

## Article

# Driving Factors of Economic Diversification in Resource-Rich Countries via Panel Data Evidence

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**Abstract:** Economic diversification is an essential aspect of sustainable development as diversification enhances macroeconomic stability and promotes structural and long-term transformation not only in the economy but also in other pillars of development such as social institutions and dimensions. There is empirical evidence suggesting an impact of economic and structural factors on diversification. However, there is no consensus on the results in the literature because of various factors, such as the employment of different variables, methodologies, countries, and periods. This paper empirically explores the relations driving economic diversification in 14 resource-rich countries between 2001 and 2019, with six alternative models. In this regard, feasible generalized least squares regression was employed for the proposed model specifications. It provides strong evidence that gross capital formation, financial development, labor force participation, education, and the rule of law have statistically significant and positive impacts on economic diversification performance. On the other hand, inward foreign direct investment, real GDP growth, and self-employment rate also have statistically significant, but negative, impacts on economic diversification, probably because they further promote or are a result of resource-based growth rather than diversification into other technology- and knowledge-based sectors.

**Keywords:** economic diversification; export diversification; resource curse; resource-rich countries; sustainable economic development



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## 1. Introduction

The resource curse, also called resource trap or the paradox of plenty, is a concept indicating a paradoxical phenomenon in which a country with an abundance of valuable natural resources underperforms economically. Countries become vulnerable to falls in natural resource prices and thus to long-run economic underperformance when they fail to make adequate investments in non-resource sectors, particularly manufacturing. The resource curse and blessing, or the antagonistic and complementary relationship between natural resource abundance and economic development, has been broadly examined in the literature. Studies show that it causes a substantial nominal, and also a real, appreciation in the currency if the currency has a floating exchange rate, and that it reduces exports in non-resource sectors because of short-term high and relatively easy earnings in the resource sectors [1]. For instance, Angola, the second-largest oil exporter in Sub-Saharan Africa after Nigeria, has experienced exchange rate pressure and dollarization and an increase in oil shares over the total exports—thus a decrease in non-resource exports [2]. The literature also reported that the economic structures of many countries have been adversely affected by resource abundance in the long term, although only a few have benefited from it [3]. In line with the solid empirical findings in the literature such as Ahmadow 2014 [4], a promising potential solution for ending the resource curse is to diversify away from primary commodities into new sectors and industries by actively promoting citizens into productive work and entrepreneurial activities [5,6]. In order

to avoid the resource curse, economies are advised to generate income from different sources that are not dependent on a sole resource such as oil and natural gas. In this regard, economies are expected to move to a more diverse production form by obtaining or developing the know-how required to manufacture high-value-added products and provide services. The literature demonstrates that economic diversification and structural transformation are correlated with economic growth, particularly at initial development stages [7,8], indicating that resources are reallocated dynamically to technology/knowledge-based productive businesses, industries, and sectors through simultaneous structural transformation and diversification.

Despite the consensus on the importance of diversification for economic and overall sustainable development, there is a limited understanding of the specific factors driving economic diversification, particularly in the context of resource-rich economies, so that accurate, reliable, and repeatable diversification strategies can be designed with minimal ambiguities. Ploeg (2011) investigated various hypotheses in his seminal work for the positive and negative impacts of extracting natural resources for export purposes on the economies of resource-rich countries [9]. He reported that countries depending on primary exports of natural resources illustrate lower growth rates and higher income inequality, particularly if the rule of law, the quality of institutions, and corruption levels are wide and deep in the society. That study emphasizes the importance of quality institutions, trade openness, and R&D investment in technology exploration for rentier states to enjoy natural resource wealth benefits. However, resource-rich countries present different and distinctive patterns regarding their economic, social, and cultural structures to cope with the diversification challenges. Alsharif et al. (2017) survey the history of the success and failure of diversification and conclude that the Middle East and North African (MENA) countries and those in the Sub-Saharan African belt lack sufficient policies and regulations to encourage diversification away from resource-based economies [10]. Frequently fluctuating energy commodity prices exert pressure on energy-rich countries and stimulate their policymakers to give importance and priority to economic diversification. Indeed, oil-rich countries are supposedly in an advantageous situation to develop sustainable, competitive, and innovative sources of economic growth because they hold significant capital due to resource rent which can be invested in diversification, but they have not achieved it yet although it has been in their strategy agenda for many decades [11].

This study aims to investigate and identify the driving forces of the economic diversification in the resource-rich countries. First, we identified the resource-rich countries according to their total natural resource rent from high to low levels between 1980–1985. Then we selected various macroeconomic indicators to measure economic diversification performance as the growth rate of real manufacturing and services. Finally, we estimated the cross-country impact of economic and structural factors on economic diversification performance.

This study contributes to the literature by investigating the significance of the economic indicators (gross capital formation, domestic credit rate, foreign direct investment, and real GDP annual growth rate) and structural variables (labor force participation, self-employment rate, human capital development in education, and the rule of law) on economic diversification simultaneously using panel data. We employed a new proxy for economic diversification, namely the subtraction of total natural resources from the total GDP, rather than the non-resource exports widely used in the literature. The results show that the driving factors for economic diversification are education (EDU), labor force participation (LPR), financial development (DCR), and investments in the non-resource sectors (GCF). In addition, the structural factors in the models indicate that economic diversification is not determined by economic factors alone.

## 2. Literature Review

The importance of economic diversification is widely acknowledged around the world, and many resource-abundant countries have been striving to make and implement

diversification policies to improve their economic performance and achieve a sustainable economy [11]. Economic diversification, which is an essential aspect of the development process for not only rentier states but all countries, improves macroeconomic steadiness and resilience to financial shocks and supports a transition to sustainable and higher growth [8]. The lack of economic diversification and specializing in resource exports could crowd out other tradable sectors, which would ultimately have negative externalities on the economy. IMF (2014) [7] surveyed the progress and policies supporting economic diversification in the Gulf Cooperation Council (GCC) countries and documented that macroeconomic stability, improving the business climate, promoting trade and FDI, advancing education, and diversifying the industrial base and service sectors are among the factors directly related to economic diversification performance [12]. The literature accommodates many studies focusing on only a few of these factors to evaluate their link with economic diversification. Harding & Javorcik (2011) focus on FDI [13], Aker and Aghaei (2019) [14] on the business environment, Olander (2019) [15] focuses on institutional quality, and Matallah (2020) [16] on the relationship between governance indicators and economic diversification.

The factors driving economic diversification require more investigations comprehensively in a multifaceted perspective, although researchers have spent tremendous time and efforts linking diversification and economic development. Many empirical studies have focused on export diversification, which is a byproduct of economic diversification. Most of these works aim at identifying the impact of export diversification on economies [17–20]. Ahmadov (2014) conducted empirical studies to estimate the effects of economic and structural variables on export concentration by employing panel data of 65 developing countries having resource rents higher than a certain threshold [4]. He concluded that diversification is considerably limited in countries with authoritarian institutions, fragile law and regulations, and arid and torrid terrains such as the Middle East and sub-Saharan Africa. His study reported that political participation and quality of government surprisingly do not have an impact on export concentration, whereas he found weak evidence supporting the effect of trade integration and policy, as well as tariff rates, on export concentration.

Parteka and Tamberi (2008) investigated the effects of various variables—country size, geographical conditions, endowments, human capital, and institutional setting—on export diversification employing panel data for 60 countries and showed that country size and closeness to major markets are statistically significant determinants for export diversification [21]. Similarly, Agosin et al. (2011) illustrated that increases in trade openness cause human capital growth and larger specialization, and thus increases in export diversification, while financial development has a limited impact on it [22]. Ross (2019) analyzed economic diversification among the 38 largest oil-producing countries for the 1962–2010 period and found that an increase in diversification leads to a decrease in oil wealth [23]. He also demonstrated that diversification success is weakly associated with government performance, population, and democratic accountability. Addisu et al. (2020) defined country-level “competitive capability” as helping the evaluation of non-resource-based growth by associating it with non-resource growth rate [24]. This descriptive study evaluates the performance of diversification and development of these capabilities assessing correlations among variables. It presents evidence of the positive associations between competitive capabilities and resource abundance.

This paper investigates the relationship between competitive capabilities and economic diversification performance using a robust empirical analysis. The contribution of this paper is to incorporate the impact of both economic factors and structural variables together on economic diversification in various models. The inclusion of structural variables which provide additional information on the resource-rich countries’ institutional settings shows us the reform areas for policymakers.

### 3. Methodology

#### 3.1. Country Selection

We first identified the resource-rich countries to investigate impacts on export, and thus economic, diversification. To this end, we ordered countries according to their total natural resource rent from high to low levels. Initially, thirty countries were identified according to the highest initial resource endowment as per the average total resource rent (% of GDP) between 1980–1985. This period was chosen to compare the countries' initial endowment and determine the reliance on the natural resources before their economic development. Due to data shortcomings and limited data availability, the list was narrowed down to 14 countries. These countries are: Algeria, Angola, Gabon, Indonesia, Iran, Kuwait, Malaysia, Nigeria, Oman, Qatar, Peru, Saudi Arabia, Uganda, and the United Arab Emirates. The reliance on resource exports could also be used to determine resource-rich countries. However, export-related measures might have a bias as the domestic consumption of the resources, and thus the export of the resource output, depends on the development of the economy [25]. Ahmadov (2014) also showed that developing countries with natural resource abundance have a limited capability to accomplish export diversity. In short, the "resource-rich" countries were selected based on resource rent.

We selected only resource-based rentier countries between 1980–1985 for two main reasons. First, there was a risk that the results would be biased or misinterpreted because of the mixed diversification, since we conducted panel data estimations. Second, (the first reason also originated from this drawback) the diversified resource-rich countries have considerably different economic and structural dynamics that positively and substantially distinguish them from other still non-diversified countries. The diversified resource-rich countries should be considered separately in a within-country analysis if sufficient data is gathered, or they can be grouped as diversified resource-rich countries to analyze their diversification process. Furthermore, these diversified resource-rich countries mostly diversified their economy before the beginning of the 2000s and before the time frame (2001–2019) of this study. Therefore, we decided to select only non-diversified resource-rich countries and to analyze the effects of economic and structural factors on diversification. Although almost all of them are not diversified yet, the diversification proxy in this study (total GDP—total natural resource rent) considerably improved over time by countries.

#### 3.2. Data

Data shortcomings are one of the caveats in studying developing economies. Due to some missing data for some countries, we used the data from 2001 to 2019 for the purpose of analyzing the same period for the selected countries. This study covers the diversification performance of fourteen resource-rich countries that provide us a sample size of 266 for the given period. The study aims at examining the driving forces of economic diversification. Therefore, the dependent variable is economic diversification (DIV) proxied by the subtraction of the GDP share of total natural resources rent from the total annual GDP. We assume that this ratio's real GDP growth is a valuable proxy for economic diversification. This is because the income generated from these non-resource sectors over time would represent the long-term diversification trajectory for countries that were rentier states initially [24]. We grouped independent variables into two categories. The economic variables were identified as gross capital formation (GCF), domestic credit to private sector by banks (DCR), and the GDP share of foreign direct investment net inflows (FDI). We also used real GDP (constant 2015) annual growth rate (RGDP), retrieved from the WDI [26], to discover the impact of global economic activity on the diversification. The second group of independent variables represents the structural features of countries. These are represented by labor force participation (LPR), the self-employment rate (SER), which also partly implies the degree of ease of doing business, human capital development in education (EDU), and the rule of law indicator (ROL). The descriptive statistics for all the data used in this study were given in Table 1.

**Table 1.** The descriptive statistics of the economic and structural variables.

Variable	Mean	Std. Dev.	Min	Max
Diversification (DIV)	76.08	14.21	41.02	98.34
Gross capital formation (GCF)	27.31	7.839	12.83	50.78
Domestic credit rate (DCR)	39.50	30.25	3.435	127.23
Foreign (FDI)	2.396	3.063	−6.369	24.01
Real GDP growth (RGDP)	3.976	4.720	−12.46	26.17
Labor force participation (LPR)	65.59	12.80	43.64	88.51
Self-employment rate (SER)	36.29	29.42	0.410	89.06
HDI Education Index (EDU)	0.600	0.102	0.300	0.803
Rule of Law Index (ROL)	−0.250	0.671	−0.663	0.958

Notes: The sample comprises data for 14 countries between 2001–2019. The number of observations is 266. DIV, GCF, DCR, FDI, RGDP, LPR, and SER [26]; HDI [27]; ROL [28].

Capital formation or accumulation refers to produced means such as plants, machinery, and equipment and plays an important role in economic growth. Both financial and non-financial capital accumulation is required for a country to diversify its economy away from a resource-based sector to multiple non-resource industries and businesses. Many studies in the literature have investigated the importance of capital formation on economic growth from both theoretical and empirical perspectives. For instance, Solow (1957) in his pioneering work explained the contribution of physical capital accumulation to long-run economic growth by utilizing growth theory [29]. There are also various empirical studies investigating the relationship between capital formation and economic growth. De Long and Summers (1990) demonstrated that countries' productivity growth could be determined by machinery accumulation that is also a prime indicator for a higher level of economic growth [30]. In this regard, as a share in GDP, the gross capital formations for the selected countries are gathered from the WDI (World Bank 2021).

Economic growth is a composition of various indicators, such as production, consumption, and capital formation, and these require financial development because of capital needs. Domestic credit to the private sector is broadly employed as a proxy for financial development in the literature. To the best of our knowledge, Schumpeter (1912) proposed for the first time that domestic credit in the banking sector finances investments [31], which is divided into public and private investments that should stimulate each other for sustainable economic development [32]. Several empirical studies, such as that by King and Levine (1993) [33], found evidence that an increase in financial service performance leads to real economic growth. As for the source of economic diversification, domestic credit or financial development could support nations in developing alternative sectors in the economy. In this regard, as a share in GDP, domestic credit to the private sector for the selected countries is obtained from WDI (World Bank 2021).

In addition to domestic investments, foreign direct investment (FDI) influences growth by improving resource use efficiency and total factor productivity in the economies [34]. In the literature, there are many studies reporting the positive effects of foreign direct investment on growth, such as Markusen (1995) [35]. Therefore, in order for governments in developing countries to develop new industries and promote economic diversity, attracting private capital is as important as stimulating economic development through increased investment, especially for building infrastructure. We retrieved the inward FDI flow percentage of GDP for each country from the WDI (World Bank 2021).

IMF points out distinctive characteristics for resource-abundant countries by utilizing various indicators such as institutional quality, development and infrastructure level, and globalization, and shows that a higher degree of these parameters leads to a positive impact on economic diversification [36]. IMF reported that gender inequalities in opportunities and limited female labor participation present a negative relationship with economic diversification [37]. These inefficiencies in resource allocation hinder the development of alternative sectors. We used the total labor force data obtained from the WDI (World Bank 2021).



Structural variables such as human capital development, innovation, and knowledge accumulation have paved the way for endogenous growth theory since the seminal work of Romer (1986) [38], Lucas (1988) [39], and Barro (1990) [40]. Developing human capital also supports economic diversification by providing a skilled labor force for skill-intensive industries and the use of technological advancements. The United Nations Development Program (UNDP) developed the Human Development Index (HDI) to assess the capabilities of people in 189 nations between 1990 and 2018 (UNDP 2020). We used the education index, which is a sub-index under HDI, to assess educational attainment. The index values are between 0 to 1.

The domestic institutional arrangement or the governance system is another characteristic of a nation that has an impact on the level of diversification. Cuberes and Jerzmanowski (2009) provided empirical evidence confirming the constructive association between industrial diversification and democracy [41]. Cabral and Veiga (2010) demonstrated that governing transparency, corruption level, and accountability play a prominent role in encouraging or discouraging economic diversification and increasing sophisticated exports [42]. We included governance performance into our models by employing the “Rule of Law” measurement to capture the public perception of obeying or disobeying the rules of society. This data for the selected countries were retrieved from the Worldwide Governance Indicators (WGI 2020).

The significance of the business environment on economic development has been discussed largely in academia, such as in Besley (2015) [43] and Fernández-Serrano and Romero (2014) [44]. Countries with more business-friendly regulations tend to have higher growth rates and the impact of improving regulations is found to be large [45]. In this regard, we used the SER as a proxy for entrepreneurship and ease of doing business. However, Alba-Ramirez (1994) [46], Earle and Sakova (2000) [47], and Santarelli and Vivarelli (2007) [48] illustrated that self-employment might indicate a lack of employment opportunities, forcing citizens to establish their own replicative, not innovative, businesses [49]. Therefore, we also investigated whether there was inefficiency in self-employment in resource-rich countries.

### 3.3. Feasible Generalized Least Squares

Feasible generalized least squares (FGLS) was employed as an estimation method for panel data in a cross-country time series for the selected countries. With the panel data approach, we not only have a larger sample size to increase the efficiency of estimates, but also can investigate some issues that cannot be handled by country-specific data, such as heterogeneity and state dependence across time [50]. All the data were transformed by shifting the series to make all data points positive and taking natural log to interpret the results by the elasticity (see Equation (1)).

$$X_{it} = \begin{cases} \log(X_{it} + \min(X_i) + 1), & \min(X_i) \leq 0 \\ X_{it}, & \min(X_i) > 0 \end{cases} \quad (1)$$

where  $\min(X_i)$  is a minimum value of a data column of  $X_i$  ( $i = DIV, GCF, DCR, FDI, RGDP, LPR, SER, EDU, ROL$ ), and  $X_{it}$  represents a datapoint of  $X_i$  at time  $t$ .

The base model given in Equation (2) employs only economic indicators as explanatory variables to investigate their impact on economic diversification. Equation (3) represents only structural factors as independent variables to examine their effect on economic diversification. Equation (4) incorporates structural variables into the first model including economic indicators.

$$LDIV_{it} = \alpha_i + \beta_1 LGCF_{it} + \beta_2 LDCR_{it} + \beta_3 LFDI_{it} + \beta_4 LGDP_{it} + u_{it} \quad (2)$$

$$LDIV_{it} = \alpha_i + \beta_1 LLPR_{it} + \beta_2 LSER_{it} + \beta_3 LEDU_{it} + \beta_4 LROL_{it} + v_{it} \quad (3)$$

$$LDIV_{it} = \alpha_i + \beta_1 LGCF_{it} + \beta_2 LDCR_{it} + \beta_3 LFDI_{it} + \beta_4 LGDP_{it} + \beta_5 LPR_{it} + \beta_6 LSER_{it} + \beta_7 LEDU_{it} + \beta_8 LROL_{it} + y_{it} \quad (4)$$

where  $\alpha_i$  implies the unobservable or individual effects of countries. LGCF is the natural log of gross capital formation, LDCR is the natural log of the domestic credit growth, LFDI is the log of foreign direct investment, LRGP is the log of the real GDP growth, LLPR is the log of labor force participation, DSER is the log of self-employment rate, LEDU is the log of the Human Development Education Index, LROL is the log of the Rule of Law scores, and  $u_i$ ,  $v_i$ , and  $y_{it}$  are the error terms.

We first analyzed the base model (Equation (4)) to determine which model—whether a pooled least square model or fixed effect—estimates economic diversification with minimum bias and spurious results. We ran fixed-effects (within) regression and checked the results of an F-test for the redundant fixed effects where the null hypothesis is  $H_0 : \alpha_i = 0$  and the alternative hypothesis is  $H_a : \alpha_i \neq 0$ . The result (13,244) was 18.01 with a probability value of 0.0000 leading to the rejection of the null hypothesis, implying that the fixed-effect model is the appropriate model specification for our estimations, instead of a pooled least square [51]. In order to be sure about the construction of the model, this study also utilized a well-known specification test called the Hausman test [52]. This test examines the correlation between the regressors and unobservable effects to decide the appropriateness of a fixed or random effect model specification. The Hausman specification test's Chi-square value was 38.238 at 0.0000  $p$ -value, implying that the null hypothesis could be strongly rejected in favor of the fixed effect model. Therefore, we investigated economic diversification estimates based on the fixed-effect model.

### 3.4. Robustness

Once we determined the specification as the fixed-effect model, we constructed the model and applied robustness tests for the base model in Equation (4). This study examined the serial correlation between the fixed-effect model's error terms to avoid bias in standard errors and misleading coefficients by employing the Wooldridge test [53]. Wooldridge's F-test statistic strongly rejects the null hypothesis of no serial correlation by the value of 937.12 with a  $p$ -value of 0.000, implying the existence of a first-order serial correlation. Afterward, this study investigated the presence of heteroscedasticity in residual terms by employing the Breusch–Pagan Lagrange Multiplier test [54]. The resulting test statistics was 673.62 with a  $p$ -value of 0.0000, which strongly rejects the null hypothesis of homoscedasticity in error terms. In order to handle both serial correlation and heteroscedasticity problems, we decided to use the FGLS regression, which is substantially different from the ordinary least squares (OLS). The FGLS method utilizes the covariance matrix of errors to estimate  $\beta$  coefficients. Therefore, the FGLS improves the efficiency and solves the problems of violating the OLS requirements of homoscedasticity and no serial correlation. In addition to this, we investigated cross-section dependence by testing the null hypothesis for the base model in Equation (4). The result indicates that there was no cross-sectional dependence (CD) by the value of  $-0.410$  with a  $p$ -value of 0.0000. We also conducted the Pesaran CD test and the Breusch–Pagan Lagrange Multiplier test to examine the cross-sectional correlation in each model analyzed in this study (Appendix A, Table A1).

The general model is given in Equation (5):

$$y_{it} = \alpha_i + X_{it}\beta + \epsilon_{it} \quad (5)$$

where  $i = 1, 2, \dots, m$  is the panel numbers, and  $t = 1, 2, \dots, T_i$ , represents time steps in years for each panel. After the application of FGLS, the  $\beta$  coefficients were estimated according to Equation (6):

$$\beta_{GLS} = \left( X' \hat{\Omega}^{-1} X \right)^{-1} X' \hat{\Omega}^{-1} y \quad (6)$$

where  $\Omega = \sum_{mxm} \otimes I_{T_i \times T_i}$  and the variance matrix is estimated by replacing the estimator  $\Sigma$  with  $\hat{\Sigma}$ , where  $\hat{\Sigma}_{i,j} = \frac{\epsilon_i^t \epsilon_j^t}{T}$ .

#### 4. Results and Discussion

Table 2 reports the FGLS regression results consisting of seven models that estimate economic diversification. Model 1 estimates only economic indicators and shows the findings for the coefficients. Model 2 examines only structural variables' impact on economic diversification. Model 3 represents the complete and comprehensive estimations by adding structural variables (i.e., Model 2) on top of Model 1. Model 4 measures the change in the significance levels of the given variables on economic diversification when we remove the negative and statistically significant effect from the structural variable in Model 3. We also alternatively ran Model 5 by removing the LROL from the structural variables in Model 4 to inspect whether there would be a change in directions (i.e., positive or negative) and significance level. Lastly, Model 6 investigates the change in directions and significance levels when removing the LFDI that is negative and a significant economic variable on economic diversification. The main goal of having these alternative models was to check whether the variables found to be significant would change the results in directions and significance level when included in the model separately and not altogether.

**Table 2.** Feasible GLS fixed model results.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	LDIV	LDIV	LDIV	LDIV	LDIV	LDIV
LGCF	0.054 ***		0.043 ***	0.050 ***	0.047 ***	0.045 ***
LDCR	0.115 ***		0.080 ***	0.083 ***	0.085 ***	0.085 ***
LFDI	−0.011 ***		−0.008 **	−0.008 **	−0.010 ***	
LGDP	−0.053 ***		−0.056 ***	−0.057 ***	−0.055 ***	−0.058 ***
LLPR		0.160 ***	0.057 ***	0.160 ***	0.146 ***	0.161 ***
LSEER		−0.070 ***	−0.053 ***			
LEDU		0.323 ***	0.123 ***	0.122 ***	0.127 ***	0.125 ***
LROL		0.082 ***	0.036 ***	0.037 ***		0.043 ***
C	3.924 ***	3.951 ***	4.029 ***	3.414 ***	3.509 ***	3.398 ***

Notes: (i) \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; (ii) the number of observations for each model was 266; (iii) The number of countries for each model was 14.

Gross capital formation (i.e., LGCF) played positive and statistically significant role in economic diversification (DIV) at a 1% significance level in all the models. The coefficients were estimated as 0.054, 0.043, 0.050, 0.047, and 0.045 in Model 1 and Models 3–6, respectively. The positive sign indicates that an increasing gross capital formation leads to larger economic diversification and less total natural resource rent share in GDP. In other words, these coefficients imply that an increase in gross capital formation will increase economic diversification by around 5%. The closeness of the coefficients in all the models also provides evidence of the models' robustness and accuracy. Solow (1957)'s foundational study on economic growth identifies physical capital as an important element in long-run economic growth [29]. Therefore, this indicates that the result is consistent with growth theory. Resource-rich countries accumulating non-financial and financial capital would achieve growth in non-resource sectors, which means larger economic diversification.

Most of the countries in this study were allocated budgets, with some of the countries even spending a significant amount, to carry out public and private infrastructure focused on transportation (i.e., airports, seaports, railways, highways, and so on) and educational and training facilities. For instance, Qatar has made substantial investments since 2010 in public transportation (i.e., metro lines), stadiums, recreational facilities, and construction because of the FIFA World Cup 2022. In general, they have built transportation facilities the diffusion of their local products in order to increase export diversification, and thus economic diversification. They have made large investments in educational facilities, and this falls into gross capital formation, because we have also strong evidence that education drastically improves economic diversification.

Domestic credit to the private sector was substituted for financial development. The change in the DCR positively and significantly affects economic diversification for the



resource-dependent countries at a 1% significance level in all the models. The coefficients were estimated as 0.115, 0.080, 0.083, 0.085, and 0.085 in Model 1 and Models 3–6, respectively. These coefficients indicate that an increase in financial development will increase economic diversification by approximately 8.5%. Financial development is the most impactful economic variable on economic diversification. Studies on financial development impact on diversification are scarce in the literature, although the causal association between financial development and growth has still been debated largely by empirical studies since the beginning of the last century, such as by Schumpeter (1912) [31] and Robinson (1952) [55].

Foreign direct investment is examined for the impact on economic diversification. The LFDI plays a statistically significant and negative role in diversification at a 1% significance level in Model 1 and Model 5, and at a 5% level in Model 3 and Model 4. The coefficients were estimated as  $-0.011$ ,  $-0.008$ ,  $-0.008$ , and  $0.010$  in Model 1 and Models 3–5, respectively. In other words, an increase in inward foreign direct investment caused a decrease in economic diversification by about 0.9%. The negative sign implies that an increase in FDI flows steers economic diversification downward. The literature contains mixed results on the FDI's impacts on diversification. The FDI results obtained in this study confirm those from Herzer (2010)'s work [56], namely that there is a negative relationship between FDI and growth, and thus diversification. On the other hand, Iwamoto and Iwamoto (2012) illustrated the positive impact of FDI inflows on export diversification and sophistication by utilizing panel data for 175 countries between 1980 and 2007 [57]. However, this study has limitations for extracting valuable and customized information on resource-rich countries due to the panel data employed in their study. Put differently, their panel data does not distinguish between the countries that present different dynamics.

The real GDP growth (LGDP) coefficients were calculated as  $-0.053$ ,  $-0.056$ ,  $-0.057$ ,  $-0.055$ , and  $-0.058$  in Model 1 and Models 3–6, respectively, and the significance levels were at 1% in all the models. In other words, an increase in the real GDP growth led to a decrease in economic diversification by around 5.6%. The negative and strong effect of the variable is in line with the economic dependency on natural recourses for resource-rich rentier countries. This finding shows that the countries under consideration in this study are still rentier economies and far from diversification. This result confirms that in Ari and Koc (2019)'s study demonstrating that the GCC countries are still rentier economies according to the non-linear causality test results, although some of them present a diversified economy in linear settings [11].

Changes in GDP growth depend on various underlying factors, and the negative impact of GDP growth originated from these factors, not directly from the growth itself. We can simply divide the GDP into two parts in the rentier countries: resource-based and non-resource-based GDP. As in this study, GDP growth negatively affects economic diversification if the weight of the resource GDP growth increases. There are two main causes of an increase in resource GDP growth. First, the extraction of natural resources or their prices, or both, rise more than the non-resource-based sectors because of local and global demand. Another reason can be a decrease in the production of the non-resource sectors, such as manufacturing, because of the attractiveness of the resource-based growth originating from short-term high and relatively easy earnings.

Labor force participation positively and strongly caused economic diversification at a significance level of 1% in Models 2–6. The estimated coefficients were 0.160, 0.057, 0.160, 0.146, and 0.161 in Models 2–6, respectively. Put differently, an increase in labor force participation substantially caused an increase in economic diversification ranging from 5.7% to 16.1%. These coefficients of the LLPR fluctuated considerably depending on the other variables, which implies that the LLPR has a profound role in increasing diversification in the existence and absence of the different variables. The positive sign indicates that an increase in LPR leads to higher growth rates in non-resource sectors and thus larger economic diversification. This result is consistent with the IMF report demonstrating a positive association between female labor participation and economic

growth [37]. As resource-rich economies develop alternative sectors, there emerges the need for a larger labor force through an increase in participation or through expatriate workers. Therefore, structural elements of the labor market such as the capabilities of the labor force, intersectoral flexibility, and social limitations play a crucial role in accelerating economic diversification.

The results show that the self-employment rate was the only indicator among the structural variables having a significant and negative impact on economic diversification at a 1% significance level in Model 2 and Model 3. The coefficients were estimated as  $-0.070$  and  $-0.053$  in Model 2 and Model 3, respectively. In other words, an increase in self-employment rate surprisingly led to a decrease in economic diversification by 6.2% when all the economic and structural indicators were included in Model 3. This result confirms the those from the studies by Alba-Ramirez (1994) [46], Earle and Sakova (2000) [47], and Santarelli and Vivarelli (2007) [48], who demonstrated that self-employment might indicate a lack of employment opportunities particularly in technology-, knowledge- and manufacturing-driven sectors, forcing citizens to establish their own replicative, not innovative, businesses such as for food, clothing, or (at best) services supporting the resource-intensive sector and its workforce [49]. In line with this, the resource-rich rentier countries have experienced significant inefficiency and probably a loss of opportunity through self-employment.

Educational attainment in the structural factors is proxied by the Human Development Education Index (EDU). The results show that education plays a strongly significant and positive role in economic diversification, and that it is the most influential indicator among all the other economic and structural variables. The estimated coefficients were 0.323, 0.123, 0.122, 0.127, and 0.125 in Models 2–6, respectively, at a 1% significance level. In other words, an increase in education dramatically increased economic diversification ranging from 12% to 32%. This finding confirms that sustained access to and possession of quality education on a country-wide basis and without any discrimination to fill gaps in diversification policy must be a key ingredient [58]. However, despite the benefits of education noted in the literature, many resource-rich countries have limited levels of education expenditure and attainment [59], although there are recent studies strategizing about education for the rentier states to enable their transition from resource-based to knowledge-based economies [60].

Finally, governance represented by the Rule of Law Index (RLI) was found to be positively and significantly impactful on economic diversification. The positive relation is consistent with theoretical expectations. The coefficients were computed as 0.082, 0.036, 0.037, 0.043 in Models 2–4 and Model 6, respectively, at a 1% significance level. The effectiveness of law enforcement and the security of property rights promote the investment environment in the country and lead the economies to develop alternative sectors more easily. Therefore, rule of law reforms should be part of a broader strategy for stimulating economic diversification.

## 5. Conclusions

Economic diversification is an essential aspect of sustainable economic development as diversification enhances macroeconomic stability and promotes structural and long-term transformation not only in economy but also in other pillars of sustainability. Many studies in the literature discuss the link between the diversification and sustainable economic development for rentier states. In addition, strong empirical evidence suggests a relationship among economic indicators, structural factors, and economic diversification. However, the factors driving the diversification have not been completely investigated, and countries have their own unique pathway constraints dictated by their economic, social, demographic, and policy- and decision-making structures. This paper empirically explored these factors driving economic diversification, with particular attention to structural competitive capabilities such as business environment, education, and governance. In this regard, feasible generalized least squares regression was employed for the proposed

model specifications, providing strong evidence that gross capital formation, financial development, labor force participation, education, and the rule of law have statistically significant and positive impacts on economic diversification performance. On the other hand, inward foreign direct investment, real GDP growth, and the self-employment rate also have statistically significant, but negative, impacts on economic diversification. We concluded that the driving factors are the factors positively impacting economic diversification with at least a 5% level. In this regard, the driving factors are education (EDU), labor force participation (LPR), financial development (DCR), and investments in non-resource sectors (GCF).

According to the results of this study, we recommend the following policy framework.

1. Resource-rich countries should gradually increase their gross capital formation to facilitate economic diversification. In other words, they should carry out public and private infrastructure focusing on transportation (i.e., airports, seaports, railways, highways, and so on) and educational and training facilities. This is because, first, transportation facilitates the diffusion of their local products abroad that increase export diversification, and thus economic diversification. Second, we have strong evidence that education drastically improves economic diversification; these countries therefore require large investments in educational facilities, which fall into gross capital formation.
2. Financial development is a positive and the most impactful economic variable among others in this study for economic diversification. Therefore, resource-rich countries should develop their financing systems by adding and improving financial instruments and intermediaries to support local investors by mobilizing domestic capital. Money creation for the private sector should be increased and well-managed by banks. It is worth noting that the transparency, accountability, and management in these countries should be maintained properly, and corruption should be reduced to the lowest level and eliminated if possible.
3. Foreign direct investment and net inflows decrease economic diversification in resource-rich countries. This is because large oil and mining companies heavily invest in these countries to extract their natural resources in an increasing trajectory. Therefore, this kind of FDI deepens the resource-rich countries' dependency on natural resources and keeps them away from exports and economic diversification. In this regard, these countries should stipulate a number of preconditions for inward FDI, such as, first, that the large investors should also establish R&D centers in the country and carry out some of their research domestically. This will allow for new opportunities for locals to diversify the economy. Second, the large investors should manufacture their equipment and machinery locally as much as possible, in order to diversify their economy by manufacturing sector.
4. Labor force participation substantially increases economic diversification. This fact implies that the LPR leads to higher growth rates in non-resource sectors and thus to larger economic diversification. However, creating a non-resource industry and sector has paramount importance for sustaining the positive and strong relationship between the LPR and DIV. Therefore, resource-rich countries should strive to establish a suitable business environment through non-resource sectors by incentivizing and monitoring the private sector to propel diversification.
5. Self-employment rate has a strong, but negative, impact on economic diversification. The reason is discussed in the literature, which has shown that self-employment might indicate a lack of employment opportunities, forcing citizens to establish their own replicative, not innovative, businesses. In this regard, education and training in vocational schools and non-resource sectors is a key factor to enable the establishment of innovative, instead of replicative and premature, businesses.
6. Education is positively the most impactful factor among all the other economic and structural variables. Therefore, education might be attractive and a key factor for resource-rich countries to diversify their economy from a resource-based to a

knowledge-based economy. First, these countries should redesign their curriculum to focus on vocational high schools, specialized and customized according to the countries' needs, that provide skills and abilities together with education and training. Second, graduates from these vocational schools will have hands-on experience and an industrial background: resource-rich countries should direct and support them either toward related college education to increase the work force or to become entrepreneurs in the prioritized sectors. Lastly, resource-rich countries should also pay attention to industry–university–government partnerships to incorporate the previous policies and industry needs.

These policies are expected to increase the associated variables' positive contribution on economic diversification, and limit—even eliminate—the negative impacts of the other indicators. This will lead to enhanced economic diversification and accelerated efficacy.

#### Future Work

Future research may involve the diversified resource-rich countries grouped separately in a within-country analysis or grouped as diversified resource-rich countries to analyze their diversification process. Furthermore, these diversified resource-rich countries mostly diversified their economies according to different timeframes. Therefore, these time discrepancies should be considered by structural time breaks. Moreover, we did not examine the currency appreciation in this study for countries with a floating exchange rate because the sample has countries with fixed exchange rates. In addition, as future work, investigations of inflation in countries with a fixed exchange rate and other monetary policies should be taken into account.

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#### Appendix A. Cross-Sectional Dependence Tests

**Table A1.** Pesaran CD, and Breusch–Pagan Lagrange Multiplier (LM) robustness results for each model.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Pesaran CD	−0.2448	−0.0805	−0.4103	−0.3724	−0.4234	−0.3837
(probability)	(0.8066)	(0.9359)	(0.6816)	(0.7096)	(0.6720)	(0.7012)
Breusch–Pagan LM	13.2680	4.8662	10.5813	9.7901	9.9904	9.2011
(probability)	(1.0000)	(1.0000)	(1.0000)	(1.0000)	(1.0000)	(1.0000)

Note: The results show that there is no cross-sectional correlation.

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