

Research article

The impacts of resource abundance and export diversity on financial development in the South Asian economic bloc

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ABSTRACT

One of the most essential aspects of a nation's economic progress that determines the citizens' lifestyles and general wellbeing is the level of financial development (FD). Thus, the current study examines the influence of natural resources as key variable for financial development in South Asian economic bloc while accounting for the roles of export diversity, inflation, and economic expansion. The dataset utilized for the South Asian bloc stretches between 1990 and 2020. Second-generation panel econometric approaches that are robust to slope heterogeneity and cross-sectional dependence were employed in the study. The relevance and applicability of the second-generation techniques was reinforced by some preliminary assessments while the cointegration checks confirm the existence of long-run interconnectedness between financial development and the regressors. The elaborate empirical analysis that was conducted shows that export diversity and natural resources abundance exert diametric impacts on financial development of the South Asian bloc. While the former positively influences financial development, the latter's impact was significantly negative thereby signaling the resource curse tendency of the South Asian countries. Furthermore, the observed roles of economic progress and inflation on the bloc's financial development were positive and significant. Therefore, authorities in the South Asian countries need to maintain greater regulatory oversight of the resources market to ensure that rent seeking and resource abuse are avoided at all costs towards building a more prudent fiscal mechanism within a stable financial system. Authorities also need to ensure that resources are fully efficiently utilized by channeling them to production activities that create value addition to resources to harness greater exports for improved FD levels. Other policy measures were also highlighted for the South Asian stakeholders in the main text.

1. Introduction

There is a vast number of research on how the abundance of natural resources impacts the economic growth of a nation. The most prominent among these studies are those that examine whether natural resources are a blessing or curse to a nation following the

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arguments of the resource cures theory. The theory which has been broadly investigated in the literature demonstrated that there is a substantial negative link between natural resource endowments and economic growth in resource-rich economies [1–3]. However, there is a rising number of theoretical and empirical studies that have established the evidence that resources abundance positively contributes to nations’ economic growth. The positive arguments on the impacts of natural resource abundance on economic growth contravene the traditional views of the resource curse conjecture and these new arguments are mainly premised on the roles of resource endowments in a nation’s financial development (FD), given that FD in particular is one of the major aspects of economic progress and prosperity [4]. Thus, this paper aims to contribute to the existing studies by investigating the influence of abundant natural resources on financial development in the South Asian countries while accounting for the roles of inflation, growth trends, and export diversification in this rapidly emerging economic bloc.

The role of natural resources, in any country in realizing national growth target cannot be undermined [5]. Undeniably, natural resources are essential tool for boosting economic development especially through the channel of global commerce and activities in the financial sectors, thus stimulating the national economic outputs. Researchers are often puzzled by low state of economic progress among some nations despite the abundance of natural resources that has been identified with them over the years, whereas even those with little natural resources keep experiencing relatively good annual economic progress. This question can be answered through the level of financial development of a country. It would be untrue to outrightly conclude that natural resource is a gross goodness (blessing) for a nation or a curse on a nation, however, the level of resource management by countries would go a long way in shaping what eventually becomes the aftermath of resource abundance in an economy. Financial development via the support of available natural resources can be a major channel for boosting a nation’s economy and trade operations. For instance, countries like Russia, the USA, and Saudi Arabia among other top natural resources abundant countries encourage their financial development so that they could be highly effective in terms of fine-tuning trade deficits and also increasing their economic activities [5]. Hence, to such countries, their natural resources become a blessing to them because their governments were able to synergize efforts on stabilizing financial development.

The relationship between the natural resources market and financial development is extremely competitive, while the dearth of resources creates debts and potential instability in financial sectors, some resource-rich countries have made the best use of resources availability to promote financial development. Empirical evidence documented in the literature provides conflicting results. Some scholars argued that the majority of natural resource-dependent countries had a poor degree of financial development [2,6–12]. Others have stated that natural resources serve as a foundation for financial growth. For example, this can be seen in the study of [13] showing a one-directional causal inference originating only from natural resources to financial development while [14] showed two-directional causal inference among these variables from their study. This, again, demonstrates the ambiguity of the natural resources and financial development nexus and its understanding is critical for policymakers to recommend effective measures for the growth of the financial industry. Besides, it has been noted that the optimal use of resources allows for the creation of a stable economy, thereby fostering economic growth [15].

Furthermore, access to natural resources is among the major ways to stimulate tangible progress in different sectors of an economy. Natural resource-rich countries have a good opportunity of developing their financial industry through the rents earned on resources utilization or by exporting the resources to the less resourced endowed countries [5]. Also, both financial and economic development levels in resource-rich countries depend on how authorities make strategic decisions on resources demand in view of the need to acquire additional funds through export diversification and rent(s) collection as enunciated by Ref. [5]. Moreover, following the

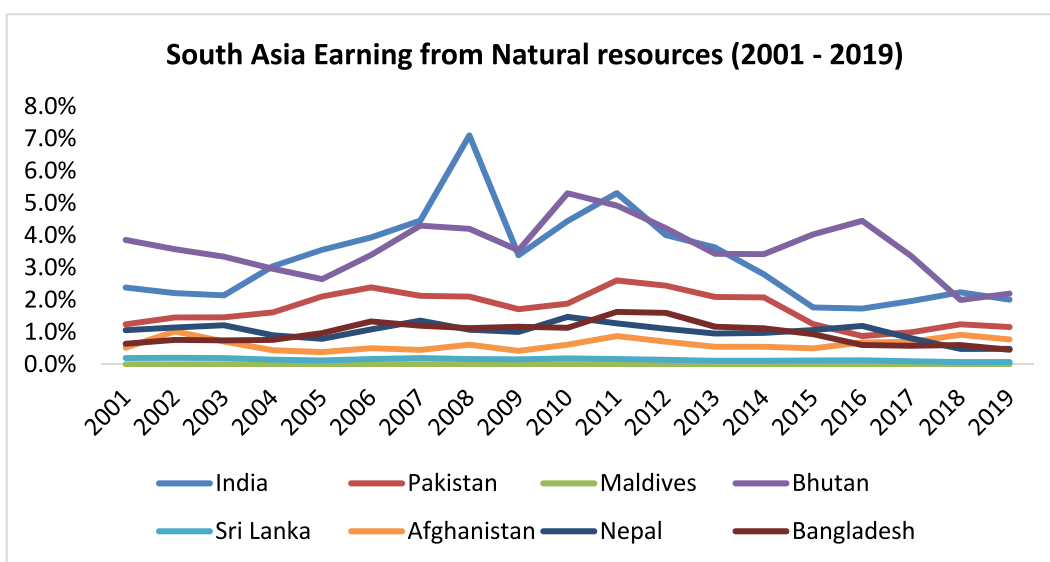


Fig. 1. South Asia earning from natural resources. Source: Authors computation, data from the World Bank Development Indicator (Available at: <https://databank.worldbank.org/>)

available World Development Indicators, it is critical to account for the influence of natural resources on productive capacity while orchestrating useful frameworks for sustainable development. The gains accrued from natural resources, especially those from fossil fuels and minerals, often constitute a sizable fraction of the GDP in certain economies, and a big chunk of these earnings are in the form of economic rents which are mainly income beyond the cost of extracting the resources. For example, the percentage contribution (% GDP) of natural resources to the South Asia economic growth for the period of 2001–2019 is depicted in Fig. 1. The plot revealed that India and Bhutan have higher earnings while other countries in the list have low earning compared to them. The earnings from the Maldives are the lowest. The clear picture of these earnings is further exposed in Fig. 2 showing the aggregated earnings for all the years from 2001 to 2019. Of the total contribution of natural resources to the South Asia’s GDP which is estimated at about 216%, Bhutan’s share in this contribution to GDP from natural resources is about 69.13% followed by India with around 62.08% of the contribution to GDP from resources between period of 2001–2019. The earnings from natural resources in other countries, such as Pakistan, Nepal, Bangladesh, and the Maldives, were also depicted in Fig. 2.

Moving on, it is also believed that natural resources are advantageous channels for financial growth. The arguments are that having natural resources will boost a nation’s economy, especially if the efforts to optimize the financial development are properly channeled. According to Ref. [5], researchers are interested in the empirical nature of the natural resource-financial development nexus because of certain reasons; (i) to examine if there is negative or positive influence of natural resources on the association between financial advancement and GDP growth which mainly depend on natural resources [16]; (ii) [17] asserted that different level of countries and regions, in term of income distribution vis-à-vis the availability of natural resources, can be provided from the exploration of natural resources-finance relationship; and (iii) [18] assert policymakers and government were able to make an informed decision that utilizes natural resources as an appropriate asset through which economic growth and financial development will be enhanced.

Considering the foregoing, the present paper contributes to the growing studies in some specific respects. Firstly, this study is the first to the best of the author’s knowledge, to explore the influence of the abundance of natural resources, while accounting for the role of economic expansion, export diversification, and inflation, on the South Asian bloc’s financial development. Besides, while the case of natural resources has received much attention alongside the roles of economic growth in the financial development discussion in general, those of inflation and export diversification have scarcely been addressed. Secondly, the approaches utilized provide better and robust results. Since these countries belong to the same region, they may have some similar or joint economic characteristics which subsequently may be influencing their individual characteristics. These characteristics if not removed will produce a biased result for the econometric panel estimation. Thus, the cross-sectional dependency (CD) test [19], scaled LM test [20], the CD test [21], and the Bias-adjusted LM CD tests [22] are used to check for the presence of the dependency in the data after which second-generation unit-root test was employed to investigate the existence of stationarity in the data. Furthermore, based on the initial research of [23,24], and [25], the present research employs robust econometric techniques for the long-run analysis, namely quantile regression (QR) and augmented mean group (AMG) to produce sufficient results that are robust for accurate inferences and policy suggestions.

2. Literature review

In this section, previous studies that are related to natural resources and financial development nexus were reviewed. The review was structures into two parts. Firstly, we reviewed the interrelationship between financial development and study’s main variables of interest namely resources rents, export diversity, and economic growth. Secondly, the study proceeded to review the relationship between financial development and some of its other possible influential determinants.

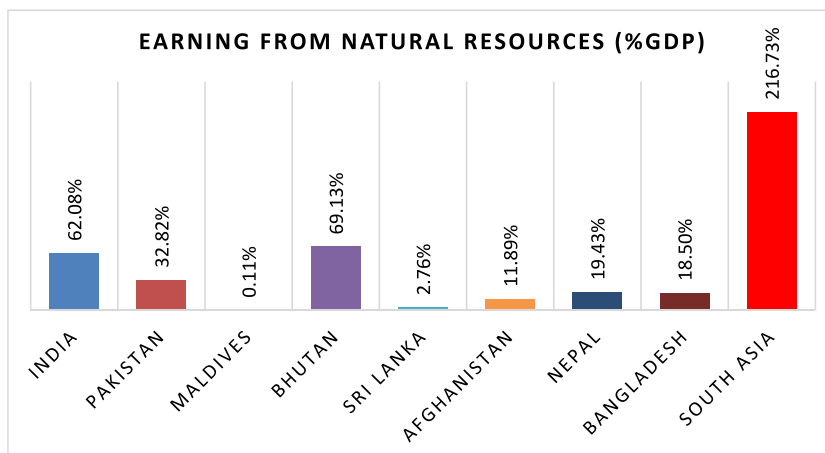


Fig. 2. Resources rents (%GDP).

2.1. Financial development (FD) and the examined variables

Following the background information and motivating points raised in the introductory part, the main determinants factors examined for financial development in line with the study's aim and objectives are resources rent, inflation, export diversification, and economic growth. Scholars from different countries have investigated the nexus of financial development with some of these variables in isolated cases. On a general note, it can be easily noticed that while the case of natural resources has received much attention alongside the roles of economic growth in the financial development discussion, those of inflation and export diversification has scarcely been addressed. The only recognized study that considered inflation rate and export diversification as determinants of financial development is the very recent study by Ref. [5]. The study considered ten leading resources-rich countries from 1990 to 2020. They examined how resources influence FD in the presence of economic expansion, inflation, and export diversification. The outcome of the study revealed that all the variables have a long-run stable relationships with FD. Furthermore, whereas export diversification, GDP growth boost FD, natural resources stifle FD among the countries. In addition, the empirical findings show unidirectional causation flowing from financial development to export diversification and inflation. Hence, policymakers and governments have a fresh insight to conserve the resources in the top ten natural resource-rich states as this will likely improve the financial growth of the countries.

[5], further exemplified that countries' natural resources are key indicators to improving financial development, that financial development is dependent on natural resources, and as a result, that the resource-rich countries must make decisions based on the natural resource demand. However, how those nations make decisions is critical since it will play a significant part in the expansion of FD by acquiring foreign money. Moreover, [26] posited that the financial sector should be enhanced to ensure the seamless operation of the system. As a result, there can be positive/good and negative/bad impacts of natural resources on the financial development of any country. Although some academic papers, such as [27] have focused on the blessing of natural resources rather than a curse on the financial development, in the recent and ongoing research, there is a conflicting report on the whether or not natural resources is a curse or blessing to countries, but the output may vary and dependent on the management strategy of natural resources in a particular country or group of countries.

For example, natural resource abundance, exercising a negative effect on the financial development, is a curse to many developing countries [28], while the high-income countries manage the resources, so it becomes a blessing for the growth of financial development [14]. It was argued by Ref. [28] that the effect of natural resources on FD is negative, that is, a curse to the Chinese government for a period from 1987 to 2017 while [14] contended that the United States, through the controlled spread of information and continuous economic progress, maximize the availability of an abundance of resources to foster the financial development of the country. The study suggests that even during any economic crisis, natural resources can be optimally utilized to support capital markets as a strategy for financial growth.

Another study conducted on thirty-eight African countries is the research of [9] which found that whether natural resources positively/negatively influenced the financial development in all the target African countries are mixed, ambiguous, and largely dependent on the financial indicators and the institutional quality of each country. Also, FD in Russia, Turkmenistan, Kazakhstan, and Azerbaijan, is largely facilitated by the abundance of natural resources in the countries [29]. Using OECD countries as a case study for the period of 1990–2016, [30] investigate the influence of natural resources and GDP expansion on FD. The findings reveal a long-run relationship between the variables and show that economic growth and FD have a positive and significant influence on FD, thereby facilitating the financial growth of the OECD countries. Ref. [7] found out that the influencing factors of FD in China for data between 1971 and 2017 are natural resources with negative influence and economic growth with positive influence. The study further revealed that the causality influence that natural resources and economics have on FD is long-term.

Some other researches also demonstrated that natural resources positively influence the financial development are the study of [13] in OECD countries, from 1990 to 2016, which further shows a one-direction causality from only the resources rent to FD; the study of [31] using Pakistan from 1972 to 2017; the study of Ref. [32] using the data from 16 developing countries from 1994 to 2017; the study of Ref. [33] using the panel data of twenty-three high-income resource-rich economies; and Ref. [28] using Pakistan as a case study for a period of 1975–2017, although the positive effect is on the short-run while the effect is negative in the long-run. On the other side, some other assembled researches that revealed that natural resources negatively influenced the financial development are the study of Ref. [34] on E7 nations as a case study; Ref. [35] for China from 1981 to 2018; and the study of Ref. [36] for a total of 10 countries; and the study of Ref. [12] and the one from Ref. [37] for in China and for 130 selected countries respectively. Even in the context of the ambiguous result, there are hardly several studies, except for the study of Ref. [5], that considered inflation, export diversity, and economics in the presence of the natural resources and financial development nexus. Although some other factors such as institutional quality, human capital, globalization, and oil reserves revenues as a determinant of financial development are also not considered in this study, these factors will be reviewed in the next subsection.

2.2. Other determinants of financial development

The association between natural resources and financial development can be controlled by some moderating factors, such as institutional quality, globalization, and human capital. To start with, the level of institutional quality can either make or mar every aspect of a government decision in such countries. The problem of most developing countries is the effect of a weak institution, and the theory asserted that in the absence of a strong institution, the negative consequences of resource revenue are more severe and so the financial development sector is unstable [38]. According to Ref. [9], the need for a strong institution in maximizing the growth of natural resource rent while reducing any negative impact has been stressed by Ref. [39] in their study. In the same vein, Ref. [40]

reiterated that the structure of the political institution, especially in natural resource-rich countries heavily influenced the economic decision of the governing elites. According to the strong institutional factors, are a strong rule of law, effective discipline on corruption, low or absence of violence, and the existence of principles of checks and balances either by the citizens or the opposition party.

As a result, the study suggests that natural resource wealth may contribute to the growth of the financial sector when institutions are strong and well-regulated. Buttressing the empirical research of Ref. [37] on 130 globally selected economies, the authors considered the role of the political institution to determine if natural resources inhibit financial development, and they discovered that resource rents are negatively associated with financial development in countries with inadequate political institutions, but this negative effect decreases and eventually disappears as political institution quality improves. As a result, the authors believe that resource-rich countries with weak political institutions are likely to be economically underdeveloped. Similarly, Natural resource abundance, according to Ref. [41], may have a detrimental impact on development when weak institutions allow resource income to be spent on public expenditures rather than innovation. Better political institutions have a favorable influence on financial growth [42, 43] while Ref. [44] shows that the presence of democratic institutions leads to a more market-based financial sector. In essence, countries with strong institutional quality are less likely to suffer from natural resource curse compared to countries with worse institutional quality.

Regarding globalization and human capital as influencing factors of financial development through natural resources, according to Ref. [45], the benefit of trade openness can be exploited through the help of globalization by mitigating the downside risk. Higher direct investment as a result of openness may give a substantial opportunity to producers to use a diverse portfolio to engage in riskier investments, which can lead to quicker growth in the economy and faster lending and borrowing [46]. Although globalization is a powerful accelerator of economic progress [47–51], its influence is lower in the less globalized economies than in highly globalized ones [52], since nations with a high level of globalization are more likely to maintain consistent growth rates [53]. The seminal work of Ref. [54] sparked the discussion concerning the relationship between globalization and financial development, and since then researchers have been on the look to empirically, theoretically, and conceptually investigate the relationship. According to him, the financial development boom and the progressive economy is as a result of globalization in benefiting the economy's institution.

This research corroborates the view of Ref. [55] who believe that the expansion of the middle-income nations has resulted from trade liberation which exerts pressure on the formation of a financial institution, thus globalization helps in contributing to financial development and, eventually, economic growth. On the account of human capital, its influence on financial development has also been exercised by different authors, and it was believed that human capital, has the potential to convert natural resources into other long-term focused enterprises, so turning resource-rich countries' burden into a gift [7]. Natural resources' excessive effect can only be offset by increasing investment in educated human capital [56]. The underlying point is that human capital development in natural resource-rich countries does not deliver the expected return in terms of rising wages, and salaries, and as a result, individuals in these countries tend to lose passion for education. In essence, high earnings in the private sector attract students and even instructors in Texas [57]. Furthermore, human capital, according to Ref. [58], is a significant contribution to Turkish financial development. Similarly, Ref. [59] observed that in the situation of sufficient resources, higher education can foster a growth-friendly environment.

2.3. Literature gaps

Despite the growing volume of studies in the resource literature, the current attention given to the South Asian bloc is inadequate considering the enormous weight of this bloc in the global economy in terms of their huge resource utilization within the rapidly evolving global financial systems. Besides, majority of the available studies on the South Asian countries have mainly focused on the strict analysis of the resources curse theory to show whether natural resources are a curse on economic growth in some of the countries in the region [7,28,60]. Hence, to improve on the existing body of knowledge, the current study provides a broader perspective by focusing on the subject matter of financial development (FD) in the region while also incorporating broader possible determinant of FD in the elaborate empirical analysis that were not covered in extant studies.

3. Theoretical framework, empirical modelling, and data collection

Going by the proportion of the natural resource curse theory [2,3,10], resource abundance often creates more woes rather than expected economic gains or benefits in resource-rich nations. Hence, there has been growing arguments regarding the validity of this claims and several studies have mainly focused on examining the resource curse theory in different resource-abundant economies [3]. However, due to natural resource abundance, it is also possible to have a sophisticated financial structure that would enable a nation to boost economic expansion that is large enough to offset the popular resource curse proportions. A healthy financial sector can ensure a judicious utilization and redistribution of natural resource income for profitable investment activities that can stimulate overall economic growth [7]. Besides, it has been noted that natural resources are a main driver of production and expansion and can serve as an engine for economic growth and development [9,13,31]. Thus, this study explores the connections between natural resources and financial development (FD) of the South Asian nations,¹ while considering the key roles played by export diversification, inflation, and economic expansion in the FD function.

Export diversification and inflation are also considered important factors in boosting financial growth through the efficient usage of

¹ Countries for the study: Bangladesh, India, Nepal, Pakistan, Sir Lanka.

natural resources [60]. Natural resources can exert either a beneficial or an undesirable influence on FD, depending on the degree of resource rent received and the connection between economic expansion and FD is also dependent on the level of overall output. In terms of impacts, export diversification may have a favorable or unfavorable impact on FD depending on the demand for goods in the global market and the operations of the manufacturing industry. As for inflation, it can have an impact on FD in either a favorable or negative way, and this may also depend on the magnitude of price fluctuations and the increase in prevailing prices. Therefore, following these theoretical considerations and based on previous studies of Refs. [9,13,61,62], the overall function of financial development is shown in equation (1).

$$FD_{it} = f(TNR_{it}, Y_{it}, EG_{it}, INF_{it}, \varepsilon_{it}) \tag{1}$$

In the first equation, FD denotes financial development, TRN is total natural resources, Y is economic growth, EG is export diversity, INF denotes inflation and ε_{it} denotes error terms. However, the nations are denoted by subscript $i = (1, \dots, N)$, as well as time duration represented by subscript $t = (1, \dots, T)$. The south Asian country’s data from 1990 to 2020 was utilized for this study base on availability of data. All data is obtained from the World Bank Development Indicator, and the timeframe is based on the accessibility of the data. The choice of these coefficients is following the 2030 Sustainable Development Goals (SDGs). However, Table 1 below presents more details on the coefficients utilized for this estimation.

The methodology framework began with the pre-estimation tests of cross-sectional dependence (CD) and slope homogeneity test. The cross-section dependency (CD) was firstly examined in the empirical framework to determine the next step of action for the analysis. This is very necessary to avoid unreliable findings from the empirical analyses [63–66]. Hence, the LM test [19], scaled LM test [20], the CD test [21], and the Bias-adjusted LM CD tests [22] are used to check for the existence of CD in this panel data. The test statistics for the four tests are identified in the list of equations (from equations (2)–(5)).

$$LM = \sum_{i=1}^{N-1} \sum_{j=i+1}^N T_{ij} \hat{p}_{ij}^2 \rightarrow \chi^2 \frac{N(N-1)}{2} \tag{2}$$

$$LM_s = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N (T_{ij} \hat{p}_{ij}^2 - 1) \rightarrow N(0, 1) \tag{3}$$

$$CD_p = \sqrt{\frac{2}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N T_{ij} \hat{p}_{ij} \rightarrow N(0, 1) \tag{4}$$

$$LM_{BC} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N (T_{ij} \hat{p}_{ij}^2 - 1) - \frac{N}{2(T-1)} \rightarrow N(0, 1) \tag{5}$$

Similarly, erroneously supposing a homogeneous slope variable where heterogeneity exists might provide misleading results. Consequently, we test for heterogeneity in the data series using the Ref. [67] version of slope heterogeneity technique (SH) in line with equations (6) and (7).

$$\tilde{\Delta}_{SH} = (N)^{\frac{1}{2}} (2k)^{-\frac{1}{2}} \left(\frac{1}{N} \tilde{S} - k \right) \tag{6}$$

$$\tilde{\Delta}_{ASH} = (N)^{\frac{1}{2}} \left(\frac{2k(T-k-1)}{T+1} \right)^{-\frac{1}{2}} \left(\frac{1}{N} \tilde{S} - 2k \right) \tag{7}$$

Whereas delta tilde as well as adjusted delta tilde are presented by $\tilde{\Delta}_{SH}$ and $\tilde{\Delta}_{ASH}$. Hereafter, the panel unit root tests and cointegration test were conducted. Checking the stationarity patterns of variables is also crucial to the reliability of the overall empirical exercise since the adoption of wrong unit root methods can result in misleading outcomes [68–72]. Based on this knowledge we utilize unit root tests that can identify variables stationarity feature amidst CD. Hence, the second generation’s stationarity methods were adopted in the analyses. We utilized both CIPS and CADF to determine the order of the coefficients of integration. Equations (8)–(9) presents the CADF.

Table 1
Description of variables.

Name of Indicator	Abbreviation	Proxy/Scale of Measurement	Source
Financial Development	FD	Domestic credit to the private sector (% of GDP)	WDI
Economic Growth	Y	it is proxied by the gross domestic product per capita (2015 Constant USD)	WDI
Export diversity	EG	exports of goods and services given as a % of the GDP	WDI
Natural resources	TNR	% of GDP	WDI
Inflation	INF	consumer prices of annual %	WDI

NOTE: all variables are transformed to their natural logarithm form to ensure homoscedasticity of the coefficients. WDI-World Bank Development Indicator (Available at: <https://databank.worldbank.org/>).

$$CADF_i = t_i(N, T) = \frac{\left(y_{i,-1}^T \overline{M} y_{i,-1}\right)^{-1} \left(y_{i,-1}^T \overline{M} \Delta y_i\right)}{\sqrt{\sigma_i^2 \left(y_{i,-1}^T \overline{M} y_{i,-1}\right)^{-1}}} \tag{8}$$

Later, the test results follow the averaging the CADF test statistics in the following manner.

$$\widehat{CIPS} = \frac{1}{N} \sum_{i=1}^n CADF_i \tag{9}$$

The derivatives from Equation (8) are represented by the word CADF in the expression of equation (9). As for the cointegration test, assuming there is a validity of CD, utilization of the 1st generation cointegration such as Pedroni and Kao cointegration methods can lead to wrongs and unreliable results in as much as the CD is not considered. Because of this, this work utilizes the Ref. [73] level relationship method to catch the level relationship between the variables following Equation (10)–(14). This approach has proved very useful and efficient in several relevant studies [74–78], especially where the issue of CD must be addressed in a cointegration analysis.

$$ai(L)\Delta y_{it} = y_{2it} + \beta_i(y_{it} - 1 - \hat{\alpha}_i x_{it}) + \lambda_i(L)v_{it} + \eta_i \tag{10}$$

where $\delta_{1i} = \beta_i(1)\hat{\vartheta}_{21} - \beta_i\lambda_{1i} + \beta_i\hat{\vartheta}_{2i}$ and $\delta_{2i} = -\beta_i\lambda_{2i}$.

The subsequent are the techniques statistics for the Westerlund test:

$$G_t = \frac{1}{N} \sum_{i=1}^N \frac{\hat{\alpha}_i}{SE(\hat{\alpha}_i)} \tag{11}$$

$$G_\alpha = \frac{1}{N} \sum_{i=1}^N \frac{T\hat{\alpha}_i}{\hat{\alpha}_i(1)} \tag{12}$$

$$P_T = \frac{\hat{\alpha}}{SE(\hat{\alpha})} \tag{13}$$

$$P_\alpha = T\hat{\alpha} \tag{14}$$

The group means statistics, comprising G_a and G_t , are shown in Equations (11) and (12). Panel statistics, comprising P_a and P_t , are represented by Equations (13) and (14). From there, the quantile regression (QR) and Driscoll-Kraay fixed effect-OLS methods were employed for the long-run estimations. The QR is modelled after [23,24], and [25] respectively. Quantile regressions provide more reliable predictions compared with simple regressions. Particularly, when the relationship between two parameters seems unlikely or non-existent [79]. The method helps to observe the distributional impacts of the independent factors on FD of the nations sampled. The results produced in this study are therefore sufficient for robust inferences.

$$QLFD_{it}(\tau / X_{it}) = \beta_i^{(\tau)} + \beta_1^{(\tau)}LTNR_{it} + \beta_2^{(\tau)}LY_{it} + \beta_3^{(\tau)}LEG_{it} + \beta_4^{(\tau)}LINF_{it} + \varepsilon_{it} \tag{15}$$

Equation (15) represents the conditional quantile of financial development $QLFD_{it}(\tau / X_{it})$. The τ th shows the interactions in equation (1), if X_{it} represents the vector of independent variables. Meanwhile, (τ) shows the quantiles for countries. In summary, combining the methodologies helps to reduce biases and eliminate erroneous outcomes which are intended to inform appropriate policy. With regards to the Driscoll-Kraay fixed-effect-OLS model, first, all the variables contained in the specified model $Z_{it} \in \{Y_{it}, X_{it}\}$ are within-transformed in Equation (16).

$$\tilde{z}_{it} = z_{it} + \bar{z}_i + z \tag{16}$$

where $\bar{z}_i = T_i^{-1} \sum_{t=t_1}^{T_i} z_{it}$; $z = (\sum T_i)^{-1} \sum_i \sum_t z_{it}$, z_{it} = vector of model variables, and T = time dimension. Second, the transformed regression model specified below is estimated via Pooled-Ordinary Least Squares (OLS) with Driscoll and Kraay standard errors. The within-estimator corresponds to the OLS estimator of Equation (16).

$$\tilde{y}_{it} = \tilde{x}'_{it} \theta + \tilde{\varepsilon}_{it} \tag{17}$$

where: \tilde{y}_{it} and \tilde{x}'_{it} in Equation (17) are the transformed variables, and $\tilde{\varepsilon}_{it}$ is the transformed error term.

4. Results and discussions

Table 2 presents the descriptive statistics and correlation matrix. It was observed from the analysis that, all the variables are negatively skewed except for income and export diversity which have positive skewness. Moreover, apart from natural resources which are inversely correlated with FD, the remaining variables are positively correlated with FD. As previously stated, the data series are examined for cross-sectional dependence using the LM test [19], scaled LM test [20], the CD test [21], and the Bias-adjusted LM tests [22], the results of which are reported in Table 3. The results show that the null assumption of no cross-sectional connection is rejected

Table 2
Descriptive statistics and correlation matrix analysis.

	LFD	LTRN	LY	LEG	LINF
Mean	3.7766	-0.1118	6.9815	2.7617	1.9121
Median	3.8736	0.1002	6.9348	2.7740	1.9726
Maximum	4.5662	1.9602	8.3488	3.6639	3.1163
Minimum	2.7495	-2.7941	6.0811	1.7763	0.6967
Std. Dev.	0.3503	0.9994	0.5491	0.4294	0.5094
Skewness	-0.9535	-0.6817	0.5914	0.1025	-0.2597
Kurtosis	3.3374	2.9039	2.8703	2.4241	2.6168
Jarque-Bera	24.2263	12.0677	9.1447	2.4136	2.6916
LFD	1				
LTRN	-0.4919	1			
LY	0.1110	-0.5576	1		
LEG	0.1251	-0.3280	0.4983	1	
LINF	0.1065	0.1072	-0.0139	0.1602	1

Table 3
Cross-sectional dependency (CD) and Slope Homogeneity (SH) Examinations.

Model	Pesaran CD Test	Pesaran LM Test	Breuch-Pagan LM	Bias-corrected Scaled LM
LFD	2.3098a	2.8720a	27.844a	2.7886a
LTRN	4.2388a	17.9968a	95.4842a	17.9134a
LY	17.3910a	64.2781a	302.4605a	64.1947a
LEG	2.5207a	29.5901a	147.3311a	29.5068a
LINF	5.7885a	8.2916a	52.0814a	8.2083a
Slope Homogeneity (SH)				
	COEFFICIENT			
SH ($\tilde{\Delta}$ test)	4.2098a			
SH ($\tilde{\Delta}$ adj test)	4.1456a			

NOTE: a<0.01.

by all four tests for all the variables at the one per cent level of significance. The SH tests [67] also show that the null of SH is rejected at a one per cent level of significance. This infers that all the succeeding econometric analyses must display robustness against CD and SH.

The CIPS unit root techniques result of [21] are presented in Table 4. The test outcomes indicate that while all the coefficients contain unit root at level, they grow into stationary level after first differencing. The result of the level relationship is therefore given in Table 5 and the null of no cointegration is clearly rejected following the results. Therefore, the long-run coefficients were examined.

From Table 6, the utilized methods (i.e., QR and Driscoll-Kraay fixed effect OLS) show relatively close outcomes, with slight variations mainly noted concerning the scales of the assessed variables and their equivalent level of statistical significance. The two techniques show that income, export diversity, and the level of inflation jointly enhance FD while natural resources on the other hand impede the growth of FD. With regards to the panel quantile regression results, as observed in Table 6, a percentage increase in natural resources for the South Asian countries decreases financial development by 0.1715% at the beginning stage (Qtile_25), 0.1821% at the median stage (Qtile_50) and 0.2425% at a later stage (Qtile_75).

This outcome confirms the results from Refs. [7,28,60]. In essence, going by the proposition of the resources curse theory, it is reasonable to infer that natural resources are a curse for the South Asian countries based on this estimated impact of resources on financial development of the countries. This observed validity of a possible resource curse may have occurred due to the rise in natural resource exports and the expansion of mainly resource-induced businesses. The implication of such development is that while the aggressive focus on primary resource based economic activities continues, there has been a lack of adequate investment in the sector where the resource belongs to. Similar arguments that corroborate this possible justification for the resource-FD nexus have surfaced in some other existing studies [63,80–83]. Another likely explanation for South Asia's resource curse includes inefficient use of resources and the concentration of resources in a few businesses, especially in resource-rich parts of these countries. Therefore, since resources obstruct financial development, and understudied nations must adjust their macroeconomic policies to improve the finance system in view of the unfavorable impacts of resources on FD levels.

However, it is good to point out that economic growth on its part induces the FD of the South Asia countries since a percentage increase in economic growth increases financial development by 0.4024% at the beginning stage (Qtile_25), 0.4846% at the median stage (Qtile_50) and 0.5346% at a later stage (Qtile_75). These results affirm the outcomes of Refs. [7,28,60,84]. It therefore demonstrates that increased economic activity has in one part led to the creation of jobs. This in turn might have raised the earnings of all segments of the population and such an outcome is desirable. As a result of these favorable conditions, spending and investment patterns are expected to be on the rise, thereby stimulating the market for financial services and advancing financial development.

Furthermore, export diversity is seen to have a positively significant influence on the FD of the nations under study. The current

Table 4
Panel CIPS unit root test.

VARIABLES	CIPS				Decision
	I(0)		I(1)		
	C	C&T	C	C&T	
LFD	-2.0809b	-1.5249c	-6.2285a	-6.4361a	I(0)&I(1)
LTRN	-0.7121	-1.3953c	-8.2292a	-6.6375a	I(0)&I(1)
LY	3.1701	1.1106	-4.2327a	-5.2027a	I(1)
LEG	0.6924	0.1781	-3.9296a	-3.3765a	I(1)
LINF	-2.8919a	-2.1007b	-9.6319a	-8.3218a	I(0)&I(1)

NOTE: a<0.01.

Table 5
Durbin-Hausman cointegration test.

Statistics	Value	P-Value
DH_p	-3.2345a	(0.002)
DH_g	-4.0756a	(0.001)

Note: a<0.1.

Table-6
QR and Driscoll-Kraay fixed effect.

Variables	Driscoll-Kraay	Qtile_25	Qtile_50	Qtile_75
LTRN	-0.1410a [-1.1576] (0.0089)	-0.1715a [-5.7927] (0.0000)	-0.1821a [-3.8251] (0.0002)	-0.2425a [-5.5620] (0.0000)
LY	0.4691a [12.3708] (0.0000)	0.4024a [7.9720] (0.0000)	0.4846a [14.1518] (0.0000)	0.5346a [19.0175] (0.0000)
LEG	0.0150b [0.1618] (0.0116)	0.1276c [0.9043] (0.0673)	0.1297b [1.5585] (0.0212)	0.1213c [1.8207] (0.0706)
LINF	0.2280a [3.3912] (0.0009)	0.4740a [4.8961] (0.0000)	0.1037b [1.1918] (0.0352)	0.0265c [0.4334] (0.0653)
Wald test	21.6741b	-	-	-
Pseudo R ² /R ²	0.4125	0.3854	0.3542	0.3012
Adj. R ²	0.4405	0.3593	0.3811	0.3271

Note: t-Statistic [] and () p-value; a<0.01, b < 0.05, c < 0.10.

results indicate that a percentage rise in the level of export diversity enhances FD by 0.1276% at the beginning stage (Qtile_25), 0.1297% at the median stage (Qtile_50) and 0.1213% at the later stage (Qtile_75) respectively. The results here affirm the outcomes of Refs. [34,35,60]. According to the most recent South Asia Economic Focus, titled “Shifting Gears: Digitization and Services-Led Development,²” the South Asian area is anticipated to grow by 7.1% between 2021 and 2022. While year-on-year growth in the area continues to be solid, albeit, from a relatively low starting point in 2020, the post Covid-19 economic recovery has been unequal among nations and sectors in recent years. South Asia’s average annual growth rate is expected to be 3.4% throughout the 2020–23 period, which is three percentage points lower than the rate of growth experienced in the four years before the pandemic. An increase in public investment as well as incentives to encourage manufacturing was expected to help India’s GDP grow by 8.3% in the post pandemic fiscal years towards becoming the fastest-growing economy in South Asia. Growth forecast is also projected on export bases for other countries. For example, in Bangladesh’s growth rate is expected to accelerate to about 6.4% in the post-pandemic fiscal year as a result of the country’s ongoing recovery in exports and consumption. Overall, export expansion is a key to the growth of FD of the South Asian countries.

Lastly, it is observed that inflation also increases financial development for the South Asia countries. The obtained results indicate that a percentage rise in the level of inflation induces FD by 0.4740% at the beginning stage (Qtile_25), 0.1037% at the median stage (Qtile_50) and 0.0265% at a later stage (Qtile_75) respectively. The results here affirm the outcomes of [60]. This is an indication that stable inflation is upheld because of the balanced progress of the financial industry in the South Asia countries as these nations continue to adjust monetary policies that are enhancing low inflationary pressure. Therefore, based on the overall findings and

² For further information see: <https://www.worldbank.org/en/region/sar/overview>.

following the general conclusion, important policy recommendations are clearly outlined in the subsequent section.

5. Conclusion and policy recommendations

5.1. Conclusion

One of the most essential aspects of a nation's economic progress is its financial development (FD). Generally, all the macroeconomic indicators that are intended to stimulate economic expansion are truly engaged with FD levels. This study therefore explores the impact of some key variables—natural resources and export diversity—on FD in South Asian nations while accounting for economic growth and inflation. The dataset utilized stretches between 1990 and 2020. Second-generation panel approaches that are robust to slope heterogeneity and cross-sectional dependence, such as the CIPS unit root test, Durbin-Hausman cointegration tests of [73], QR and Driscoll-Kraay fixed effect panel estimation technique, are employed. The results of the CD as well as heterogeneity techniques support the utilization of these second-generation approaches. The cointegration test results confirm the existence of long-run interaction regarding the dependent variable, financial development, and the regressor. From the outcome, it was revealed that economic expansion, the rate of export diversity and the level of inflation all have a positive substantial influence on the level of FD while natural resources have a significant adverse impact on FD thereby signaling the resource curse tendency of the South Asian countries.

5.2. Policy recommendations

Following the outcomes of this analysis, we make the following policy ratifications. To start with, natural resources symbolize a country's ability to assert its economic sovereignty. The effective commercialization and utilization of these resources significantly help nations to generate more revenue. Therefore, we advise the authorities in the South Asian economies to ensure that resources are fully efficiently utilized by channeling them towards boosting the general production level rather than just exporting them in their raw forms without creating any significant value-added. It is also crucial to note that greater attention should be given to the revolving dynamics of the international resources market in terms of the changes in the level of supply and demand for resources to build a more prudent fiscal mechanism within a stable financial system. Prompt monitoring of the international resource market would further ensure the reduction in stakeholder fluctuation, thereby correcting the unfavorable impact of natural resource exploitation on financial development as seen in the empirical analysis.

The FD of a country is an essential indicator. In the South Asia case, natural resources are abundant and are found to be harmful to FD in this study. However, the impacts of other macroeconomic variables such as economic growth, export diversification, and inflation, are not in a bad shape. As a result, the South Asian countries may still be able to leverage their resource markets for possible economic benefits. Aside from the economic benefits, financial development can also contribute to a more favorable environment, particularly in areas where natural resources can be exploited to a substantial extent. A robust financial system can result in the preservation of resources as well as enhancing the elongation of resources lifespan. The expansion and strengthening of the financial sector can provide beneficial development from the perspective of better chances of educational investments and human capital development. A robust educational investment from a developed financial system can in turn encourage the building of a society that is more cautious about environmental protection from the angle of exploitation and utilization of natural resources.

Furthermore, numerous economic challenges in several resource-rich states have been attributed to the weaker nature of their institutional quality levels [85]. Therefore, authorities of the South Asian countries must maintain greater regulatory oversight of the resources market to ensure that rent seeking and resource abuse are avoided at all costs. In this regard, the development of strong institutions would be needed to ensure the correct supervision and monitoring of resources exploitation and utilization activities in the bloc. South Asia's countries must make an informed judgment about how to build their financial sectors and it is equally important to rethink the economic strategies to stimulate the financial industry. Since natural resources have not only aided in the development of the financial sector, but also helped to boost economic growth and exports in other climes as based on the reviewed literature, the South Asian economies' financial development state can equally benefit from their natural resources if the recommendations are considered.

6. Limitations and directions for future studies

Although the study explored the impacts of resources abundance on FD in the south Asian countries, it is currently not clear what are the direct reasons responsible for the unfavorable effect of natural resources on FD. This thus constitutes some degree of limitations in the current study. As explained, perhaps the level of institutional quality may matter in this context. Therefore, future studies can extend the current work to include the examination of the possible ways by which factors like institutional quality among others can impact the present findings on resource-FD nexus in the South Asia region and perhaps, for other countries as well. The prospective coverage of other analysis could include analyzing the connection among natural resources and other financial growth metrics for individual economy or a group of economies.

Author contribution statement

Bright Akwasi GYAMFI: Conceived and designed the analysis; Performed analysis and interpreted the data; Contributed analysis

tools or data; Wrote the paper.

Stephen Taiwo ONIFADE: Contributed to analysis; Wrote the paper.

Ilham HAOUAS: Contributed to analysis; Wrote the paper.

Festus Fatai ADEDOYIN: Performed analysis; Interpreted the data; Wrote the paper.

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Data will be made available on request.

Declaration of interest's statement

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