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Article

Can the Resource Curse for Well-Being Be Morphed into a Blessing? Investigating the Moderating Role of Environmental Quality, Governance, and Human Capital

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Abstract: One of the most pressing global concerns is ensuring high levels of human well-being without overburdening natural resources. The impact of natural resource abundance on the economy's monetary dimensions has long been controversial, with researchers debating whether it is a blessing or a curse. Recently, focus has shifted to its impact on non-monetary attributes (i.e., human well-being), with conflicting empirical evidence with respect to existence of the resource curse. However, studies on the indirect impact of natural resources on well-being are rare. This inquiry extends previous research by investigating the effect of natural resource abundance on human well-being and the underlying mechanisms that may clarify the convoluted link between the two variables in the UAE from 1990 to 2019. The novel contribution of this research is the evaluation of the resource curse concept from a broader perspective by considering how resource endowments indirectly affect human well-being via environmental quality, human capital, and governance channels. To this end, in the present study, we utilized the autoregressive distributed lag (ARDL) technique for cointegration and deployed the vector error correction model (VECM) for causality investigation. The ARDL results indicate cointegrated variables with diverse integration orders, signifying a long-term bond. Furthermore, the outcomes endorse the notion that resource endowment is inversely related to well-being as calibrated by the Human Development Index (HDI), corroborating the "Resource Curse Concept", whereby large resource endowments impede human well-being. In terms of transmission channels, natural resources improve human well-being through environmental quality. In contrast, both human capital and governance have insignificant impacts on the influence of natural resources on well-being. Therefore, resource endowments improve human well-being as long as they do not harm the environment. The present analysis also resulted in the development of a feedback hypothesis between natural resource endowments and human well-being. The findings of this study provide several insights into the control of the direct and indirect adverse effects of natural resources on human well-being, the foremost being the provision of incentives for low-carbon energy use, reducing energy intensity, and assisting businesses engaged in R&D to minimize the cost of employing renewables, as well as investments in low-carbon technologies/cleantech and environmental technologies.

Keywords: resource curse; well-being; governance; human capital; environmental sustainability; UAE

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1. Introduction

"The mismanagement of natural assets could ultimately undermine human development" [1]. For decades, natural-resource-rich economies have been recognized to have an over resource-poor peers, providing them with more development opportunities [2]. Nevertheless, since the 1980s, awareness of the adverse repercussions of resource richness has increased. Ref. [3] identified the "Natural Resources Curse", a phenomenon whereby countries with ample resources endowments experience slower development than those with scant natural resources. A considerable amount of literature has since emerged debating whether natural resources (NRs) are a blessing or a burden. However, empirical research on the occurrence of resource curses has yielded contradictory and inconsistent results.

On one hand, several studies have confirmed the resource curse theory. According to [4], abundant natural capital curtails growth prospects for most developing economies. Another recent wave of evidence reinforced this claim by suggesting that over-reliance on NRs stifles economic growth potentials, effectively turning resource endowments into a curse [5–8]. On the other hand, a great deal of research has refuted the resource curse concept. For instance, ref. [9] revealed a positive association between resource availability and national growth in three Gulf states; others have reported similar findings [8,10]. The conversion of NR into a "curse" or "blessing" cannot be judged solely by its effect on economic growth, as most prior studies espoused [11]. Alternatively, the influence of NR abundance on non-monetary development outcomes, such as human well-being (HW) is attracting increasing attention in political and academic circles, with mixed results. The availability of NRs is thought, on the one hand, to shield HW by elevating people's living standards [11–13]. However, on the other hand, a research survey suggests that abundant NRs are detrimental to HW [14,15]

A growing belief holds that NRs do not obstruct development on their own; however, they may cause some discrepancies that operate as transmission conduits to thwart economic advancement [16]. A vast body of literature has identified human capital (HC) as a channel to convert the NR curse into a blessing with respect to development [17,18]. However, others have highlighted the importance of institutional quality (IQ), claiming that poor IQ caused by NR abundance is responsible for poor economic performance [11,19]. Furthermore, environmental efficiency has been shown to modulate the impact of NRs on HW [20,21].

The pursuit of sustainable development goals (SDGs) has cast light on the significance of effective NR conservation and management [22]. Moreover, SDG3 asserts that "ensuring healthy lives and promoting well-being for all ages is crucial to sustainable development". Despite widespread recognition of the importance of human well-being in attaining sustainable development, research on the impact of NRs on HW is limited. Consequently, the aim of this investigation is to bridge this literature gap by evaluating the direct and indirect impacts of NRs on HW.

The United Arab Emirates (UAE) became a Gulf Cooperation Council (GCC) federal entity in 1971. The country is brimming with natural wealth and is known as a hydrocarbon economy. Since its discovery, oil has catalyzed the country's exports and foreign currency and is the primary driver of government revenues used to fund infrastructure and other public goods. The UAE generated 165.6 million tons of oil in 2020, accounting for an estimated 5.6% of worldwide oil reserves [23]. However, despite the country's successful use of its resource endowments for economic advancement and improved well-being, some manifestations of the resource curse may persist [16,24]. Therefore, the UAE faces a critical policy challenge in determining how to thrive within its ecological boundaries. In other words, the country is faced with the challenge of improving the well-being of its citizens in a way that does not compromise its natural resources.

Notwithstanding their growing importance, the effects of resource endowments on human well-being have received insufficient empirical attention. The underlying mechanisms that connect them are further neglected. Against this backdrop, the primary focus of this paper is to supplement previous the contradictory findings of previous research by examining other underlying reasons that may explain and elucidate the convoluted link between NRs and HW. The study fills a research gap by assessing the effects of NR dependence on HW and identifying the channels through which NR dependence impacts transfers to HW. Furthermore, we evaluate the extent to which governance, human capital, and environmental quality dictate the impact of NRs on HW. Aside from considering both the direct and indirect effects of NR, this study differs in that it examines the mixed and combined impacts of multiple conduits instead of focusing on a single one. To that end, we hypothesized that the influence of resource endowments on human well-being is primarily determined by their effects on environmental quality, governance, and human capital. The research enriches the extant body of evidence in several manners. Our analysis provides a sanely nuanced response to the study query about whether a wealth of resources helps or hinders HW. Resource richness benefits development as long as reliance on NRs does not harm environmental efficiency.

To the best of our knowledge, this is the first attempt to examine these dynamics in the UAE. In addition, the present research represents a pioneering study examining the indirect impact of NRs on HW by considering several transmission channels. Thus, the primary purpose of this study is to bridge the literature gap by answering the following questions: What is the impact of NR endowments on HW in the UAE? How is the effect of NRs on HW influenced by governance, human capital, and the environment? What are the primary channels through which NRs affect HW in the UAE? The study findings will enable us to devise policies and actions to control impact of the resource curse through primary transmission channels. Furthermore, the empirical conclusions presented herein have the potential to contribute crucial policy insights. Finally, the methodology employed in this study enables the development of many effective policy recommendations to enhance well-being while avoiding resource blight.

The remainder of this paper is arranged as follows. In the Section 1, we delve into the UAE's economy. In the Section 2, we survey existing research on the relationship between natural endowments and human well-being, as well as the moderating impact of the designated transmission channels. The Section 3 is devoted to the presentation of the data and methodological approaches. In the Section 4, we present the quantitative data, and in Section 5, we present an analysis of our findings and discussion. In the Section 6, we propose policy recommendations and suggestions for future research.

2. The UAE Economy: Stylized Facts

In 1971, the UAE was formed as a coalition of seven emirates in the GCC region. The country boasts the Middle East's second-largest economy, trailing Saudi Arabia. Regarding GDP/capita, the UAE ranks second in the Middle East, behind Qatar, and 28th worldwide. However, owing to oil prices, the UAE GDP per capita growth rate has oscillated from negative to positive [25] from 1975 to 2019, as shown in Figure 1. For instance, the per capita growth rate declined by −6.135% in 2020 compared to 2019 due to a 6% drop in oil revenue [26], and a double jolt buffeted the economy: a drop in fuel prices in 2020 and declines in the services sector due to COVID-19 lockdown measures.

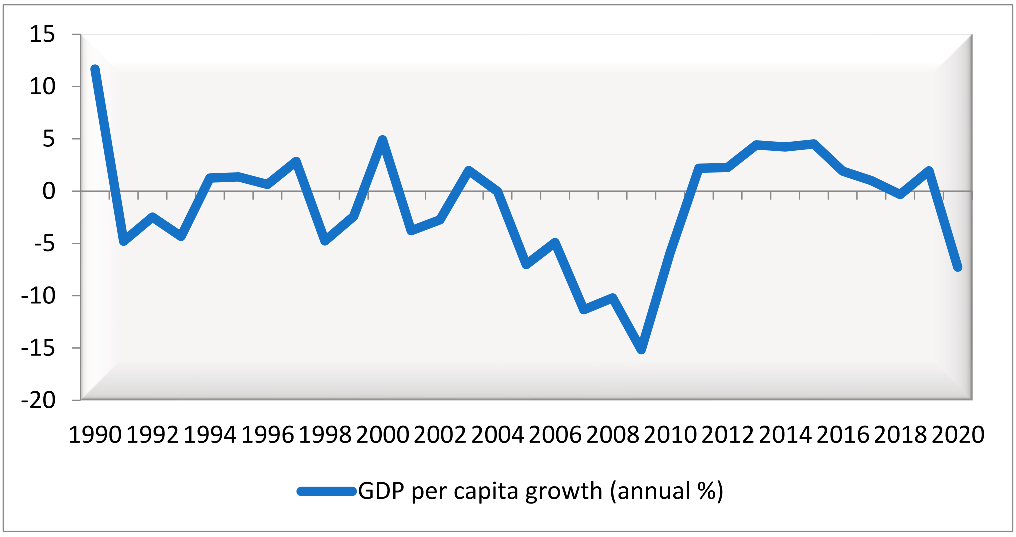

Figure 1. GDP/capita annual growth, 1990–2020. Source: [27].

Since its discovery in the early 1960s, oil has been at the heart of the UAE economy, contributing to 30% of its GDP [28]. Owing to oil revenues, the country has ascended the development ladder with few hurdles. Oil is considered the primary catalyst of exports and foreign currencies and the critical driver behind state revenues used to maintain infrastructure and other public amenities. The UAE is also a leading ally of the Organization of Petroleum Exporting Countries (OPEC). As of 2020, the country generated 165.6 million tons of oil, placing eight in proven global reserves and accounting for approximately 5.6% of global oil reserves [23]. Abu Dhabi, the country's capital and largest emirate, holds the most significant oil and gas deposits.

Figure 2 shows that the UAE is a fossil-fuel-driven economy. Hydroelectricity accounts for only 1% of overall energy usage, with other renewable sources accounting for a negligible share of energy production.

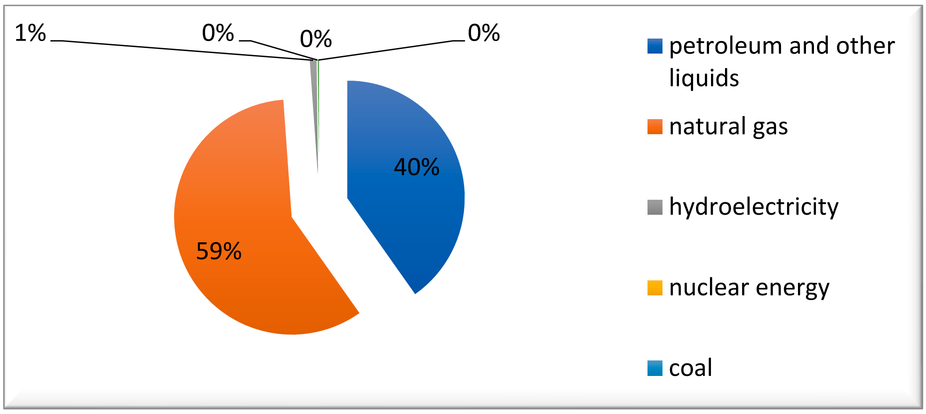

Figure 2. UAE's primary energy consumption by fuel type, 2018. Source: [29].

The UAE is OPEC's third top oil producer, trailing only Saudi Arabia and Iraq. Figure 3 outlines the UAE's production and consumption of petroleum and other liquids from 2008 to 2018. The country generates four million barrels of oil and other liquids daily, with crude oil responsible for roughly 3.1 million barrels per day and non-crude oil liquids accounting for the remainder. The per capita energy consumption of the GCC is four times higher than the global average, with the UAE being the largest energy consumer in the region [30].

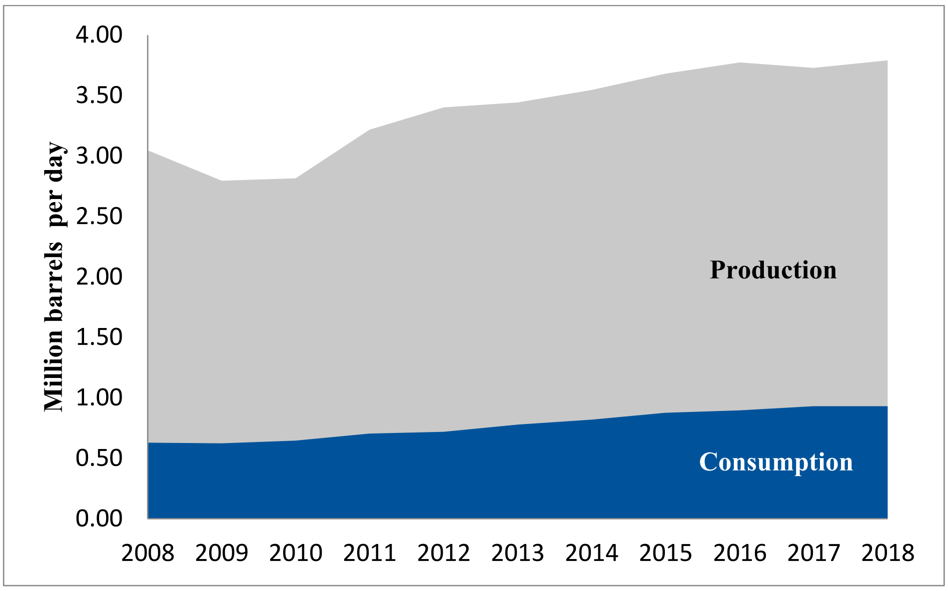

Figure 3. UAE total supply and consumption of petroleum and other liquids. Source: [29].

Moreover, the UAE holds the seventh-largest proven natural gas reserves globally, with 215 trillion cubic feet (Tcf). Figure 4 illustrates the UAE's overall energy supply by sector, with natural gas leading the market, followed by oil.

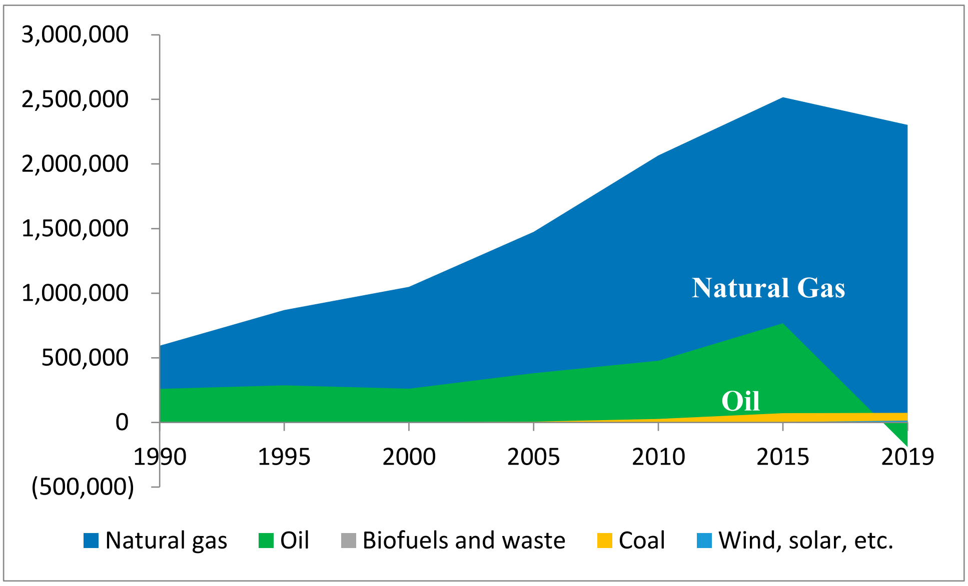

Figure 4. Overall energy supply divided by source, UAE 1990–2019. Source: [31].

Accordingly, the UAE is highly dependent on its natural resources. A proportion of 20% of the UAE's GDP (on average) was generated natural resources from 1996 to 2019, as shown in Figure 5. However, the natural resources share of GDP fell to 16.7% in 2019 compared to 30% in 2011, owing to the country's diversification efforts [32].

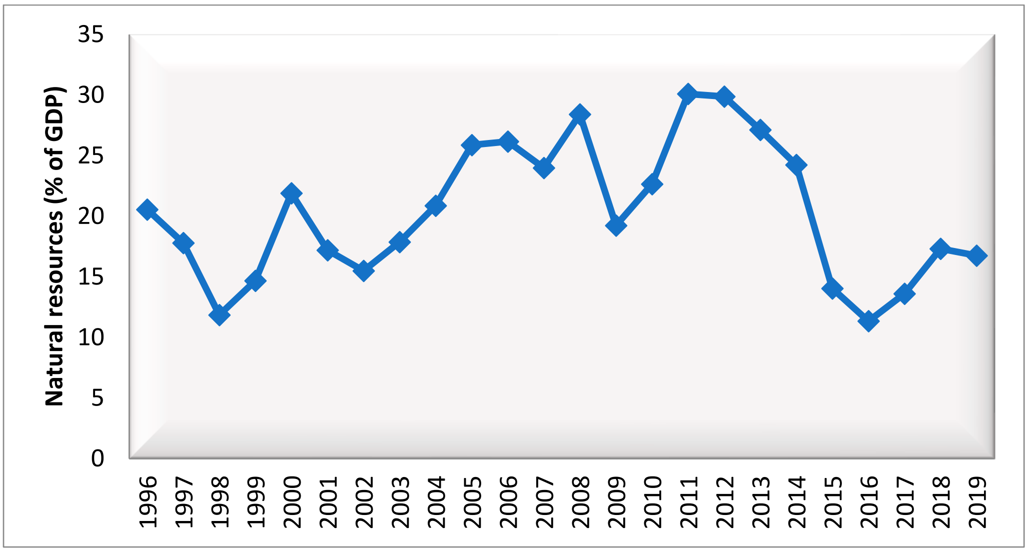

Figure 5. Natural resource rents (% of GDP) in the UAE. Source: [33].

The UAE's well-being status, as captured by the HDI continuously improved between 1990 and 2019. Figure 6 depicts an increase of 23.1%, from 0.723 to 0.890. Consequently, the UAE ranked 31st out of 189 economies, significantly higher than the average for Arab states of 0.705. A similar improvement occurred in the HDI subdimensions. Approximately 6 years have been added to life expectancy at birth, 6.5 years to schooling, and 4 years to expected education. The UAE has successfully used its natural endowments for economic development and enhanced well-being, but this does not preclude the possibility that some of the manifestations of the resource curse persist [16,24], which is the focus of the current investigation.

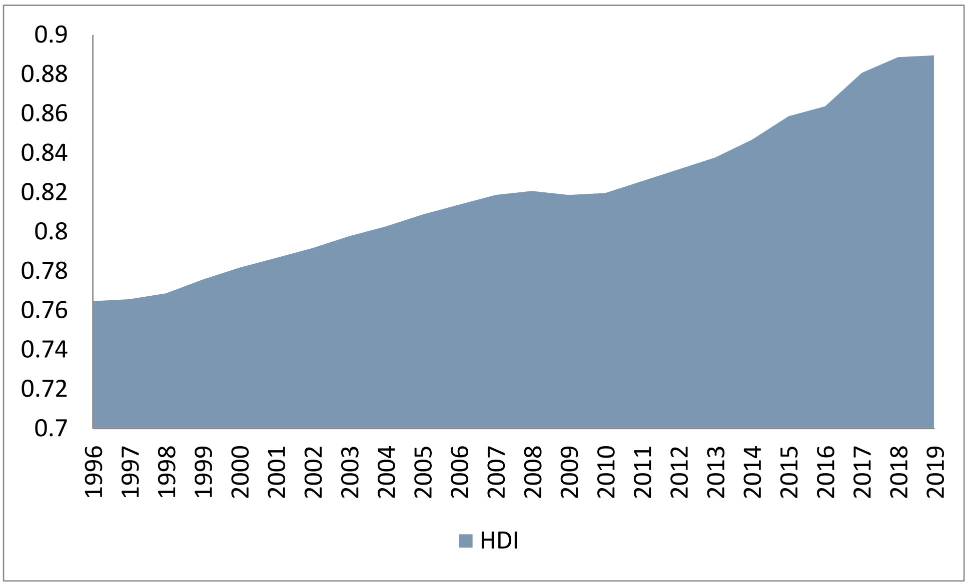

Figure 6. HDI evolution in the UAE. Source: [34].

3. Reviewing the Existing Literature

3.1. Resource Endowments and Human Well-Being Nexus

Most development research has concentrated on the monetary dimensions of development (i.e., income), with a scant emphasis on non-monetary dimensions (i.e., human well-being). Furthermore, a consensus has yet to be established with respect to how natural wealth impacts development. Ref. [35] reviewed 43 empirical studies on the influence of resource abundance on economic advancement; approximately 40% of the reviewed studies reported adverse effects, 40% reported no impact, and 20% reported positive outcomes. Broadly speaking, two adjacent streams have emerged at the link between individual well-being and natural endowments. The first stream contends that NR substantially improves HW. Ref. [36] tested the natural resource blight assumption by including welfare inclusion in the analysis. The reported findings corroborate the resource blessing effect, as resource richness is associated with increased income and welfare.

Likewise, ref. [11] investigated the influence of NR abundance (resources/per capita) and NR dependence (resources as % of GDP) on development outcomes. The authors concluded that NR abundance contributes substantially to developmental outcomes [37], whereas NR dependence adversely affects development outcomes, owing to its detrimental impact on institutional quality. More recently, ref. [38] assessed the effect of natural capital on health, happiness, and well-being in China between 1993 and 2020. The HDI was employed to determine people's well-being status, happiness was defined as the percentage of happy individuals, and life expectancy at birth was used to evaluate health quality. The authors discovered that both subjective and objective well-being dimensions (i.e., health, happiness, and well-being) were favorably influenced by natural capital and wealth. Likewise, ref. [5] reported a positive link between NR and economic advancement in China. Ref. [39] affirmed the preceding argument by discerning that a one USD increase in resource rental rates results in nearly USD 5 increase in annual educational spending. Ref. [13] used a novel approach to examine how resource drilling affects future well-being, using genuine saving (GS) to predict socioeconomic well-being and describe unsustainable practices. Although Norway heavily relies on NRs to fuel its development, it achieved sustainable development through extensive investment in HC to compensate for NR depletion. Ref. [40] suggested that biodiversity and sustainable utilization of NRs are preconditions for HW.

The second stream concedes that resource rent impairs human well-being. For instance, ref. [41] illuminated the existence of resource blight in GCC countries in terms of health, as measured by life expectancy in the short and long terms. The authors also highlighted the moderating effect of institutions between the two variables. Ref. [42] scrutinized the links between human development (HD), national growth, and factors reflecting mineral resource reliance in ten African countries. The empirical results showed an adverse link between mineral dependence and development, also highlighting an inverse association between average HD growth and the relative contribution of natural resource rents. Ref. [43] explored the impact of NRs on HD, fixating on child health in developing countries. The author convincingly demonstrated that wealth derived from total NRs is unrelated to reductions in under-five mortality rates. Nonetheless, when he divided the sample according to NR components, only the wealth from no-renewable resources was found to be inversely related to under-five mortality rates. According to [44], oil rents benefit the quantity of education measured as government spending on primary and secondary schools. However, the authors found that oil rent dependence has a significant negative long-term impact on educational quality both objectively and subjectively. Similarly, ref. Ref. [15] investigated the influence of plentiful resources on human well-being, asserting that NR abundance has a negative direct effect on HW. The author of [45] deduced that rapid maturation in the natural wealth sector inhibits growth in other sectors of the economy by increasing the value of the currency and crowding out investment in non-resource-based industries, a phenomenon he referred to as "Dutch disease". According to the "Dutch disease" notion, the vitality of natural wealth hampers the expansion of other sectors because their expansion relies on unprecedented resources [46]. The "Dutch disease" expression was coined to denote the repercussions of massive gas reserves unearthed in the Dutch economy between the 1960s and 1970s. The excavation of such reserves engendered huge income revenues, allowing mining activity to swell at the cost of other segments of the economy. As a result, inflationary pressures increased as national income and demand increased, while capital inflows resulted in a trade account surplus and real exchange rate appreciation. This boom compelled policymakers to prioritize the present over long-term growth goals [12].

A recent flurry of research has begun to employ broader economic advancement measures. For example, ref. [47] provided statistical evidence of the resource curse in 32 African economies using the economic complexity index as a holistic measure of development. Similarly, ref. [48] assessed 24 African economies based on interactions between economic complexity, NRs, and economic growth. Their findings verified the resource curse theory by demonstrating the negative impact of NRs on economic advancement at an early stage of development (in individual analysis). However, these empirical findings, endorse the resource blessing effect when considering the interaction between economic complexity and NRs.

3.2. Human Capital, Governance, Emissions, and Resource Endowments

For decades, research has prompted concerns about the veracity of the claim made in [3], with evidence indicating that NRs can be either a boon or a blight. A growing belief suggests that resource endowments themselves do not inevitably undermine development. However, they may cause some aberrations that operate as transmission conduits to stymie development [16]. Numerous studies have indicated that the resource curse is dependent on external forces. Several paths have been identified by which resource endowments might affect development, including HC, low IQ, governance, environmental quality, and corruption.

Several studies have opined that *HC* is critical in dissuading the resource curse. Ref. [49] explored the moderating roles of HC and IQ on the nexus of natural capital endowments, foreign direct investment (FDI), and economic expansion for Middle East and North Africa (MENA) countries. The study findings suggested that interaction of resource endowments with HC and IQ positively impacts growth. Likewise, ref. [3] showed that natural wealth is detrimental to national growth. However, the interaction between HC and NRs contributes to economic growth; thus, HC development is an effective means by which to conquer the curse of natural capital. Ref. [5] contended that the "resource curse" is manifested by crowding out of total HC accumulation. Ref. [8] highlighted the importance of HC development in harvesting the advantages of resource endowments.

IQ plays an evident role in shaping the impact of NRs on HW. The robustness of institutions is essential for the improved allocation of NR revenues. According to [50], NR abundance influences human welfare measures indirectly through its impact on IQ. As per [22], the quality of governance has a favorable influence on natural wealth price fluctuations. Additionally, ref. [51] reported a bidirectional association between IQ and resource capital. As a result, NR endowments paired with a robust institutional framework could stimulate growth and development while alleviating the curse of resource abundance. Ref. [52] reported that IQ and mineral- and oil-resource rents improve welfare. However, this is contingent on a country's resource endowment and income level.

On the other hand, *poor governance* is more prevalent in countries where institutions have not been adequately constructed. For example, inadequate institutional effectiveness has been identified as the root cause of Nigeria's weak economic performance, despite its abundance of NRs [53]. Ref. [54] similarly presumed that high rates of corruption and poor democracy are to blame for the resource curse in the most resource-rich countries. As revealed by [55], government effectiveness spurs growth. Nevertheless, it diminishes the positive impact of resource endowment on economic growth, whereas regulatory quality intensifies this positive impact. According to [56], oil revenues augment the perks of corruption, resulting in a harmful effect on institutional quality. In the same line, ref. [57] demonstrated that private ownership of oil leads to increased welfare in countries with weak institutions. In contrast, state ownership of oil leads to increased welfare in countries with strong institutions. The empirical findings reported in [58] support the rent-seeking concept, indicating that NR dependence diminishes IQ.

Ultimately, NR extraction and utilization are commonly characterized the release of hazardous waste and gas into the environment. According to [59], there is a causal link between natural resource depletion and climate change. Ref. [60] explored the ecological footprint drivers in 73 developing economies. Their findings reveal that NR consumption dramatically increases environmental harm in terms of ecological footprint. In a similar context, ref. [61] assessed the impacts of NR abundance on ecological footprint, among other variables. Their results confirmed the detrimental impact of NR abundance on environmental quality. Ref. [62] uncovered the adverse impact of NRs on environmental excellence in BRICS economies. Similarly, ref. [63] reported the unfavorable consequences of NRs with respect to the ecological footprint in BRICS countries. Furthermore, ref. [64] showed that gas and coal are essential for the green growth of the Chinese economy, despite unfavorable connections detected between them. Ref. [20] reported a favorable impact of NRs on inclusive HD modulated through governance and environment quality in Sub-Saharan Africa. According to [65], NRs moderate the link between national growth and dioxide emissions. In contrast, NRs have been recognized to mitigate the ecological footprint in the USA [66]. Ref. [67] revealed that a one percent increase in natural assets increases Central Asian carbon emissions by 0.02%. According to [68], the abundance of energy resources in resource-rich countries such as the Caspian Sea is accompanied by environmental destruction, economic insecurity, and geopolitical tensions. Lastly, ref. [69] argued that NR dependence has accentuated CO_2 emissions in 250 Chinese peripheral cities.

Research on the natural resources curse hypothesis in the UAE is scarce. However, among a few others, two recent studies have been conducted. First, ref. [9] investigated the consequences of NR volatility with respect to growth, focusing on three resource-rich countries: the UAE, Saudi Arabia, and Oman. The study outcomes do not support the resource blight concept in the UAE and Saudi Arabia. Instead, substantial evidence indicates a link between NRs and national growth. On the other hand, NR volatility negatively influenced the economic progress of all countries studied. Ref. [24] investigated how natural resource rents and IQ affect HC in the UAE economy. Corruption, law, and order were used as measures for IQ. The author concluded that a unit percent increase in NR rents and a percentage point increase in corruption would reduce HC by 0.16 percent and 0.14 percent, respectively, over time, whereas in the short term, corruption and lag of resource rents negatively impact HC.

The literature review indicates a need for further investigation of the combined impacts of human capital, governance, and environmental quality on well-being, especially in resource-rich countries. Studies on the existence of the resource curse in such countries should include more than just the direct impact of natural resources. Nevertheless, it is imperative to understand how the resource curse operates from different perspectives (i.e., the indirect effect). Despite their importance, the transmission channels through which indirect impacts on natural resources affect well-being are rarely explored.

Additionally, the resource curse is a regionally heterogeneous phenomenon [69,70] that influences countries differently depending on their circumstances [24]. Thus, tracking the phenomenon in each country is crucial for accurate policy formulation. Ultimately, the UAE is an interesting case study because its economy has grown tremendously in terms of well-being and economic development during the past several decades, owing to its natural resources. However, this development has coincided with the overconsumption of natural resources. Therefore, it is critical for the country to improve its well-being without overburdening its natural capital while also controlling the negative impacts of NRs on HW.

4. Data and Methods

The aim of this study is to determine whether there is an indication of a resource curse with respect to well-being in the UAE, one of the world's top petroleum exporters, by investigating the direct and indirect effects of NRs on HW. Based on the prior discussion, we seek to address two major research queries:

Q1: How did natural resource endowments contribute to human well-being in the UAE between 1990 and 2019?

Q2: How did institutional quality, human capital, and environmental efficiency influence the impact of natural resource endowments on human well-being in the UAE?

In what follows, we introduce the article design and data sources to answer these questions and further expose the model specification and the quantitative econometric analysis.

4.1. Research Design and Data

This research addresses the influence of resource endowments on HW, considering the moderating impact of environmental quality, HC, and governance indicators in the UAE between 1990 and 2019. In doing so, we measure resource endowments by natural resource rents (NRR) (% of GDP), HW by the Human Development Index (HDI), environmental quality by CO_2 emissions/per capita, HC by years of schooling and returns to education, and governance proxies by averaging the six governance metrics.

The NRR data are elicited from the World Development Indicators database of the World Bank. Control of corruption, regulatory quality, political stability and absence of violence, the rule of law, voice and accountability, and government effectiveness are the governance indicators generated by worldwide governance indicators. HC data are sourced from Penn World Tables. Per capita CO_2 emissions are obtained from the Global Carbon Atlas. HDI data are obtained from the UNDP database. Additional details on data source information and descriptions are provided in Appendix A.

It is believed that improved NRs increase the well-being of a nation's population, although this may be equally environmentally harmful [47,52,59]. In addition, increased incomes from NRs could stimulate HW while also stimulating rent-seeking behavior [43,44,46]. Furthermore, NR abundance may reduce household incentives to educate children and the emphasis of governments on education, further crowding out human capital [24]. Additionally, because NR, HC, governance, and environmental quality have a long-standing relationship, it is intuitively believed that HC, governance, and environmental quality are the primary channels through which NRs impact HW.

4.2. Methods

Building on the existing research, in this study, we employ the following log-linear specification proposed in [71].

$$LnHDI_t = \beta_0 + \beta_1\ lnNRR_t + \beta_2 lnHC_t + \beta_3\ lnCO2_t + \beta_4 lnGOV_t + \varepsilon_t \quad (1)$$

where HDI, NRR, HC, CO_2, and GOV are the Human Development Index, natural resources abundance, human capital, carbon dioxide emissions, and governance indicators, respectively; Ln is the natural log; β_0 is a constant parameter; β_1 is the natural resource rent coefficient; β_{2-4} are coefficients of the other control variables; and ε_t signifies the error term, which is assumed to be normally distributed with homoscedastic variance.

4.2.1. Examining Variable Cointegration: ARDL Technique

In this analysis, we use the ARDL bounds technique developed by [72] to determine the long-term link between the studied variables. Owing to its superior properties compared to other cointegration methods (such as Engle and Granger and Johansen's cointegration), ARDL is the most popular cointegration strategy among economists. First, the ARDL method is most efficient when the sample size is small [73]. Secondly, it can also be applied regardless of the order in which the series is integrated, as it is compatible with both I(0) and I(1) or any combination thereof but not with I(2) [74]. Third, the ARDL method incorporates sufficient lags to accurately capture the method used to generate data in particular models. Fourth, it aids in the repair of endogeneity and serial correlation issues. Additionally, in the ARDL model, long-run and short-run coefficients can be calculated simultaneously; the short-run coefficient measures the extent to which the dependent variable deviates from its long-run trend. Finally, it enables the evaluation of the dynamic unrestricted error-correction model (UECM) [75].

Conforming to the UECM scheme, the ARDL bounds technique is expressed as follows:

$$\begin{aligned}\Delta Ln(HDI)_t = \alpha + \alpha_t T + \alpha_1 LnHDI_{t-1} + \alpha_2 Ln\ NRR_{t-1} + \alpha_3 Ln\ HC_{t-1} \\ + \alpha_4\ Ln\ CO2_{t-1} + \alpha_5 Ln\ Gov_{t-1} + \alpha_{il} \sum_{j=1}^{k-1} \Delta LnHDI_{t-j} \\ + \alpha_i \sum_{j=1}^{k-1} \Delta LnNRR_{t-j} + \alpha_j \sum_{j=1}^{k-1} \Delta LnHC_{t-j} + \alpha_k \sum_{j=1}^{k-1} \Delta LnCO2_{t-j} \\ + \alpha_q \sum_{j=1}^{k-1} \Delta LnGov_{t-j} + \mu_t\end{aligned} \quad (2)$$

where Δ refers to the differenced operator, and μ_t denotes the residual term in t. In this study, we apply the Akaike information criterion (AIC) to determine the optimal lag length of the first differenced regression. Cointegration of the variables is then determined by computing the F-statistic for the appropriate model specified by AIC and comparing it to the critical boundaries proposed by [72].

The null hypothesis posits the absence of cointegration between variables, i.e., in Equation (2), Ho: α_1, α_2, α_3, α_4, α_5 are all identical to zero, trailed against the alternate hypothesis, which postulates the emergence of cointegration between variables: H1: α_1, α_2, α_3, α_4, α_5 are all inequitable to zero.

Then, we use both the calculated F-statistic values and the critical bound values (upper and lower) to ascertain whether the variables are cointegrated for a long-run association. There is an indication of cointegration among the factors if the estimated F-statistic is above the critical upper bound. However, the estimated F-statistic becomes uncertain if it lies between the critical borders. Furthermore, there is no cointegration among the factors if the estimated F-statistic does not approach the lower critical restriction.

The critical bound values are similarly used to examine the long-run relationship between series when the variables are integrated at I(1), I(0) or a combination of I(1) and I(0). According to Equations (3)–(6) (see Appendix A), we calculate the F-statistic by applying the following models: F_{HDI} (HDI/NRR, CO_2, HC, GOV), F_{NRR} (NRR/HDI, CO_2, HC, and GOV), F_{CO2} (CO_2/HDI, NRR, HC, and GOV), F_{HC} (HC/HDI, NRR, CO_2, and GOV), and FGOV (GOV/HDI, NRR, CO_2, and HC).

The current study has a limited sample size (29 observations). Hence, the developed critical constraints [72] are inapplicable. As a result, we employ [76] critical values, which are better suited to small samples. The stability of the bounds-testing procedure is assessed by checking the cumulative sum (CUSUM) and the CUSUM squared (CUSUMSQ), as envisioned by [77].

4.2.2. Investigating Variable Causality: VECM Approach

Upon verifying the occurrence of cointegration between the HDI and its determinants, we use the vector error correction model (VECM) version developed by [78] to determine the trajectory of the causal association. The following equation is used to estimate VECM-based Granger causality.

$$(1-\mathrm{L})\begin{pmatrix}\ln HDI_t\\ \ln NRR_t\\ \ln HC_t\\ \ln GOV_t\\ \ln CO2_t\end{pmatrix}=\begin{pmatrix}\alpha_1\\ \alpha_2\\ \alpha_3\\ \alpha_4\\ \alpha_5\end{pmatrix}+\sum_{i=1}^{p}(1-L)\begin{pmatrix}\beta_{11i} & \beta_{12i} & \beta_{13i} & \beta_{14i} & \beta_{151}\\ \beta_{21i} & \beta_{22i} & \beta_{23i} & \beta_{24i} & \beta_{251}\\ \beta_{31i} & \beta_{32i} & \beta_{33i} & \beta_{34i} & \beta_{351}\\ \beta_{41i} & \beta_{42i} & \beta_{43i} & \beta_{44i} & \beta_{451}\\ \beta_{51i} & \beta_{52i} & \beta_{53i} & \beta_{54i} & \beta_{551}\\ \beta_{61i} & \beta_{62i} & \beta_{63i} & \beta_{64i} & \beta_{651}\end{pmatrix}\times\begin{pmatrix}\ln HDI_t\\ \ln NRR_t\\ \ln HC_t\\ \ln GOV_t\\ \ln CO2_t\end{pmatrix}+\begin{pmatrix}\partial\\ \\ \varphi\\ \pi\\ \vartheta\end{pmatrix}ECT_{t-1}+\begin{pmatrix}\varepsilon_{1t}\\ \varepsilon_{2t}\\ \varepsilon_{3t}\\ \varepsilon_{4t}\\ \varepsilon_{5t}\end{pmatrix}$$

where ECT_{t-1} is the long-run lagged residual subject; ε_{it} are residual terms that are presumed to be identically, independently, and normally distributed; and (1 − L) denotes the difference operator. We test the long-run causal connection through the ECT_{t-1} significance values using t-test statistics. Statistically significant and negative values of ECT_{t-1} indicate long-run causality. A negative ECT_{t-1} value also indicates the speed of convergence between short- and long-run equilibrium paths in all models. The Wald or F-test is employed to determine short-term causal relationships. For instance, $\beta_{12i} \neq 0\forall_i$ indicates causality extending from NRs to HDI, and $\beta_{21i} \neq 0\forall_i$ reveals that human well-being causes natural resources.

5. Empirical Findings and Discussion

The descriptive data and correlation matrix are displayed in Table 1. The Jarque–Bera test statistics indicate that all variables exhibit a normal distribution, except for the HC variable. As the HC variable has a mean almost equal to the median, a normality distribution can be assumed. According to the correlation matrix, the HDI positively correlates with the NRR, CO_2 emissions, HC, and governance indicator variables. A positive correlation is also found between CO_2 emissions and the NRR, HC, and governance indicators. Finally, the correlation between the NRR, HC, and governance indicators is also positive.

Table 1. Descriptive analysis and correlation matrix.

	HDI	CO_2	LnNRR	HC	GOV
Mean	0.81	175.91	11.07	2.65	0.56
Median	0.81	160.21	11.11	2.71	0.57
Maximum	0.89	286.34	11.61	2.75	0.69
Minimum	0.72	76.83	10.52	2.33	0.39
Std. Dev.	0.05	70.35	0.36	0.12	0.10
Skewness	0.18	0.24	0.02	−1.57	−0.15

Table 1. *Cont.*

	HDI	CO_2	LnNRR	HC	GOV
Kurtosis	2.28	1.57	1.51	4.34	1.36
Jarque–Bera	0.81	2.87	2.79	12.19	3.48
Probability	0.67	0.24	0.25	0.00	0.18
Sum	24.15	5277.22	332.15	66.35	16.75
Sum Sq. Dev.	0.06	143,533.40	3.80	0.32	0.28
HDI	1				
CO_2	0.96	1			
LNNRR	0.76	0.83	1		
HC	0.79	0.81	0.81	1	
GOV	0.61	0.69	0.64	0.32	1

5.1. Checking the Stationarity of Variables

As previously stated, in this investigation, we consider the association of long-term variables using the ARDL bounds technique. This method requires that all variables be stationary at level I(0) or first difference I(1). If a particular variable is stationary at I(2) or higher, the ARDL test results are deemed invalid. In the present study, we employ the ADF and PP unit root tests; the results are summarized in Table 2.

Table 2. Unit root analysis.

Variable	ADF Test with Intercept and Trend				PP Test with Intercept and Trend			
	At Level		At First Difference		At Level		At First Difference	
	t-Statistic	*p*-Value	t-Statistic	*p*-Value	t-Statistic	*p*-Value	t-Statistic	*p*-Value
HDI	−2.50	0.3253	−4.04 **	0.0190	−1.76	0.6994	−4.05 **	0.0187
CO_2	−2.03	0.5618	−5.62 ***	0.0005	−1.93	0.6121	−5.65 ***	0.0004
LnNRR	−2.27	0.4379	−4.56 ***	0.0060	−2.39	0.3765	−4.90 ***	0.0026
HC	−1.53	0.7838	−7.72 ***	0.0000	−1.19	0.8886	−7.46 ***	0.0000
GOV	−4.45 **	0.0136	−6.69 ***	0.0003	−4.33 *	0.0167	−6.28 ***	0.0007

Note: *, ** and *** denote the significant at 1, 5 and 10 percent levels, respectively.

The findings demonstrate that, apart from the governance variable, the ADF test identifies a unit root issue at the level. Furthermore, the variables are integrated at I(1) with a 5% significance level, indicating that they are all stationary at the first difference. Given the similar level of integration, the cointegration between variables can be probed using the ARDL bounds technique.

5.2. Findings of ARDL Cointegration Analysis

Before processing the ARDL approach, the lag length of each variable must be identified using an unrestricted vector autoregressive (VAR) method. This helps to calculate the specific model's F-statistic, as different lag lengths lead to different F-statistics. We employ the Akaike information criterion (AIC) to select the optimum lag for each model. AIC has strong accuracy, producing accurate and reliable outcomes for small samples. A further step involves the generation of the model's corresponding F-statistic and comparison with Narayan's critical values (2005). The ARDL test results are listed in Table 3.

The empirical findings reveal that the resulting F-statistics are greater than the critical upper bound proposed by [76]. As a result, at a 5% significance level, adequate information is available to refute the null hypothesis of no integration. Accordingly, the results confirm the emergence of cointegration between the variables, implying at least one long-run association between the HDI and the remaining variables between 1990 and 2019.

All the models are valid, as none of the errors are serially correlated, there is no evidence of heteroskedasticity, and they are normally distributed. Furthermore, the Ramsey reset test indicates that the models have well-defined functional forms. Finally, the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUM2) developed by [79] are run to test for the model's stability. The CUSUM and CUSUM2 tests, depicted in Figures 7 and 8, respectively, validate the stability of both long- and short-run estimates. Hence, the estimated results are reliable, with the blue lines of CUSUM and CUSUM2 lying within the 5 percent critical bounds. However, CUSUM2 breaks the year-long trend and then stabilizes again in the recommended range. This structural break may be attributable to the oil price plunge (70% drop) between mid-2014 and early 2016; the oil price decline resulted in the UAE government cutting expenditures due to declining energy export revenues [80]. According to the World Bank, this was one of the most significant drops in oil prices in modern history. This was the longest-lasting price drop since the supply-driven collapse of 1986 and one of the three largest since the Second World War [81]. A 5% significance limit/threshold is represented by the straight lines.

Table 3. ARDL empirical results.

Bounds Testing Approach to Cointegration	**Diagnostic Tests**							
Estimated Models	**Lag Length**	**F-Statistic**	$^{2}_{NORMAL}$	$^{2}_{ARCH}$	$^{2}_{RESET}$	$^{2}_{SERIAL}$	**CUSUM**	**CUSUMsq**
$HDI_t = f(CO_{2t}, lnNRR_t, HC_t, GOV_t)$	1, 2, 2, 2, 2	5.163 **	0.6621 (0.7182)	0.1168 (0.7361)	0.9429 (0.3734)	2.7906 (0.1285)	Stable	Stable
$CO_{2t} = f(HDI_t, lnNRR_t, HC_t, GOV_t)$	2, 2, 2, 2, 2	1.945	0.9793 (0.6128)	2.6539 (0.1189)	0.4039 (0.6983)	1.6753 (0.2642)	Stable	Stable
$lnNRR_t = f(HDI_t, CO_{2t}, HC_t, GOV_t)$	2, 2, 2, 2, 2	2.486	0.9583 (0.5155)	0.0331 (0.8574)	1.1568 (0.2853)	5.6985 (0.0914)	Stable	Stable
$HC_t = f(HDI_t, CO_{2t}, lnNRR_t, GOV_t)$	2, 2, 2, 2, 2	2.397	0.5864 (0.7459)	0.8632 (0.3639)	1.2742 (0.2433)	2.6026 (0.1535)	Stable	Stable
$GOV_t = f(HDI_t, CO_{2t}$, lnNRRt, HCt)	2, 2, 2, 2, 2	4.799 **	0.6534 (0.7213)	1.6638 (0.2118)	4.6791 (0.0649)	2.9166 (0.1304)	Stable	Stable
Significance Level	Critical values (T = 30)							
	Lower bounds I(0)	Upper bounds I(1)						
1% level	2.752	3.994						
5% level	3.354	4.774						
10% level	4.768	6.670						

Note: ** denote significance at the 5 percent levels. The optimal lag length is determined by AIC.

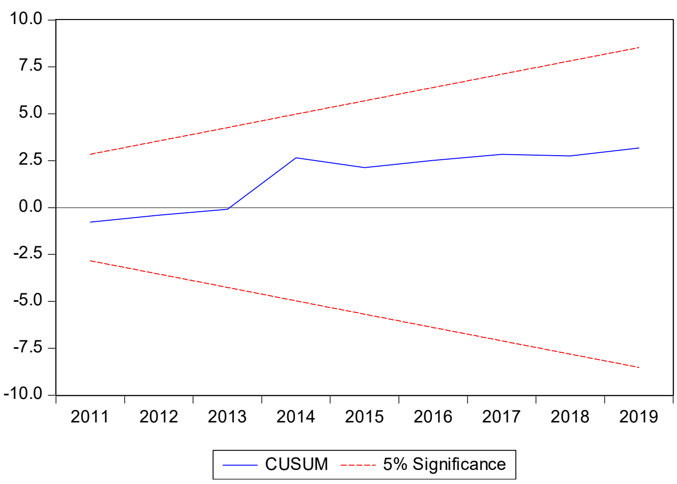

Figure 7. CUSUM Plot of the recursive residual at a 5% level of significance.

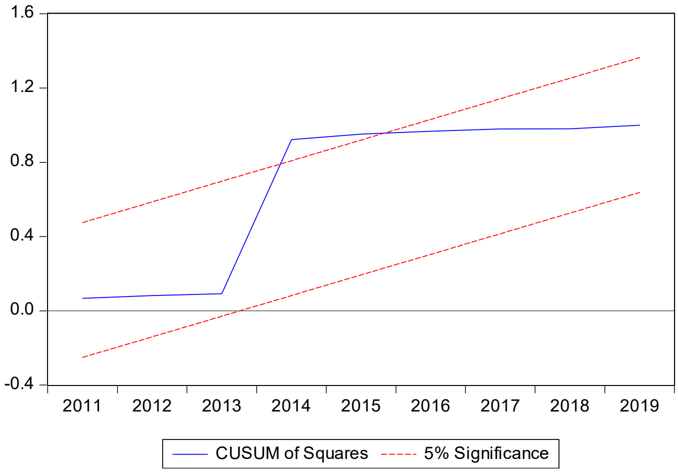

Figure 8. CUSUM2 of the recursive residual at a 5% level of significance. The horizontal lines provide the critical limits at a 5% significance level.

5.3. Long- and Short-Term Estimates

Following the ARDL approach, Table 4 summarizes both long-run and short-run relationships among the variables. The long-run analysis indicates that natural resource capital is inversely related to human well-being, which implies the emergence of a resource curse in the UAE case. Leaving other variables unchanged, a 10 percent increase in NRR reduces HDI by 6 percent. This result supports the findings of [14,15,42]. However, it contradicts the results reported in [19], which claims that rents from individual natural resources positively correlate with HDI. CO_2 emissions have a positive long-term impact on human well-being as measured by HDI under a 1% significance level. This result is in line with [20,21]. As stated by [20], the exploitation of abundant natural resources causes contamination of the environment, which can seriously harm both individual health and economic advancement. Furthermore, the authors assert that profits from the extraction of natural resources should be harnessed in the country's economic and social development, such as health care and education. Our findings indicate that human capital and governance appear to have a significant impact on human development in the UAE.

Table 4. Long- and short-run estimates.

Dependent Variable HDI				
Long-Run Analysis				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CO_2	0.00	0.00	7.31	0.0000
LnNRR	−0.06	0.02	−2.92	0.0172
HC	−0.12	0.12	−1.01	0.3403
GOV	−0.05	0.06	−0.74	0.4758
Short-Run Analysis				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.00	0.00	0.09	0.9327
D(HDI(-1))	1.01	0.39	2.60	0.0194
D(LnNRR(-1))	0.01	0.01	0.85	0.4101
D(CO_2(-1))	0.00	0.00	0.25	0.8086
D(HC(-1))	−0.05	0.04	−1.10	0.2861
D(GOV(-1))	−0.02	0.01	−1.17	0.2580
ECM(-1)	−1.74	0.43	−4.06	0.0009
R-squared	0.66			
Adjusted R-squared	0.53			
F-statistic	5.17 *			
Durbin-Watson stat	2.18			

Table 4. *Cont.*

Dependent Variable HDI		
	Short-Run Diagnostic Tests	
Test	F-statistic	Prob. Value
NORMAL	0.82	0.6623
SERIAL	0.38	0.6916
ARCH	0.50	0.4865
RESET	0.42	0.5261

Note: * denote significance at 1 percent levels.

The short-run results confirm an insignificant association between the HDI and all the variables. However, the analysis indicates that the error correction model (ECM) coefficient is significantly negative (−1.74) at a 1% level, suggesting that the short-term deviation is corrected in the long-run equilibrium path, demonstrating a long-term link among the variables in the UAE from 1990 to 2019. The empirical evidence suggests that natural resource rents are still adversely linked with the HDI but statistically insignificant.

5.4. Variables Causal Link Investigation

We employ [78] the VECM Granger causality approach to analyze the direction of the causal relationship between NRR rates, the HDI, environmental quality, governance, and human capital. The results presented in Table 5 support a *short-run* bidirectional causal association between the HDI and NRR. Thus, a feedback hypothesis is generated between the two variables. This finding is partially consistent with the findings of [82], who reported bidirectional Granger causality between environment, HDI, and natural resources in Ghana. Furthermore, the research results support the existence of bidirectional causality between HDI and CO_2 emissions. Our findings appear to partially agree with [83], who found a one-way causality between HDI and CO_2, and [84–86], who revealed a one-way causality running from CO_2 to HDI.

Table 5. VECM Granger causality analysis.

Dependent Variable	Direction of Causality										
	Short-Run					Long-Run	Joint Long and Short-Run Causality				
	ΔHDI_{t-1}	ΔCO_{2t-1}	$\Delta lnNRR_{t-1}$	ΔHC_{t-1}	ΔGOV_{t-1}	ECT_{t-1}	ΔHDI_{t-1}, ECT_{t-1}	ΔCO_{2t-1}, ECT_{t-1}	$\Delta lnNRR_{t-1}$, ECT_{t-1}	ΔHC_{t-1}, ECT_{t-1}	ΔGOV_{t-1}, ECT_{t-1}
ΔHDI	...	−0.001 * [−13.481]	0.068 * [6.160]	0.209 * [3.593]	0.052 [1.294]	−0.211 ** [−2.555]	...	−0.001 ** [−2.474]	0.016 *** [1.723]	−0.233 * [−2.971]	0.013 [0.767]
ΔCO_2	−969.837 * [−9.472]	...	−65.564 [−6.025]	−202.747 [−4.03559]	−51.288 [−1.554]	−0.443 ** [−2.614]	−140.720 [−0.374]	...	−24.414 [−1.322]	283.191 *** [1.815]	−6.261 [−0.183]
ΔlnNRR	14.792 * [5.628]	−0.015 * [−7.833]	...	3.092 * [3.75806]	0.782 [1.486]	−0.071 [−0.377]	−0.340 [−0.053]	−0.004 [−1.211]	...	−0.501 [−0.190]	0.367 [0.632]
ΔHC	4.783 * [5.478]	−0.005 * [−8.756]	0.323 * [6.271]	...	0.253 [1.977]	−0.021 [−0.955]	0.058 [0.246]	-5.77×10^{-05} [−0.438]	−0.010 [−0.855]	...	−0.007 [−0.331]
ΔGOV	18.910 * [5.531]	−0.019 * [−9.456]	1.278 * [6.954]	3.953 * [5.544]	...	0.112 ** [2.629]	−2.305 [−1.253]	0.001 [1.016]	−0.086 [−0.957]	0.196 [0.258]	...

Note: *, ** and *** denote the significant at 1, 5 and 10 percent levels, respectively.

Similarly, HDI and human capital are causally related. This finding is backed up by [87], who reported a nonlinear causal relationship between human development and health and education indicators as human capital indicators. Likewise, governance and HDI are causally related, which is consistent with the findings reported in [88] regarding the impact of institutional quality on HDI. On the other hand, our findings show that whereas all variables have a unidirectional causal relationship with the governance indicator, this relationship does not hold in the opposite direction. However, in the long run, our VECM findings indicate a unidirectional causality running from the HDI to all variables except governance. Ultimately, CO_2 emissions have a direct impact on human capital.

6. Conclusions and Policy Recommendations

With global action on sustainability intensifying, promoting human well-being while preserving ecological constraints has become a global concern. For decades, human well-being has been linked to the emergence of severe environmental harm worldwide, posing a critical ecological quandary for the international community [89]. Furthermore, it has become evident that countries thrive economically while still struggling to reduce pressure on their natural capital. In the same vein, a commonly held belief posits that NRs are among the most precious development assets if responsibly administered; however, if not properly managed, they can pose a severe threat to a country's economy and political system [68], as well as individual well-being.

Accordingly resource curse theory has triggered a growing body of evidence; nevertheless, unanimity with respect to its existence remains elusive. Over the past three decades, investigation of the impact of NRs on the monetary dimensions of the economy has attracted the attention of scholars. Despite this scholarly interest, scant attention has been paid to how resource dependency affects non-monetary factors (e.g., HW), raising the question of how resource endowments affect well-being. The few studies that examine the impact of NRs on HW tend to focus on its direct effects, with scant emphasis on how different transmission channels may moderate this interaction.

Accordingly, in the present study, we investigated, for the first time, how NRs impacted human well-being directly and indirectly in the UAE between 1990 and 2019. A clear set of goals guides this research, including the aim of determining how NRs impact HW; identifying the extent to which institutional quality, governance, and human capital influence the relationship between NR and HW; and finally, determining the primary channels through which NRs impact HW. In doing so, we employed various time-series econometric techniques. First, ADF and PP unit root were used to examine the stationarity of our observations. Then, for cointegration, we used the ARDL bounds testing method to assess the short- and long-term link between resource endowments, human well-being, governance, human capital, and environmental sustainability. Finally, to investigate the causal association among the variables, we applied the VECM Granger causality approach. Durbin, ARCH, and LM tests were also implemented to verify model stability.

The study findings corroborate cointegration among the variables, indicating that variables are cointegrated for long-run connections. According to the empirical analysis, NRs appear to worsen HW over the long term and short term by deteriorating environmental quality, confirming the resource curse argument in the UAE. On the other hand, HC and governance have no discernible impact on the relationship between NRs and WB. In addition, human well-being and resource rents have a mutual Granger causal relationship. Therefore, a feedback effect is present between the two variables. A bidirectional causality also flows from well-being to all other variables.

In summary, environmental quality is the primary channel through which resource endowments influence (worsen) human well-being in the UAE. Thus, environmental stress and human well-being are inextricably linked in the UAE. Real-world data back up our findings; the UNDP's planetary-adjusted HDI, which subtracts the HDI for environmental pressures, shows that environmental pressure has caused a 105-point drop in HDI ranking and a 43.1% drop in HDI value [34].

Arguably, environmental sustainability in the UAE faces profound pressures that threaten individual well-being. Robust and efficient policies aiming to mitigate and adapt to CO_2 emissions are critical in shaping the nexus of natural resources and human well-being and, consequently, the country's sustainability path and future. Any reform strategy that does not consider environmental sustainability is no longer a viable option.

The UAE's per capita energy and water consumption are among the highest globally, resulting in a substantial carbon footprint. The country is considered among the world's most water-stressed states. As a result, the UAE is a significant emitter of carbon emissions worldwide [30]. By 2019, the country will emit 243.55 million tons of GHG, with the energy sector accounting for approximately 86% of those emissions [90]. The UAE government has exerted considerable efforts to transform the country from a hydrocarbon-based economy to a technology- and knowledge-driven economy, prioritizing climate change issues. The UAE was the first MENA country to declare a strategy to attain a net-zero emissions target by 2050. The strategy entails a renewable investment of AED 600 billion. The country already possesses the world's largest single-site solar park, which is predicted to save more than 6.5 million tons of CO_2 annually [91]. Furthermore, the UAE has enacted several economic diversification measures centered on the green economy, such as renewable and clean energy, sustainable transportation policy, and sustainable urban planning [92]. Despite government efforts, the UAE is one of the most susceptible nations to the potential consequences of climate change. The UAE government should have submitted a long-term plan to the United Nations Framework Convention on Climate Change [93]. The climate action tracker evaluated the UAE's climate objectives and policies as "very insufficient", "signifying that the country's climate change strategies, initiatives, and pledges are irreconcilable with the Paris Treaty's 1.5 °C temperature threshold, culminating in growing rather than diminishing emissions". Likewise, the UAE's policies and 2030 emissions reduction target were deemed "deficient," with the country's 2030 aim rated as "critically insufficient" [94].

Consequently, we argue that economic diversification with less dependency on natural resources will help the UAE improve its performance in the human well-being sphere. Reducing the reliance on natural resources means less extraction, slowing the rate of environmental degradation. Therefore, the UAE government's top priority should be boosting renewable portion of the energy mix. The success of these diversification strategies is contingent on significant government intervention to promote renewable energy technologies and energy security [68]. The UAE could therefore use the proceeds from resource endowments to finance its renewable energy development. We suggest several policy actions in this context: providing incentives for low-carbon energy use and reducing energy intensity (i.e., carbon allowance). Furthermore, the UAE government should assist businesses engaged in R&D to minimize the cost of employing renewables. Concerning their significant reliance on oil and gas revenues, carbon pricing/carbon tax and fees can also be considered to generate revenues for the government. Investing in low-carbon technologies/cleantech and environmental technologies would provide significant opportunities for the country's "green" economy targets and air pollution reduction. We also recommend accelerating the electrification of buildings, transportation, vehicles, the industrial sector, and other sectors of the economy to ensure energy efficiency.

Additionally, the UAE government needs to incorporate resource efficiency and resource management strategies into its climate, sustainable development, and biodiversity plans. Eventually, ensuring that a more substantial proportion of climate change adaptation funding reaches local communities and developing solid policies and crucial mechanisms for their implementation, in addition to establishing a long-run climate change strategy, would reduce the country's vulnerability to climate change. Future research should expand the analysis to panel sets for country comparisons and incorporate other transmission mechanisms, such as information and communication technology. Furthermore, research should investigate other measures of well-being, such as subjective well-being and separate components of well-being (e.g., health and education). Finally, it is worth noting that our findings are limited due to the thirty years studied.

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Abbreviations and Acronyms

NR	Natural resource
HW	Human well-being
HDI	Human Development Index
Human capital	HC
Institutional quality	IQ
Human development	HD
Natural resource rent	NRR

Appendix A

Variable	Source
Natural resource rent	WDI
Human Development Index	UNDP
Governance	WGI
CO_2 emissions	Global Carbon Atlas
Human capital	PWT

The ARDL bounds technique equations:

$$\begin{aligned}\Delta Ln(NRR)_t = {} & \beta + \beta_t T + \beta_1 LnHDI_{t-1} + \beta_2\, LnNRR_{t-1} + \beta_3 Ln\ HC_{t-1} + \beta_4\ Ln\ CO2_{t-1} + \beta_5 Ln\ Gov_{t-1} \\ & + \beta_l \sum_{j=1}^{k-1} \Delta LnNRR_{t-j} + \beta_i \sum_{j=1}^{k-1} \Delta LnHDI_{t-j} + \sum_{j=1}^{k-1} \beta_j \Delta LnHC_{t-j} + \beta_k \sum_{j=1}^{k-1} \Delta LnCO2_{t-j} \\ & + \beta_q \sum_{j=1}^{k-1} \Delta LnGov_{t-j} + \mu_t\end{aligned} \tag{A1}$$

$$\begin{aligned}\Delta Ln(HC)_t = {} & \varphi + \varphi_t T + \varphi_1 LnHDI_{t-1} + \varphi_2\ Ln\ NRR_{t-1} + \varphi_3 Ln\ HC_{t-1} + \varphi_4\ Ln\ CO2_{t-1} + \varphi_5 Ln\ Gov_{t-1} \\ & + \varphi_l \sum_{j=1}^{k-1} \Delta LnNRR_{t-j} + \sum_{j=1}^{k-1} \varphi_i \Delta LnHDI_{t-j} + \sum_{j=1}^{k-1} \varphi_j \Delta LnHC_{t-j} + \varphi_k \sum_{j=1}^{k-1} \Delta LnCO2_{t-j} \\ & + \varphi_q \sum_{j=1}^{k-1} \Delta LnGov_{t-j} + \mu_t\end{aligned} \tag{A2}$$

$$\begin{aligned}\Delta Ln(CO2)_t = {} & + {}_t T + {}_1 LnHDI_{t-1} + {}_2\ Ln\ NRR_{t-1} + {}_3 Ln\ HC_{t-1} + {}_4\ Ln\ CO2_{t-1} + {}_5 Ln\ Gov_{t-1} \\ & + {}_l \sum_{j=1}^{k-1} \Delta LnNRR_{t-j} + \sum_{j=1}^{k-1} {}_i \Delta LnHDI_{t-j} + \sum_{j=1}^{k-1} {}_j\ \Delta LnHC_{t-j} + {}_k \sum_{j=1}^{k-1} \Delta LnCO2_{t-j} \\ & + {}_q \sum_{j=1}^{k-1} \Delta LnGov_{t-j} + \mu_t\end{aligned} \tag{A3}$$

$$\begin{aligned}\Delta Ln(GOV)_t = {} & \rho + \rho_t T + \rho_1 LnHDI_{t-1} + \rho_2\ Ln\ NRR_{t-1} + \rho_3 Ln\ HC_{t-1} + \rho_4\ Ln\ CO2_{t-1} + \rho_5 Ln\ Gov_{t-1} \\ & + \rho_l \sum_{j=1}^{k-1} \Delta LnNRR_{t-j} + \sum_{j=1}^{k-1} \rho_i \Delta LnHDI_{t-j} + \sum_{j=1}^{k-1} \rho_j \Delta LnHC_{t-j} + \rho_k \sum_{j=1}^{k-1} \Delta LnCO2_{t-j} \\ & + \rho_q \sum_{j=1}^{k-1} \Delta LnGov_{t-j} + \mu_t\end{aligned} \tag{A4}$$

References

1. OECD Environmental Outlook to 2050. 2012. Available online: https://www.oecd.org/g20/topics/energy-environment-green-growth/oecdenvironmentaloutlookto2050theconsequencesofinaction.htm (accessed on 2 November 2022).
2. Rahim, S.; Murshed, M.; Umarbeyli, S.; Kirikkaleli, D.; Ahmad, M.; Tufail, M.; Wahab, S. Do natural resources abundance and human capital development promote economic growth? A study on the resource curse hypothesis in next eleven countries. *Resour. Environ. Sustain.* **2021**, *4*, 100018. [CrossRef]
3. Auty, R. *Resource Based Industralization: Sowing the Oil in Eight Developing Countries*; Clarendon Press: Oxford, UK, 1990.
4. Sachs, J.D.; Warner, A.M. *Natural Resource Abundance and Economic Growth*; Working Paper No. 5398; National Bureau of Economic Research: Cambridge, MA, USA, 1995.
5. Wang, R.; Tan, J.; Yao, S. Are natural resources a blessing or a curse for economic development? The importance of energy innovations. *Resour. Policy* **2021**, *72*, 102042. [CrossRef]

6. Sharma, C.; Mishra, R.K. On the Good and Bad of Natural Resource, Corruption, and Economic Growth Nexus. *Environ. Resour. Econ.* **2022**, *82*, 889–922. [CrossRef]
7. Inuwa, N.; Adamu, S.; Sani, M.B.; Modibbo, H.U. Natural resource and economic growth nexus in Nigeria: A disaggregated approach. *Lett. Spat. Resour. Sci.* **2022**, *15*, 17–37. [CrossRef]
8. Miamo, C.W.; Achuo, E.D. Can the resource curse be avoided? An empirical examination of the nexus between crude oil price and economic growth. *SN Bus. Econ.* **2022**, *2*, 5. [CrossRef]
9. Hayat, A.; Tahir, M. Natural Resources Volatility and Economic Growth: Evidence from the Resource—Rich Region. *J. Risk Financ. Manag.* **2021**, *14*, 84. [CrossRef]
10. Khan, S.A.; Ponce, P.; Yu, Z.; Ponce, K. Investigating economic growth and natural resource dependence: An asymmetric approach in developed and developing economies. *Resour. Policy* **2022**, *77*, 102672. [CrossRef]
11. Lashitew, A.; Werker, E. Do natural resources help or hinder development? Resource abundance, dependence, and the role of institutions. *Resour. Energy Econ.* **2020**, *61*, 101183. [CrossRef]
12. Dialga, I.; Ouoba, Y. How do extractive resources affect human development? Evidence from a panel data analysis. *Resour. Environ. Sustain.* **2022**, *7*, 100046. [CrossRef]
13. Fink, J.; Ducoing, C. Does natural resource extraction compromise future well-being? Norwegian Genuine Savings, 1865–2018. *Extr. Ind. Soc.* **2022**, *11*, 101127. [CrossRef]
14. Noumba, I.; Noula, A.J.; Nguea, S.M. Do globalization and resource rents matter for human well-being? Evidence from African countries. *Int. Econ.* **2022**, *170*, 49–65. [CrossRef]
15. Carmignani, F. Development outcomes, resource abundance, and the transmission through inequality. *Resour. Energy Econ.* **2013**, *35*, 412–428. [CrossRef]
16. Ilham Haouas, I.; Soto, R. *Has the UAE Escaped the Oil Curse?* Documentos de Trabajo 412; Instituto de Economia, Pontificia Universidad Católica de Chile: Santiago, Chile, 2012.
17. Zallé, O. Natural resources and economic growth in Africa: The role of institutional quality and human capital. *Resour. Policy* **2019**, *62*, 616–624. [CrossRef]
18. Hu, Y.; Xiao, D. The threshold of economic growth and the natural resource curse. *Manag. World* **2007**, *4*, 15–23.
19. Sinha, A.; Sengupta, T. Impact of natural resource rents on human development: What is the role of globalization in Asia Pacific countries? *Resour. Policy* **2019**, *63*, 101413. [CrossRef]
20. Nchofoung, T.; Achuo, E.; Asongu, S. Resource Rents and Inclusive Human Development in Developing Countries. *Resour. Policy* **2021**, *74*, 102382. [CrossRef]
21. Erdoğan, S.; Çakar, N.D.; Ulucak, R.; Kassouri, Y. The Role of Natural Resources Abundance and Dependence in Achieving Environmental Sustainability: Evidence from Resource-Based Economies. *Sustain. Dev.* **2020**, *29*, 143–154. [CrossRef]
22. Liu, Y.; Sohail, M.T.; Khan, A.; Majeed, M.T. Environmental benefit of clean energy consumption: Can BRICS economies achieve environmental sustainability through human capital? *Environ. Sci. Pollut. Res.* **2022**, *29*, 6766–6776. [CrossRef]
23. British Pertoleum. Statistical Review and World Energy. 2021. Available online: https://www.bp.com/en/global/corporate/news-and-insights/press-releases/fourth-quarter-2021-results.html (accessed on 20 April 2022).
24. Aljarallah, R. Impact of Natural Resource Rents and Institutional Quality on Human Capital: A Case Study of the United Arab Emirates. *Resources* **2019**, *8*, 152. [CrossRef]
25. Haouas, I.; Heshmati, A. *Can the UAE Avoid the Oil Curse by Economic Diversification?* IZA Discussion Papers, No. 8003; Institute for the Study of Labor (IZA): Bonn, Germany, 2014.
26. BNP Paribas. *UAE Uneven Economy Recovery*; Eco Emerging 4th Quarter 2021; BNP Paribas: Seoul, Korea, 2021.
27. World Bank. GDP per Capita Growth (Annual %). 2022. Available online: https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG?locations=AE (accessed on 5 May 2022).
28. OPEC. UAE Facts and Figures. 2020. Available online: https://www.opec.org/opec_web/en/about_us/170.htm (accessed on 22 April 2022).
29. EIA US Energy Information Administration. United Arab Emirates. 2020. Available online: https://www.eia.gov/international/analysis/country/ARE (accessed on 5 May 2022).
30. Elmassah, S.; Hassanein, E.A. *Investigating the EKC Hypothesis in GCC Countries: The Role of Economic Complexity, Non-Renewable Energy and Globalization*; forthcoming; Energy Efficiency: Berlin/Heidelberg, Germany, 2022.
31. IEA World Energy Balances. United Arab Emirates. 2022. Available online: https://www.iea.org/countries/united-arab-emirates (accessed on 5 May 2022).
32. Ustadi, I.; Mezher, T.; Abu-Zahra, M.R.M. The Effect of the Carbon Capture and Storage (CCS) Technology Deployment on the Natural Gas Market in the United Arab Emirates. *Energy Procedia* **2017**, *114*, 6366–6376. [CrossRef]
33. World Bank. Total Natural Resources Rent (% of GDP)—United Arab Emirates. 2022. Available online: https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS?locations=AE (accessed on 5 May 2022).
34. UNDP. Human Development Reports. 2022. Available online: https://hdr.undp.org/data-center/human-development-index#/indicies/HDI (accessed on 15 October 2022).
35. Havranek, T.; Horvath, R.; Zeynalov, A. Natural resources and economic growth: A meta-analysis. *World Dev.* **2016**, *88*, 134–151. [CrossRef]
36. Kolios, B. The resource curse hypothesis and welfare: A panel data analysis. *Empir. Econ. J.* **2017**, *5*, 163–168.

37. Wang, Y.; Huang, P.; Khan, Z.A.; Wei, F. Potential of Kazakhstan's grain export trade. *Agribusiness* **2022**, 52. [CrossRef]
38. Lu, F.; Sohail, M.T. Exploring the Effects of Natural Capital Depletion and Natural Disasters on Happiness and Human Wellbeing: A Study in China. *Front. Psychol.* **2022**, *13*, 870623. [CrossRef] [PubMed]
39. Stijns, J.P.C. *Natural Resource Abundance and Economic Growth Revisited*; Unpublished Mimeo; Department of Economics, University of California: Berkeley, CA, USA, 2001.
40. Knickel, K.; Almeida, A.; Galli, F.; Hausegger-Nestelberger, K.; Goodwin-Hawkins, B.; Hrabar, M.; Keech, D.; Knickel, M.; Lehtonen, O.; Maye, D.; et al. Transitioning towards a Sustainable Wellbeing Economy—Implications for Rural–Urban Relations. *Land* **2021**, *10*, 512. [CrossRef]
41. Al-Shboul, M.; Rawashdeh, R. The impact of institutional quality and resources rent on health: The case of GCC. *Resour. Policy* **2022**, *78*, 102804. [CrossRef]
42. Pérez, C.; Claveria, O. Natural resources and human development: Evidence from mineral-dependent African countries using exploratory graphical analysis. *Resour. Policy* **2020**, *65*, 101535. [CrossRef]
43. Gani, A. Natural resource effect on child health outcomes in a multifactor health production model in developing countries. *Int. J. Soc. Econ.* **2022**, *49*, 801–817. [CrossRef]
44. Farzanegan, M.R.; Thum, M. Does oil rents dependency reduce the quality of education? *Empir. Econ.* **2020**, *58*, 1863–1911. [CrossRef]
45. Ross, M.L. The political economy of the resource curse. *World Politics* **1999**, *51*, 297–322. [CrossRef]
46. Larsen, E.R. Escaping the Resource Curse and the Dutch Disease? *Am. J. Econ. Sociol.* **2006**, *65*, 605–640. [CrossRef]
47. Ajide, K. Is natural resource curse thesis an empirical regularity for economic complexity in Africa? *Resour. Policy* **2022**, *76*, 102755. [CrossRef]
48. Tabash, M.; Mesagan, E.P.; Farooq, O. Dynamic linkage between natural resources, economic complexity, and economic growth: Empirical evidence from Africa. *Resour. Policy* **2022**, *78*, 102865. [CrossRef]
49. Shittu, W.O.; Musibau, H.O.; Jimoh, S.O. The complementary roles of human capital and institutional quality on natural resource—FDI—Economic growth Nexus in the MENA region. *Environ. Dev. Sustain.* **2022**, *24*, 7936–7957. [CrossRef]
50. Bulte, E.H.; Damania, R.; Deacon, R.T. Resource intensity, institutions, and development. *World Dev.* **2005**, *33*, 1029–1044. [CrossRef]
51. Ali, A.; Ramakrishnan, S. Financial development and natural resources. Is there a stock market resource curse? *Resour. Policy* **2022**, *75*, 102457. [CrossRef]
52. Muhanji, S.; Ojah, K.; Soumaré, I. How do natural resource endowment and institutional quality influence the nexus between external indebtedness and welfare in Africa? *Econ. Syst.* **2019**, *43*, 77–98. [CrossRef]
53. Sala-i-Martin, X.; Subramanian, A. Addressing the natural resource curse: An illustration from Nigeria. *J. Afr. Econ.* **2013**, *22*, 570–615. [CrossRef]
54. Bulte, E.; Damania, R. Resources for sale: Corruption, democracy and the natural resource curse. *BE J. Econ. Anal. Policy* **2008**, *8*. [CrossRef]
55. Musibau, H.O.; Shittu, W.O.; Yanotti, M. Natural resources endowment: What more does West Africa need in order to grow? *Resour. Policy* **2022**, *77*, 102669. [CrossRef]
56. Dietz, S.; Neumayer, E.; De Soysa, I. Corruption, the Resource Curse and Genuine Saving. *Environ. Dev. Econ.* **2007**, *12*, 33–53. [CrossRef]
57. Khanna, A.A. Heading towards a welfare curse? The interplay of oil ownership and institutions in oil-rich developing countries. *Energy Res. Soc. Sci.* **2021**, *72*, 101887. [CrossRef]
58. Asiamah, O.; Agyei, S.K.; Bossman, A.; Agyei, E.A.; Asucam, J.; Arku-Asare, M. Natural resource dependence and institutional quality: Evidence from Sub-Saharan Africa. *Resour. Policy* **2022**, *79*, 102967. [CrossRef]
59. Barchielli, B.; Cricenti, C.; Gallè, F.; Sabella, E.A.; Liguori, F.; Da Molin, G.; Liguori, G.; Orsi, G.B.; Giannini, A.M.; Ferracuti, S.; et al. Climate Changes, Natural Resources Depletion, COVID-19 Pandemic, and Russian-Ukrainian War: What Is the Impact on Habits Change and Mental Health? *Int. J. Environ. Res. Public Health* **2022**, *19*, 11929. [CrossRef] [PubMed]
60. Jahanger, A.; Usman, M.; Murshed, M.; Mahmood, H.; Balsalobre-Lorente, D. The linkages between natural resources, human capital, globalization, economic growth, financial development, and ecological footprint: The moderating role of technological innovations. *Resour. Policy* **2022**, *76*, 102569. [CrossRef]
61. Langnel, Z.; Amegavi, G.B.; Donkor, P.; Mensah, J.K. Income inequality, human capital, natural resource abundance, and ecological footprint in ECOWAS member countries. *Resour. Policy* **2021**, *74*, 102255. [CrossRef]
62. Awosusi, A.A.; Adebayo, T.S.; Altuntaş, M.; Agyekum, E.P.; Zawbaa, H.M.; Kamel, S. The dynamic impact of biomass and natural resources on ecological footprint in BRICS economies: A quantile regression evidence. *Energy Rep.* **2022**, *8*, 1979–1994. [CrossRef]
63. Nathaniel, S.P.; Nwulu, N.; Bekun, F. Natural resource, globalization, urbanization, human capital, and environmental degradation in Latin American and Caribbean countries. *Environ. Sci. Pollut. Res.* **2021**, *28*, 6207–6221. [CrossRef]
64. Xu, X. The impact of natural resources on green growth: The role of green trade. *Resour. Policy* **2022**, *78*, 102720. [CrossRef]
65. Badeeb, R.A.; Lean, H.H.; Shahbaz, M. Are too many natural resources to blame for the shape of the Environmental Kuznets Curve in resource-based economies? *Resour. Policy* **2020**, *68*, 101694. [CrossRef]
66. Zafer, M.W.; Zaidi, S.S.; Khan, N.R.; Mirza, F.M.; Huo, F.; Kirmani, S.A. The impact of natural resources, human capital, and foreign direct investment on the ecological footprint: The case of the United States. *Resour. Policy* **2019**, *63*, 101428. [CrossRef]

67. Fathi, A.; Zhakanova Isiksal, A.; Zhakanov, A. *Do Natural Resources and Human Capital Contribute to Environmental Degradation? Evidence from the Central Asian States*; IEEE: Piscataway, NJ, USA, 2022; pp. 249–256. [CrossRef]
68. Karatayev, M.; Hall, S. Establishing and comparing energy security trends in resource-rich exporting nations (Russia and the Caspian Sea region). *Resour. Policy* **2020**, *68*, 101746. [CrossRef]
69. Luo, K.; Wang, Q.; Liang, C. The way to break the resource curse: New evidence from China. *Resour. Policy* **2022**, *79*, 102971. [CrossRef]
70. Yu, H.; Hu, C.; Xu, B. Re-examining the existence of a "resource curse": A spatial heterogeneity perspective. *J. Bus. Res.* **2022**, *139*, 1004–1011. [CrossRef]
71. Wang, Z.; Zhang, B.; Wang, B. Renewable energy consumption, economic growth, and human development index in Pakistan: Evidence form a simultaneous equation model. *J. Clean. Prod.* **2018**, *184*, 1081–1090. [CrossRef]
72. Pesaran, M.H.; Shin, Y.; Smith, R. Bounds testing approaches to the analysis of level relationships. *J. Appl. Econom.* **2001**, *16*, 289–326. [CrossRef]
73. Haug, A. Temporal Aggregation and the Power of Cointegration Tests: A Monte Carlo Study. *Oxf. Bull. Econ. Stat.* **2002**, *64*, 399–412. [CrossRef]
74. Baloch, M.A.; Suad, S. Modeling the impact of transport energy consumption on CO_2 emission in Pakistan: Evidence from ARDL approach. *Environ. Sci. Pollut. Res.* **2018**, *25*, 9461–9473.
75. Banerjee, A.; Newman, A. Occupational Choice and the Process of Development. *J. Political Econ.* **1993**, *101*, 274–298. [CrossRef]
76. Narayan, P.K. The saving and investment nexus for China: Evidence from cointegration tests. *Appl. Econ.* **2005**, *17*, 1979–1990. [CrossRef]
77. Brown, R.L.; Durbin, J.; Evans, J. Techniques for Testing the Constancy of Regression Relationships over Time. *J. R. Stat. Soc. Ser. B* **1975**, *37*, 149–192. [CrossRef]
78. Granger, C.W.J. Investigating causal relations by econometric models and crossspectral methods. *Econometrica* **1969**, *37*, 424–438. [CrossRef]
79. Pesaran, M.H.; Shin, Y. Pooled mean group estimation of dynamic heterogeneous panels. *J. Am. Stat. Assoc.* **1999**, *94*, 621–634. [CrossRef]
80. Torchia, A. UAE to Cut State Spending by 4.2 Percent This Year—Central Bank. Reuters, 2015. Available online: https://www.reuters.com/article/emirates-spending-idUSL5N1072PL20150727 (accessed on 29 October 2022).
81. Stocker, M.; Baffes, J.; Vorisek, D. What triggered the oil price plunge of 2014–2016 and why it failed to deliver an economic impetus in eight charts. *World Bank Blogs* **2018**. Available online: https://blogs.worldbank.org/developmenttalk/what-triggered-oil-price-plunge-2014-2016-and-why-it-failed-deliver-economic-impetus-eight-charts (accessed on 17 October 2022).
82. Shobande, O.A.; Joseph, O.E. A Multivariate VAR Model for Evaluating Sustainable Finance and Natural Resource Curse in West Africa: Evidence from Nigeria and Ghana. *Sustainability* **2021**, *13*, 2847. [CrossRef]
83. Wang, M.L.; Wang, W.; Du, S.Y.; Li, C.F.; He, Z. Causal relationships between carbon dioxide emissions and economic factors: Evidence from China. *Sustain. Dev.* **2019**, *28*, 73–82. [CrossRef]
84. Akbar, M.; Hussain, A.; Akbar, A.; Ullah, I. The dynamic association between healthcare spending, CO_2 emissions, and human development index in OECD countries: Evidence from panel VAR model. *Environ. Dev. Sustain.* **2021**, *23*, 10470–10489. [CrossRef]
85. Bedir, S.; Yilmaz, V.M. CO_2 emissions and human development in OECD countries: Granger causality analysis with a panel data approach. *Eurasian Econ. Rev.* **2016**, *6*, 97–110. [CrossRef]
86. Asongu, S.A. CO_2 emission thresholds for inclusive human development in sub-Saharan Africa. *Environ. Sci. Pollut. Res.* **2018**, *25*, 26005–26019. [CrossRef]
87. Liu, S.Y.; Wu, P.C.; Huang, T.Y. Nonlinear Causality between Education and Health: The Role of Human Development Index. *Appl. Res. Qual. Life* **2018**, *13*, 761–777. [CrossRef]
88. Ullah, K.; Majeed, M.T. District-level multidimensional poverty and human development in the case of Pakistan: Does institutional quality matter? *GeoJournal* 2022. [CrossRef]
89. Wang, S.; Wang, X.; Lu, B. Is resource abundance a curse for green economic growth? Evidence from developing countries. *Resour. Policy* **2022**, *75*, 102533. [CrossRef]
90. Climate Watch. 2022. Available online: https://www.climatewatchdata.org/countries/ARE?end_year=2019&start_year=1990 (accessed on 19 May 2022).
91. United Nations. MENA Climate Week Opens with Aim To Accelerate Climate Action. 2022. Available online: https://egypt.un.org/en/176181-mena-climate-week-opens-aim-accelerate-climate-action (accessed on 19 May 2022).
92. The UAE Governmental Portal. Green Economy for Sustainable Development. 2022. Available online: https://u.ae/en/about-the-uae/economy/green-economy-for-sustainable-development (accessed on 21 May 2022).
93. Climate Scope. 2022. Available online: https://global-climatescope.org/markets/ae/ (accessed on 23 May 2022).
94. Climate Action Tracker. 2020. Available online: https://climateactiontracker.org/countries/uae/policies-action/ (accessed on 21 May 2022).