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THE EFFECTS OF SUSTAINABLE DEVELOPMENT ON AGRICULTURE, INFLATION, AND UNDEREMPLOYMENT ACROSS NATIONS: A COMPARATIVE STUDY BETWEEN THREE OECD COUNTRIES

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ABSTRACT

This study aims to analyse the outcomes of sustainable development on agriculture, inflation, and underemployment in three diverse countries - Australia, Canada, and India. By comparing these countries, we can gain insights into how sustainable development practices differ across different economic and social contexts. Additionally, this comparative analysis will help identify potential strategies and policies that can be adopted to promote sustainable development in both developed and developing nations. The study found that Government should hasten the spread of technology, particularly that which organizes agricultural output. To allay the worries of agriculturalists, recent agricultural inflation rates have been estimated to range between 5% and 10%. Input and equipment costs are rising, and the government's responsibility in creating a sustainable economy includes funding basic research necessary for renewable energy and resource technology, as well as tax management.

The results among others demonstrate that sustainable development lowers inflation in mature nations, which lowers the unemployment rate in developing economies and creates space for increased supply and increased demand, which eventually leads to the perfection of a standard economy. More-so, the government must offer the necessary support in the form of financing, technical knowledge, and other specialized training in order for these countries to reach the sustainable development goals in agriculture that would ensure food security as well as bring about development that is sustainable. But most critically, the creation of a rail network that connects important economic centers at reasonable costs.

Keywords: Sustainable Development, Inflation, Agriculture, Unemployment, Developed Economy

1. INTRODUCTION

The concept of sustainable development especially within the global development agenda was first introduced by the 1987 United Nations report on “Our Common Future”, which defined it as “development that meets the needs of the present without compromising the ability of future generations to meet the of own needs” (Brundtland *et al.,* 1987; Xu *et al.,* 2022). Since then, sustainable development has become the catchphrase and buzzword within the development space for both international and national development plans, agenda, policies and programmes. Pertinent to the concept is that sustainable development embodies three overlapping dimensions of economic, social and environment sustainability, which reinforces the interrelationship and interactions between economic growth, social development and environmental quality. Thus, discourse on sustainable development often include fundamental issues surrounding

development: hunger and poverty eradication, improved healthcare and educational systems, sustained economic growth accompanied with decent employment, climate change and other ecological issues which can affect overall well-being of the global population.

Currently, the 2030 Global Agenda emphasizes the important of achieving sustainable development across countries in the global economic system. The agenda has put forward seventeen (17) sustainable development goals (SDGs) which by 2030 if properly implemented is intended to provide a pathway for achieving sustainable development both globally and across regions and countries (UN, 2015). The agenda emphasizes the principle of "leave no one behind" and thus defines the targets, policy scope and actions require achieving sustainable development. Interesting the SDGs cover cross-cutting domains of economic, social, and environmental sustainability dimensions of development. Hence, the SDGs goals are interconnected and broadly inclusive and offers a platform for global partnership towards achieving sustainable development. Interestingly, since majority, if not all, countries in the world have signed up and adopted the SDGs framework for strategic planning and alignment of local development along with global agenda for sustainable development.

India, as a developing cum emerging country is one of the countries that have adopted the SDGs for national development planning, programmes and policies. For instance, the SDGs have become central in the India's development trajectory through various programmes, policies and measures aimed at promoting and maintaining economic growth, and the overall goal of sustainable development (Chaturvedi, 2021). The Indian government's vision of "New India" for 2017-2022 had priority areas including high-end manufacturing, infrastructure, effective healthcare systems, information and communication technology (ICT) which were aimed for sole goal of ensuring poverty eradication, corruption, ecological degradation and fostering good governance systems. According to Chaturvedi (2021), the SDGs progress report show that India's sustained economic growth has contributed significantly to poverty reduction. There has also been improved food and nutrition security that has led to reduced hunger and malnutrition among children and adults. On the environmental front, India among the top performers in terms of low per capita emissions with an increased renewable energy generation capacity of about 75 percent as of 2019. This, success scorecard for India suggests that the country is making significant inroads toward sustainable development. However, much work is still required to fast track current progress

This present study is intended to analyse the effects of sustainable development in India with a specific view on the role of agricultural production, inflation, urban development and unemployment using time series methods. Drawing on sample data over the period 1997 to 2020, the study estimated the effects of these factors and further offers a comparative analysis with two developing countries namely, Australia and Canada. Such analysis offers a basis for ascertaining the key factors worth considering in the sustainable development debate and policy strategy design. Further, the comparative analysis is interesting as all three countries performed differently based on the 2022 SDGs ranking of countries performance (Sachs *et al.,* 2022). India is currently ranked 121 whereas Australia and Canada have a SDG rank index of 38 and 29 out of 163 countries. This means that India has a huge task ahead if sustainable development targets are to be realized come 2030. Hence, it is necessary to explore the role of these selected factors in order to properly design appropriate strategies sustainable development.

Following from the Introduction, the balance of the paper is as follows. Section 2 provides the model specification, discussion on variables description and data sources as well some stylized and descriptive statistics. Section 3 presents the empirical estimation results along with a discussion of empirical findings. Section 4 provides the conclusion and policy suggestions.

2. DATA AND METHODOLOGY

2.1 MODEL SPECIFICATION

To offer a comparative analysis of the effects of agricultural production, inflation, urban development and unemployment for India, Australia and Canada, the model specification is specified as follows:

$$SD_t = \beta_0 + \beta_1 AGR_t + \beta_2 INF_t + \beta_3 URB_t + \beta_4 UNEM_t + \varepsilon_t \qquad (1)$$

Where SD is sustainable development, AGR is agricultural production, INF is inflation rate, URB is urban development (or urbanization), $UNEM$ is the unemployment rate, and ε_t is the stochastic disturbance error term. β's are the model parameters to be estimated. Equation (1) is time series model given the temporal evaluation of the relationship. For simplicity, the model is estimated using the ordinary least Squares (OLS) technique.

2.3 VARIABLE MEASUREMENT AND DATA SOURCES

Sustainable development is a multi-faceted and multi-dimensional concept, which is formed from the interaction between economic, social and environmental sustainability. Hence, there is no precise indicator of sustainable development, and the choice of indicators may be contingent on the aspect of sustainability been considered. For the foregoing analysis, the percentage of adjusted net saving from the gross net income (GNI) was applied as suggested by Hunjra *et al.* (2020) to measure the sustainability of countries' wealth over a specific period of time. This is because the measure is widely used in the literature to project the sustainable development especially in the area's countries' economy. It is also useful in checking the extent to changes in natural capital (i.e., natural resources rents). According to the world development indicator (WDI), adjusted net savings is calculated by subtracting the total consumption of fixed capital from the net national savings.

Agricultural production is measured using total agriculture value added (including forestry and fishing) as percentage share of GDP. Inflation is measured by changes the price index in the market. This measure is also predominantly used to measure the extent of urbanization in a country (Effiong, 2018). Lastly, unemployment is the share of total unemployment to the total labour force. The study relied on the World Bank's World Development Indicators (WDI) as the primary source of data for the empirical analysis. Specifically, the sample period based on availability of data is for the period 1997-2020; and the analysis involves the comparison of a developing cum emerging market, India, with two advanced and developing countries that include Australia and Canada. Table 1 below provides a full description of the variables and their associated measurement as obtained from the WDI.

Table 1. Variable Description

Variable	Description	Source
SD	(% of GNI)	WDI
AGR	(% of GDP)	WDI
INF	Inflation, consumer prices (annual %)	WDI
URB	Urban population (% of total population)	WDI
UNEM	Unemployment, total (% of total labour force)	WDI

Table 2. Descriptive Statistics

	Mean	Median	Max	Min	Std. Dev.
		A. ***India***			
SD	18.312	19.432	23.038	12.685	3.371
AGR	18.391	17.087	24.249	16.032	2.590
INF	6.455	5.372	13.231	3.328	2.926
URB	30.574	30.417	34.926	27.028	2.454
UNEM	5.615	5.545	7.997	5.270	0.521
		B. ***Australia***			
SD	7.203	7.205	10.264	5.087	1.317
AGR	2.652	2.431	3.949	2.006	0.495
INF	2.342	2.335	4.457	0.225	1.127
URB	85.073	85.003	86.241	84.100	0.671
UNEM	5.797	5.625	8.360	4.230	0.968
		C. ***Canada***			
SD	8.130	8.342	11.719	4.122	2.176

AGR	1.874	1.875	2.196	1.493	0.209
INF	1.818	1.882	2.912	0.299	0.666
URB	80.473	80.668	81.562	78.340	0.915
UNEM	7.211	7.130	9.460	5.660	0.962

Table 2 presents the summary statistics of the associated model variables for the empirical analysis for each of the three countries considered in the analysis. For instance, sustainable development as measured by the adjusted net savings (% GNI) is relative higher in India than Australia and Canada. Figure 1 presents the trend of the adjusted net savings over the sample period for the analysis. on average, adjusted net savings for India stood at 18.31 percent compared to 7.2 percent for Australia and 8.13 percent in Canada. This clearly means that India's has a high potential for sustainable development; as such, policy efforts towards effective and efficient management of sustainable resources may help preserve natural resources and the environment. For Australia and Canada, these countries have attained significant economic development although there still room for expanding current efforts at sustainable development.

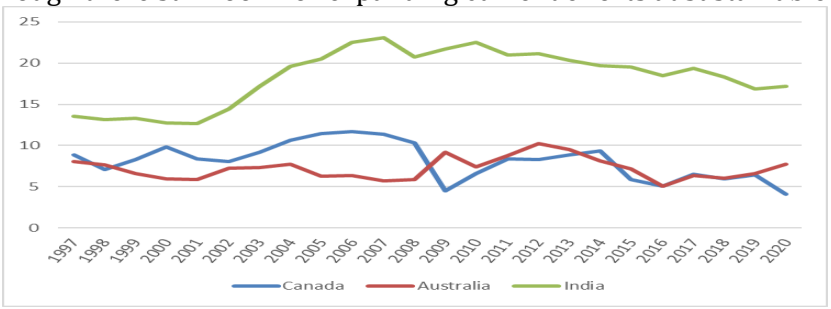

Figure1. Trend of Adjusted Net Savings (% GNI)

Looking at agricultural activities as measured by its GDP share and as presented in Figure 2 on the trend over the sample period, agricultural output averaged 18.39 percent compared to 2.65 percent for Australia, and 1.87 percent for Canada. It should be noted that these developed countries have successfully undergone industrialization during the 20th century, and economic activities are dominated by manufacturing and services sector. Meanwhile, agriculture activities still remain crucial for the India in terms of its shared contribution to overall GDP.

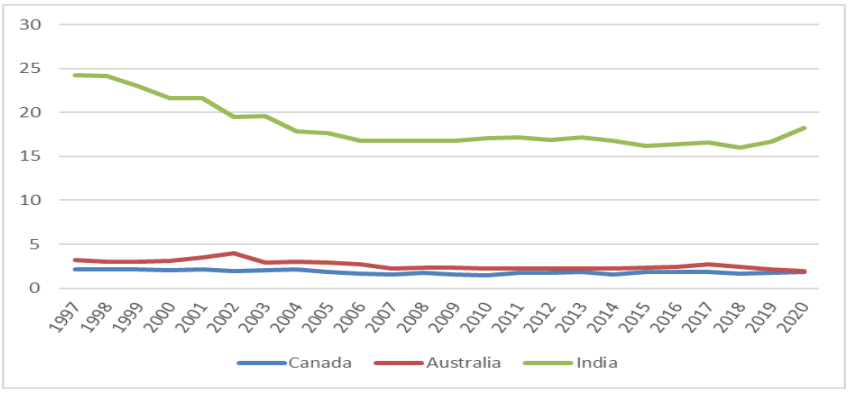

Figure 2: Agriculture value added (% GDP)

In terms of other variables considered in Table 2, urban development (or urbanization) is relatively higher in Australia and Canada with an average of 85 percent and 80 percent respectively of the total population domiciled in the city centres. Meanwhile, India averaged only 30 percent implying that a larger fraction of her population are domiciled in the rural areas. For inflation, all three countries have maintained single digit inflation on averaged over the sample period. While Australia and Canada have managed inflation within around the 2 percent inflation target, India have also succeeded in managing their inflation has reduced from a double digit of 12 percent in 2010 to as low as 3.3 percent on 2017 (see Figure 3 below). Recent trend suggests an upward trajectory with inflation for 2020 standing at 6.6 percent which is still within manageable range and incapable to creating sizeable distortions in the macroeconomy. Lastly, data on unemployment does not suggest a worrying trend based on the sample period considered in the analysis (see Figure 4 below). Unemployment rate as shown in Table 2 stood at 5.6 percent on average for India compared to 5.79 percent in Australia and 7.21 percent in Canada.

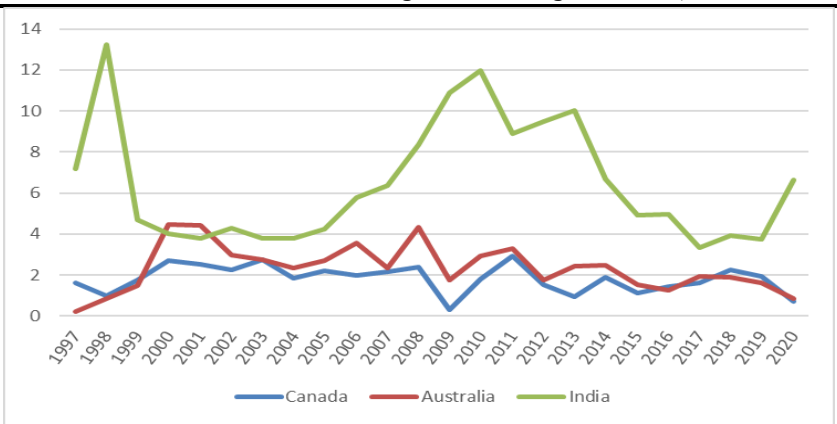

Figure 3. Inflation, consumer prices (annual %)

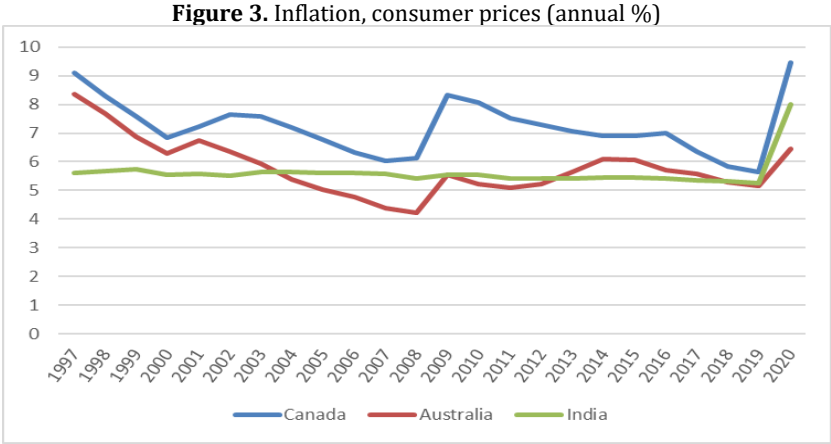

Figure 4. Unemployment (% of total labour force)

3. EMPIRICAL RESULTS

3.1 RESULTS FOR INDIA

Table 3 presents the regression for the causal factors of sustainable development in India considering the role of agricultural production, inflation, urbanization and unemployment. From the results, the impact of agricultural output has a coefficient estimate of -1.627 and is statistically significant at the 1 percent level. This means concentration in agricultural production mostly especially through unsustainable agricultural practices may harm the realization of sustainable development in India. While, agriculture is central to the economic activities in India, the pertinent implications of the empirical results suggest that agricultural production must emphasize sustainability through the adoption of practices, tools/equipment that promotes output but minimizes the effect on the environment. Meanwhile, the effect of inflation turns out positive with a projected coefficient of 0.364. Although this may suggest that inflation is good for sustainable development, the caveat is that persistent, inflation may in reverse hinder the prospects of sustainable development. Much of the debate can be better understood from the perspectives of the inflation-economic growth relationship (Girdzijauskas *et al.,* 2022). From a broad perspective, the economic dimension of sustainable development provides a more general picture of the economic health of a country. In this context, inflation is a key economic indicator. As long as inflation does not discourage savings and investment then it may not be inimical to sustainable development programmes.

Table 3. OLS Regression Outputs for India

Variable	Coef	Std. Error	t-Stat	Prob.
AGR	-1.627	0.160	-10.144	0.0000
INF	0.364	0.083	4.347	0.0003
URB	-0.681	0.171	-3.988	0.0008
UNEM	0.705	0.529	1.332	0.1984
Constant	62.751	6.978	8.992	0.0000

R-sq	0.900	Mean	18.311
Adj. R-sq.	0.879	S.D.	3.3714
S.E. reg	1.172	Akaike info criterion	3.338
Sum sq. res.	26.090	Schwarz criterion	3.583
Log likelihood	-35.057	Hannan-Quinn criter.	3.403
F-stat	42.834	Durbin-Watson stat	1.672
Prob(F-stat)	0.000		

Source: Authors' Compilation (2022).

The impact of urban development (or urbanization) has a negative coefficient of -0.681 and 1% of statistical significance. Such negative effect can manifest if there are no concomitant efforts at providing the requisite infrastructural facilities to cope with the urban boom. Otherwise, rising urbanization rates can lead to urban sprawl, which in turn can bring about higher energy use, traffic congestion which are associated with environmental pollution (Effiong, 2018). Turning to unemployment, the impact is positive with a coefficient of 0.705 though insignificant. This means that unemployment may not pose significant threat to the realization of sustainable development in India. Given that unemployment is the country is relatively low, policy efforts should concentrate on how to ensure non-acceleration of the unemployment over the medium to long-term. Overall, the results for India suggest that agricultural activities, inflation and urbanization are causal factors that can affect sustainable development in India.

3.2 REGRESSION RESULTS FOR AUSTRALIA

Turning to the results for Australia which is presented below in Table 4, on the basis of statistical significance only unemployment rate is significant whereas agricultural output, inflation and urbanization does not play significant role in influencing sustainable development. This result is understandable from the perspectives that Australia is an advanced and developed country with significant technological advancement and innovation across most facets of economic activities. For instance, inflation is low and within manageable range, urban centres are well developed with appropriate infrastructural facilities sufficient to meet to the teeming demand of the urban population, and agricultural output accounts for a negligible fraction of total economic activities. Moreover, it is important to note that the signs of the parameter estimates are similar to those of India above and Canada below. The positive effect of unemployment suggest that it may induce the need to create decent jobs. This is because sustainable development can only be useful if it leads to an improvement in the welfare of the people and lead to creation of jobs. Higher employment can lead to sustainable economic growth in the long-run (Siddikee, etal., 2022).

Table 4. Regression for Australia

Var	Coef	Std. Error	t-Stat	Prob.
AGR	-7.382	4.424	-1.668	0.1391
INF	1.850	1.742	1.062	0.3234
URB	-2.417	1.823	-1.325	0.2265
UNEM	5.512	2.556	2.156	0.0680
Constant	193.892	158.464	1.223	0.2607
R-sq	0.761	Mean var		7.202
Adj. R-sq	0.727	S.D. var		1.316
S.E.	1.314	Akaike info criterion		3.568
Sum sq	32.849	Schwarz criterion		3.813
Log likelihood	-37.821	Hannan-Quinn criter.		3.633

F-stat	41.015	Durbin-Watson stat	1.613
Prob(F-stat)	0.000		

Source: Authors' Compilation (2022).

3.3 REGRESSION RESULTS FOR CANADA

For Canada, the empirical results are presented in Table 5 below. Interestingly, the impact of agricultural output and inflation are statistically insignificant implying that these factors may not be of much important for achieving sustainable development. In the context of developed economy such as Canada the results are plausible given the small contribution of agriculture to total output and also the fact that inflation has been relatively low over time. However, the empirical estimates suggest that urban development and unemployment may have result in unsustainable development. For instance, urbanization has a negative effect with coefficient estimate of -1.545 and statistically significant at 1 percent similar to unemployment which has a coefficient estimate of -0.862. as already mentioned in the results for India, rapid urbanization if not accompanied with properly planning and provision of requisite infrastructures can lead to unsustainable activities and environmental pollution which are threats to achieving sustainable development. Likewise, sustainable development requires the provision of decent jobs opportunities and employment which can enable people adopt pro-environment consumption behaviours.

Table 5. Regression result for Canada

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGR	-2.367	2.110	-1.121	0.276
INF	1.037	0.602	1.722	0.101
URB	-1.545	0.518	-2.982	0.008
UNEM	-0.862	0.438	-1.966	0.064
Constant	141.197	45.593	3.097	0.006
R-sq	0.566	Mean var		8.130
Adj. R-sq	0.474	S.D. var		2.176
S.E.	1.578	Akaike info criterion		3.933
Sum sq	47.312	Schwarz criterion		4.179
Log likelihood	-42.199	Hannan-Quinn criter.		3.998
F-stat	6.183	Durbin-Watson stat		1.774
Prob(F-statistic)	0.002			

Source: Authors' Compilation (2022).

4. CONCLUSION

Achieving sustainable development remains the ultimate outcome especially for developing countries. India is definitely not an exception and given the current progress towards achieving the SDG targets requires concerted and coordinated efforts through various programmes and policies. On the basis of the empirical analysis to explore the causal factors of sustainable development in India with specific focus on agriculture, inflation, urban development and unemployment, the findings on the using a regression framework and data for the period 1997 to 2020 suggest that agriculture, inflation and urban development are pertinent and key for achieving sustainable development in India. For example, sustainable agricultural activities must encompass the adoption of ecologically friendly tools and technology to maximize agricultural output while minimizing possible adverse environmental impacts. The centrality of agriculture in India

means that it remains important for ensuring food sufficiency and security as well as decent job employment. On the other hand, maintaining single digit inflation is critical for sustained economic growth and macroeconomic stability.
Finally, prioritizing sustainable urban development and transformation will be another key factor towards realizing sustainable development. This is because with the expected surge in urban population by 2030, there is urgent need for the provision of urban infrastructural and social amenities such as housing, clean water and waste treatment and management. Overall, urban renewal should be given top priority in order to curb future surge in ecological footprints of cities and material intensity. This will resolve famers being undermined by middle men in sabotaging the inflation of agricultural produce.

CONFLICT OF INTERESTS

None

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None

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