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The Impact of Financial Sustainability in Stimulating Sustainable Development in Iraq

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Abstract

The imperative of sustainable development (SD) has gained international prominence in response to widespread environmental degradation, underscoring the need for scholarly attention. Consequently, this research endeavours to investigate the influence of financial sustainability indicators, including public debts, tax revenue, gross domestic product (GDP) growth, and industrialization, on the trajectory of sustainable development in Iraq. Moreover, inflation is incorporated as a control variable to refine the predictive model of SD. Drawing upon data from the World Development Indicators (WDI) spanning from 1990 to 2022, the study employs the Dynamic Autoregressive Distributed Lag (DARDL) model to analyse the interconnections among these variables. The findings reveal a positive correlation between public debts, tax revenue, GDP growth, inflation, industrialization, and sustainable development in Iraq. This study offers valuable insights for policymakers seeking to foster sustainable development through strategic interventions in financial sustainability domains.

Keywords: Financial Sustainability, Public Debts, Tax Revenue, GDP Growth, Industrialization, Sustainable Development, Inflation.

1. Introduction

The attainment of success is not merely a singular endeavour but necessitates sustained and continuous efforts. Furthermore, the intensity and duration of exertion increase to uphold this state of success over an extended period. Similarly, the transition from conventional development paradigms to the principles of SD is gaining prominence globally. Over time, the significance of SD is burgeoning precipitously, propelled in part by the dynamic shifts in the global landscape spurred

by financial crises. Both developing and developed economies alike are steadfastly striving to realize the objectives of SD, recognizing its pivotal role in fostering national prosperity (Ruggerio, 2021). SD epitomizes a developmental approach that aligns with contemporary imperatives, safeguarding the capacity of future generations to meet their needs by mitigating the depletion of natural resources. Traditionally, the pursuit of SD has been driven by a singular imperative, often resulting in a narrowing of focus and a concomitant degradation of holistic outcomes. Consequently, the persistence in unsustainable development trajectories portends increasingly dire consequences. SD entails a comprehensive action plan aimed at facilitating individuals or nations in achieving sustainability across all resource-utilizing activities (Litvinenko, Tsvetkov, & Molodtsov, 2020).

Iraq stands as a prominent economic force in the Western Asian region, boasting a storied history marked by various conflicts. Notably, the abundance of natural resources, particularly oil, has historically played a central role in the country's geopolitical landscape, often serving as a catalyst for armed conflicts and subsequent economic downturns (Jaff, Al-Kake, & Hamawandy, 2021). In the past two decades, Iraq has exhibited a burgeoning interest in Sustainable Development (SD) owing to the imperative to diversify its economic base and reduce dependency on oil revenues, driven in part by global economic shifts. Undoubtedly, this shift in focus has encountered formidable obstacles, impeding the formulation of coherent SD strategies (Thabit, Aldabbagh, & Ibrahim, 2019; Yawer, Bakr, & Fathi, 2023). Thus, the primary objective of this study is to elucidate the key challenges confronting Iraq's SD trajectory and offer insights into the pivotal role of financial considerations such as GDP growth, tax revenues, and public debt, along with proposing recommendations to surmount these obstacles.

This study addresses several literature gaps, particularly in the context of Iraq, pertaining to the examination of the interrelationships among Sustainable Development (SD), public debt, tax revenues, GDP growth, industrialization, and inflation. Firstly, Georgescu (2014) investigated the association between public debt and SD, a facet which this study extends by incorporating additional variables such as tax revenues, GDP growth, industrialization, and inflation within the Iraqi context.

Similarly, Xu et al. (2022) explored the nexus between tax revenues and SD, which this study further investigates by integrating variables like public debt, GDP growth, industrialization, and inflation in the Iraqi context. Additionally, Zaman and Abd-el Moemen (2017) this study by incorporating variables such as public debt, tax revenues, industrialization, and inflation within Iraq. Furthermore, Udemba and Keleş (2022) investigated the link between industrialization and SD, a theme which this study expands upon by incorporating variables such as public debt, tax revenues, GDP growth, and inflation within Iraq. Finally, Febrianti and Indriyati (2020) explored the association of inflation with SD, a perspective which this study extends by incorporating variables such as public debt, GDP growth, and industrialization within Iraq. Beyond these specific gaps, the significance of this study is underscored by its exploration of the importance of SD for nations, aiming to enhance the standard of living for their citizens and secure a prosperous future for subsequent generations. Moreover, this study contributes to the existing literature on sustainability, thereby enriching the discourse for future scholars. Furthermore, it serves as a practical guide for professionals engaged in SD-related endeavours.

2. Literature Review

Various factors contribute to the prosperity of a nation, among which public debt holds significant sway. The magnitude of public debt serves as a critical determinant of SD prospects. In this vein, the correlation between public debt and SD was investigated by Yang et al. (2022), who sampled data spanning seven years from 2012 to 2019. Employing the MK method, the study analysed the data and found a discernible connection between public debt and SD, highlighting the pivotal role of public debt in advancing SD objectives. Additionally, economic growth emerges as a salient indicator of SD. Similarly, Georgescu (2014) examined the interplay among public debt, sovereign risk, and SD, utilizing debt ratios to provide a comprehensive overview. Through structural analysis, the study unveiled a notable association between public debt and SD, underscoring the pivotal role of public debt in fostering SD, alongside the significance of sovereign risk. Moreover, economic development stands out as a crucial SD indicator. In a related context, Kim, Ha, and Kim (2017)

explored the nexus between public debt, corruption, and SD within the framework of economic development. A dataset spanning 24 years, commencing from 1990 and concluding in 2014, was selected for analysis in the present study. Utilizing the Generalized Method of Moments (GMM), the study scrutinized the data, revealing a significant correlation between public debt and Sustainable Development (SD). Moreover, public debt emerged as a catalyst for corruption, thereby exerting a detrimental influence on SD within the framework of economic development. Furthermore, the linkage between public debt and SD was investigated by Ojukwu, Ibanichuka, and Egbe (2021) through an examination of a dataset covering 49 years, from 1970 to 2019. Employing the Vector Error Correction (VEC) method, the study delved into the nexus between public debt and SD, particularly focusing on Nigeria. The findings underscored a robust association between public debt and SD in the Nigerian context. Specifically, domestic debt in Nigeria exhibited a pronounced positive impact on primary school enrolment, whereas its effects on life expectancy at birth and gross domestic product per capita were negative and statistically insignificant. Conversely, external debt in Nigeria demonstrated a negligible and adverse impact on primary school enrolment, lacked discernible influence on life expectancy at birth, and exhibited a modest positive effect on gross domestic product per capita. Consequently, it can be inferred that domestic debt, among the components of public debt, plays a pivotal role in advancing SD objectives in Nigeria.

Governments globally strive to achieve fiscal equilibrium, seeking avenues to augment revenue, with taxation serving as a pivotal source. Tax revenue allocation contributes to societal welfare and fosters SD. Wang et al. (2023) investigated the relationship between environmental tax revenue and SD over a 19-year period from 2000 to 2019, utilizing the LMDI method. Their findings reveal a significant nexus between tax revenues and SD, advocating for heightened revenue generation to bolster SD objectives. Similarly, Ajeigbe, Ganda, and Enowkenwa (2023) explored the interplay among sustainable tax revenue, expenditures, and SD across various African economies. Analysing a decade of data from 2010 to 2020 using the GMM method, they identified a pronounced nexus between tax revenues and SD. Moreover, they underscored the positive impact of increased tax revenue, grants, and diverse income

streams on economic performance and individual welfare. The study emphasizes that diversified funding sources contribute to financial stability, foster SD, and bolster economic growth in these nations.

Egbunike et al. (2018) conducted an investigation into the relationship between tax revenue and SD within the context of economic development. Employing data spanning 14 years from 2003 to 2017 and employing the ARDL method, their study elucidated a significant nexus between tax revenues and SD. The findings underscore the imperative for Nigeria to strategize methods to enhance revenue generation to realize SD objectives effectively. Additionally, Omodero (2021) delved into the correlation among oil resources, tax revenue, and SD. Analysing a 16-year dataset from 2003 to 2019 utilizing the Multiple Regression (MR) method, the study revealed a significant nexus between tax revenues and SD. Notably, the study highlighted the limited impact of crude oil wealth on Nigeria's socioeconomic advancement. Moreover, both exchange and inflation rates significantly impede the nation's social progress. Intriguingly, tax income emerged as a statistically significant factor favourably influencing societal development.

The attainment of SD holds paramount importance for national prosperity, with the standard of living intricately linked to a country's development trajectory. The optimal utilization of natural resources is pivotal for economic growth, thereby positively influencing SD outcomes. Abbasi et al. (2021) investigated the nexus among natural resources, economic growth, and carbon emissions in the context of SD. Analysing data spanning 49 years from 1970 to 2019 via the Autoregressive Distributed Lag (ARDL) method, their study revealed a significant correlation among these factors, all of which substantially contribute to SD achievement. Moreover, Zaman and Abd-el Moemen (2017) explored the relationship between energy consumption, carbon emissions, and economic development from an SD perspective. Utilizing a 40-year dataset from 1975 to 2015 and employing the Environmental Kuznets Curve (EKC) hypothesis method, their study unveiled a nexus among these variables, elucidating their collective contribution to SD attainment. Economic growth serves as a crucial indicator signalling progress towards SD.

Similarly, Szaruga et al. (2021) examined the relationship between energy

provision and economic development within the framework of SD. Utilizing a dataset spanning six years from 2012 to 2018 and employing the Seasonal Extraction of Time Series (SEATS) method, their study revealed a significant nexus between energy provision and economic development, leading to advancements in SD.

Furthermore, Pradhan et al. (2021) investigated SD through the interconnection among financial inclusion, Information and Communication Technology (ICT) development, and economic progress, focusing on the Indian population. Analysing data covering 27 years from 1991 to 2018 through regression analysis, their study highlighted the critical importance of financial inclusion and ICT development in fostering SD.

There exist various determinants influencing SD, with industrialization being a crucial factor. Udemba and Keleş (2022) examined the interrelation among urbanization, industrialization, and Foreign Direct Investment (FDI) in the context of SD attainment. Employing a dataset spanning 48 years from 1970 to 2018 and utilizing the Autoregressive Distributed Lag (ARDL) analysis method, their study revealed that urbanization, industrialization, and FDI significantly contribute to SD, particularly in the context of Turkey. Furthermore, Sadorsky (2014) investigated the implications of SD in the nexus among urbanization, industrialization, and energy usage. Analysing data covering 37 years from 1971 to 2008 using the ARDL analysis method, the study unveiled that income growth leads to increased energy consumption over both short and long terms. The study further elucidated that industrialization and economic growth strategies aimed at boosting income exacerbate energy consumption. As fossil fuels currently dominate energy provision in emerging nations, strategies fostering economic expansion and industrialization may pose challenges to SD objectives.

Inflation stands as a pivotal factor within any economy, assuming heightened importance due to its direct impact on the community through fluctuations in prices. Its ramifications extend significantly to the standard of living, thus posing challenges to Sustainable Development (SD) objectives. Febrianti and Indriyati (2020) delved into the interplay among inflation, poverty, and investment in achieving SD. Utilizing a seven-year dataset from 2009 to 2016 and employing the MLR analysis method, their study revealed that poverty significantly affected SD in West Kalimantan Province,

while inflation and investment showed no such impact individually. However, the SD of West Kalimantan province was influenced by poverty, investment, and inflation collectively.

Similarly, Roncaglia de Carvalho, Ribeiro, and Marques (2018) explored the relationship between inflation and SD within the context of Kalimantan Province. Analysing a ten-year dataset from 2001 to 2011 using the MLR analysis method, their findings indicated a negative connection between SD and inflation. Additionally, the study identified a weak and inverse relationship between inflation persistence and SD.

3. Research Methods

The research investigates the influence of public debts, tax revenue, GDP growth, inflation, and industrialization on SD in Iraq. Data for the analysis was sourced from the WDI spanning from 1990 to 2022. The study formulated the following equation to model the relationship.

$$SD_t = \alpha_0 + \beta_1 PD_t + \beta_2 TR_t + \beta_3 GDPG_{it} + \beta_4 IND_t + \beta_5 INF_t + e_t \quad (1)$$

Where;

SD = Sustainable Development

t = Time Period

PD = Public Debt

TR = Tax Revenue

GDPG = GDP Growth

IND = Industrialization

INF = Inflation

The study employed SD as the principal variable, assessed through CO2 emissions (metric tons per capita). Furthermore, financial sustainability served as the predictor, gauged by central government debt as a percentage of GDP, total tax revenue as a percentage of GDP, annual GDP growth rate, and the proportion of Industry value added to GDP. Additionally, a control variable, inflation, measured by consumer prices (annual %), was included in the analysis. Table 1 delineated these measurements.

Table 1: Variables and Measurements.

S#	Variables	Measurement	Sources
01	Sustainable Development	CO2 emissions (metric tons per capita)	WDI
02	Public Debt	Central government debt, total (% of GDP)	WDI
03	Tax Revenue	Tax revenue (% of GDP)	WDI
05	GDP Growth	GDP growth (annual percentage)	WDI
07	Industrialization	Industry value added (% of GDP)	WDI
06	Inflation	Inflation, consumer prices (annual %)	WDI

The study scrutinizes the particulars of the variables through descriptive statistics. Additionally, it assesses the correlations using a correlation matrix. Furthermore, it conducts unit root tests among the variables using the Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) tests, with the equations provided as Equation 2, 3 and 4.

$$d(Y_t) = \alpha_0 + \beta t + \gamma Y_{t-1} + d(Y_t(-1)) + \varepsilon_t \quad (2)$$

Furthermore, the method proposed by Westerlund and Edgerton (2008) was employed to verify the co-integration in the model. The equations for the co-integration approach are delineated.

$$LM_{\varphi}(i) = T\hat{\varphi}_i\,(\hat{r}_i/\hat{\sigma}_i) \quad (3)$$

$$LM_{\tau}(i) = \hat{\varphi}_i/SE(\hat{\varphi}_i) \quad (4)$$

Furthermore, the interrelations among the variables under examination were analysed using the ARDL model. This methodology is regarded as optimal when certain constructs exhibit stationarity at I(0) while others display stationarity at I(1) (Zaidi & Saidi, 2018). Additionally, the ARDL model was employed to mitigate the impacts of heteroscedasticity and autocorrelation on the outcomes (Nazir, Nazir, Hashmi, & Ali, 2018). The equation is outlined below.

$$\Delta SD_t = \alpha_0 + \sum\delta_1\Delta SD_{t-1} + \sum\delta_2\Delta PD_{t-1} + \sum\delta_3\Delta TR_{t-1} + \sum\delta_4\Delta GDPG_{t-1} + \sum\delta_5\Delta IND_{t-1} + \sum\delta_6\Delta INF_{t-1} + \varphi_1 SD_{t-1} + \varphi_2 PD_{t-1} + \varphi_3 TR_{t-1} + \varphi_4 GDPG_{t-1} + \varphi_5 IND_{t-1} + \varphi_6 INF_{t-1} + \varepsilon_t \quad (5)$$

The study employed the DARDL model to examine the interconnections among the variables. Furthermore, this approach was established by Jordan and Philips (2018) and addresses certain aspects not encompassed by the ARDL framework. Equation 6 represent the DARDL model.

$$\Delta SD_t = \alpha_0 + \sum\delta_1\Delta SD_{t-1} + \sum\delta_2\Delta PD_t + \sum\delta_3\Delta PD_{t-1} + \sum\delta_4\Delta TR_t + \sum\delta_5\Delta TR_{t-1} + \sum\delta_6\Delta GDPG_t + \sum\delta_7\Delta GDPG_{t-1} + \sum\delta_8\Delta IND_t + \sum\delta_9\Delta IND_{t-1} + \sum\delta_{10}\Delta INF_t + \sum\delta_{11}\Delta INF_{t-1} + \varepsilon_t \quad (6)$$

4. Research Findings

The results indicate that the mean value of SD was 3.734 percent, Public Debt (PD) was 28.236 percent, and Tax Revenue (TR) was 1.183 percent. Additionally, the findings reveal that the mean value of Gross Domestic Product Growth (GDPG) was 6.082 percent, Industrialization (IND) was 60.391 percent, and Inflation (INF) was 49.252 percent. Table 2 presents these statistical measures.

Table 2: Descriptive Statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
SD	32	3.734	0.680	2.552	5.325
PD	32	28.236	2.321	27.188	35.863
TR	32	1.183	0.561	0.8730	2.687
GDPG	32	6.082	20.066	-64.047	53.382
IND	32	60.391	10.296	39.904	84.796
INF	32	49.252	108.473	-16.117	448.500

Furthermore, the study conducted a correlation analysis using a correlation matrix. The results revealed a positive association between public debts, tax revenue, GDP growth, inflation, and industrialization with SD in Iraq. Table 3 presents these statistical findings.

Table 3: Matrix of Correlations.

Variables	SD	PD	TR	GDPG	IND	INF
SD	1.000					
PD	0.217	1.000				
TR	0.203	0.894	1.000			
GDPG	0.311	-0.116	-0.109	1.000		
IND	0.017	-0.373	-0.460	0.180	1.000	
INF	0.376	-0.202	-0.242	-0.114	-0.038	1.000

Moreover, the study conducted unit root tests among the variables using the PP and ADF tests. The results revealed that SD, PD, TR, and INF are stationary at the level, while GDPG & IND are stationary at the first difference. Table 4 presents these statistical outcomes.

Table 4: Unit Root Test.

ADF			PP	
Series	Level	First Difference	Level	First Difference
SD	-2.009***	------	-2.888***	------
PD	-2.002***	------	-2.091***	------
TR	-2.000***	-----	-3.110***	------
GDPG	------	-4.002***	------	-4.622***
IND	------	-4.291***	------	-4.300***
INF	-3.101***	------	-3.202***	------

Furthermore, the investigation employed the method proposed by Westerlund and Edgerton (2008) to examine co-integration within the model. The findings revealed that the p-values were below 0.05 and the t-values exceeded 1.96, indicating the presence of co-integration. Table 5 presents these statistical results.

Table 5: Co-Integration Test.

Model	No Shift		Mean Shift		Regime Shift	
	Test Stat	p-value	Test Stat	p-value	Test Stat	p-value
LM_{τ}	-3.019	0.001	-3.001	0.003	-4.394	0.000
LM_{φ}	-3.201	0.002	-3.209	0.002	-4.098	0.000

The study utilized the DARDL model to explore the relationships among the variables. The findings revealed a positive correlation between public debts, tax revenue, GDP growth, inflation, and industrialization with SD in Iraq. Table 6 presents these statistical results.

Table 6: Dynamic ARDL Model.

Variable	Coefficient	t-Statistic	Prob.
ECT	-3.893***	-5.784	0.000
PD_{t-1}	4.844***	4.302	0.000
PD	1.950**	2.102	0.020
TR_{t-1}	2.103**	2.193	0.018
TR	3.201***	5.409	0.000
$GDPG_{t-1}$	3.804***	4.302	0.000
GDPG	4.320***	3.743	0.002
IND_{t-1}	2.102**	2.126	0.019
IND	2 .321**	2.323	0.012
INF_{t-1}	3.201***	5.784	0.000
INF	3.492***	5.320	0.000
Cons	3.888***	4.903	0.000

R square=59.098 Stimulation = 5000

5. Discussions

The study delves into the intricate interplays among various economic indicators, including GDP growth, inflation, public debt, tax revenue, and industrialization. Given Iraq's tumultuous history marked by prolonged conflicts and political instability, comprehending the nuances of financial sustainability becomes imperative for fostering sustainable long-term growth. A focal point of the study lies

in public debt, which has emerged as a significant concern for Iraq's economy. As highlighted by Oo (2019), excessive public debt poses a threat to economic growth by diverting funds away from essential expenditures in healthcare, education, and infrastructure. The research investigates the correlation between public debt management and SD, emphasizing the importance of effective debt reduction strategies to allocate funds towards development-related initiatives. Furthermore, the study scrutinizes the impact of inflation within the context of Iraq's developmental trajectory. Research by Pereira et al. (2022) and Lim et al. (2022) underscores that high inflation rates can diminish individuals' purchasing power, leading to social unrest and hindering efforts towards sustainable development. Consequently, the paper explores the nexus between inflation and SD, underscoring the significance of maintaining price stability through prudent economic and monetary policies. Moreover, the research assesses the role of tax revenue in contributing to SD. According to Alshubiri, Elheddad, and Alfar (2023), a well-structured tax system can enhance the overall welfare of the populace by facilitating the necessary funding for infrastructure and public services. The study evaluates the efficacy and equity of Iraq's tax system and offers recommendations for potential reforms aimed at improving revenue collection while ensuring fairness.

The study focuses on GDP growth as a key indicator of economic development and health. It explores the link between inclusive and sustained GDP growth and financial sustainability strategies, highlighting the importance of stable economic conditions for attracting investments and fostering economic activity in Iraq. The findings offer policymakers valuable insights into implementing policies that promote both accelerated economic growth and its long-term sustainability. Additionally, the research underscores the significance of industrialization in economic growth, emphasizing its contribution to value addition, technological transfer, and employment generation. By examining how financial sustainability policies can support industrialization, the study contributes to creating a robust and diversified economic landscape in Iraq, particularly pertinent in the post-conflict environment. Through elucidating the correlation between industrialization and financial sustainability, policymakers are provided with guidance on effectively managing

challenges and leveraging opportunities in this transformative phase.

The analysis is further complicated by Iraq's unique geopolitical and historical context, which presents persistent challenges to the country's endeavours towards economic reconstruction and diversification. The findings underscore the importance of adopting a comprehensive strategy for financial sustainability, encompassing both long-term growth strategies and immediate economic stabilization measures. To effectively address Iraq's complex challenges, this study advocates for a holistic policy framework that recognizes the interdependence of public debt management, inflation mitigation, tax reforms, GDP growth, and industrialization. Moreover, the research explores the potential role of foreign assistance and collaboration in supporting Iraq's sustainable growth and financial stability. It examines how cooperation with regional partners, donor nations, and international organizations can bolster Iraq's financial resilience within the globalized economic landscape. The findings emphasize the necessity of transparent governance frameworks, effective aid utilization, and strategic partnerships to navigate the complexities of post-conflict recovery and economic advancement.

6. Implications

The study yields broad and varied implications. Firstly, it underscores the critical need for targeted policy interventions to address the pressing issue of public debt. Implementing effective debt reduction strategies and enhancing financial oversight are essential to redirect funds towards crucial developmental endeavours such as infrastructure, healthcare, and education. Additionally, the findings stress the importance of maintaining price stability through prudent monetary policy, with a particular emphasis on the central bank's role in curbing inflationary pressures. Moreover, the study suggests implications in the realm of tax reform, advocating for an equitable and efficient tax system that not only bolsters government revenue but also ensures fair distribution. The focus on promoting industrialization and GDP growth highlights the necessity of fostering an environment conducive to private sector expansion and foreign investment to diversify the economy and create sustainable job opportunities in the long term. Furthermore, the study emphasizes the

importance of global collaboration, emphasizing the need for transparent governance frameworks and strategic alliances to maximize external support for Iraq's sustainable development efforts. Overall, the study underscores the importance of a comprehensive, integrated approach to financial sustainability, offering valuable insights for policymakers seeking to advance Iraq's progress towards a robust and sustainable economy in the future.

7. Limitations

While the study provides valuable insights, it is important to recognize its limitations. The validity and reliability of the data sources utilized are crucial, and any shortcomings in these sources could undermine the strength of the conclusions. Additionally, the dynamic and unstable nature of economic conditions, especially in post-conflict environments, may impose constraints on the research. The findings may also lack generalizability to other contexts, as the study may not fully capture the complexities of local variables influencing economic success in Iraq. Furthermore, uncertainties surrounding geopolitical developments and global economic trends may pose challenges in predicting Iraq's future economic trajectory. It's worth noting that the study's focus on numerical indicators may overlook qualitative aspects of SD, such as natural and social integration.

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