Resources Policy 63 (2019) 101433

Contents lists available at ScienceDirect

Resources Policy

journal homepage: www.elsevier.com/locate/resourpol

Examining the World Bank Group lending and natural resource abundance induced financial development in KART countries

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ARTICLE INFO

Keywords:
World bank lending
Natural resources
Financial development
Developing countries

JEL classification:
G21
O13
F35
F40
O52
O53

ABSTRACT

This study investigates the roles of the World Bank lending and abundance of natural resources in fostering the financial development of Kazakhstan, Azerbaijan, Russia, and Turkmenistan during the period from 1992 to 2017. Empirical findings confirm co-integration between the variables being investigated. The results of the dynamic ordinary least squares test indicate that in the long-run the World Bank lending and an abundance of natural resources positively affects financial development. We also confirm that excessive borrowing from the World Bank and faulty management of loans and credits from the bank negatively affect financial development. Empirical findings show that institutional quality has an impact on how effectively natural resources are managed. We discuss the policy implications of our study in detail in the conclusion section.

1. Introduction

Financial development constitutes an integral part of the World Bank's strategy to contribute towards the long-term economic growth and poverty reduction in developing countries. The World Bank's loans/credits are one of the most essential instruments towards realizing this strategy (Bayer, 2004). These loans/credits[1] to the member states are directed mainly towards improving financial and private sector, public sector governance, rural and human development (e.g., World Bank, 2016; World Bank, 2017).

Some of the World Bank member states are natural resource abundant countries (e.g., Nigeria, Mongolia, Kazakhstan, Azerbaijan, Russia, Turkmenistan) borrowing towards enhancing the natural resource management and environment, and improving resource mobilization (e.g., World Bank, 2016; World Bank, 2017). The concern is whether these loans/credits are managed efficiently. The natural resource abundant member states have weak macroeconomic developments and may endure rent-seeking activities resulting in diminishing not only economic growth (see e.g., Auty, 1994; Sachs and Warner, 1995; Gylfason et al., 1999; Ross, 2001; Torvik, 2002; Watts, 2004; Rustamov and Adaoglu, 2018), but also impacting negatively the financial development (Auty, 2001; Gylfason, 2001). This phenomenon is known as the resource curse hypothesis (Auty, 1993). Collier (2006) compares loans/credits to natural resources and considers both as "rents." Hence, the same negative consequences arising from the abundance of natural resources because of rent-seeking activities can also be stemming from the borrowed loans/credits from multilateral institutions (Morrison, 2007; Svensson, 2000; Smith, 2008; Collier, 2006).

However, the effective utilizing these loans/credits towards enhancing the natural resources management, increasing investments in human and physical capital contribute to the efficiency of the financial sector (Cull and Effron, 2008) and result in positive impact on the financial development and economic growth (Mallick and Moore, 2005). Mallick and Moore (2005) hypothesize two critical outcomes from the linkage between the World Bank lending and macroeconomic indicators. First, the World Bank lending contributed to investment projects stimulates inflow of private investments, and second, the recipients of the World Bank loans/credits are subject of accepting/improving structural policy reforms. The World Bank's package of macroeconomic reforms and policies contributes to economic growth (Hadjimichael et al., 1995; Durbarry et al., 1998) and trade liberalization (Krueger and Rajapatirana, 1999). Also, reforms are directed

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[1] The lending is provided by the International Bank for Reconstruction and Development (IBRD) in the form of loans and by the International Development Association (IDA) in the form of credits. The IBRD and the IDA together represent the World Bank.

https://doi.org/10.1016/j.resourpol.2019.101433
Received 18 November 2018; Received in revised form 17 June 2019; Accepted 18 June 2019

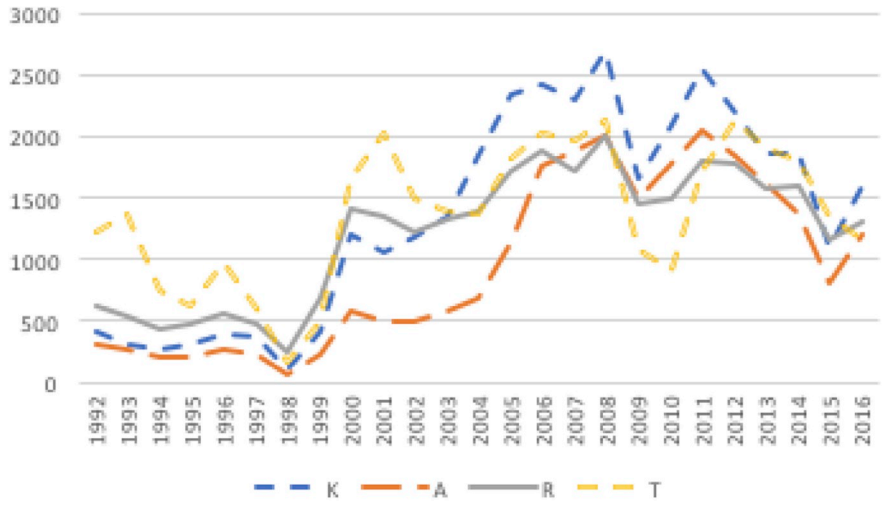

Fig. 1. Abundance of natural resources.
Note: K - Kazakhstan; A - Azerbaijan; R - Russian Federation; T - Turkmenistan; Y- axis is in natural resources rents per capita (USD).

towards improving banking legislation and banking sector to establish well managed financial institutions that lead to the direct impact on financial development (Cull and Effron, 2008).

The empirical studies on the World Bank lending-induced financial development are scarce in the literature to make a definitive conclusion on its impact. Mainly, it is still puzzling whether loans/credits from multilateral institutions result in "curse" or "blessing" towards financial development in natural resource abundant developing countries. Therefore, it is essential to investigate the impact of the World Bank lending on financial development in a natural resource abundant developing countries to establish conclusive empirical findings for researchers and policymakers.

Given the importance, we empirically investigate the role of the World Bank lending and natural resource abundance on the financial development in the case of four natural resource-rich developing countries: Kazakhstan, Azerbaijan, Russia, and Turkmenistan (KART). These countries are the World Bank Group recipients of loans/credits and also members of the Commonwealth Independent States (CIS) that cooperate in economic, political and security aspects. In 2017, KART countries produced 7424 billion cubic meters of gas that constitutes 91 percent and 20 percent of the total produced gas in CIS and the world respectively. In respect to the oil production, these countries produced around 1.4 million barrels per day that is 98 percent and 15 percent of the total produced oil in CIS and the world respectively (see, e.g., BP 2018). In addition to the abundance of natural resources, these countries are the only CIS states bordering the Caspian Sea with the enormous of oil and gas resources. There are an estimated 48 billion barrels of oil, and 292 trillion cubic metrics of natural gas proved reserves in the Caspian Sea and onshore fields (EIA 2013).

By this, the study makes several contributions to the literature. First, our study examines the role of the World Bank lending and also natural resource abundance in enhancing financial development. We establish the relationship not only between the World Bank lending and financial development but also between natural resource abundance and financial development that have not been done until now for the case of developing countries. Also, we confirm that the World Bank lending has a positive linkage to financial development. Second, we estimate the average turning point of borrowing to avoid the diminishing marginal effect on financial development and to confirm the inverted U-shaped of the World Bank lending. Third, we employ accurately selected panel data econometric methods. We carry CD test (Pesaran, 2004) to identify cross-sectional dependency in variables. Also, we apply the Pesaran and Smith (1995) mean group estimator, and Pesaran et al. (2008) bias-adjusted LM test to identify the cross-sectional dependency in the model. We also apply the second-generation cointegration test, Westerlund ECM (2007), which takes into account cross-sectional dependence and heterogeneity. To identify the causality between variables, we carry Dumitrescu and Hurlin (2012) panel causality test. The superiority of this test is that it takes into account the heterogeneity of causal relationships in the estimation model.

2. KART countries: natural resource abundance and the World Bank Lending

After the collapse of the Soviet Union, the former states form the Commonwealth of Independent States (CIS) that share the common view on economic, trade, political and security aspects. Only KART countries (including Iran) border the Caspian Sea which is rich in natural resources, mainly, oil and gas reserves. According to the U.S. Energy Administration (2013), the Caspian Sea region is the critical area with a significant source of global energy production. However, almost 30 years, the use of the Caspian Sea from territorial perspectives has been under dispute. On August 12, 2018, the Caspian bordering countries signed an agreement on the legal framework of the sea. From the natural resource side, this agreement creates an opportunity for the undersea pipelines of energy (see, e.g., EIA 2013; Dadwal and Purushothaman, 2018).

In Europe and the Eurasian region, Russia is the largest producer of natural gas and oil. In 2017, Russia produced around 1.1 million barrels of oil per day and 635.6 billion cubic meters of natural gas. Kazakhstan has the largest oil reserves that comprise about 49 percent of oil reserves, and Turkmenistan has the second largest gas reserves with 31 percent of all natural gas reserves in Europe and the Eurasian region. Azerbaijan is also rich in oil and natural gas reserves with 7 billion barrels and 1.1 trillion cubic meters respectively (see, e.g., BP 2016, BP 2017, BP 2018). Fig. 1 shows that in terms of the abundance of natural resources, KART countries demonstrate almost the same pattern of the cycle. After the collapse of the Soviet Union, KART countries experienced difficulties in the realization of natural resources. Besides, the decline in oil prices decreased the natural resource rents per capita. During 1992 and 1994, natural resource rents per capita decreased in Kazakhstan from 422 USD to 271 USD; in Azerbaijan from 305 USD to 212 USD; in Russia from 628 USD to 444 USD, and in Turkmenistan from 1225 USD to 740 USD. During 1999–2008, natural resource abundance per capita of the KART countries increased significantly due to a high demand for the oil. Natural resource rents per capita increased in Kazakhstan from 424 USD to 2683 USD; in Azerbaijan from 237 USD to 2014 USD; in Russia from 481 USD to 2011 USD; in Turkmenistan

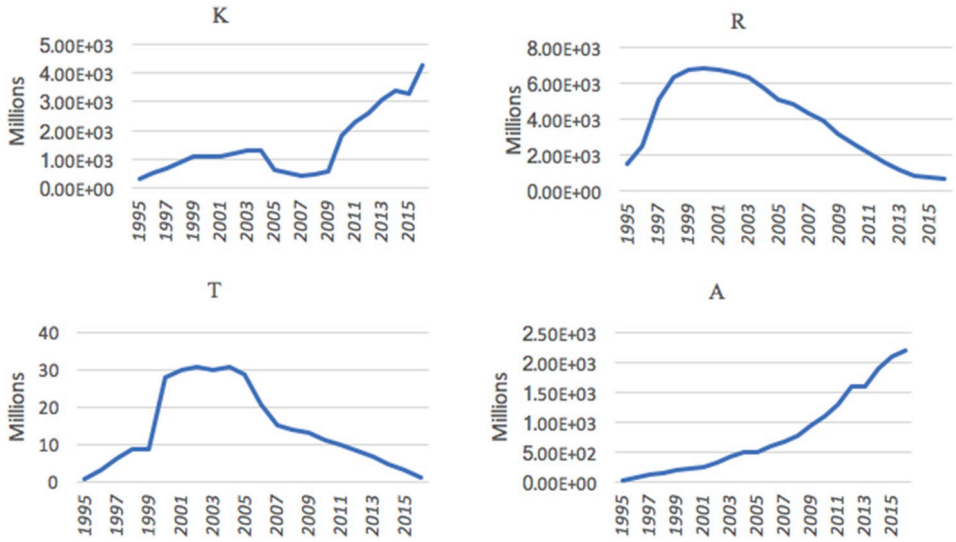

Fig. 2. Borrowing from the world bank.
Note: K - Kazakhstan; A - Azerbaijan; R - Russian Federation; T - Turkmenistan; Y- axis is in USD values.

from 970 USD to 2129 USD. The 2008 Global Financial Crises drove the price of oil down that reduced the natural resource abundance per capita for KART countries. Afterwards, we observe the natural resource abundance per capita increased due to the increase of oil price. From 2012 to 2015, KART countries faced with decline in oil and gas prices, economic sanctions on Russia, and increase of supply of oil and gas natural resources. Natural resource rents per capita decreased in Kazakhstan from 2184 USD to 1094 USD; in Azerbaijan from 1848 USD to 817 USD; in Russia from 1771 USD to 1153 USD; in Turkmenistan from 2134 USD to 1433 USD.

KART countries are the recipients of loans and credits from IBRD and IDA respectively as they satisfy the World Bank's requirements. The borrowing amount varies among KART countries, and the graph lines exhibit non-linearity of demand for financing (Fig. 2). Since the 1990s, KART countries have received the World Bank loans/credits. They still experience the transition process from the planned to the market economy, and the role of IBRD and IDA are significant in this process. The economy of Russia experienced financial and economic improvements due to the increase of oil price, and undertaking reforms in fiscal and monetary policies at the beginning of the 2000s. The government of Russia also implemented effective policies towards repayment of national debts. All of these aspects resulted in decreasing dependence from the World Bank loans/credits (Diplomacy 2019). However, the decline of borrowing in Turkmenistan occurred due to the inability of the country to fulfill the World Bank's requirements. The country experienced difficulties with disbursements of loans/credits, procurement issues in projects and their implementations, and country failed to achieve improvement in institutional quality (Saigal, 2003). All mentioned characteristics make these countries ideal for our investigation to determine the impact of the World Bank lending and natural resource abundance on financial development.

3. Literature review

Developing countries with the less developed financial market and rich in natural resources borrow (e.g., loans/credits) from multilateral institutions (e.g., IBRD, IDA, IMF). Reasons behind this borrowing are weak domestic financial institutions (Morrison, 2007), ineffective management of natural resources (World Bank, 2016), poor economic and political factors (Morrison, 2012), and weak governance of extractive industries (EI 2018). There is a significant number of empirical studies on examining the impact of multilateral institutions' lending on macroeconomic indicators. Majority of these studies investigate the lending-induced growth (Hadjimichael et al., 1995; Durbarry et al., 1998; Obstfeld, 1999; Lensink and Morrissey, 2000; Mallick and Moore, 2005), relationship between lending and investment (Boone, 1996; Easterly, 1999), and impact of lending on reducing poverty (Mosley et al., 2004).

Studies reveal inconclusive results on the impact of the multilateral institutions' lending on macroeconomic indicators. Boone (1996) applied OLS and fixed effects methods to examine 96 countries for 1971 and 1990, and found no effect of multilateral institutions' financing on growth and investment. He also observed that these financing did not affect human development and education. Bird and Rowlands (2001) also found no impact on the multilateral institutions' lending on growth by investigating 93 developing countries from 1984 through 1995 using fixed effects estimation. Easterly (2005) found no impact of lending on growth in 20 top recipients of multilateral institutions' lending for the period of 1980–1999 employing probit regressions.

The positive impact of the multilateral institutions' lending on macroeconomic indicators is also reported. Durbarry et al. (1998) applied two-way fixed effects, and generalized least squares estimations to investigate 68 developing countries for the period of 1970–1993 and found strong support for the positive impact of multilateral institutions' lending on growth under stable macroeconomic environment. They observed that this result varies based on geographical location, the income level in the country and the amount of lending. Butkiewicz and Yanikkaya (2005) applied the seemingly unrelated regression and three stages least squares estimations to investigate the effect multilateral institutions' lending on the economic growth of 100 developing countries for the period of 1970–1999 and found a positive impact mostly in countries with low income and poor democracy. Marchesi and Sirtori (2011) estimated the joint impact of the multilateral institutions' financing from the World Bank and IMF on economic growth for the panel of 128 countries throughout 1982–2005. They employed two-stage least squares estimation and found that collaboration between the World Bank and IMF has a positive impact on economic growth, rather than by each performing individually.

To the best of our knowledge, only one study examined the relationship between World Bank adjustment loans and financial sector development (Cull and Effron, 2008). It confirmed the significant advantages enjoyed by recipients of loans and credits from the World Bank as compared to non-recipient states during the period from 1992 to 2003. Recipients are better able to mobilize resources and efficiently manage risks. However, this study did not consider the abundance of natural resources in countries in order to examine the relationship

between lending and macroeconomic indicators.

In the energy policy literature before the 1980s, the natural resource abundance was viewed as a blessing for resource-rich economies (e.g., Balassa, 1980; Rostow, 1990). Economists considered the natural resource abundance as a contribution to the expansion of industries and increase in production. However, this view was altered by Auty (1993) who put forward the resource curse hypothesis which stated that the abundance of natural resources stimulates rent-seeking activity and weakens policies that can result in negative economic growth.

Many researchers have found empirical support for the resource curse (e.g., Gylfason et al., 1999; Torvik, 2002). They observed that rent-seeking activities lead to corruption (Diaz-Briquets and Pérez-López, 2006), deindustrialization (Davis, 1995), and high poverty rates (Ross, 2003). Although, there is a strong support for the validity of the resource curse in the literature, there are also some studies they found that an abundance of natural resources has a positive impact and that countries rich in natural resources enjoy economic growth with sustainable financial development (e.g., Moradbeigi and Law, 2017), as well as high investments in human capital (Gylfason et al., 1999) and physical capital (Gylfason and Zoega, 2006).

The linkage between natural resources and financial development is discussed and empirically shown by many studies (e.g., Sachs and Warner, 2001; Frankel, 2012; Gylfason, 2001; Shahbaz et al., 2018). Gylfason and Zoega (2006) found that natural resources are an exogenous factor that diminishes the economic growth through the financial system that may be weakened due to rent-seeking activity leading to the low investment and saving in natural resource abundant countries. They revealed that economies dependent on revenue from natural resources tend to have a slower pace of financial development. Yuxiang and Chen (2011) empirically confirmed also that natural resource-rich regions possess the slower pace of financial development compared to the less abundant natural resource regions. They observed that shrinking the traded sector, corruption and rent-seeking, low incentive of accumulation of human capital, and less demand for investments are four reasons that abundance of natural resources may impact the financial development negatively.

Moradbeigi and Law (2017) found that countries with abundant natural resources and sustainable financial development have a positive impact on the oil-growth relationship. They showed that countries with a developed financial market can transfer revenues from natural resources to investments and thereby dampen the adverse effects of an abundance of natural resources on growth. Shahbaz et al. (2018) confirmed these findings by investigating the relationship between abundance of natural resources and financial development and finding it to be a positive one. They demonstrated this relationship by applying the finance demand function and using econometric techniques for the case of a developed financial market.

4. Model specification

To examine the World Bank lending and natural resource abundance-induced financial development, we use finance demand function. The theoretical motives behind "finance demand" is the demand for money to provide the necessary financing to cover planned investments, expenditures (governmental, business and/or individual). The amount of planned financing depends on the availability of finance, that comes from current income (Smith, 1977):

$$\Phi_t = f(\Lambda_t) \tag{1}$$

where, Φ_t is the finance and Λ_t is the current income, and t is the time. The increase of finance is closely related to the growth in the economic income. Expansion of financial services and high demand for them in the economy is observed as stimulating engine for economic growth that consequently leads to financial development (Shahbaz, 2012). Thus, the lack of finance may decrease future investment into the banking sector (Keynes, 1937). In this way, if the Φ_t and Λ_t in equation (1) are replaced by the F_t and G_t respectively, we obtain equation (2):

$$F_t = f(G_t) \tag{2}$$

where, F_t is financial development, G_t is economic growth, and t is time.

In countries with abundant natural resources and a developed financial system, effective management of natural resources suppresses the effects of the resource curse on economic growth (Moradbeigi and Law, 2017). According to Shahbaz et al. (2018), the abundance of natural resources generates additional capital that increases investments and results in increasing demand for financial development. They employed the finance demand function by augmenting the model of natural resources, education, and capital:

$$\mathrm{F}_t = f(G_t,\ N_t\ E_t,\ C_t) \tag{3}$$

where, F_t is the financial development, G_t is the economic growth, N_t is natural resource abundance, E_t is the education, and C_t is the capital, and t is the time. To provide the necessary financing for investment expenditures, demand for that financing is essential. If current financing is insufficient, alternative sources such as loan funds, should be used (Smith, 1977). Borrowed money is similar to natural resources (Collier, 2006) in that it increases investment and demand for financial services, stimulating financial development. The quality of financial institutions is vital in ensuring the smooth flow of funds and financial instruments between creditors and solvent debtors that results in a sound financial system (Djankov et al., 2007; Bhattacharyya and Hodler, 2014). In finance demand function, we also augment loan funds and institutional quality:

$$\mathrm{F}_t = f(L_t,\ G_t,\ N_t,\ I_t,\ E_t\ ,\ C_t) \tag{4}$$

where, F_t is the financial development, L_t is the loans, G_t is the economic growth, N_t is natural resource abundance, I_t is institutional quality, E_t is the education, and C_t is the capital, and t is the time. By using finance demand function in equation (4), we estimate the World Bank lending and natural resource abundance-induced financial development in the panel of developing countries. We apply the following models:

$$F_{it} = \alpha_i + \lambda{\cdot}L_{it} + \theta{\cdot}L_{it}^2 + \beta{\cdot}G_{it} + \delta{\cdot}N_{it} + \gamma{\cdot}E_{it} + I_{it} + \varepsilon_{it} \tag{5}$$

$$F_{it} = \alpha_i + \lambda{\cdot}L_{it} + \theta{\cdot}L_{it}^2 + \beta{\cdot}G_{it} + \delta{\cdot}N_{it} + \gamma{\cdot}C_{it} + I_{it} + \varepsilon_{it} \tag{6}$$

where, F_{it} is the financial development, L_{it} is the loans, L_{it}^2 is the squared form of loans, G_{it} is the economic growth, N_{it} is natural resource abundance, I_{it} is institutional quality, E_{it} is the education in equation (5), and C_{it} is the capital in equation (6), the subscript i is the country, and t is the time, ε is the disturbances. We include education and capital in different models because these variables have a high correlation.[2] We also use the natural log form of all variables in our empirical models to obtain a reliable measurement (Shahbaz and Lean, 2012).

5. Data and methodology

Our study covers the period of 1992–2017 for KART countries, and the majority of data were taken from the World Bank database and the World Scope database. We collected data for domestic credits to private sector (as percentage of GDP) to measure financial development, GDP per capita to measure economic growth, total natural resource rents per capita to measure natural resource abundance, government effectiveness to measure institutional quality and IBRD loans and IDA credits to measure the World Bank lending. We also collected data for education expenditure per capita to measure education, and gross capital formation per capita to measure capital formation. For the estimation purposes, we removed years with the missing variables and constructed an annual balanced panel data for the period of 1995–2016.

We employed accurately selected econometric methods to examine

[2] The result of the correlation matrix between variables are shown in Table 2. It shows that education and capital formation has 90% correlation.

the World Bank lending and natural resource abundance-induced financial development. Firstly, we carried the Pesaran and Smith (1995) mean group estimator, Pesaran's test of cross-sectional independence, Pesaran et al. (2008) bias-adjusted LM test and Breusch-Pagan LM test to identify the cross-sectional dependency in the model. According to Pesaran et al. (2008), the following equation can be applied with the particular ordering of cross section units:

$$LM(p)adj = \sqrt{\frac{2}{p(2N-p-1)}} \sum_{s=1}^{p} \sum_{i=1}^{N=s} \frac{(T-k)p_{i,i+s}^2 - \mu_{Ti,i+s}}{v_{Ti,\,i+s}} \quad (7)$$

where,

$$\mu_{Ti,i+s} = \frac{Tr[E(M_i M_{i+s})]}{T-k} \text{ and } v_{Ti,\,i+s} = \{Tr[M_i M_{i+s}]\}^2 a_{1\,T} + 2Tr\{[M_i M_{i+s}{}^2]\}a_{2T}$$

After conforming cross-sectional independency in the model, we applied the unit root tests: Fisher (Maddala and Wu (1999)), Levin et al. (2002), Im et al. (2003). We also applied Pesaran's CADF (2003) test with cross-section dependence and heterogenous panels. Next, we examine the existence of cointegration among variables. We applied KAO, Pedroni, and Westerlund Cointegration tests. We also employed the second-generation cointegration test, Westerlund ECM (2007), which takes into account cross sectional dependency and heterogeneity. Westerlund (2007) applied the bootstrap approach to correct for cross-sectional dependency. This approach is based on three steps. The first step is to employ the least squares regression to form the vector that is the essential basis of the bootstrap approach:

$$\Delta y_{it} = \sum_{j=1}^{pi} \propto_{ij} \Delta y_{it-j} + \sum_{j=0}^{pi} \gamma_{ij} \Delta x_{it-j} + e_{it} \quad (8)$$

The following vector is formed:

$$w_t = (e_t',\ \Delta x_t')' \quad (9)$$

This vector is used in order to generate bootstrap samples:

$$w_t^* = (e_t^{*'},\ \Delta x_t^{*'})' \quad (10)$$

The second step is to obtain Δy_{it}^* from the bootstrap:

$$\Delta y_{it}^* = \sum_{j=1}^{pi} \propto_{ij} \Delta y_{it-j}^* + u_{it}^* \quad (11)$$

where, $\propto_{ij}$ is obtained from equation (8). The last step is to generate y_{it}^* and x_{it}^*:

$$y_{it}^* = y_{i0}^* + \sum_{j=1}^{t} \Delta y_{it}^* \quad (12)$$

$$x_{it}^* = x_{i0}^* + \sum_{j=1}^{t} \Delta x_{it}^* \quad (13)$$

To identify the long-term coefficients, Dynamic Ordinary Least Squares (DOLS) was employed. We concluded our empirical tests by carrying Dumitrescu and Hurlin (2012) panel causality test to identify the causality between variables.

6. Results and discussion

Table 1 presents descriptive statistics. The mean of the variables is close to the median. The standard deviation of economic growth (LGROWTH), the World Bank Lending (LWB), education (LED) and capital formation (LCAP) variables are higher compared to financial development (LFD), natural resource rents (LNR), and institutional quality (LIQ). Table 2 presents the correlation matrix. We observed that natural resource rents and World Bank lending are positively correlated with all variables. Education is highly correlated with the capital formation; hence we did not include both of the variables in the same model. We carried separate estimations with education and capital formation.

Table 1
Descriptive statistics.

Variable	Obs	Median	Mean	Standard Deviation	Minimum	Maximum
LFD	88	3.26	3.08	0.74	0.049	4.08
LWB	88	20.37	19.69	2.38	13.76	22.65
LNR	88	7.00	6.97	0.77	4.13	7.89
LGROWTH	88	9.90	10.00	2.83	3.43	14.79
LIQ	88	0.43	0.41	0.36	0.25	2.59
LED	88	4.28	4.43	1.06	2.47	6.32
LCAP	88	6.70	6.68	1.07	4.55	8.30

Note: LFD – Financial development; LWB – World Bank lending; LNR – Natural resource abundance; GROWTH – Economic growth; LIQ – Institutional quality; LED – Education expenditure; LCAP – Capital formation.

Table 2
Correlation matrix.

	LNR	LWB	LGROWTH	LIQ	LED	LFD
LNR	1.0000					
LWB	0.1070	1.0000				
LGROWTH	0.4519	0.5235	1.0000			
LIQ	0.1366	0.6846	0.5473	1.0000		
LED	0.5853	0.5001	0.7294	0.6049	1.0000	
LFD	0.5371	0.3304	0.5407	0.2893	0.6468	1.0000
LCAP	0.6690	0.1737	0.5903	0.4047	0.8984	0.6236

Note: LFD – Financial development; LWB – World Bank lending; GROWTH – Economic growth; LED – Education expenditure; LNR – Natural resource abundance; LIQ – Institutional quality; LCAP – Capital formation.

Table 3
CD tests for the model results.

	(1)		(2)	
	Statistic	p-value	Statistic	p-value
Pesaran and Smith (1995) Mean Group estimator	0.113	0.131	0.128	0.302
Pesaran's test of cross sectional independence	0.751	0.4526	0.638	0.5234
Pesaran et al. (2008) bias-adjusted LM test				
LM	10.72	0.1173	6.396	0.3803
LM adj (two-sided test)	1.455	0.1457	−0.6745	0.5000
LM CD (two-sided test)	−0.5897	0.5554	−0.6239	0.5327
Breusch-Pagan LM test of independence				
LM	7.932	0.2431	6.859	0.2713

Note: H_0: Cross sectional independence.

We employed the Pesaran and Smith (1995) mean group estimator, Pesaran's test of cross-sectional independence, Pesaran et al. (2008) bias-adjusted LM test and Breusch-Pagan LM test to identify the cross-sectional dependency in the models 5 (column 1) and 6 (column 2). Table 3 shows that all of the results indicate our panel data exhibits cross-sectional independence.

After conforming cross-sectional independence in the model, we applied the panel unit root tests: Fisher (Maddala and Wu (1999)) test, Levin et al. (2002) test, Im et al. (2003) test. We also applied Pesaran's CADF (2003) test with cross-section dependence and heterogenous panels. Table 4 reports that all variables are integrated of order one (I). Since all the variables are integrated of the same order (I), next we examined the existence of cointegration among variables. Table 5 presents the cointegration with the models with education (column 1) and capital formation (column 2) respectively. We applied KAO,

Table 4
Unit root tests results.

	Fisher		Levin Lin Chu		IM Peseran Shin		Pesaran's CADF Test	
Panel A: Levels	Statistic	p-value	Statistic	p-value	Statistic	p-value	Statistic	p-value
LFD	4.1581	0.5836	0.5251	0.6492	1.1823	0.9592	−1.074	0.913
LWB	1.0382	0.9583	1.5793	0.5965	4.1829	1.0000	−1.921	0.475
LGROWTH	0.2184	1.0000	0.1364	0.9918	7.0471	1.0000	−0.082	1.000
LED	1.9172	0.9983	−1.3819	0.1613	3.5106	0.9850	−2.056	0.246
LIQ	11.7224	0.1640	−1.0110	0.2047	−2.1032	0.1365	−1.998	0.312
LNR	12.0183	0.3461	−0.9504	0.5192	−1.0047	0.1717	−2.210	0.144
Panel B: First Differences								
LFD	53.6742	0.0000	−5.0174	0.0000	−6.1826	0.0000	−3.004	0.015
LWB	38.1923	0.0000	−15.038	0.0000	−4.0650	0.0000	−4.769	0.000
LGROWTH	24.0826	0.0014	−4.1052	0.0002	−2.6294	0.0036	−3.860	0.001
LED	19.0583	0.0117	−5.0487	0.0000	−2.0367	0.0044	−4.631	0.000
LIQ	−21.495	0.0055	−7.6932	0.0000	−4.5283	0.0000	−3.830	0.001
LNR	61.2864	0.0000	−5.0587	0.0000	−4.3628	0.0000	−4.447	0.000

Note: LFD – log of financial development; LWB – log of IBRD loans and IDA credits; LNR – log of total natural resource rents per capita; GROWTH – log of GDP per capita (current LCU); LIQ – log of institutional quality; LED - log of education expenditure per capita; LCAP – log of gross fixed capital formation per capita.

Table 5
Panel cointegration tests with the world bank lending.

	(1)		(2)	
	Statistic	p-value	Statistic	p-value
KAO Panel Cointegration Test				
Modified Dickey-Fuller	−3.6247	0.0016	−3.7278	0.0025
Dickey-Fuller	−3.7295	0.0000	−4.2146	0.0000
Augmented Dickey-Fuller	−4.0136	0.0000	−3.8533	0.0013
Pedroni Panel Cointegration Test				
Modified Phillips-Perron	3.8954	0.0005	2.9483	0.0116
Phillips-Perron	4.1526	0.0000	−4.6254	0.0000
Augmented Dickey-Fuller	3.3518	0.0001	−2.9462	0.0109
Westerlund Panel Cointegration Test				
Variance ratio	4.6472	0.0000	3.4526	0.0035
Westerlund ECM Panel Cointegration Tests				
Gt	−2.753	0.061	−5.057	0.000
Ga	−2.914	0.065	−4.627	0.052
Pt	−11.381	0.000	−13.263	0.000
Pa	−13.213	0.018	−13.428	0.042

Note: H_0: No cointegration among variables.

Pedroni, and Westerlund cointegration tests. All of the cointegration tests revealed significant results, indicating the existence of a co-integrated association between the variables. We also applied the second-generation cointegration test Westerlund ECM (2007) which takes into account cross-sectional dependency and heterogeneity. The result proved that in both models (see, Table 5) the existence of co-integration between data is confirmed at 1% significance level.

Next, Panel Dynamic Ordinary Least Squares (DOLS) was employed in estimating models (5–6) in columns (1–2) in Table 6. Results for column (1) with education (LED) variable reveal that the World Bank lending variable and its squared form are statistically significant at the 10% level. The sign of LWB is positive, implying that an increase in the borrowing from the World Bank positively affects the financial development in KART countries. However, too much borrowing negatively affects the financial development, that can be confirmed by the negative sign of the squared form of LWB variable. Natural resource abundance variable (LNR) is positive and statistically significant at 5% level. It indicates that the increase of natural resources has a positive impact on financial development in KART countries. For developing countries under study, natural resources are an indispensable source of revenue that may lead to an increase in economic activities resulting in an increase in financial services. However, Hooshmand et al. (2013) and Law and Moradbeigi (2017) found that natural resource abundance has a negative impact on financial development.

Table 6
Dynamic ordinary least squares results.

Variables	(1)	(2)
LWB	1.360*	2.319***
LWB^2	−0.033*	−0.055***
LIQ	1.122***	1.302***
LNR	0.480**	0.335*
LGROWTH	0.100*	0.071*
LED	0.185*	
LCAP		0.270*
Cons	−6.369**	−6.170*

Note: LWB – World Bank lending; LWB^2 – Squared of the World Bank lending; LIQ – Institutional quality; LNR – Natural resource abundance; GROWTH – Economic Growth; LED – Education expenditure; LCAP – Capital formation; Cons – constant.

Institutional quality has a positive sign and statistically significant at the 1% level. It indicates the importance of institutions in financial development. The higher quality of institutions means that better processing of transactions in financial institutions can positively impact the financial system. LGROWTH and LED have a positive sign and they are statistically significant at the 10% level. These results confirm that economic growth and education are also important determinants of financial development. The positive relationship between economic growth and financial development was found by Shahbaz (2009) and Shahbaz et al. (2018). It indicates that improvement of economic activities contributes to a high level of income of the population. This, in turn, facilitates an increase of demand for financial services resulting in increasing of financial development. Education also is an important catalyst of financial development through investment in research, increase of financial knowledge (Shahbaz et al., 2018) and improving skills of human capital (Hatemi-J and Shamsiddin, 2016).

Results for column (2) with capital formation variable confirm our findings from column (1). LWB and LWB^2 have positive and negative sign respectively. These findings also reveal, that the World Bank lending of loans/credits to KART countries has a positive impact on financial development; however, excessive borrowing has an adverse effect. LNR also has a positive sign and it is statistically significant at the 10% level indicating the importance of natural resource abundance for financial development. Likewise, in column (1), the institution quality and economic growth were found to have a positive impact on financial development. LCAP variable is positive and statistically significant at the 10% level. An increase in capital formation increases the

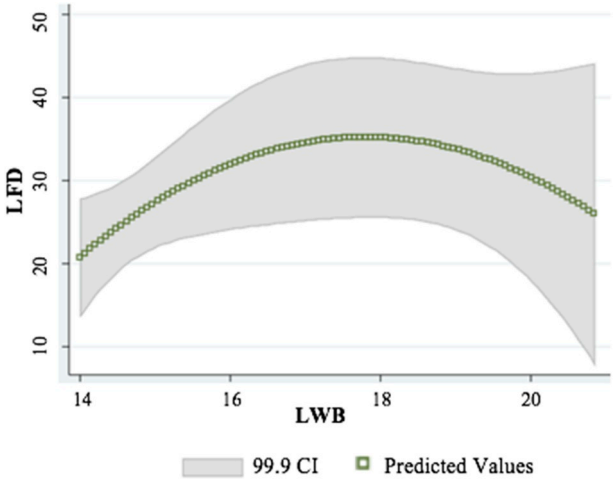

Fig. 3. Quadratic prediction with confidence level.
Note: LFD – Log of Financial Development; LWB – Log of the World Bank Loans and Credits; CI is the confidence level is plotted in a range of grey area.

financial development in KART countries.

Before proceeding further, we should note that Fig. 3 illustrates the scatter diagram of the World Bank lending variable and financial development prediction values. Fig. 3 shows the inverted U-shaped pattern between the World Bank lending and financial development with the 99.9% confidence level. It supports our findings from DOLS estimation (column 1 and 2 in Table 6), where we found the LWB variable has positive-elastic and LWB^2 variable has a negative-inelastic impact on financial development in the long-run. It confirms that excessive borrowing above the maximum level may have a negative effect on financial development. We estimated the average turning point of the maximum acceptable level of borrowing. The turning point of the annual average borrowing amount from the World Bank is around $US 88.9 Million (based on model (5)), and around $US 683.1 Million (based on model (6)). The inclusion of education variable in model (5) increased the turning point. We believe, it is due to the effective knowledge and management of loans and credits. We observed that the turning points (calculated based on model (5) and (6)) are within the range of the actual amounts borrowed from the World Bank.

Developing countries that possess an abundance of natural resources, but also exhibit weak macroeconomic indicators, borrow extensively from multinational institutions to improve their economies. However, inefficient allocation of these loans and credits contributes to a decline in investment in human and physical capital. Also, inexpedient utilization of loans and credits weakens management of natural resources and the financial sector (e.g. Mallick and Moore, 2005; Cull and Effron, 2008).

Mismanagement and ineffective governance result in wasteful allocation of resources. In economies that have abundant natural resources but are burdened by destructive economic and political factors, too much borrowing from multinational institutions may encourage rent-seeking activities that treat both natural resource rents and loans/credits; which can be compared to natural resources and considered as "rents" as well (e.g., Collier, 2006). Rent-seeking activities result in the misuse and spoliation of loans and credits, reducing savings and investment and impeding financial development.

Table 7 displays the Dumitrescu and Hurlin (2012) panel causality test results that confirm the causal interaction between financial development and all regressors. Statistically significant coefficients of LWB and LNR indicate the existence of a causal link from both, World Bank lending and natural resources abundance to financial development. This finding supports the results of Shahbaz et al. (2018) and implies that the World Bank lending and natural resources abundance are essential determinants in predicting the long-run financial development pace in a natural resource abundant countries. The Dumitrescu and Hurlin (2012) panel causality test also rejected the null hypothesis of no causality from institutional quality, capital, growth, and education to financial development. These results are compatible with the previous research findings (see, Hakeem and Oluitan, 2012; Shahbaz, 2012).

Table 7
Dumitrescu and Hurlin (2012) Causality test results.

Hypothesis	p-value	Causality
LCAP *causes* LFD	0.0000	Yes
GROWTH *causes* LFD	0.0062	Yes
LED *causes* LFD	0.0038	Yes
LNR *causes* LFD	0.0146	Yes
LWB *causes* LFD	0.0011	Yes
LIQ *causes* LFD	0.0259	Yes

Note: LFD – Financial development; LCAP – Capital formation; GROWTH – Economic Growth; LED – Education expenditure; LNR – Natural resource abundance; LWB – World Bank lending; LIQ – Institutional quality.

For the robustness purpose, we employed different proxies for measuring financial development, and natural resource abundance. Also, we took into account the oil price shocks, and an interaction term of the World Bank loans and natural resource abundance. The results are displayed in Table 8. We estimated main models using bank deposits (columns 1 and 2), the ratio of the bank credits to the private sector to bank deposits (columns 3 and 4), and the bank credits to the private sector (columns 5 and 6) as proxies to measure financial development. Our results are consistent with our main estimated models. We also confirmed that our findings by using Subsoil Assets per capita variable to measure natural resource abundance. We present our results which are consistent with our main estimated models (columns 7 and 8). The natural resource abundance has a positive impact on financial development in KART countries. It also confirms that excess of the World Bank borrowing above the turning point negatively impact financial development. In columns (9) and (10) in Table 8, we also report results with using oil price variable to capture the impact of oil price shocks on financial development, that also shows consistent results. Columns (11) and (12) show that the interaction term of the World Bank lending and natural resource abundance (LWB*LNR) has a positive sign and it is statistically significant in both models with education and capital formation respectively. It indicates that an increase in borrowing has a positive impact on natural resource abundance-financial development nexus. It confirms the statement that the World Bank member states may borrow towards enhancing the natural resource management and environment.

7. Conclusion

This study investigates the impact of the World Bank lending on financial development in natural resource abundant developing countries. The main aim of this study is to determine whether the World Bank lending is the "curse" or "blessing" towards financial development. For this purpose, accurately selected first and second generations of panel data econometrics methods were employed. Our results reveal that the World Bank lending and natural resource abundance have positive impacts on the financial development of KART countries.

Our findings indicate the existence of the inverted U-shaped pattern between the World Bank lending and financial development. The results suggest that to some points, World Bank lending has a positive impact on financial development. However, the inverted U-shaped relationship implies that excessive borrowing of the World Bank may harm financial development. This finding shows that although policymakers consider the World Bank lending as one of the instruments to accelerate financial development in developing countries rich in natural resources, overreliance on these credits and excessive borrowing

Table 8
Robustness results.

Variables	Proxies for financial development						Proxy for natural resource abundance		Oil price shock		Interaction term LWB*LNR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
LWB	0.734***	1.128**	2.599***	1.605***	3.474***	3.193***	2.28***	0.780***	0.755***	0.6735**	1.186*	1.944***
LWB^2	−0.019***	−0.030**	−0.055***	−0.034***	−0.081***	−0.072***	−0.057***	−0.020***	-.0018***	−0.019**	−0.049***	−0.077***
LIQ	1.051***	0.768***	0.440***	−0.230	−0.142	−0.004	0.521*	0.105*	.05229***	−0.204	1.50***	2.129***
LNR	1.067***	0.694***	0.794***	0.596***	0.584***	1.177*			1.66***	1.919***	−5.012***	−8.351***
LGROWTH	0.109***	0.120	0.091	0.131*	0.181***	0.148***	0.168**	0.051***	0.079***	0.009***	0.051	0.022
LED	0.480***		−0.039		0.223***		0.251*			0.530***	0.238	
LCAP		0.415***		−0.114		0.376***		0.083**	0.491***			0.200
LSA							2.75***	0.496***				
LOP									8.415***	9.40***		
LWB*LNR											17.08***	24.65***

Note: Dynamic ordinary least squares estimation is employed. LWB – log of IBRD loans and IDA credits per capita; GROWTH – log of GDP per capita (current LCU); LED - log of education expenditure per capita; LNR – log of total natural resource rents per capita; LIQ – log of institutional quality; LCAP- log of capital formation per capita; LSA – log of Subsoil Assets per capita; LOP – log of oil price; LWB*LNR – interaction term between Log of IBRD loans and IDA credits per capital and log of total natural resource rents per capita.

amount may have a negative impact on financial development. Our findings also suggest the importance of increasing investment on education to overcome lack of management knowledge working with loans and credits.

There are several recommendations for policymakers to enhance positive nexus between natural resource abundance and financial development. First, investment in human capital through education is an essential procedure to undertake to dampen the negative consequences of the resource curse. Knowledge and trainings increase the potential of governance for effective utilization of the resources, avoid wasteful allocation of wealth, and minimizes rent-seeking activities. Second, the increase of investment in institutional quality has a positive impact on educational quality. Also, improvement of institutional quality brings to governance efficiency and credibility of the government's commitment to reforms and policies contributing to the effective natural resource management. Third, as our findings reveal, the role of the loans/credits from multinational institutions also is vital for a positive relationship between natural resource abundance and financial development. Efficient utilization of loans/credits for enhancing natural resources management and their exploitations increases the positive impact of natural resource abundance on financial development.

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