Natural Resources, Institutional Quality and Financial Development in GCC Member Countries: Visiting 'Resource Curse Hypothesis' by DCCE Estimation

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ARTICLE DETAILS	ABSTRACT
History: *Accepted 25 April 2021* *Available Online June 2021*	*The main purpose of the study is to check whether natural resource rent affects the financial development or supporting the resource curse hypothesis by employing a recently developed estimation technique by Chudik and Pesaran (2015) from 1985 to 2017 in GCC member countries.
Keywords: *Financial Development, Natural Resource Rent, Institutional Quality, DCCE Approach, GCC Countries*	The novelty of this methodology is to consider structural breaks and the heterogeneity issues that are common in panel data. The results of DCCE estimates are in support of the resource hypothesis that natural resource rent hurt financial development. Additionally, this study takes moderation of institutional quality to check the threshold point or turning point where the natural resource rent effect becomes positive.
JEL Classification: *A19, C58, G00, Q34*	Our results of interaction term postulate that a higher level of institutional quality mitigates the adverse effect of natural resource rent on financial development. The study results recommend the policy of natural resource rent in the presence of high institutional quality should
DOI: 10.47067/reads.v7i2.343	continue because it improves the financial development in GCC member countries.*

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1. Introduction

The financial development role is central for greater prosperity achievement, and an efficient financial system is needed to encourage natural resources efficient for the growth of any economy (Pradhan et al., 2016; Nawaz et al., 2019). Financial development also improves financial intermediary services' quality and quantity (Muhammad et al. 2016). Stabilization and commercial banking assets, net interest margins, and creation of creating credit circulation are the source of financial indicators stability (Dwumfour and Ntow-Gyamfi, 2018) that contribute to economic growth but in low strength in resource abundance countries (Sachs and Warner, 2001; Gelb, 2010). The development of any economy's natural resources plays a crucial role for the countries as it is an asset of a country (Guan et

al., 2020), and that is in discussion since Smith (1776) and Ricardo (1917). It helps to generate economic activities and recorrect trade balance through institutional performance, good governance indicators, and financial development (Asif et al., 2020). On the contrary, under certain conditions, resource abundance creates an exigent environment for financial sector development. Nevertheless, in recent times several economies have high natural resources but lagging in economic growth from countries that have fewer resources (Badeeb et al., 2017).

In theory, the resource curse concept assumes the cause of the economic collapse of assets plentiful nations, and experimentally, it was shown that in the mainstream of surveys (Sachs and Warner, 2001). The investigation described numerous reasons that trigger the resource curse hypothesis, for example, dishonesty, rental pursuing actions, fallback industrial sector financing, and inferior organizational quality and goods price shocks in assets-rich nations (Mlachila and Quedraogo, 2019). Economic growth is supposed to be a foundation for moving capital curse into capital benediction in the existence of higher organizational superiority, high-level trade, and great value of human capital (Rajan and Zinglaes, 2013).

Previous literature has shown that institutional quality important determinant of financial development (Law et al., 2014; Kirch and Terra, 2012; Law and Habibullah, 2006; Tamazian and Rao, 2010). Many researchers reported a positive relation (Khan et al., 2020; Bhattacharyya and Hodle, 2014). In contrast, others found a negative relation (Hunjra et al., 2020). The literature revealed a damaging linkage of sources with economic advancement (Cardon and Neary, 1982; Zoega and Gylfascon, 2001; Guan et al., 2020; Sun et al., 2020). On the other side, there is a work in the paradox of the research and revealed a positive relationship (Auty, 2001; Gokmenoglu and Rustamov, 2019; Nawaz et al., 2019). So, our investigation provides policy direction for the accomplishment of financial expansion along with efficient natural assets use in the GCC countries.

This remaining is organized in the following sections: part 2 reviews previous studies. Part 3 detail the methodology. Part 4 expresses the results and the final section draw concluding remarks and suggestions.

2. Literature Review

A glut of empirical literature investigated the association of natural resource with macroeconomic indicators, like natural resource and economic growth (Fum and Hodler, 2010; Alexeev and Chernyavskiy, 2015; Erum and Hussain, 2019; Atil et al.,2020); inflation (Ouoba, 2016; Kim and Lin, 2017; Henri, 2019; Freeman et al., 2020; Chaudhry et al., 2021) unemployment (Sjöberg et al., 2010; Kayode et al., 2014; Bagchi and Paul, 2018; Mukoka, 2020) trade balance (Vallejo, 2010; Gill et al., 2014; Harding and Venables, 2016; Tran et al., 2020); poverty (Barbier, 2010; Timilsina and Zilberman, 2016; Marchand and Weber, 2018); environment (Simon, 2010; Panayotou, 2016; Ding and Peng, 2018; Badeeb et al., 2020).

However, limited studies revealed the link of natural resources with the financial sector (Shahbaz et al., 2013; Bhattacharyya and Hodler, 2014; Hattendorff, 2014; Suliman and Elian, 2014). The overwhelming part of the literature demonstrates a positive association of natural resources with financial development like, (Nwani, 2016; Zaidi et al., 2019; Ibrahim, 2019; Faisal et al., 2019; Yıldırım et al., 2020) and other negatives (Khan et al., 2020).

Many studies reported a positive association link of natural resources with the financial development of countries (Nwani, 2016; Ibrahim, 2019; Zaidi et al., 2019; Khan et al., 2020). Khan et al.

(2020) indicate a linkage between financial development and natural resources by employing maki cointegration and multiple structural break approach evidence from China positively. Recently, Yıldırım et al. (2020) reported the positive influence of natural resources on financial development evidence from 16 countries. In contrast, Asif et al. (2020) used the ARDL approach and empirical results reported that natural resources harm financial development in the long run in Pakistan. Evidence from China, Guan et al. (2020) reported the negative effect of natural resources on financial development overused time-series data from 1971-2017 by employing the ARDL approach. Similarly, Bhattacharyya and Hodler (2014) argued that if the political-institutional quality is poor, so the result reported with statistical evidence that found a negative association. In China, Yuxiang and Chen (2011) tested how natural resources affected financial development overtime the period 1996 to 2006 by employing the GMM model. The result indicates that natural resources hurt financial development.

In eight Asian countries, Law et al. (2014) tested the relation between institutional quality and financial development over time from 1984 to 2006 by employing an econometric heterogeneous panel cointegration test. The empirical result reported a positive influence of institutional quality on financial development. In ninety developed and developing countries, Huang (2010) revealed the association of financial development and political intuition by employing the GMM model overusing panel data from 1960 to 1999. The result statistically indicates a positive association. In contrast, Girma and Shortland (2008) investigated the influence of political intuition on financial development by employing the GMM model. The statistical result indicates that political institution has positively affected to financial development.

Law et al. (2015) tested the influence of real GDP with other variables like institutional quality and globalization on financial development over the time from 1984 to 2008 in East Asian countries. The empirical analysis result indicates that real GDP affected positively. Atil et al. (2020) explores the association of real GDP, oil price, natural resource, and globalization with financial development in Pakistan over 1972-2017 and found real GDP associated positively with financial development. Similarly, Satti et al. (2014) found the granger causality relationship.

In the case of GCC panel countries, Grassa and Gazdar (2014) by employing OLS, and GLS approaches, and result indicates the negative and significant impact of financial development on economic growth. In contrast, Bist (2018) analyzed the association of financial development on economic growth in the long run by employing the OLS approach over using panel data of 20 years.

From the previous literature, it can be wrap up those ambiguous findings exists in literature and there is a need to address this issue in the context of oil-exporting countries like GCC member countries that are highly resource-abundant.

3. Data and Methodology

For the testing of the resource curse hypothesis, our study uses financial development (proxied by broad money to GDP) as a dependent variable. The regressors are natural resource rent, gross domestic product (GDP), institutional quality (INSQ), and the interaction term of institutional quality and natural resource (NRR*INSQ) and all variables are taken in logarithmic form, and description reported in table A1 (see appendix). The study covers the period 1985-2017 for GCC member countries.

Different methodologies have been used in previous studies to prove the resource curse hypothesis. Some are on time series data like ARDL, NARDL, VAR and others are on a panel like GMM, fixed and random effect, panel ARDL. These methods are traditional methods and unable to cover

severe issues related to heterogeneity, cross-sectional dependence, and structural breaks. The study uses the recently developed methodology that covers this issue and provides reliable estimates.

3.1 DCCE Estimation Methodology

A recently developed dynamic common correlated effects (DCCE) method by Chudik and Pesaran (2015) solves the previous studies' issues that make them inefficient and unreliable for estimation. This method solves the issue of cross-sectional dependence (CSD) which was not entertained in previous studies by taking cross-sectional averages and lagged CS averages of the dependent variable with regressors. This method also entertains the heterogeneity issue in the parameters with the assistance of the mean group method and suitable, even small sample size. The beauty of this methodology is that it gives reliable estimates to even have unbalanced data and structural breaks (Kapetanios et al. 2011; Ditzen, 2016; Ditzen, 2019).

The study empirically tested the resource curse hypothesis in the specification DCCE estimation by taking financial development as the dependent variable and natural resource rent, real GDP, institutional quality, an interaction term of institutional quality, and natural resource rent as independent variables.

The concerned model is composed in the following equation:

$$Y_{it} = \alpha_i Y_{it-1} + \delta_i X_{it} + \sum_{p=0}^{p_T} \gamma_{xip} \overline{X}_{t-p} + \sum_{p=0}^{p_T} \gamma_{yip} \overline{X}_{t-p} + \mu_{it} \tag{1}$$

In the above equation Y_{it}, Y_{it-1} and X_{it} represent the dependent variable, lag of dependent variable, and independent variable, respectively. The cross-sectional time and dimension are denoted by i and t. And $P_{T \text{ and }}$ μ_{it} denotes the lag of cross-sectional averages and the error term. γ_{xip} and γ_{yip} denotes the unobserved factors.

For testing the resource curse hypothesis, we extend this in our variable formulation:

$$LFD_{it} = \alpha_i LFD_{it-1} + \beta_i X_{it} + \sum_{p=0}^{pT} \gamma_{xip} \overline{X_{t-p}} + \sum_{p=0}^{pT} \gamma_{yip} \overline{X_{t-p}} + \mu_{it} \tag{2}$$

In the above equation, LFD is the log of financial development that is used as the dependent variable, and other LNRR, LGDP, LINSQ, and (LNRR*LINSQ) are explanatory variables reported by X_{it}. μ_{it} is the error term.

3.2 Test of Cross-sectional Dependence (CSD)

It can happen CD in the panel estimation because of interaction among countries, space effects, and unobserved factors, and estimation will provide unreliable results if these issues do not address properly (Chudik and Pesaran, 2013; Dong et al., 2018b). the widely used method to tackle this CD issue is the Lagrange multiplier (LM) test grounded in Breush and Pagan (1980) and expressed as follows:

$$y_{it} = \alpha_i + \beta_i x_{it} + \mu_{it}$$

β_i and α_i denotes countries individual slope coefficients and intercept.

Breush and Pagan (1980) LM test standard form is the following:

$$LM_{BP} = T\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \rho_{ij}^2$$

Notwithstanding, there are some shortcomings in this test like it is suitable only for the large period and the small number of countries (Pesaran, 2004). Therefore, the scaled version is given by Pesaran (2004) which tackles the previous test issues.

$$Scaled \text{ LM Test} = \sqrt{\left(\frac{1}{N(N-1)}\right)} \left[\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \left(T\hat{\rho}_{ij}^2 - 1\right)\right]$$

For the small sample and large N, Pesaran (2004) introduced the cross-sectional dependence (CD) test which is also suitable.

$$CD = \sqrt{\left(\frac{2T}{N(N-1)}\right)} \left[\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}\right]$$

The latest modified version of the LM test is given by Baltagi et al. (2012) for accurate mean and variance of the LM statistics:

3.3   Unit Root Tests (First Generation and Second Generation)

There are frequently adopted traditional first-generation unit root tests in the literature like LLC, IPS, ADF, and PP that guides variables' stationarity. But the issue is that in the case of CD, these test results are not more reliable (Pesaran, 2007). In contrast, the second-generation unit root test like CIPS introduced by Pesaran (2007) tackle these issue that first-generation unit root ignored.

3.4   Cointegration Test (Pedroni and Westerlund)

In the case of CSD, the results not more reliable by traditional unit root tests like Pedroni (1999). Consequently, we apply a recently developed cointegration technique developed by Westerlund (2007) that provides reliable results and cope with the issues. The specialty of this test is it considers the cointegration in panel series whether ECM present for individual or the whole panel (Persyn and Westerlund, 2008).

4. Results and Discussion

The summary of features of data expresses in the form of descriptive statistics and correlation shows the association, results are reported in the following table 1 of LFD, LNRR, LGDP, LINSQ, and (LNRR*LINSQ), respectively.

Table 1: Descriptive statistics and Correlation

	LFD	LNRR	LGDP	LINSQ	(LNRR*LINSQ)
Mean	3.9619	3.4665	25.2838	1.8387	6.3944
Median	3.9529	3.5063	25.286	1.9284	6.5066
Maximum	5.2587	4.1278	27.2233	2.1691	8.6051
Minimum	3.2614	2.1613	23.4531	2.00E-06	4.32E-06
Std. Dev.	0.3715	0.3599	1.0452	0.3007	1.2638
Skewness	0.2693	-0.7789	0.1026	-2.1118	-1.0582
Kurtosis	2.8053	3.7047	1.8582	10.7401	5.8312
Jarque-Bera	2.2550	20.0971	9.2519	534.5270	85.9024
Probability	0.3238	0.0000	0.0098	0.0000	0.0000
Sum	653.7071	571.9790	4171.821	303.3864	1055.083
Sum Sq. Dev.	22.6310	21.2537	179.1699	14.8284	261.9439
Observations	165	165	165	165	165
LFD	1	-0.1189**	0.1131	-0.0814	-0.1002
LNRR		1	-0.1775**	0.1905**	0.6529***
LGDP			1	0.3085***	0.1434*
LINSQ				1	0.8544***
(LNRR*LINSQ)					1

To test the cross-sectional dependence is very crucial for choosing the econometric method. Different types of tests are applied like biased-corrected scaled LM test, CD test, and scaled LM test which is given by Baltagi et al. (2012), (Pesaran et al. 2004), and Pesaran (2004) to check the CSD and provides us guidance about methodology. The results of these tests report in the following table 2.

Table 2 : Panel Unit Root Tests for Cross-Sectional Dependence

	Pesaran CD	Pesaran scaled LM	Breusch-Pagan LM
LFD	8.68***	24.14***	122.99***
LNRR	12.37***	34.01***	167.09***
LGDP	17.14***	62.44***	294.24***
LINSQ	14.31***	44.55***	214.22***
(LNRR*LINSQ)	14.71***	46.28***	221.96***

*** show to the levels of significance at 1 percent.

Unit root tests are two types namely first and second generations unit root tests and most studies only rely on first-generation unit root tests like Levin et al. (2002), Im et al. (2003), and some other traditional unit root tests. Some issues are not covered by these unit root tests like these tests ignore the CSD, which is the most major problem in panel data. To tackle this issue and for reliable results, we use the second-generation unit root test (CIPS-Test), which is introduced by Pesaran (2007) and is useful for guidance of econometric methodology. The following table 3 of unit root test results express that variables are mixed order of integration.

Table 3: Unit Root (First & Second Generation) Tests Results

Unit Root Tests (LLC & IPS)				
	Levin, Lin, and Chu		Im, Pesaran, and Shin W-stat	
	Level	First Difference	Level	First Difference
LFD	2.57	-5.76***	2.04	-7.61***
LNRR	-2.36***	-2.96***	-3.03***	-9.44***
LGDP	2.08	-3.24***	4.39	-4.59***
LINSQ	-2.82***	-7.33***	-1.56*	-6.85***
(LNRR*LINSQ)	-1.87**	-3.95***	-1.34*	-7.19***
Unit Root Test (CIPS)				
	Level		First Difference	
LFD	-1.52		-5.39***	
LNRR	-3.13***		-5.46***	
LGDP	-2.23		-4.56***	
LINSQ	-1.99		-4.19***	
(LNRR*LINSQ)	-2.62**		-4.98***	

Note: *** , **and * show the levels of significance at 1 percent, 5 percent, and 10 percent, respectively.

The next step is to check the cointegration among the variables. For this, we applied two types of unit root tests for reliable results. First, we applied the traditional cointegration test that is introduced by Pedroni (1999), and table 4 expresses the results. The outcome of the traditional cointegration test shows there is no cointegration.

The results of the traditional cointegration test are not sufficient and reliable because it ignores the various issues like CSD, structural breaks. While the second-generation cointegration test that was introduced by Westerlund (2007) is suitable because it copes up these issues regarding structural breaks, CSD, serial correlation, and heteroskedasticity.

Table 4: Pedroni Residual (Traditional) Cointegration Test

	t-Stat	Probability	W. Stat	Probability
v-Stat	0.48	0.31	0.32	0.37
rho-Stat	-0.53	0.29	-0.16	0.43
PP-Stat	-1.85**	0.03	-1.32	0.09
ADF-Stat	-1.34*	0.08	-0.92	0.17
	Stat	Probability		
Group rho-Stat	0.23	0.59		
Group PP-Stat	-1.63**	0.04		
Group ADF-Stat	-1.16	0.12		

Note: **and * refer to 5% and 10%   levels of significance, respectively.

The following table 5 reports the results of Westerlund (2007) cointegration test that show the existence of cointegration in the long run.

Table 5: Panel Cointegration Test (Westerlund ECM)

H_o: no cointegration	Value	Probability
Gt	-3.63**	0.02
Ga	-11.01**	0.01
Pt	-7.96***	0.00
Pa	-13.36**	0.03

Note: *** and ** refer to 1% and 5% significance level, respectively.

The findings of the DCCE model are reported in table 6. The results show our main independent variable NRR is associated with financial development negatively, which means a one percent increase in LNRR will decrease financial development by 0.28%. These results support the resource curse hypothesis in GCC member economies. Other control variables affect significantly financial development. The variable LFDI shows a positive association with the ecological footprint. However, the result of our interaction term is positively significant that explains this resource curse effect minimizes and converts to a positive effect in the presence of strong institutional quality.

Table 6: Results Dynamic Common Correlated Effects (DCCE) estimation

Regressors	Coefficient	p-value
LFD (-1)	-0.79**	(0.06)
LNRR	-0.28**	(0.03)
LGDP	0.37*	(0.07)
LINSQ	0.88**	(0.02)
(LNRR*LINSQ)	0.23***	(0.00)
Constant	0.44	(0.90)

Note: ***, ** and * shows 1%, 5% and 10% significance level, respectively

Furthermore, the study finds the marginal effect at various institutional quality levels like minimum, mean and maximum level, and following table 7 and the graph presents the results.

Table 7: Marginal Effect

		Minimum	Average	Maximum
GCC member Countries	Institutional Quality	2.00E-06	1.8387	2.1691
	Marginal Effect	-0.208	0.2149	0.2908

$$\delta LFD_{it} / \delta LNRR_{it} = -0.208 + 0.23 LINSQ_t$$

The marginal effect of natural resource rent on financial development is calculated at minimum, the mean and maximum level of institutional quality is -0.208, 0.2149, and 0.2908, respectively.
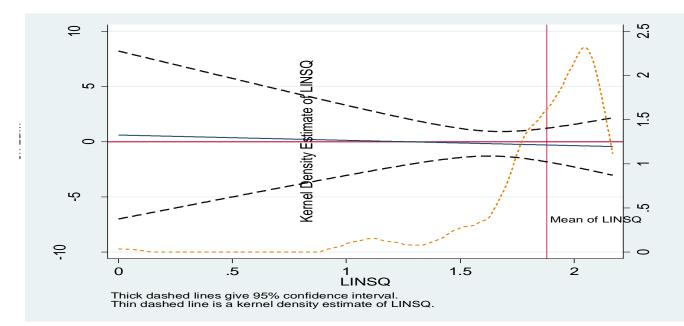
Figure 1: Marginal Effect Graph

The study further checks the robustness by using new proxy financial development, and the results are given in Table 8. The findings are consistent with the previous results reported in Table 6. Natural resource abundance hurts financial development while real GDP, institutional quality, and interaction term increase the financial development for GCC member countries.

Table 8: Robustness Check using Financial Development Index as Measure for Financial Development

Regressors	Coefficient	probability-value
LFD (-1)	-0.56***	(0.00)
LNRR	-0.57***	(0.00)
LGDP	0.15**	(0.04)
LINSQ	0.45***	(0.00)
(LNRR*LINSQ)	0.17**	(0.02)
Constant	0.77	(0.81)

Our results are in line with the empirical studies of Asif et al. (2020) that sow the adverse association of resources with financial development. The control variables real GDP, and institutional quality affect positively significant. The interaction term of natural resource rent and institutional quality is positive that postulates, resource curse hypothesis mitigated by a high level of institutional quality.

5. Conclusion and Recommendations

The explores the relation of natural resource rent with financial development in visiting the resource curse hypothesis in GCC member countries over 1985-2017. We employ the novel method

DCCE approach developed by Chudik and Pesaran (2015) that have an advantage over the traditional method to cope with the cross-sectional dependence and structural breaks problem in the panel data. The results of DCCE estimates are in support of the resource hypothesis that natural resource rent harms financial development. Additionally, we take moderation of institutional quality to check the threshold point or turning point where the natural resource rent effect becomes positive. Our results of interaction term postulate that a higher level of institutional quality mitigates the adverse effect of natural resource rent on financial development. The study results recommend the policy of natural resource rent in the presence of high institutional quality should continue because it improves the financial development in GCC member countries.

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Appendix
Table A1: Variable Description and Data Sources

Variables	Description	Measurement (Unit)	Source
LFD	Log of financial development	Broad Money to GDP	WDI
LNRR	log of natural resource rent	Total natural resource rent (% of GDP)	WDI
LGDP	log of GDP	constant 2015 US$	WDI
LINSQ	Log of institutional Quality	Calculated through panel principal component analysis (PCA)	International Country Risk Guide (ICRG)