IRANIAN ECONOMIC REVIEW
Print ISSN: 1026-6542
Online ISSN: 2588-6096
https://ier.ut.ac.ir/
University of Tehran

Oil Rents and Financial Development Through The Stock Market: Is the Institutional Quality A Matter? New Evidence from Brazil and Norway

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Article Info

Article Type: Research Article

Article History:
Received: 10 October 2021
Received in revised form: 23 December 2021
Accepted: 14 January 2022
Published online: 01 October 2023

Keywords:
Economic Growth, Financial Development, Stock Market, Trade Openness, TSVAR.

JEL Classification:
O13, G10, P16, C24.

ABSTRACT

The present study investigates the effect of oil resource rent on financial development through the stock market. In this case, the analysis process has been accomplished in two different states: considering and ignoring the institutional quality index in oil resource rent at the values above and below the financial development threshold. The threshold structural vector autoregression (TSVAR) model has been employed to analyze the stock markets in Norway and Brazil from 1984 to 2019. In Brazil, by ignoring the institutional quality index, the resource curse hypothesis is confirmed at the values below the financial development threshold. If the institutional quality index increases, the positive oil rent shock leads to the increment of financial development through the stock market. Therefore, the hypothesis of the resource curse is rejected in this country. In Norway, by ignoring the institutional quality, the resource curse hypothesis is confirmed at the values above the financial development threshold. If the institutional quality is considered in oil rent, a positive shock to oil rent reduces the financial development through the stock market in a short-term period. This situation increases the financial development through the stock market in a long-term period. As a result, an increase in institutional quality contradicts the resource curse hypothesis at the values above the threshold level. In Norway, if the institutional quality in oil rent is considered, a positive shock to oil rent enhances financial development through the stock market at values below the threshold.

Cite this article: Roudari, S., Jamshidi, H., Ghasemi, H., & Ghoreshi, D. (2023). Oil Rents and Financial Development Through The Stock Market: Is the Institutional Quality A Matter? New Evidence from Brazil and Norway. *Iranian Economic Review, 27*(3), 1065-1102. DOI: https://doi.org/10.22059/ier.2021.84449

 Publisher: University of Tehran Press.
DOI: https://doi.org/10.22059/ier.2021.84449

1. Introduction

In general, various studies have been performed on economic growth and the curse of natural resources. In other words, these studies have evaluated whether natural resources are a curse or a blessing (Badeep et al., 2017; Van der Ploeg, 2011; Sedaghat Kalmarzi et al., 2021; Bala and Chin, 2020). Fewer studies have investigated whether oil resources are a curse or blessing in financial development through the stock markets.

Institutional quality plays a fundamental role in determining the influence of oil resource rent on financial development. Numerous channels negatively affect financial development because of natural resources rent and approval of the curse hypothesis of natural resources. Natural resource rent leads to corruption and illegal relationships in economies with low institutional quality (Atkinson et al., 2003; Baland et al., 2000; Bhattacharyya et al., 2010; Leite et al., 1999**)**.

Also, natural resource rent has inverse impacts on entrepreneurship, investments, and economic growth in societies with fragile institutional quality. These factors are inseparable from financial development (Bologna et al., 2015; Ndikumana et al., 2008).

This study analyzes whether oil resource rent is a curse or blessing and considers the effect of other factors such as economic growth, trading openness, and institutional quality index on oil resource rent. Different researches showed that the plentifulness of natural resources is a blessing for countries and its curse hypothesis is not always true. However, these studies represented that the natural resources were cursed by Dutch disease. Also, they ignored to consider the effect of other factors such as economic growth, trading openness, and institutional quality index (Van der Ploeg and Venables, 2009). Emerging novel theories (e.g., the natural resources curse and Dutch disease) demonstrated that the plentifulness of natural resources was a deterrent to economic growth and the country's development. In other words, natural resource abundance can deprive rich countries of industrialization (Davis, 1995), developments and increased quality of institutions (Diaz-Briquets and Perez-Lopez, 2006), and financial developments.

According to the mentioned literature, there is no consensus regarding the influence of natural resources' plentifulness on financial developments through the stock market. Indeed, there are different views in this area, including negative impact (Yuxiang and Chen, 2010; Asif et al., 2020), positive impact (Auty, 2001; Nawaz et al., 2019; Shahbaz et al., 2019; Shirazi and Emami Meibodi, 2020), and neutral impact (Quixina and Almeida, 2014). Also, some researchers expressed it as a controversial issue (Dwumfour and Ntow-Gyamfi, 2018). Furthermore, some researchers argued that it was dependent on the country's income induced by natural resources and the country's financial systems (Bel Hadj and Ghodbane, 2021).

One of the principal reasons for these differences is related to their methodology and sampling selection. Numerous studies have concentrated on specific countries (Rustamov and Adaoglu, 2018; Shahbaz et al., 2018; Asif et al., 2020; Guan et al., 2020), and some studies have focused on countries and their income level (Gylfason and Zoega, 2001; Gokmenoglu and Rustamov, 2019; Bel Hadj and Ghodbane, 2021). Empirical studies have employed various econometrics techniques, such as the generalized method of moments (GMM) (Yuxiang and Chen, 2011; Hoshmand et al., 2013; Dwumfour and Ntow-Gyamfi, 2018), Common Correlated Effects Mean Group estimator (Moradbeigi and Law, 2017), cointegration approach (Khan et al., 2020), Autoregressive Distributed Lag (ARDL) approach (Asif et al., 2020), Dynamic Ordinary Least Square (DOLS) and Fully Modified Ordinary Least Square (FMOLS) approach (Gokmenoglu and Rustamov, 2019; Guan et al., 2020), and panel quantile regression (Bel Hadj and Ghodbane, 2021).

Natural resource existence leads to corruption increase through rent-seeking behavior in societies with fragile institutional structures. Therefore, the role of institutional quality is an undeniable issue. Overall, some studies incorporated institutional quality with development as mediating variable (Dwumfour and Ntow-Gyamfi, 2018), moderating

variable (La porta et al., 2000; Djankov et al., 2007; Khan et al., 2020), and independent variable (Bel Hadj and Ghodbane, 2021).

Other studies have not addressed several issues at the same time. Besides, some studies have compared the two countries in terms of development level and rent of oil resources. Most studies have considered the effect of oil resource rent on financial development by considering and ignoring the institutional quality index. These procedures have been performed considering the level of development of countries and the level of institutional quality. Also, the effects of positive and negative shocks on natural resources have not been studied in terms of considering and ignoring the institutional quality index at the values above and below the financial development threshold.

The contributions of this paper are as follows:

1. Fewer studies have evaluated the effect of positive and negative shocks of oil resource rent on financial development by considering and ignoring the institutional quality index at the values above and below the financial development threshold. This process has been accomplished by emphasizing financial development through the stock market in different time horizons. The present study has thoroughly examined this effect.
2. The two considered countries (Norway and Brazil) export oil and have different levels of development in comparison with each other.
3. The financial development response has been investigated with different thresholds in two different conditions: considering and ignoring the institutional quality index.

In this study, the TSVAR model has been utilized to analyze the effect of positive and negative shocks to oil resource rent on financial development through the stock market with the values above and below the financial development threshold through the stock market in Norway and Brazil. This analysis process has been performed based on considering and ignoring institutional quality index, economic growth, and trade openness. Suppose the institutional quality index is an

interaction term in the oil resource rent. In this regard, it can change the threshold of financial development through the stock market and alter its response to other endogenous variables in the model.

Many studies have defined the financial development index and considered its various aspects. Suppose that different aspect of financial development is in the form of an index. In this case, it is impossible to interpret financial development separately through the bank (ratio of facilities granted to GDP) and the stock market.

Figure 1 shows oil resource rent as the percentage of GDP in Norway and Brazil.

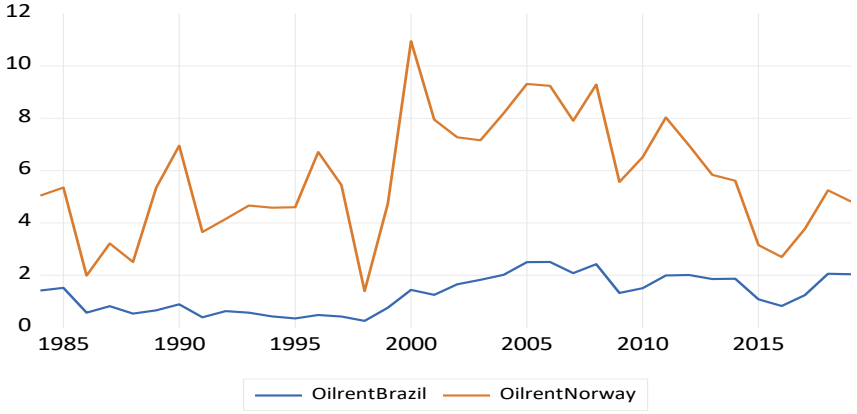

Figure 1. Oil Rent to GDP in Norway and Brazil
Source: World Bank.

As shown in Figure 1, the ratio of oil resource rent to GDP in Norway fluctuated from 5.04 percent in 1984 to 10.94 percent in 2000. Then, it had a downward trend to 4.808 percent in 2019. Overall, this ratio in Brazil had an upward trend from 1.415 percent in 1984 to 2.507 percent in 2006, and then it slightly decreased to 2.038 percent in 2019.

Figure 2 depicts the financial development through the stock market (stocks traded and total value (% of GDP)) for these two countries.

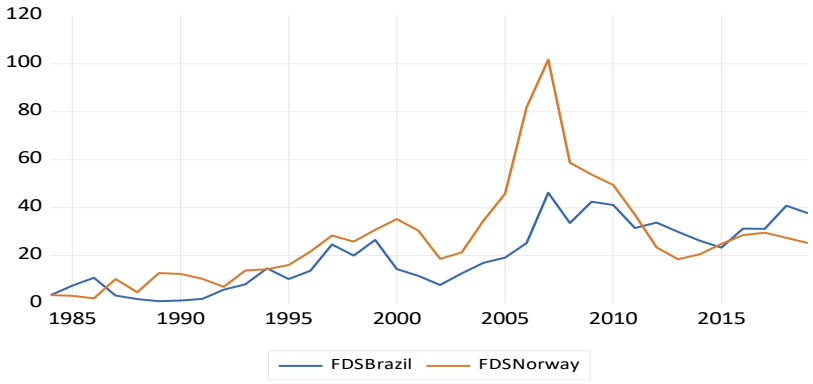

Figure 2. Stocks Traded and Total Value (% of GDP)
Source: World Bank.

In most of the studied years, financial development through the stock market in Norway was higher than this value in Brazil. The highest rates in Brazil and Norway were 46.19% and 101.72% in 2007. The highest rate dropped in both countries after 2007. As shown in Figures 1 and 2, there is no specific relationship between trends and changes in oil resource rent and financial development through the stock market. Therefore, the study of this relationship requires a profound econometrics study, which is the subject of empirical analysis of the present study.

This paper is outlined as follows. The next section discusses the literature on the impact of oil resource rent, institutional quality, and financial development variables. In the third section, the methodology and results of the models are proposed. Conclusions and policy recommendations are presented in the fourth and fifth sections, respectively.

2. Literature Review

2.1 Plentifulness of Natural Resources and Financial Development

Until the 1980s, researchers believed that natural resources played a positive role in long-term sustainable development. In the late 1980s, numerous theoretical and empirical evidence emerged and showed the negative effects of natural resources on economic development and

growth. This evidence is known as the resource curse or plenty paradox (Auty et al., 1993; Gylfason, 2001).

Researchers conventionally believe that the higher income from natural resources provides a booming financial sector. Potentially, countries with rich natural resources can reach financial development by exporting their natural resources and using their capital inflows through the financial sector (Khan et al., 2020).

Some studies showed that natural resource rent (e.g., oil) could decrease financial development. Also, researchers concluded that natural resource abundance hurt financial development because of the resource curse hypothesis, Dutch disease, and rent-seeking. Other researchers argued that the natural resource abundance had a positive impact on financial development. This issue was due to several reasons, such as more access of households and businesses to facilities and the growth of the stock market index because of the inflationary effects of more natural resources rent (Bhattacharyya and Hodler, 2014).

In general, an increase in natural resources enhances available resources, and subsequently, liquidity grows and injects into the economy. In these situations, banks have a remarkable ability to provide facilities. Rostow (1961) first analyzed the relationship between natural resource abundance and development. In this study, the author represented that the plentifulness of natural resources was an essential factor in economic development.

Moradbeigi and Law (2017) argued that natural resources promoted economic growth and prosperity and provided more sustainable financial development. Rustamov and Adaoglu (2018) conducted a study in Russia and reported that financial development plays a mediating role in natural resources and economic growth. The financial market can generate income that guarantees sustainable growth using oil resource rent.

Gokmenoglu and Rustamov (2019) conducted studies in Kazakhstan, Azerbaijan, Russia, and Turkmenistan and represented that the abundance of natural resources had a positive long-term effect on

financial development. They applied the DOLS model for the analysis process during 1992-2017.

Shahbaz et al. (2017) employed the Bayer-Hanck Cointegration model for the analysis process. They concluded that natural resources had a positive impact on financial development in the long run. This study was performed in the United States from 1960 to 2016. Also, Shahbaz et al. (2018) presented that the United States efficiently used natural resources in the stock market development and promotion. The authors stated that the abundance of natural resources could lead to the transfer of knowledge and economic growth in the United States. Consequently, it caused financial development in this country.

Another group of studies emphasized the destructive role of natural resources in the financial system. In rich natural resource countries, companies are looking for rents that are easy to obtain. This issue leads to the collapse and failure of the productive sector towards unproductive activities (Mehlum et al., 2006). Also, abundant natural resources lead to the export of natural resources instead of using these resources in manufacturing industries and creating excess profit (Arvanitis and Weigert, 2017). In general, the inflow of foreign exchange leads to the strength of the exchange rate, and thus export to these countries becomes more expensive and hurts the competitiveness of their economies (Sarraf and Jiwanji, 2001).

Gylfason and Zoega (2001) employed a seemingly unrelated regression (SUR) model for analyzing 58 countries during 1965-1998. In this study, they found a negative correlation between natural resources and the degree of financial development. According to Beck (2002), the abundance of natural resources is harmful to financial development traced through the deviation of investments from the financial system. This deviation destroys the volume of demand and savings. Accordingly, economic rents obtained from natural resources must be used in the stock market until businesses are financed.

Gylfason and Zoega (2006) stated that natural resources as an exogenous factor have led to the enhancement of rent-seeking activities

and weakness of financial development and economic growth. Furthermore, Hoshmand et al. (2013) studied oil-exporting countries using the GMM model during 2002-2010. The results demonstrated that the abundance of natural resources weakened economic growth through a negative impact on financial development.

Khan et al. (2020) argued that natural resources are harmful to financial development. Also, the resource curse hypothesis has been confirmed using the Maki cointegration analysis in China from 1987 to 2017. Guan et al. (2020) suggested that natural resources hurt financial development. While they represented that natural resources were the desired item for human capital, globalization, and economic development, and thus natural resources positively affect financial development.

Asif et al. (2020) concluded that some natural resources (e.g., coal, gas, and oil) had an inverse relationship with domestic credit in the private sector during a long-term period. They applied the ARDL bounds testing model in Pakistan during 1975-2017.

Bel Hadj and Ghodbane (2021) utilized the Panel quantile regression model and indicated that natural resources hurt financial development in countries with better financial systems. Also, they argued that the abundance of natural resources had a positive impact on financial development in countries with high natural resources income. In this study, the sample dataset was collected in ten countries during 1984-2016.

Law, order, and human capital had a positive impact on financial development. This impact was regardless of the country's natural resources income level. Thus, the resource curse hypothesis has been rejected in countries with less developed financial markets. However, no significant relationship was observed between natural resources and financial development in other studies.

Quixina and Almeida (2014) have not observed a significant relationship between natural resources and financial development in Angola. Dwumfour and Ntow-Gyamfi (2018) utilized the Arellano-Bond

GMM model in African countries and showed that the impact of natural resources on financial resource development was dependent on the index used for financial development. Also, the resource curse hypothesis has been confirmed for low- and middle-income countries (sub-Saharan African countries) and not for North African countries.

Sadeghi and Roudari (2022) showed that the stock market's responses to oil shocks have been regime-dependent, with most responses being more sharply in a bear market than in a bull market. According to the findings, there is a strong link between the stock market, the source and type of oil shocks (positive or negative), economics' oil structures, and regime changes, which may influence policymakers' response to various oil shocks in different stock market conditions.

Ahmadian-Yazdi et al. (2022) utilized the Panel data model and indicated that a high level of financial development can ensure resource rents, positively influencing social capital. However, findings showed an adverse impact of natural resource rents on social capital in medium-income countries.

Roudari et al. (2023) results showed that oil shocks, mainly oil demand shocks, are significantly associated with the oil structure of the country (oil-exporting or oil-importing), channels of the effectiveness of the monetary policy, and the stock market regimes. Furthermore, the channel through which the money supply growth affects Norway's economic growth depends on the stock market regimes. Moreover, the results persist for the money growth-inflation nexus. Similarly, the impact of oil demand shocks depends on the Japanese stock market's regime and the monetary policy's effectiveness. Finally, we find that positive output shocks positively affect the stock markets of both countries in the long run regardless of the stock market conditions. In the short run, a positive inflation shock has a negative (positive) impact on Norway (Japan) during bullish and bearish market conditions.

Roudari et al. (2023) indicated that the difference between the impulse-response functions in the bullish and bearish stock markets in Iran, with and without considering institutional quality, is only related to the effects

of sanctions and inflation, respectively. Considering the institutional quality case, inflation brings about an improvement in the stock market in the medium term; however, without institutional quality, there is only an improving short-term effect. Accordingly, within increasing the sanctions case, if the institutional quality has been also enhanced; an increase in the number of sanctions causes a long-term improvement in the bullish market. Also, in the bearish market, an increase in the sanctions and the depreciation of the Rial, along with increasing institutional quality, leads to long-term growth in the stock market.

2.2 Institutional Quality and Financial Development

Previous studies emphasized the importance of institutional quality in enhancing financial development (La Porta et al., 1998; Girma and Shortland, 2008; Huang, 2010). Also, some studies have discussed the role of institutional quality in financial development through natural resources (Mavrotas et al., 2011; Dwumfour and Ntow-Gyamfi, 2018). Atkinson and Hamilton (2003) stated that natural resource rent is utilized instead of public spending without a proper institutional framework, especially in low-saving countries. Thus, this procedure causes low development.

In most studies, institutional quality is an intermediate variable between natural resources and financial development. The moderating role of institutional quality between natural resources and financial development is in facility contracts (Djankov et al., 2007). By existing sound institutions, financiers can straightforwardly provide facilities and funding in the form of contracts. On the other hand, if the financiers are unconfident regarding the contracts, they will be risk-averse.

According to Leite and Weidman (1999), the effectiveness of law and institutional quality is weaker in developing countries, which highly depend on natural resource abundance. Thus, rent-seeking activities lead to more corruption.

Mehlum et al. (2006) asserted that if institutional quality caused improved property rights and greater control over government activities, the abundance of resources could have been a valuable factor.

Yuxiang and Chen (2011) reported that the increase in corruption in rich natural resources countries is one of the principal reasons for the weak financial development.

Bhattacharyya and Hodler (2014) implied the crucial role of political institutions in weakening the resource curse. They argue that it is possible by improving economic growth and financial development. Also, Huang (2010) studied 90 developed and developing countries during 1930-1999. The results demonstrated that political institutions positively affected financial development in low-income countries in a short-term period.

Robinson et al. (2006) characterized that the abundance of natural resources could not automatically lead to the curse of resources. But the abundance of natural resources can lead to the resource curse in situations where the quality of political institutions can not eliminate corrupt behavior, especially in the public service sector with more clients. Dwumfour and Ntow-Gyamfi (2018) conducted a study in African countries. The results revealed that the resource curse could reduce by restricting rent-seeking activities in countries with better institutional quality. Brunnschweiler (2008) rejected the idea that an institutional framework could overcome the resource curse hypothesis. Also, the author represented that the abundance of natural resources positively affects institutional quality.

2.3 Trade Openness and Financial Development

Natural resource improvements tend to transfer the factors of production from the productive sector, which reduces tradable goods (Gylfason et al., 1999; Krugman, 1987; Van Wijnbergen, 1984). On the other hand, the increment of natural resources in rich natural resource countries leads to inflation and strengthens the real exchange rate (Auty et al., 1993). Strengthening domestic currency in resource-dependent countries leads to a non-competitive export, especially for the manufacturing sector in international markets, and reduces trade volume (Sach and Warner, 1995). Trading openness plays a vital role in financial development by increasing the demand for financial services (Aluko et al., 2018; Ashraf, 2018; Zhang et al., 2015). Renting natural resources can decrease

financial development by reducing trade volume in countries that depend on natural resources. Also, financial development may directly affect economic growth through expenditure channels. Moreover, it may indirectly affect trading openness. Therefore, there is a strong relationship between economic growth, financial development, and trading openness (Pradhan et al., 2017).

According to the mentioned literature, the impact of natural resources and institutional quality on financial development has not explicitly been recognized. This issue was because of the financial development index and considering the types of financial development as a specific index. The previous studies have not used the TSVAR model to analyze the role of positive and negative shocks of resource abundance in two cases: considering and ignoring institutional quality at the values above and below the financial development threshold. Indeed, this model expresses how the abundance of natural resources affects financial development in another way.

3. Methodology

3.1 Data

Financial development through stocks, oil reserves, per capita economic growth, and trading openness variables are extracted from the WDI database. Also, bureaucracy quality, corruption, democratic accountability, government stability, and law and order variables are extracted from the ICRG database (Table 1). In this study, Brazil and Norway were used as emerging and developed oil exporters, respectively. These two countries significantly have different oil reserves and financial development through the stock market. In the present study, only two countries have been considered. This issue was due to two reasons: the length of the research and the high statistical analysis for each country. In this study, financial development through the stock market has been used to reach a specific result for an index with different aspects. Also, an institutional quality index was created using five variables and applying principal component analysis. In this paper, the institutional quality index

is used according to some previous studies (Khan et al., 2019a; 2019b; 2020a; 2020b).

3.2 Model

In this study, the TSVAR model has been employed to analyze the impact of oil resource rent, economic growth, trading openness, and institutional quality index on financial development through the stock market. This study has been performed based on two different states: considering and ignoring the institutional quality index in oil resource rent at the values above and below financial development thresholds. The TSVAR model can evaluate the effect of positive and negative shocks on the higher and lower values of the financial development threshold. Indeed, the influence of positive and negative shocks may vary according to the amount and level of financial development. Also, the financial development threshold and the impact of variables on financial development may change based on considering and ignoring the institutional quality index.

In this study, the TSVAR model has been employed because of its significant advantages over other methods. First, it is a relatively straightforward method to capture possible nonlinearities such as asymmetric reactions to shocks. Since the effects of shocks depend on the size and sign of shock and initial conditions, the impulse response functions are not linear. Second, its regime-switching is endogenous to the system, and it is possible to distinguish between the impacts of oil rents, GDP growth, trade openness, and oil rents on financial development (stocks traded, total value (% of GDP)) under different regimes. Therefore, the nonlinear impacts of variables on financial development are form regime-dependent. In the following, financial development is characterized as a threshold variable. Hence, two regimes are available when financial development crosses a threshold value (the first regime is the value higher than the threshold, and the second regime is the value lower than the threshold). Thus, the TVAR model can be formulated as follows:

$$Y_t = C1 + A1Y_t + B1(L)\,Y_{t-1} + (C2 + A2\,Y_t + B2(L)\,Y_{t-1})\,I[Z_{t-d} > \gamma] + U_t \quad (1)$$

where Zt is the threshold variable, d is the lag order, I is an indicator function, and γ is a threshold value. Thus, the second regime takes place if $Z_{t-d} > \gamma$. In this case, the system parameters are C1 + C2, A1 + A2, and B1 (L) + B2 (L) because $I[Z_{t-d} > \gamma] = 1$. In contrast, the first regime takes place if $Z_{t-d} \leq \gamma$. In this case, the system parameters are C1, A1, and B1 (L) because $I[Z_{t-d} > \gamma] = 0$.

$$\begin{cases} A1Y_t + B1(L)\,Y_{t-1} + U_t & if\ \ I = 0 \quad (regime1) \\ (A1 + A2)Y_t + [B1(L) + B2(L)]\,Y_{t-1} + U_t & if\ \ I = 1 \quad (regime2) \end{cases} \quad (2)$$

In the following, Yt is a vector of endogenous variables (K × 1), which includes the percent change in the financial development through the stock market (GSTOCK), the percent change in oil rent to GDP (GOIL), the percent change in GDP per capita (GDPG), the percent change in trade openness (GOPEN), and finally the percent change in intersection variable (GOILIQI). It is briefly expressed as Y t = [GSTOCK, GOIL, GDPG, GOPEN, GOILIQI]. C1 and C2 are a vector of constant variables (K × 1). A1 and A2 are contemporaneous matrices (K × K) because contemporaneous effects might also differ across the regimes. B1 and B2 are lag polynomial matrices (K × K). U t is a vector of serially and mutually uncorrelated structural disturbance. After dividing the period into two different regimes, it is possible to apply the nonlinear TSVAR model for analyzing the responses of stock prices to oil shocks. A VAR (p) model is formulated as follows:

$$Y_t = \mu + A_1 Y_{t-1} + \ldots + A_p Y_{t-p} + \varepsilon_t \quad (3)$$

$$A(L)\,Y_t = \mu + \varepsilon_t$$

where A (L) is the matrix of a lag polynomial of order p, and $\varepsilon_t \sim N(0, \Omega)$. Under weak regularity conditions, a stationary process can be expressed as an invertible distributed lag of serially uncorrelated disturbances. Thus, Equation 3 can be written as follows:

$$Y_t = A^{-1}(L)\,\varepsilon_t \quad \text{and} \quad Y_t = B(L)\,\varepsilon_t \quad B_0 = 1 \quad (4)$$

The elements of ε_t are contemporaneously correlated. Thus, these elements cannot be represented as structural shocks. The elements of ε_t

are orthogonalized by applying the restrictions. Hence, Equation 4 can be written as follows:

$$Y_t = C(L)\, e_t \quad (5)$$

Given that B0 is an identity matrix, the following formula is achieved using Equations 2 and 3:

$$\varepsilon_t = C_0\, e_t \quad \text{and} \quad B_j C_0 = C_j \quad (6)$$

Then, the following formula is obtained by Equation 6:

$$B(L)\, C_0 = C(L) \quad (7)$$

In this case, $C0$ matrix contains sixteen elements when the existing four endogenous variables are used in the system (considering and ignoring institutional quality index). Also, twenty restrictions are needed for different innovations in orthogonalization. The normalization of VAR (e t) denotes that $\Omega = C0\ C0'$. By applying six restrictions [C12 = C13 = C14 = C23 = C24 = C34 = 0], the long-run expression of Equation 3 can be written in the matrix form ($C1 = \sum_{j=0}^{\infty} C\,j$) as follows:

$$\begin{pmatrix} GOIL \\ GDPG \\ GOPEN \\ GSTOCK \end{pmatrix} = \begin{bmatrix} c11 & 0 & 0 & 0 \\ c21 & c22 & 0 & 0 \\ c31 & c32 & c33 & 0 \\ c41 & c42 & c43 & c44 \end{bmatrix} \begin{pmatrix} e_t\, GOIL \\ e_t\, GDPG \\ e_t\, GOPEN \\ e_t\, GSTOCK \end{pmatrix} \quad (8)$$

In this study, εt is characterized as the reduced form error associated with four variables: growth of oil rent to GDP, GDP per capita growth, growth of trade openness, and financial development growth through the stock market. It was assumed that the relationship between the reduced form and structural disturbances was recursive. The TSVAR model was estimated by testing the existing threshold structure. Hence, the hypothesis of C2 = A2 = B2 (L) = 0 is first tested. However, the threshold value is not recognized under the null hypothesis (there is no threshold effect). Also, the distribution of traditional statistical tests becomes nonstandard due to the existing nuisance parameters. This issue has been solved by following three steps proposed by Balke (2000). First, the threshold model is estimated by the least squares for all possible threshold values. Second, the Wald test statistics are calculated to determine the difference between regimes for each possible threshold

value. Third, three different test statistics (i.e., Sup-Wald, Avg-Wald, and Exp-Wald) are considered and utilized with each other. The Sup-Wald statistic is the maximum Wald statistic over all possible threshold values. The Avg-Wald statistic is the average Wald statistic over all possible threshold values. The exp-Wald statistic is a function of the sum of exponential Wald statistics. The empirical distribution of three statistics under the null hypothesis is obtained via the simulation method proposed by Hansen (1999). If the statistics are significant, the null hypothesis of a linear structure is rejected, and the threshold model is utilized to perform the analyses. Finally, the estimated threshold value is used to minimize the log determinant of the residual covariance matrix.

Table 1. Definition of Variables and Summary of Descriptive Statistics

Variable	Definition	Source	Mean	Std. dev.	Minimum	Maximum	Median
STOCKB	Stocks traded, total value (% of GDP)	WDI	19.755	13.482	0.975	46.198	18.077
OILB	Oil rent (% of GDP)	WDI	1.28	0.698	0.253	2.507	1.285
GDPGB	GDP growth	WDI	2.626	2.907	-3.545	7.988	3.029
OPENB	Trade (% of GDP)	WDI	22.179	4.819	14.39	29.678	22.705
OILIQIB	Multiplying Oil rent by the Institutional Quality Index	WDI, ICRG	12.548	7.007	2.754	24.065	12.51
STOCKN	Stocks traded, total value (% of GDP)	WDI	27.334	21.223	2.16	101.72	24.179
OILN	Oil rent (% of GDP)	WDI	5.714	2.254	1.388	10.945	5.398
GDPGN	GDP growth	WDI	2.426	1.71	-1.727	6.052	2.199
OPENN	Trade (% of GDP)	WDI	70.296	2.792	65.507	76.741	69.933
OILIQIN	Multiplying oil rent by the institutional quality Index	WDI, ICRG	69.328	27.529	16.888	133.109	64.884

Source: Research finding.

In Table 1, the letters N and B at the end of the variables' names characterize Norway and Brazil, respectively.

4. Results and Discussion

According to the reports of some studies (Khan et al., 2019a; 2019b; 2020a; 2020b), the institutional quality index and the principal component analysis approach have been suggested for the analysis process. In this regard, Spider environment in Python programming language has been employed for computations. The PCA is one of the oldest and most widely used techniques for converting multidimensional indices into a single variable, which contains most of the characteristics of the variables (Le et al., 2016).

According to Khan et al. (2020), the institutional quality index has been established using the bureaucracy quality, corruption, democratic accountability, government stability, law, and order variables. Tables 2 and 3 provide the factor loading results in Norway and Brazil, respectively.

Table 2. Factor Loading Results in Norway

	F1	**F2**	**F3**	**F4**
Lawn- Law and Order	0.965	0.256	-0.050	-0.003
Govstn- Government Stability	-0.021	0.422	0.906	-0.031
Demon- Democratic Accountability	0.965	0.256	-0.050	-0.003
Corrn- Corruption	0.290	-0.856	0.247	0.349
Bqn- Bureaucracy Quality	-0.271	0.879	-0.165	0.357

Source: Research finding.

Table 3. Factor Loading Results in Brazil

	F1	**F2**	**F3**	**F4**	**F5**
Lawb- Law and Order	0.940	-0.038	0.142	-0.281	-0.130
Govstb- Government Stability	0.643	0.732	-0.111	-0.194	0.014
Demob- Democratic Accountability	-0.841	-0.164	0.498	-0.122	0.060
Corrb- Corruption	0.768	0.501	0.334	0.218	-0.004
Bqb- Bureaucracy Quality	0.971	-0.017	-0.044	-0.135	0.190

Source: Research finding.

Figures 3 and 4 show the scree plots for Norway and Brazil, respectively.

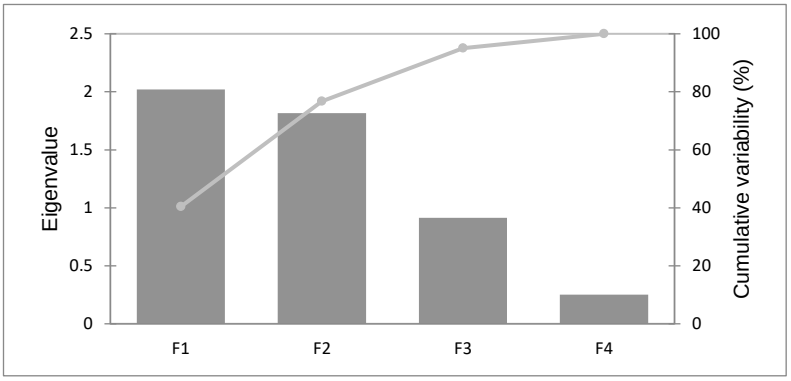

Figure 3: Scree plot for Norway
Source: Research finding

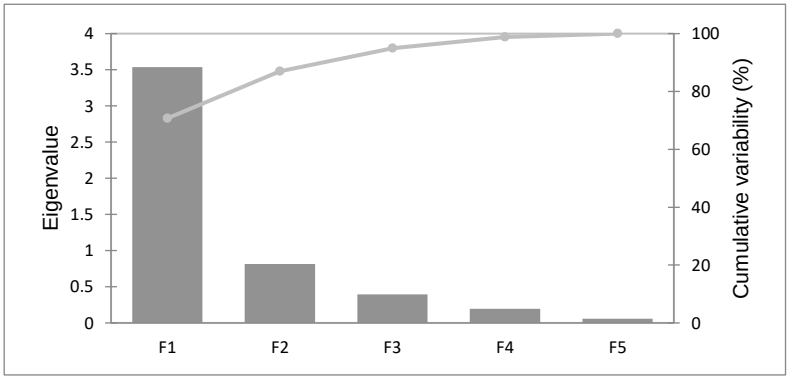

Figure 4. Scree Plot for Brazil
Source: Research finding.

After establishing the institutional quality index, it is essential to determine the significance level of the variables. The results of the Augmented Dickey-Fuller (ADF) test are presented in Table 4.

Table 4. Augmented Dickey-Fuller Unit Root Test

Variable	Include in the test Equation	t-statistic	Probability	Result
GSTOCKB	Intercept	-4.641	0.000	**S**
	Intercept and Trend	-4.675	0.000	**S**
GSTOCKN	Intercept	-5.242	0.000	**S**
	Intercept and Trend	-5.171	0.000	**S**
GOILB	Intercept	-5.993	0.000	**S**
	Intercept and Trend	-5.911	0.000	**S**
GOILN	Intercept	-5.25	0.000	**S**

Variable	Include in the test Equation	t-statistic	Probability	Result
	Intercept and Trend	-5.287	0.000	**S**
GOPENB	Intercept	-5.399	0.000	**S**
	Intercept and Trend	-5.4	0.000	**S**
GOPENN	Intercept	-7.621	0.000	**S**
	Intercept and Trend	-7.538	0.000	**S**
GDPGB	Intercept	-3.992	0.004	**S**
	Intercept and Trend	-4.135	0.013	**S**
GDPGN	Intercept	-3.247	0.025	**S**
	Intercept and Trend	-3.4	0.021	**S**
GOILIQIB	Intercept	-5.324	0.000	**S**
	Intercept and Trend	-6.078	0.000	**S**
GOILIQIN	Intercept	-5.257	0.000	**S**
	Intercept and Trend	-5.292	0.000	**S**

Source: Research finding.

According to Table 4, all variables are stationary at a significance level of 5%. In this step, all variables must be stationary at their levels.

In the next step, it is necessary to set the lag length. In this case, three criteria of Schwarz, Akaike, and Hannan-Quinn have been considered to decide regarding the lag length. According to the results of the initial run of the VAR model, each three mentioned criteria showed one optimal lag for Brazil and Norway. Therefore, a test process has been developed to find whether the threshold value of financial development through the stock market is statistically significant or not. If it is statistically significant, the next step is to obtain the threshold value of financial development through the stock market in the two countries. Thus, the non-linear relationship between financial development through the stock market and other variables is analyzed. Using the TSVAR model without considering the institutional quality index, the threshold values of financial development through the stock market were 6.86 and 7.65% in Brazil and Norway, respectively.

Using the institutional quality index, the threshold values of financial development through the stock market were 11.87 and 8.98% in Brazil and Norway, respectively. The nonlinear test results in Table 5 and Table 6 denote that all Wald statistics reject the null hypothesis, and the model does not have threshold effects. The test statistics of the Sup-Wald, Avg-Wald, and Exp-Wald were significant for all the obtained threshold values in the two countries. This issue demonstrates that the TSVAR model has a threshold value and divides the whole period into two regimes**.** Therefore, if financial development through the stock market in

two countries is higher than their threshold values, the financial development through the stock market is in the second regime. In contrast, if financial development through the stock market is lower than its threshold values, the financial development through the stock market is in the first regime.

Table 5. Test for Threshold without IQI

Country	**Test Statistics**			**Threshold Value**
Brazil	Wald Test	Value	p-value	6.863
	Sup-Wald	113.53	0.000	
	Avg-Wald	97.9	0.000	
	Exp-Wald	55.43	0.000	
Norway	Wald Test	Value	p-value	7.654
	Sup-Wald	150.67	0.000	
	Avg-Wald	115.01	0.000	
	Exp-Wald	73.38	0.000	

Source: Research finding.

Table 6. Test for Threshold with IQI

Country	**Test Statistics**			**Threshold Value**
Brazil	Wald Test	Value	p-value	11.867
	Sup- Wald	157.15	0.000	
	Avg- Wald	124.76	0.000	
	Exp- Wald	76.43	0.000	
Norway	Wald Test	Value	p-value	8.988
	Sup- Wald	79.05	0.000	
	Avg- Wald	71.61	0.000	
	Exp- Wald	38.11	0.000	

Source: Research finding.
Note: It has been set based on one Lag of the stock price in each country.

According to Tables 5 and 6, if the institutional quality index is considered in the model, the threshold of financial development through the stock market will increase in both countries. But the increased value in Brazil is greater than the value in Norway. After approval of the existing threshold effect and dividing the whole period into two regimes, the nonlinear impulse response function has been utilized to analyze the dynamic impacts of oil rent growth, GDP growth, and trade openness growth in both counties.

In another case, the influence of the variable of oil resource rent growth on the institutional quality index and other variables has been studied in the two regimes of Norway and Brazil.

As mentioned before, we considered several items, including oil rent growth (% of GDP), trade openness growth, GDP growth, and multiplying oil rent (% of GDP) by the institutional quality index. Besides, we separated the negative oil shocks from the positive ones. Finally, it is necessary to note that the responses to variables are under the conditions of plus or minus one and two standard deviations (± 1SD and ± 2SD) in two regimes. Thus, we first examine the responses of financial development through the stock market to variable shocks in the emerging economy (Brazil).

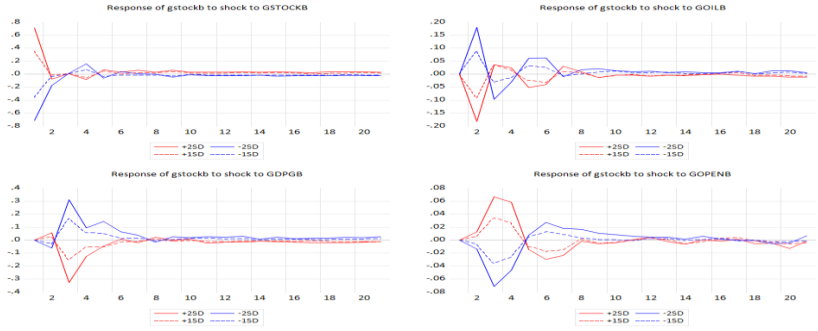

Figure 5. The Response of Financial Development in Brazil (At the Values above the Threshold)
Source: Research finding.

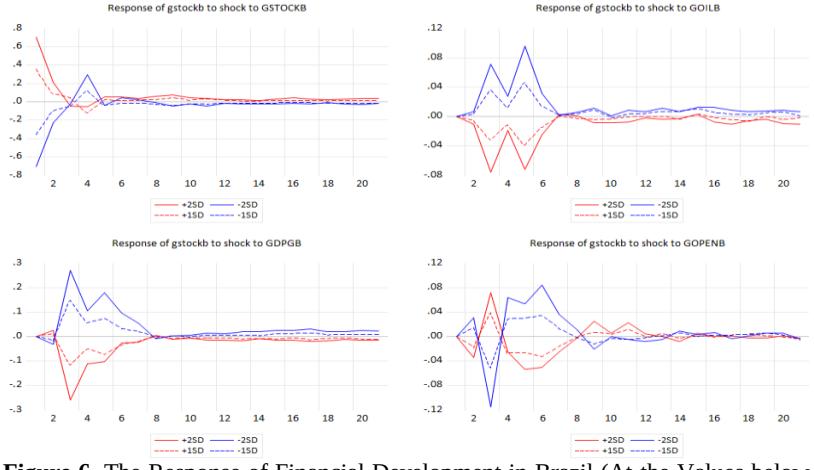

Figure 6. The Response of Financial Development in Brazil (At the Values below the Threshold)
Source: Research finding.

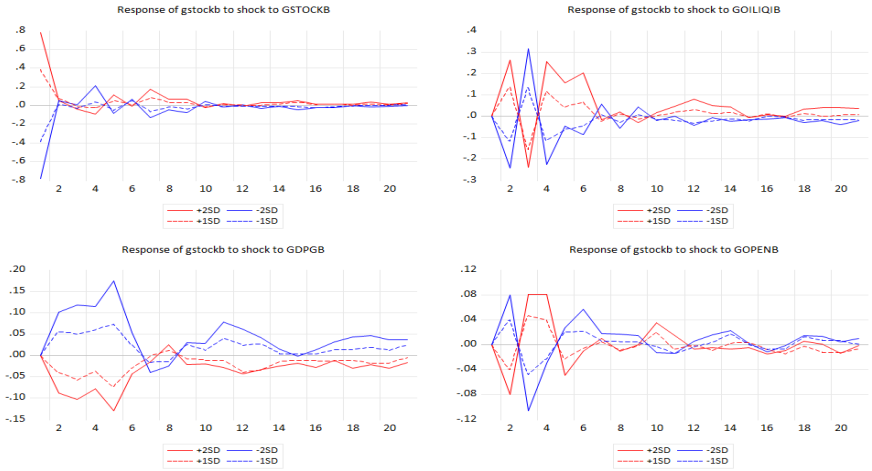

Figure 7. The Response of Financial Development in Brazil Considering Institutional Quality Index (At the Values above Threshold)
Source: Research finding.

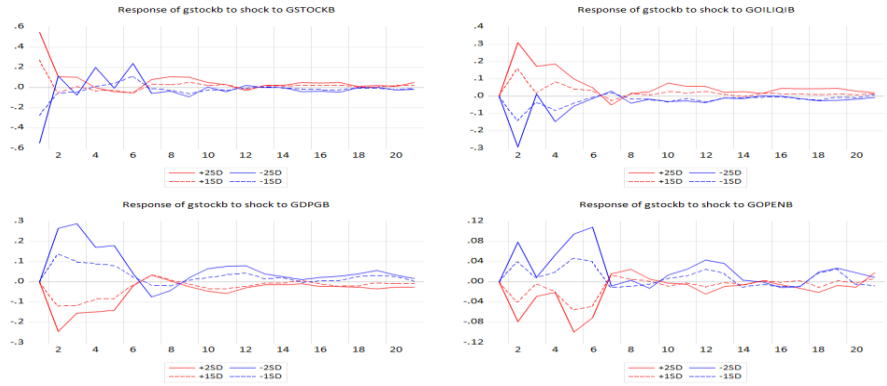

Figure 8. The Response of Financial Development in Brazil Considering Institutional Quality Index (At the Values below Threshold)
Source: Research finding.

Figures 5 and 6 depict the response of financial development at the values above and below the threshold, respectively. These results were gained when the institutional quality index has been ignored in the natural resources rent. Figures 7 and 8 indicate the response of financial development at the values above and below the threshold, respectively. These outcomes were gained when the institutional quality index was considered in the natural resources rent.

The positive (negative) shock to the oil resource rent is not similar in different periods at the values above the financial development threshold. Until the third period, the positive shock to the oil resource rent reduced the financial development through the stock market. Also, it has reduced the financial development through the stock market in a long-term period.

However, a positive (negative) shock has decreased (increased) the financial development through the stock market in all periods at values below the financial development threshold. By ignoring the institutional quality index in the oil resource rent at the values above the threshold, it was concluded that a positive and negative shock to the oil resource rent did not have the same effect on financial development in different periods. By ignoring the institutional quality index, a positive shock to oil rent has reduced financial development through the stock market in all periods at values below the threshold. In other words, the resource curse hypothesis is confirmed in this case. However, if the institutional quality index is considered in the oil rent, a positive (negative) shock to the oil rent has increased (decreased) financial development through the stock market, especially at the values below the threshold.

In both cases (above and below the threshold), a positive (negative) shock to economic growth has increased (decreased) in a short-term period. But, it has reduced (increased) financial development through the stock market in other periods. Negative economic growth had a similar effect on the upper and lower threshold regimes.

By considering the institutional quality index, it was concluded that the positive shock (negative) to economic growth has reduced (increased) financial development through the stock market in most periods. This situation has increased (decreased) financial development through the stock market only in two periods. By ignoring the institutional quality index in oil rent, it was concluded that the positive (negative) shock to trade openness has increased (decreased) in a short-term period at the values above the threshold. This situation has reduced (increased) financial development through the stock market in other periods. However, for the values below the threshold, the effect of positive and negative shocks on trade openness was not constant over time.

By considering the institutional quality index in oil rents, it was concluded that the positive and negative shocks to trade openness did not have the same effect on the values above and below the financial development threshold. The following paragraphs represent the response of financial development through the stock market to the positive and negative shocks of oil rents in Norway and other research variables.

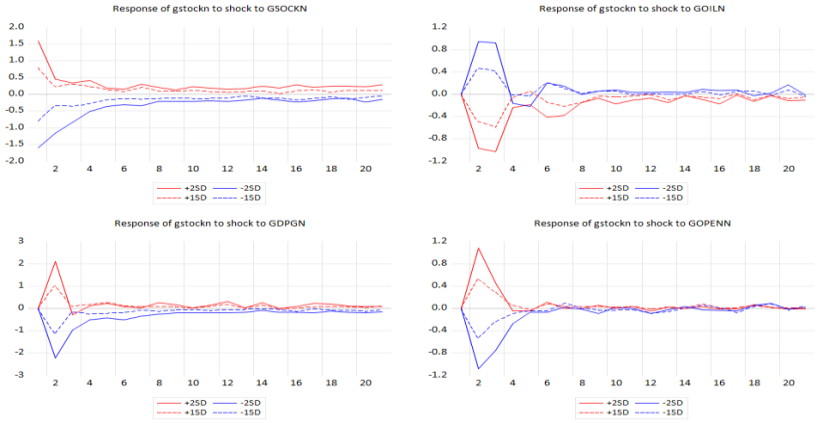

Figure 9. The Response of Financial Development in Norway (At the Values above the Threshold)

Source: Research finding.

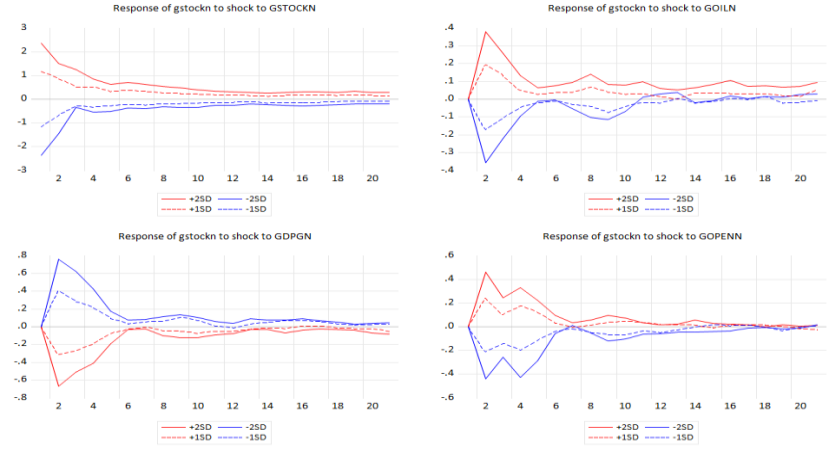

Figure 10. The Response of Financial Development in Norway (At the Values below the Threshold)

Source: Research finding.

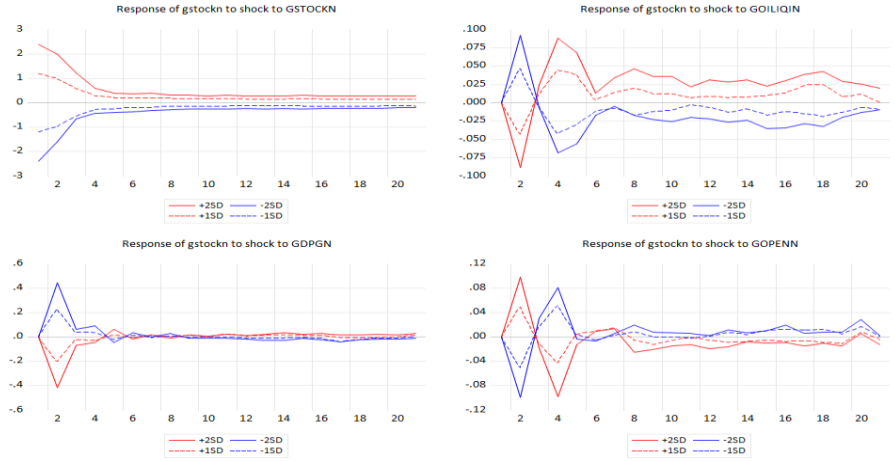

Figure 11. The Response of Financial Development in Norway by Considering the Institutional Quality Index (At the Values above the Threshold)
Source: Research finding.

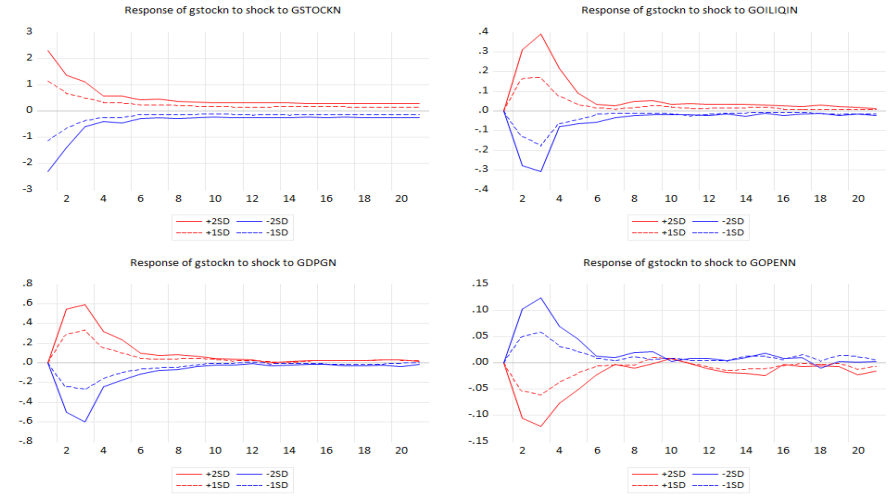

Figure 12. The Response of Financial Development in Norway by Considering the Institutional Quality Index (At the Values below the Threshold)
Source: Research finding.

In Norway, a positive (negative) shock to oil rents has reduced (increased) financial development through the stock market in almost all periods at values above the financial development threshold.

This issue demonstrates that if financial development through the stock market is upper than the threshold, a positive oil rent shock can reduce financial development. By ignoring the institutional quality index, it was concluded that the resource curse hypothesis was confirmed for the values above the threshold.

However, the positive (negative) shock to the oil rent has increased (decreased) the financial development through the stock market at values below the financial development threshold. Therefore, if the financial development index is ignored in the oil resource rent, the resource curse hypothesis is rejected for financial development through the stock market at the values below the threshold, and oil rent is considered a blessing. Also, if the institutional quality index is considered in the oil resource rent, a positive (negative) shock to the oil resource rent reduces (increases) financial development through the stock market in a short-term period even at the values above the threshold. In this case, the resource curse has been confirmed only in a short-term period. However, the positive (negative) shock to the oil resource rent has increased (decreased) financial development through the stock market in a long-term period.

By considering the institutional quality index, the positive (negative) rent shock of oil resources has increased (decreased) financial development through the stock market in all periods at the values below the threshold. Regardless of the institutional quality index in oil resource rent, a positive (negative) shock to economic growth and trade openness has increased (decreased) financial development through the stock market at the values above the financial development threshold. But in the case of ignoring the institutional quality index, a positive (negative) shock to economic growth has reduced (increased) financial development through the stock market at the values below the financial development threshold. This issue suggests that if the institutional quality is ignored, the positive shock of economic growth can increase financial development through the stock market at values above the threshold.

Also, it can decrease financial development through the stock market for the values below the threshold.

If the institutional quality index is considered in the oil resource rent, the positive (negative) shock of economic growth reduces (increases) financial development through the stock market at the values above the threshold. While the positive (negative) shock of economic growth increases (decreases) financial development through the stock market for the values below the threshold.

By ignoring the institutional quality index in the oil resource rent, a positive (negative) shock to trade openness has increased (decreased) financial development through the stock market at the values above and below the threshold. By considering the institutional quality index in the oil resource rent, the positive shock (negative) of trade openness has increased (decreased) in a short-term period at the values above the threshold. This situation has reduced (increased) financial development through the stock market in a long-term period. The positive (negative) shock of trade openness has reduced (increased) financial development through the stock market in all periods at values below the threshold.

This study concluded that oil resource rent had different impacts on the two countries with various levels of institutional quality at the values above and below the threshold of the financial development through the stock market. The present study confirms the results reported by Gokmenoglu and Rustamov (2019) and Bel Hadj and Ghodbane (2021). Indeed, these studies demonstrated that natural resource rent increased financial development in rich natural resource countries.

This study examined the positive and negative shocks of the oil resource rent by considering and ignoring institutional quality at the values above and below the threshold.

Also, the results of Bhattacharyya and Hodler (2014) have been confirmed. Indeed, the improvement of natural resources can reduce financial development in a country with adequate income from natural resources but low institutional quality (Brazil). Moreover, the results revealed that this issue was dependent on the period and the level of

financial development. Furthermore, economic growth had different impacts on financial development, depending on the institutional quality level, being above and below the threshold, and period. Bel Hadj and Ghodbane (2021) showed that economic growth in all countries hurts financial development. Also, Shahbaz et al. (2018) demonstrated a positive relationship between economic growth and financial development. While the present study expresses that the impacts of oil resource rent, economic growth, and trade openness on financial development were different, depending on the level of the institutional quality of countries, being above and below the threshold of financial development through the stock market, and period. The other studies have not considered these three influential factors at the same time.

5. Conclusion

The literature survey revealed that some studies confirmed the existence of the resource curse and the negative impact of natural resource abundance on financial development. This issue was due to the increment of rent-seeking activities and Dutch disease. Other studies rejected the resource curse hypothesis and reported that natural resource abundance was a worthwhile factor for financial development.

In this study, the effects of positive and negative rent shocks of oil resources have been evaluated on financial development through the stock market in different periods. This procedure has been performed by comparing different conditions: (I) considering and ignoring the institutional quality index, (II) considering the values above and below the financial development threshold, and (III) considering two countries of Brazil and Norway with different levels of oil resource rent and institutional quality index. The TSVAR model has been employed for the analysis process.

The findings demonstrated various situations for the curse hypothesis. In Brazil, if the institutional quality index was considered, a positive shock to the oil resource rent had different impacts on financial development at the values above the financial development threshold. But a positive shock to the oil resource rent hurt financial development at

the values below the financial development threshold. Therefore, the curse of resources has been confirmed in this case. However, if the institutional quality index was considered in the oil resource rent, the positive shock of the oil rent had a positive effect on financial development in most periods at the values above the threshold. Also, this situation had a positive impact on financial development at the values below the threshold. Therefore, if the institutional quality index increases, the positive oil rent shock can increase financial development through the stock market in Brazil. In this case, the resource curse hypothesis is rejected.

In Norway, by ignoring the institutional quality index, the positive shock to oil resource rent hurt financial development at the values above the financial development threshold. But the positive shock to oil resource rent hurt financial development at the values below the financial development threshold. In other words, ignoring the institutional quality index confirmed the resource curse hypothesis at the values above the threshold of financial development through the stock market. If the institutional quality index is considered in oil resource rent, the positive shock to oil resource rent has reduced in a short-term period. This situation has increased financial development through the stock market in a long-term period. The improvement of institutional quality can disprove the resource curse hypothesis at the values above the threshold. By considering institutional quality in oil resource rent and the values below the financial development threshold, a positive shock to oil resource rent has boosted financial development through the stock market in Norway.

These results showed that if the periods are considered in the analysis process, the threshold of financial development through the stock market and the institutional quality index can be effective elements in determining the impact of oil resource rent on financial development through the stock market. According to the results, the government structure should facilitate the circulation of liquidity from oil resource rents to financing institutions, especially the stock market. Thus, the companies in the stock market can straightforwardly finance their

required funds. In this regard, it is essential to improve the institutional quality and legal framework. Also, it is necessary to pay great attention to the period and the level and threshold of financial development through the stock market. The results showed that the positive shock of oil rent often increased financial development through the stock market in both countries. This situation occurred by considering the institutional quality index. The improvement of the institutional quality index can reduce rent-seeking activities in countries with abundant resources. Consequently, financial development can take place in these countries.

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