTIONS
- 5. CONCEPTUAL FRAMEWORK
- 6. METHODOLOGY
- 7. EMPIRICAL RESULTS
- 8. CONCLUSION

1. Background/ Motivation

- **Wellbeing or wellness: indicators that individuals, communities and nations alike, use to gauge their levels of comfort in terms of health, wealth, and overall happiness. Individual: individual wellbeing; community level: community wellbeing and nation level: national wellbeing (can help rank countries).**

- **Different types of measurements of wellbeing with some emphasizing pure economic aspects or macroeconomic aggregates such as GDP (income) or GDP per capita, others focusing on health aspects (for example, Indigo Wellness Index measure) and yet others being a mixture of economic aspect, health as well as other aspects (for example, Human Development Index (HDI), Indigo Score Index, and Bloomberg Healthiest Country Index).**

- **Yet, GDP or GDP per capita and other measurements of wellbeing can convey very different if not conflicting wellbeing rankings. Case in point concerns the Caribbean region and Africa. Indeed, out of 20 unhealthiest countries in the world in 2019, the Indigo Wellness Index (IWI) has identified St. Lucia as the second unhealthiest country, Barbados as the fifth unhealthiest country, Haiti as the ninth unhealthiest country, Trinidad and Tobago as the fourteenth unhealthiest country, Jamaica as the sixteenth unhealthiest country, and Dominican Republic as**

- **Only three African countries in the cohort: South Africa as the first unhealthiest country, Central African Republic as the eighth unhealthiest country and Egypt as the eighteenth unhealthiest country. At the same time, it has been noticed that the sizes of 2019 GDP per capita (using purchasing power parity, PPP) in international \$, present another picture: Central African Republic 681 (2017); Haiti 1,940; Jamaica 9,726; South Africa 13,498 (2017); St. Lucia 15,225; Egypt 16,953 (2017); Barbados 18,886; Dominican Republic 19,452; and Trinidad and Tobago 33,026.**

2. OBJECTIVE

- **These observations provide the foundation of the present paper that seeks to examine whether there is a strong relationship between income per capita and each of the following four countries' wellbeing/wellness Indicators (HDI, Indigo Wellness Index (IWI), Indigo Score Index (ISI) and Bloomberg Healthiest Countries Index (BHCI)).**

3. IMPORTANCE

- **THREE REASONS.**

First, the inquiry invites all of us to have a deep appreciation of knowledge of the indices assumed to capture a certain number of life/country characteristics.

Second, the paper alerts us on the possibility that all measures of wellness are not equally good and some may even blur countries' rankings.

Third, the paper implicitly motivates us to look more deeply into the role of economic aspects in the whole wellness saga skewed towards health aspects.

4. CONTRIBUTION

- Although there are studies using surveys dealing with similar issues at the individual wellbeing level as well as studies centred timidly on the relationship between HDI and GDP or GDP per capita, to the best of our knowledge no work has been undertaken in the spirit of this paper. That is, the issue of association between (national) indices of wellness has not in general been empirically examined. The paper attempts to fill up this gap.**

5. CONCEPTUAL FRAMEWORK

- **5.1 Exploring the wellness concept**
- **A plurality of meanings with no clear cut consensus.**
- **Wellbeing= encompasses the way a person feels and functions both personally and socially as well as how he/she holistically evaluates his/her life**

- **Wellbeing is interchanged with wellness: the integration, balance and harmony of the mind, body, soul and emotions (Seaward 2003, 4)**
- **Wellbeing and wellness are neither about having high levels in every aspect/dimension of life but rather focuses on the balance that is necessary. It is not a state that is achieved at one specific time but it is rather a process and essentially, a way of life.**

- **Personal Wellbeing:** measuring the quality of one's life through subjective measures of life satisfaction and happiness, this is ideally from the individual's perspective (Wallace 2019) . Concept exploited by the government as the progress of a nation in more recent times is being linked to the wellbeing of its people. The implementation of the Sustainable Development Goals (SDG's) by the United Nation's General Assembly in 2015 is a prime example of the shift from typically measuring economic production to now measuring wellbeing as a measure of economic performance and social progress. The goals have the common aim of 'achieving a better and more sustainable future for all' or rather inclusive economic growth (United Nations 2018). There are seventeen goals stipulated in SDGs.

- **5.2. Measuring Wellness**
- ***5.2.1 Pure Economic Based Approach***
- ***GDP* or *GDP* per capita**
- ***GPI* (Genuine Progress Indicator) measures the social and environmental costs and benefits that GDP as an indicator ignores.**

- 5.2.2 *Wellness Based Indicators*
- **a) *Human Development Index, HDI* (GDP per capita, Literacy, Health)**
- **b) *The Indigo Era*** (era focused on innovation and technology)
- **b.1 *The Indigo Score***
- **It encompasses levels of education, the infrastructure for doing business & competitiveness, the legal system, political stability, the ecosystem and the digital infrastructure. Essentially, the higher the score, the higher the country is ranked in the index as one of the healthiest throughout the world similar to the ranking system of the human development index.**
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- **b.2. The Indigo Wellness Index (IWI)**
- **It is an index that seeks to measure the healthiest nations throughout the world by tracking the health of countries throughout the world based on ten essential measures: blood pressure, blood glucose, obesity, depression, happiness, alcohol use, tobacco use, exercise, healthy life expectancy and government spending on healthcare.**

- c) *The Bloomberg Healthiest Country Index*
- The index is one that grades countries based on their wellness/health while incorporating similar factors as the Indigo Wellbeing Index. It takes into consideration life expectancy, the use of tobacco (smoking), obesity, eating habits, environmental factors (access to clean water and sanitation) and childhood malnutrition. Bloomberg simplifies the ranking system that they use as a health grade, which is the 'health score minus health risk penalties' (Lu 2019).
- 2.3. Wellbeing and Sustainable Development

6. METHODOLOGY

- **6.1 GRAPHICAL ANALYSIS**

- The aim of this type of analysis is to speculate on the type of relationship between GDP per capita and each of the other wellbeing measures.

- **6.2 CORRELATION ANALYSIS**

- Quantitative measure of association. Two categories of correlation measures : (i) the Pearson product-moment correlation coefficient based on the values of the indices, and (ii) the Spearman rank correlation coefficient based on the ranks given to the values of those indices.

- For the Pearson product-moment coefficient, the null hypothesis and alternative hypotheses can be written as follows:

- $H_0: \rho = 0$

- $H_a: \rho \neq 0$

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- where ρ is the population Pearson correlation coefficient.

- The test statistic takes either one of the following forms:

- $$t = \frac{r \sqrt{n-2}}{\sqrt{(1-r^2)}} \quad (2)$$

- or
$$Z = \frac{\sqrt{n-3}}{2} \cdot \ln \frac{(1+r)(1+\rho)}{(1-r)(1-\rho)} \quad (3)$$

- **For the Spearman rank correlation coefficient,**
 - $H_0: \rho_s = 0$
 - $H_a: \rho_s \neq 0$
- **With $n > 30$, the test statistic (see Thamhane and Dunlope 2000, 587) is**

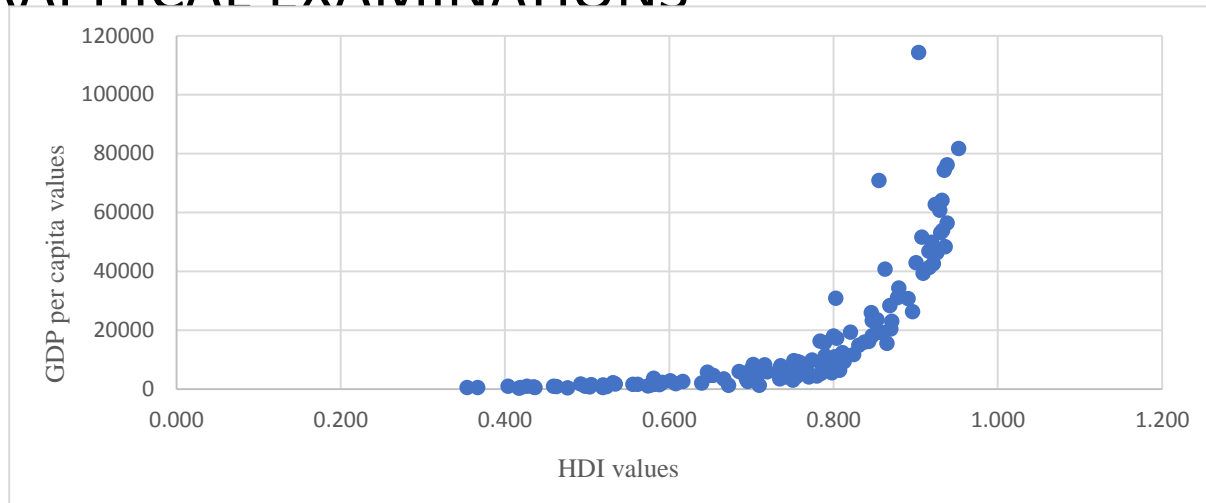
$$z = r_s \sqrt{n - 1} \quad (4)$$
- **The null hypothesis is rejected if $|Z| > 1.96$.**

- **6.3. *How to Qualify the Strength of Correlation***

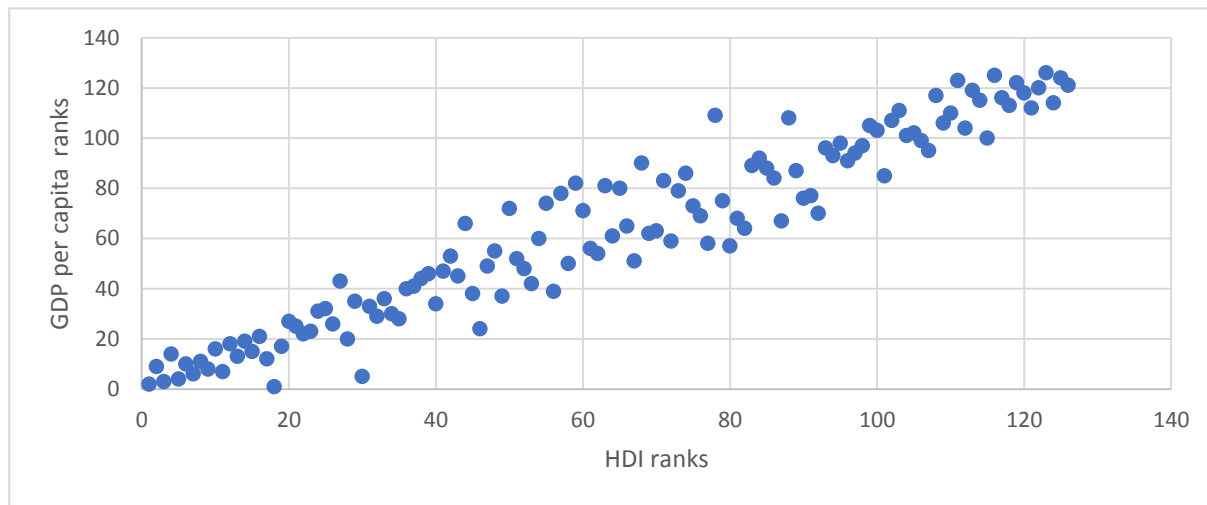
- After conducting the tests of significance, there is a need to qualify the strength of correlation sizes. Apart from the values ± 1 which express perfect direct association or agreement if positive and perfect reverse if there is no consensus on the qualification of the correlation sizes. For example, (Cohen 1988) considers $r = \pm 0.50$ as a strong relationship, $r = \pm 0.30$ as a moderate relationship and $r = \pm 0.10$ as a weak relationship. Others consider $r < 0.20$ as a very weak relationship, $r < 0.40$ as a weak relationship, $r < 0.60$ as a moderate relationship, $r < 0.80$ as a strong relationship and $r \leq 1$ as a very strong relationship. This classification matches somehow the one from Boslaugh and Watters, (2008) for the Spearman rank correlation coefficient: $0.9 \leq r_s \leq 1$ as a very strong relationship, $0.7 \leq r_s < 0.9$ as a strong relationship, $0.5 \leq r_s < 0.7$ as a moderate relationship and the rest as a weak or very weak relationship. We adopt the latter classification.

7. EMPIRICAL RESULTS

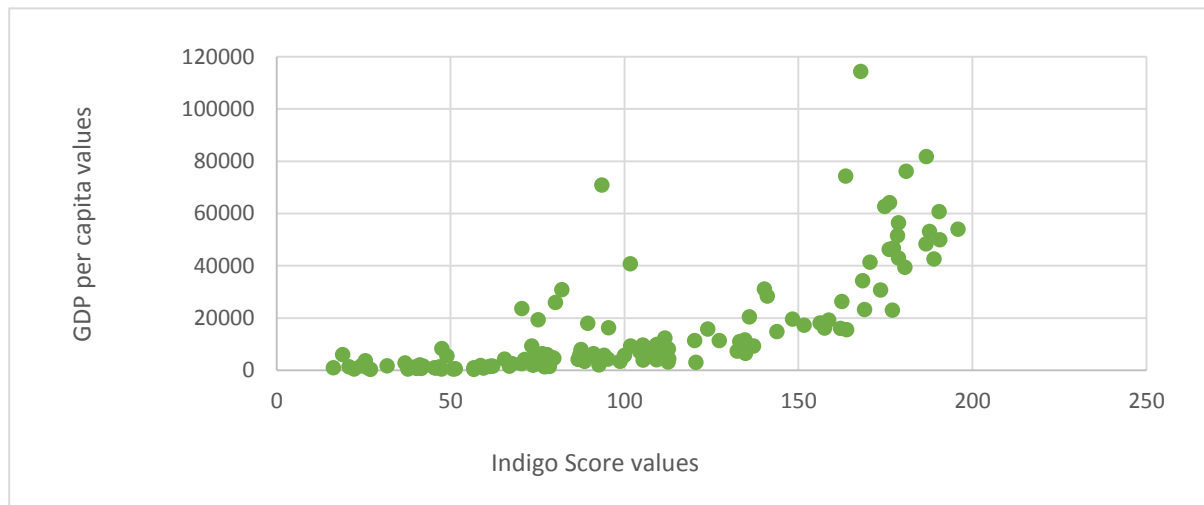
- The paper uses 126 countries
- 7.1 GRAPHICAL EXAMINATIONS



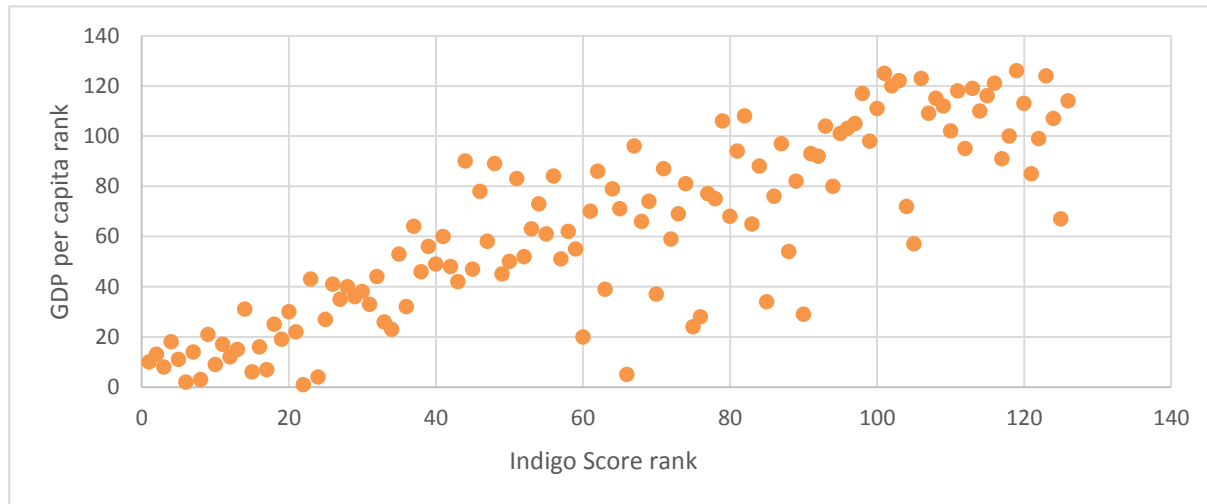
- *Figure 1A - GDP per capita versus HDI values*



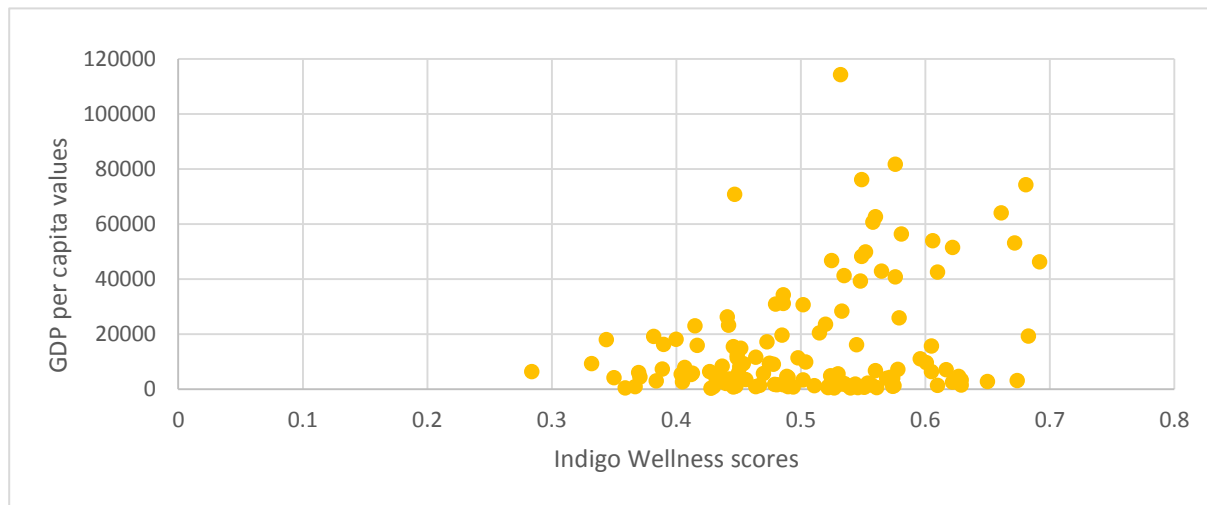
- *Figure 1B- GDP per capita versus HDI ranking*



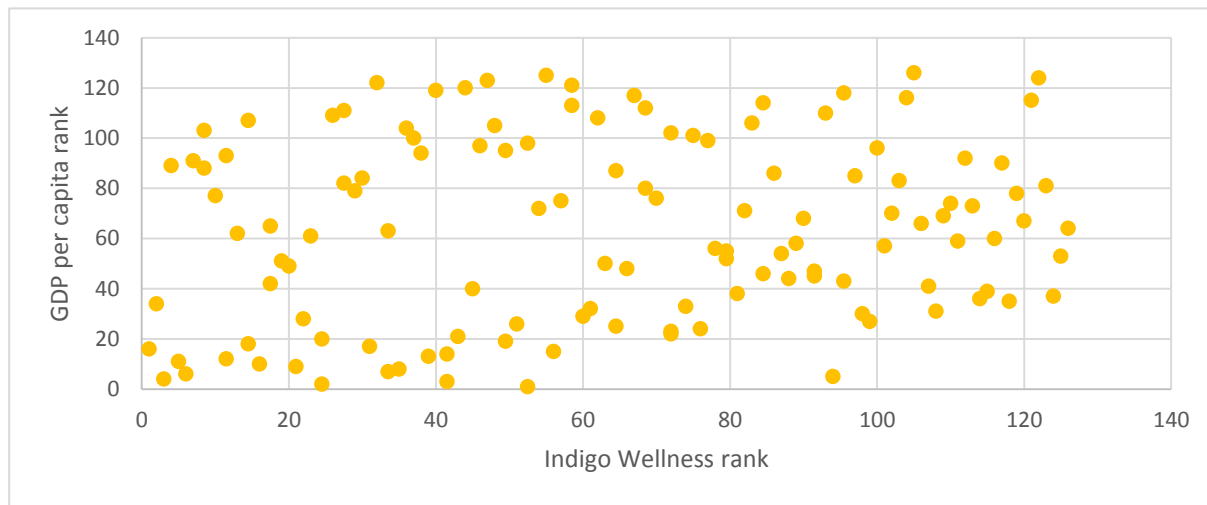
- Figure 2A - GDP per capita versus Indigo Score Index



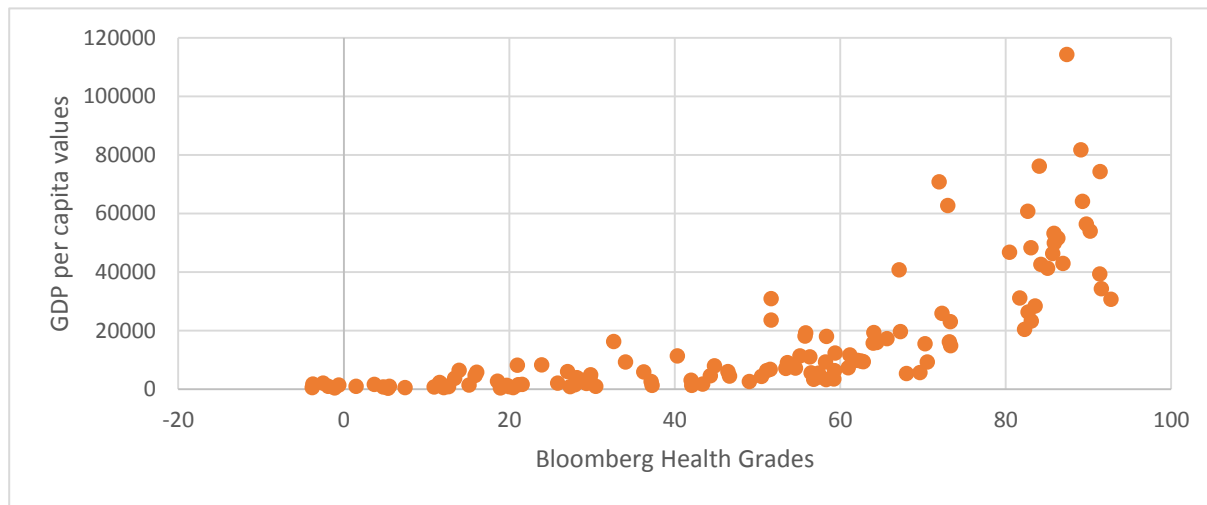
- Figure 2B - GDP per capita ranks versus Indigo Score ranks



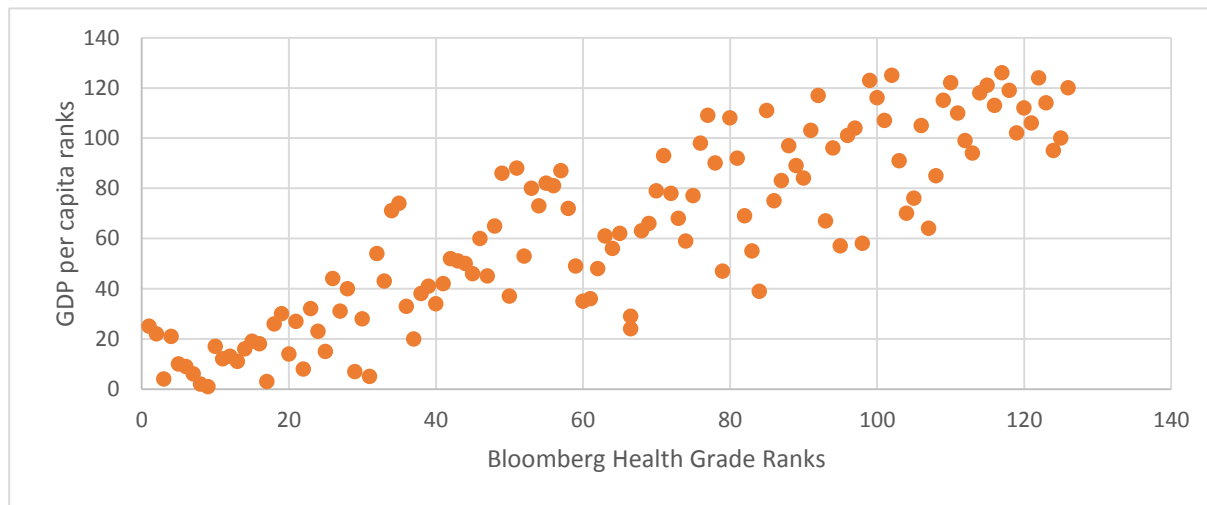
- Figure 3A- GDP per capita versus Indigo Wellness value



- Figure 3B- GDP per capita Rank versus Indigo Wellness Rank



- Figure 4A- GDP per capita values versus Bloomberg Health Grades



- Figure 4B - GDP per capita ranks versus Bloomberg Healthiest Country Rank

• 7.2 Correlation Results and Interpretations

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Variable	IWI vs. GDP per capita		Indigo Score vs. GDP per capita		BHCI vs. GDP per capita		HDI vs. GDP per capita	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
Correlation Coefficient (r) and (r_s)	0.30	0.15	0.73	0.85	0.72	0.88	0.71	0.96
Statistics t and z	3.50	1.72	11.90	9.5	11.55	9.78	11.23	10.72
The critical value (95% confidence)	1.96		1.96		1.96		1.96	
Decision Rule	Reject H_0	Do not Reject H_0	Reject H_0		Reject H_0		Reject H_0	

Variable	IWI vs. Indigo Score		IWI vs. BHCI		IWI vs. HDI		Indigo Score vs. HDI		Indigo Score vs. Bloomberg		HDI vs. BHCI	
Table 3: Correlation between wellness measurements	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
r & r_s	0.14	0.11	0.23	0.23	0.14	0.16	0.86	0.89	0.84	0.83	0.92	0.93
Stat. t & z	1.57	1.27	2.63	2.60	1.57	1.74	18.8	9.90	17.3	9.31	25.1	10.35
CV	1.96		1.96		1.96		1.96		1.96		1.96	
Decision	Do not Reject H ₀		Reject H ₀		Do not reject H ₀		Reject H ₀		Reject H ₀		Reject H ₀	

8. CONCLUSION

- **The results reveal that there is a very weak correlation to none between the Indigo Wellness Index and GDP per capita. On the contrary, there are strong positive linear correlations or agreements between GDP per capita and each of the remaining indices. The correlation outcomes match those from graphical analysis. In addition, the Indigo Wellness Index is statistically uncorrelated with HDI and ISI. These results go a long way to explaining the Caribbean – African paradox according to which the Caribbean countries occupy the bottom ranking as they are unhealthier than most African countries. Although, the exact definition of wellness is still subject to debates, the Indigo Wellness Index is rather suspicious as it produces overall outcomes that are not in line with those from other indices.**

- **POLICY IMPLICATIONS.** First, since wellness is at the core of life, a **CONSENSUS** on the meaning of wellness is urgently needed to enlighten policy makers trying to promote the social, economic, environmental paths of countries. Second, the Indigo Wellness Index does not provide superior quality information compared to the Bloomberg Healthiest Country Index, for example. In addition, given its lack of correlations with all other indices, it needs to be **REVISITED**. Third, although not developed here, the results may mean that inclusive growth, the new country's growth focus, may reveal to be not good enough for people's overall wellbeing in a number of situations. Indeed, each country has to consider full development goals which really target wellbeing via economic growth. **FOURTH**, the inquiry invites all of us to have a deep appreciation of knowledge of the indices assumed to capture a certain number of life/country characteristics.

THANK YOU