Natural Resources, Financialization and Economic Growth: Empirical Evidence in a Global Sample

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The nexus between natural resources and economic growth remains one of the great controversies in economic literature. The objective of this study is to examine this relationship by considering the role of financial development. We use data from 162 countries, covering the period from 1996 to 2017. The methodology is based on a long-run analysis and a nonlinear panel model exploring the non-linearity impact of natural resources and financialisation on economic growth, and threshold effects. The results of the estimates show a differentiated effect based on the level of development of countries: natural resource income negatively affects long-term growth in low-income countries, while it has no significant effect for high-income countries. Moreover, while the degree of financial development can mitigate the adverse effects of natural resources on growth, the phenomenon is non-linear in the sense that there are thresholds of financial development necessary to reverse the natural resource curse.

Keywords: natural resources, growth, financialization

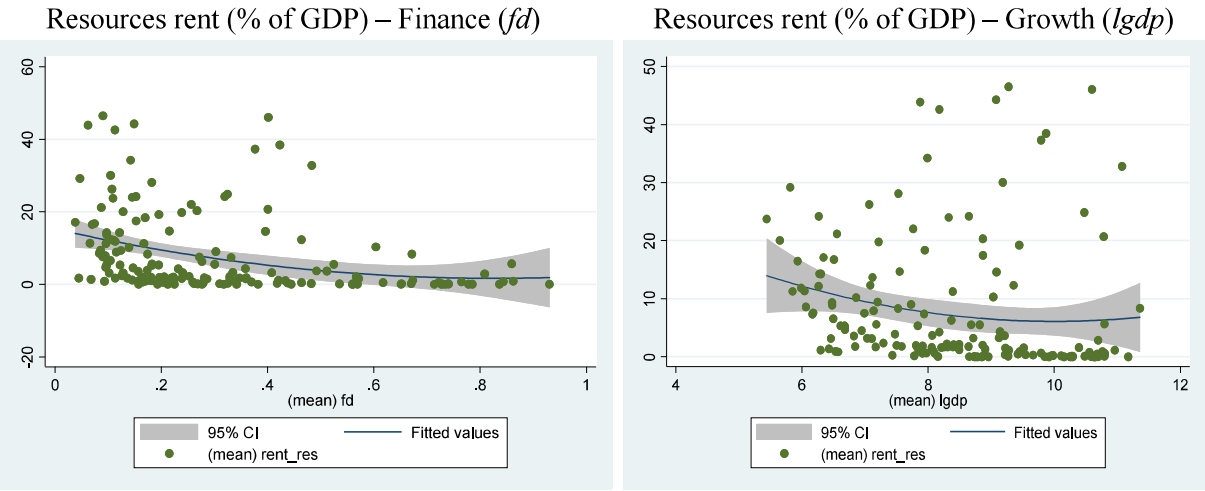
INTRODUCTION

One of the great paradoxes in macroeconomics of development (Obstfeld and Rogoff, 2000) is the relationship between natural resources – biological, mineral and energy resources, raw materials and basic agricultural products or commodities – and growth. In contemporary economic literature, the natural resource curse, which means that countries with resource abundance had low economic growth compared with countries without such resources, is increasingly accepted (Auty, 1993; Sachs and Warner, 1995; Karl, 1997). There is extensive literature developed to study the explanatory factors for this phenomenon. If various factors (economic, political, and environmental) were used to explain this result, the institutional aspect seems to be the preferred explanation (Robinson et al., 2006; John, 2011). However, institutional issues are mixed with the challenges of financial development and access to international financial markets for countries with natural resources abundance (Hooper, 2017). Some authors point that the marginal effect of natural resource on growth depends on financial depth (Javadi et al., 2017; Erdogan

et al., 2020). In addition, economic growth is not only driven by natural resources, and a poorly developed financial system would not support economic diversification (Damette, 2017).

During the past few decades, only a few countries with natural resource abundance had a strong economic growth performance. Developed countries such as Australia and Norway have successfully exploited their natural resources for development (Lederman and Maloney, 2007). These countries are characterized by an advanced financial system. Some developing countries have consistently improved their economic growth and standard of living (Cai and Treisman, 2006). For example, the consumption of natural resources, especially forest resources, has played a main role in China's miracle (Canh and Thong, 2020). Other examples such as Botswana (diamond) or Chile (copper) are often mentioned. However, most of the resource-rich countries have experienced appalling economic performance. Venezuela, which is currently going through a deep economic and political crisis, is nevertheless richly endowed with natural energy resources (oil, gas, mines). In sub-Saharan Africa, growth in countries with natural resource abundance (including South Africa and Nigeria) is on average less than 1 point compared to other countries (IMF, 2019). In most cases, these countries are characterized by embryonic financial systems. Figure 1 shows a global negative correlation between resources dependence and financial conditions, and with economic growth.

FIGURE 1
RESOURCE DEPENDENCE, FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH (AVERAGE 1996-2017)



Note: The values are derived from the data used in this study; fd represents the calculated financial development index (see section 3).
Source: Authors

Beyond institutional aspects, would natural resources curse not be a question of financial capacities? This paper examines the relationship between natural resources and economic growth by considering the role of financial development. In fact, current literature has raised a debate on the relationship between financial development, natural resources and economic growth. However, the literature is still incomplete and inconclusive.

The contribution of this study is threefold. First, it revisits the nexus between natural resources rents and economic growth, taking into account the financial development level. Most of the previous research focuses on institutional or political factors. However, the issues related to financial conditions and its implication on economic diversification in countries with natural resource abundance have been often occulted in the economic literature. So, the nexus between financial development, natural resources and growth are still ambiguous and remain as an interesting gap in the literature. Nevertheless, most of the

previous studies concern simple aspects of financial development such as credit supply (Rashid Khan et al., 2019), while the literature emphasizes that financialisation is a complicated process with multiple dimensions (Nguyen C. and Nguyen T., 2020). In addition, although the use of panel data has become widespread, allowing in particular to correct the bias of omitted variables raised by the use of cross-sectional data (Zallé, 2018), econometric methodologies have failed to resolve empirically the resource curse controversy. The use of new tools, such as non-linear econometrics (Damette, 2017) offers new perspectives for testing this phenomenon by introducing threshold effects. Finally, the analysis covers a large sample, and allows controlling for heterogeneity of countries under various aspects, in particular natural resources dependence and financial development level.

The rest of the paper is organised as follows. The second section presents the literature review. The methodology and data are reported in Section 3. Section 4 presents and discusses the econometric results. The final section concludes the paper.

LITERATURE

The economic literature shows that natural resources are positively and negatively linked with growth. Indeed, while some authors (Atkinson and Hamilton, 2003; Sala-i-Martin and Subramanian, 2013; Ahmed et al., 2016) validate the natural resource curse hypothesis, others (Moshiri and Hayati, 2017; Arin and Braunfels, 2018) highlight the positive effects of natural resource endowment on economic performance. Theoretically, the natural resource curse hypothesis is explained by the fact that the rent associated with the exploitation of these resources does not favour the diversification of export sectors, particularly the development of the manufacturing sector, which is a source of high value added and structural transformation. Thus, the dynamics of growth are mainly based on the export of these resources, which favours an appreciation of the real exchange rate and subsequently a degradation of the price competitiveness of the domestic economy. This loss of competitiveness on the international market does not favour the development of other export sectors and leads to a decline in domestic production (Sala-i-Martin and Subramanian., 2013; Ahmed et al., 2016). Natural resources also can degrade the quality of institutions, leading to very poor economic performance. This thesis is known as the institutional natural resources curse (Isham et al., 2005; Sala-i-Martin and Subramanian, 2008). The verification of these hypotheses led to several empirical investigations, which did not lead to a consensus.

However, financial depth may have played a major role in these controversial results. Overall, the literature shows that natural resources rents mostly have negative effects on financial development in many developing countries, whereas it is positive in most high-income countries (Bhattacharyya and Hodler, 2014). The literature explains that the negative effects of natural resources on financial development are due to low level of financial development, weak institutional quality and poor management of natural resources (Canh et Thong, 2020). Countries with natural resource abundance deals with poor financial conditions and challenges of access to the international financial markets linked with their debt (Damette, 2017). Hooper (2017) suggests that economies that depend on exhaustible natural resources often face institutional problems, particularly when it comes to managing their external debt. This has repercussions on the way in which the financial markets perceive their sovereign risk and therefore on their financing capacity. These countries paradoxically face difficulties to access to international financial markets and mobilizing internal and external resources to support their natural resources exploitation. Resource-rich countries face problems that interfere with their economic performance, such as poor resources allocation between sectors and general weak economic diversification, even if they have higher financial resources (Frankel, 2012): weak financial development does not allow efficient use of resources for growth. Considering the influences of finance on natural resources, most previous studies show a causal relationship between two variables, whereas others show no relationship or one-direction causality (Canh et Thong, 2020).

Other studies focus on the relationship between natural resources and economic growth by considering the role of financial deepening. For Moradbeigi and Law (2017), the abundance of oil has a positive effect on economic growth when the financial system is strong. The positive effect of natural

resource abundance on the economy is related to the fact that the export composition and the production system of a country do not only depend on those natural resources. Apart from natural resource production and exports, the existence of high value-added goods and services that serve international markets saves the economy from being dependent on a single sector (Erdogan and al., 2020). The financial system needs to develop in order for natural resource exports to have a positive effect on economic growth. Which means that country with a higher level of financial development can reduce resource curse in oil-producing economies (Law and Moradbeigi, 2017). Yet, an advanced financial system is crucial for transferring the revenues from oil exports to productive investments. If the level of development of the financial system remains under a certain threshold, the effect of natural resource exports on economic growth is too low (Erdogan et al., 2020).

Empirically, a number of studies attempted to analyse the role of finance in the hypothesis of the natural resource curse. The empirical studies examined beforehand the effect of resources abundance on financial development. The results are ambiguous. Dwumfour and Ntow-Gyamfi (2018) find that natural resources rents have an ambiguous impact on financial development in the case of 38 African countries over the period of 2000–2012. Bhattacharyya and Hodler (2014) find that natural resource revenues have negative impacts on financial development in 133 countries over the period 1970–2005. However, in developed countries, results are less ambiguous: there is a mutual effect between finance and natural resource rent. Zaidi et al. (2019) find that natural resources have Granger causality and positive effects on financial development in member countries of the Organization for Economic Cooperation and Development (OECD) during the period 1990–2016. Nguyen C. et Nguyen Thong (2020) examines the relationships between financialisation and natural resources rents in a global sample of 86 economies over the period 2002–2017. They found a strong mutual Granger causality between two variables, especially from financialisation to natural resources rents.

Summarizing the previous works, Havranek et al (2016) point out that at the 5% threshold, 40% of the works attest to the negative effect of natural resource exports on growth against 20% that conclude a positive relationship on a sample of 43 empirical works. Subsequently, Law and Moradbeigi (2017) deepen the analysis by taking into account the performance of the financial system in examining the relationship between natural resources and economic growth. Using a panel of oil-producing countries, they show that with a well-performing financial system, the export of natural resources positively influences economic growth by promoting the transfer of rent to productive sectors. Furthermore, following Law and Moradbeigi (2017), Erdogan et al. (2020) investigate the relationship between the impact of natural resource exports on economic growth and the level of financial deepening based on a sample of 11 oil producing countries over the period 1996-2016. Using nonlinear panel data methodology, they find that the impact of natural resources rent on economic growth depends on the level of financial development: natural resource impact significantly on economic growth only when rate of financial deepening to the revenues exceeds 45%; under this rate, the increase in oil exports does not have a statistically significant effect on growth.

Overall, the empirical review remains mixed regarding the relationship between natural resources and growth, and the role of financial development remains largely understudied. The determination of the level and the deepness of financial development that has a positive impact on the growth of natural resource rent requires further analysis.

METHODOLOGY

Data

In this study, we use annual data from 162 countries, covering the period from 1996 to 2017. The sample is divided into two categories according to the level of development of the countries. One category representing rich countries and the other representing low and middle-income countries (World Bank, 2017). The variables considered in the study are: economic growth (*gdp*) derived from annual GDP per capita data expressed in constant 2010 US dollars; natural resources (*natres*) measured by the share of

natural resource rents in GDP (percentage). All-natural resources (gas, oil, mining, forestry, etc.) are considered in this measure.

Finance is captured by an aggregated index of financial development (*fd*) which is a linear combination of two sub-indices: financial institutions (*fi*) and the financial market (*fm*). Financial institutions include banks, insurance companies, mutual funds, and pension funds. Financial markets include stock and bond markets. Financial development is defined as a combination of depth (size and liquidity of markets), access (ability of individuals and companies to access financial services), and efficiency (ability of institutions to provide financial services at low cost and with sustainable revenues, and the level of activity of capital markets). This broad multi-dimensional approach to defining financial development follows the matrix of financial system characteristics developed by Čihák et al. (2012) and Svirydzenka (2016).

The other control variables include general government expenditure (*gov*) and investment (*inv*) expressed as a percentage of GDP, trade openness (*trade*) represented by the share of the value of exports and imports of goods and services in GDP. Inflation (*inf*) and population growth (*pop*) are calculated in annual percentage rate. Institutional quality (*inst*) is measured by an average of six institutional indicators from the Worldwide Governance Indicators (WGIs) database (Nguyen et Nguyen, 2020).

TABLE 1
DESCRIPTIVE STATISTICS

Variable	Obs	Mean	Std. Dev.	Min	Max
gdp	3520	12291.57	16897.83	187.5167	91565.73
natres	3520	7.985937	11.89018	.000313	86.4526
fd	3520	.3079184	.2240285	0	1
fm	3520	.2077831	.2532511	0	1
fi	3520	.4014655	.2175684	0	1
gov	3520	15,8768	6.1085	0,9112	73,5766
inv	3520	23.2767	7.1217	2.1000	68.0227
inf	3520	6.5994	9.5568	-18.1086	98.77
inst	3520	-.0276997	.8876146	-2.100317	1.969566
trade	3520	42.01255	24.11609	.083709	221.31
fdi	3520	4.651942	8.36486	-43.2445	198.573
pop	3520	1.48394	1.530883	-9.080639	17.51095

Some variables (*gdp, gov, inv* and *inf*) are expressed in logarithm in our model. However, generally, the inflation series can have negative numbers. Therefore, considering the studies of Khan and Senhadji (2001), Drukker et al. (2005), and Kremer et al. (2013), the following equation has been used to take the logarithm of the inflation series.

$$\pi_{it} = \begin{Bmatrix} \pi_{it} - 1 \; if \; \pi_{it} \leq 1 \\ ln(\pi_{it}) \; if \; \pi_{it} > 1 \end{Bmatrix} \tag{1}$$

Cross Sectional Dependency and Panel Data Test

Pesaran's (2004) CD test was selected for the investigation of cross-sectional dependence. Pesaran's CD test statistics are calculated as follows:

$$CD = \sqrt{\frac{2T}{N(N-1)}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\widehat{\rho_{ij}}\right)} \rightarrow N(0,1) \tag{2}$$

As shown in table 2, the null hypothesis stating that there is no cross-sectional dependence cannot be accepted for all variables excepted one. Then it is seen at a significance level of 1% that all the series, excepted institution quality (*inst*) for developed countries sample, have cross sectional dependence in the three samples. The CIPS test is used for the stationarity analysis of series.

TABLE 2
CROSS SECTION DEPENDENCE TEST RESULTS FOR FULL SAMPLE, DEVELOPED COUNTRIES (LMCS=0) AND LOW MIDDLE COUNTRIES (LMCS==1)

Variables	CD test stat. Full sample	CD test stat. LMCs=0	CD test stat. LMCs=1
lgdp	317.618***	103.066***	225.113***
lgov	29.107***	18.018***	26.225***
linv	19.708***	21.489***	13.016***
linf	96.033***	52.776***	49.93***
trade	72.458***	57.947***	27.614***
inst	5.32***	.468	4.26***
natres	98.357***	51.263***	53.488***
pop	9.686***	1.603	11.632***
fdi	46.419***	21.357***	30.062***
fd	187.063***	70.724***	138.542***
fi	219.335***	54.335***	174.679***
fm	43.019***	33.843***	17.351***

***Notes**: Under the null hypothesis of cross-section independence, CD ~ N(0,1) P-values close to zero (***) indicate data are correlated across panel groups*

The CIPS test analyzes unit root properties for the entire panel. The CIPS test is derived from the CADF test. The estimation equation and the hypotheses are as follow:

$$CIPS = N^{-1} \sum_{i=1}^{N} CADF_i \quad (3)$$

It tests the null hypothesis of the non-stationarity of the series. We run the test for the three sample by considering both options intercept and intercept & trend. The results are presented in the following table 2 for full sample, table 3 for developed countries sample and table 4 for low and middle countries sample.

For the full sample, we find that the non-stationarity hypothesis cannot be rejected for growth (*lgdp*), general government expenditure (*lgov*), domestic investments (*linv*), trade openness (*trade*) and institutional quality (*inst*). These variables are I(1) at significance level of 1%.

TABLE 3
CIPS UNIT ROOT TEST FOR FULL SAMPLE

Variables	Level		First difference		conclusion
	intercept	Intercept & trend	intercept	Intercept & trend	
lgdp	-1.929	-2.126	-3.280***	-3.524***	*I(1)*
lgov	-1.959	-2.482	-3.950***	-4.043***	*I(1)*
linv	-2.125	-2.364	-3.783***	-3.909***	*I(1)*
linf	-2.476***	-3.437***			*I(0)*
inst	-1.646	-2.476	-3.948***	-4.130***	*I(1)*
natres	-2.131*	-2.744*			*I(0)*
pop	-2.417***	-2.890***			*I(0)*

fdi	-3.166***	-3.559***			*I(0)*
fd	-2.498***	-3.204***			*I(0)*
fi	-2.752***	-3.106***			*I(0)*
fm	-2.095*	-2.717**			*I(0)*
trade	-1.775	-2.335	-3.924***	-4.057***	*I(1)*

Note: ****, ** and * show stationarity at 1%, 5% and 10% significance levels, respectively. The critical values for the intercept model for 10%, 5% and 1% respectively; -2.08, -2.16, and -2.3, the critical values for the intercept & trend model for 10%, 5% and 1% respectively; -2.59, -2.65 and -2.77. Lags criterion decision based on F joint test.*

For the developed countries sample, growth (*lgdp*), general government expenditure (*lgov*), domestic investment (*linv*), institutional quality (*inst*), natural resources (*natres*), population growth (*pop*) and trade openness (*trade*) are stationary in first difference at the signifance level at 1%. The others variables are stationary at level.

TABLE 4
CIPS UNIT ROOT TEST FOR DEVELOPED COUNTRIES SAMPLE (LMCS=0)

Variables	Level		First difference		conclusion
	intercept	Intercept & trend	intercept	Intercept & trend	
lgdp	-2.243***	-2.170	-3.131***	-3.223***	*I(1)*
lgov	-1.461	-1.741	-3.679***	-3.867***	*I(1)*
linv	-1.648	-1.876	-3.399***	-3.553***	*I(1)*
linf	-2.821***	-3.299***			*I(0)*
inst	-1.489	-2.153	-4.422***	-4.639***	*I(1)*
natres	-2.100*	-2.550	-4.182***	-4.100***	*I(1)*
pop	-2.137*	-2.542	-3.485***	-3.735***	*I(1)*
fdi	-3.395***	-3.828***			*I(0)*
fd	-2.558***	-3.335***			*I(0)*
fi	-2.322***	-2.813***			*I(0)*
fm	-2.642***	-3.145***			*I(0)*
trade	*-1.736*	*-2.043*	*-3.662***	*-3.737***	*I(1)*

Note: ****, ** and * show stationarity at 1%, 5% and 10% significance levels, respectively. The critical values for the intercept model for 10%, 5% and 1% respectively; -2.08, -2.16, and -2.3, the critical values for the intercept & trend model for 10%, 5% and 1% respectively; -2.59, -2.65 and -2.77. Lags criterion decision based on F joint test.*

The following table 4 present the result for CIPS test for the Low & Middle developed countries. We find that economic growth (*lgdp*), general government expenditure (*lgov*), domestic investment (*linv*), institutional quality (*inst*), population growth (*pop*), financial market index (*fm*) and trade openness (*trade*) are stationary in first difference and the others are stationary at level.

TABLE 5
CIPS UNIT ROOT TEST FOR LOW MIDDLE COUNTRIES SAMPLE (LMCS=1)

Variables	Level		First diffirence		Conclusion
	Intercept	Intercept & trend	Intercept	Intercept & trend	
lgdp	-1.926	-2.011	-3.438***	-3.928***	*I(1)*
lgov	-2.108	-2.656**	-4.074***	-4.194***	*I(1)*
linv	-2.282**	-2.478	-4.040***	-4.097***	*I(1)*
linf	-2.997***	-3.534***			*I(0)*

inst	-1.869	-2.556	-3.763***	-3.915***	*I(1)*
natres	-2.200**	-2.832***			*I(0)*
pop	-2.012	-2.467	-3.449***	-4.086***	*I(1)*
fdi	-2.919***	-3.193***			*I(0)*
fd	-2.723***	-2.859***			*I(0)*
fi	-2.896***	-2.944***			*I(0)*
fm	-1.768	-2.425	-4.038***	-4.148***	*I(1)*
trade	-1.757	-2.483	-4.115***	-4.286***	*I(1)*

Note: ****, ** and * show stationarity at 1%, 5% and 10% significance levels, respectively. The critical values for the intercept model for 10%, 5% and 1% respectively; -2.08, -2.16, and -2.3, the critical values for the intercept & trend model for 10%, 5% and 1% respectively; -2.59, -2.65 and -2.77. Lags criterion decision based on F joint test.*

Since in all samples in the series do not have the same order of integration, in the following, we test whether there is a long-term relationship between the series. We employ the cointegration test including the versions by Kao (1999), Pedroni (1999) and Westerlund (2005). The results in table 6 show that, for our three samples, our variables are cointegrated. This condition motivates us to examine the long-run relationships.

TABLE 6
COINTEGRATION TEST FOR *F* (*LGDP, NATRES, FINANCE, FINANCE*NATRES*)

	Kao test		Pedroni test		Westerlund test		
	Modified Dickey-Fuller t	p-value	Modified Phillips-Perron t	p-value	Variance ratio	p-value	Conclusion
Full sample							
fd	2.7096***	0.0034	7.7285***	0.0000	11.9867***	0.0000	cointegrated
fi	-0.2787	0.3902	5.4217***	0.0000	5.5810***	0.0000	cointegrated
fm	6.6629***	0.0000	11.5553***	0.0000	19.4175***	0.0000	cointegrated
Developed countries							
fd	2.4670***	0.0068	6.4038***	0.0000	9.8034***	0.0000	cointegrated
fi	0.9083	0.1819	4.3443***	0.0000	3.8137***	0.0001	cointegrated
fm	2.9286***	0.0017	7.2141***	0.0000	11.7179***	0.0000	cointegrated
Low middle developed countries							
fd	0.7144	0.2375	4.9300***	0.0000	7.7206***	0.0000	cointegrated
fi	-1.1619	0.1226	3.5719***	0.0002	4.1330***	0.0000	cointegrated
fm	5.5698***	0.0000	8.6581***	0.0000	15.4912***	0.0000	cointegrated

Note*: in Kao test for cointegration: Ho: No cointegration, Ha: All panels are cointegrated; in Pedroni test for cointegration: Ho: No cointegration, Ha: All panels are cointegrated; Westerlund test for cointegration: Ho: No cointegration, Ha: Some panels are cointegrated; *, **, *** are significant levels at 10%, 5%, 1%, respectively.*

Long Run Model and Nonlinearity Panel Model

Since the tests for unit-roots and cointegration suggest that the variables are non-stationary and cointegrated, we proceed to estimation of the long run relationship using the fully model ordinary least squares (FMOLS) estimator suggested by Pedroni (2004 and dynamic ordinary least squares (DOLS) estimator suggested by Kao and Chiang (2000). However, we consider that the efficient results are given by the DOLS estimator because it has been established that in panel data samples with small time dimension the DOLS estimator performs better than the FMOLS estimator. Additionally, the DOLS estimator yields unbiased and asymptotically efficient estimates of the long run relationship, even if there are endogenous regressors, thus allowing us to control for the potential endogeneity between economic growth and finance.

The DOLS model is expressed as:

$$lgdp_{it} = \alpha_i + \beta_1 natres_{it} + \beta_2 natres * finance_{it} + \sum_{j=p}^{q} \emptyset_{1it} \Delta natres_{it+j} + \sum_{j=p}^{q} \emptyset_{2it} \Delta natres * finance_{it+j} + \varepsilon_{it} \quad (4)$$

In the equation, $\emptyset_{1it}$ and $\emptyset_{2it}$ represent coefficients of lead (q) and lag (p) differences which help generate unbiased estimates of β_1 and β_2 by eliminating asymptotic endogeneity and serial correlation. For exploring the non-linearity impact of natural resources and financialisation on economic growth, we use a nonlinear panel model methodology developed by Hansen (1999). The estimation equation is shown in the following equation:

$$lgdp_{it} = \mu_{it} + \beta_1 natres_{it} I(q_{it} \leq \gamma_1) + \beta_2 natres_{it} I(\gamma_1 \leq q_{it} < \gamma_2) + \beta_3 natres_{it} I(q_{it} \geq \gamma_2) + \beta_4 X_{it} + \varepsilon_{it} \quad (5)$$

where $I(.)$ is the indicator function indicating the regime defined by the threshold variable q_{it} and the threshold level γ. Financial development index (*fd*), financial institution (*fi*) and financial market (*fm*) sont alternativement utilisés comme étant la valeur seuil q_{it}. X is the matrix of controls variables including general government expenditure (*lgov*), domestic investment (*linv*), trade openness (*trade*), inflation (*linf*), population growth rate (*pop*), and institutional quality (*inst*). These control variables are chosen with reference to the economic literature on the determinants of growth.

RESULTS AND DISCUSSIONS

This section presents the results of the long-term model (using the FMOLS and the DOLS estimators), and the nonlinear panel model. To take into account the heterogeneity of the countries making up the sample, the analysis is conducted taking into account the different categories of countries identified in this study (World Bank, 2017).

The Long Run Effects of Natural Resources and Financialisaton Interaction on Economic Growth

Table 7 shows the results of the long-term model estimates. Overall, it shows that natural resources and finance have a differentiated effect across groups of countries (and hence, levels of economic and financial development).

TABLE 7
LONG RUN EFFECTS OF NATURAL RESOURCES AND FINANCIALISATON ON ECONOMIC GROWTH

Variables	**Full sample**					
	FMOLS			DOLS		
	fd	*fi*	*fm*	*fd*	*fi*	*fm*
natres	-.1487***	-.4326***	-.0110*	-.0850***	-.1154***	-.0493***
	(.0083)	(.0075)	(.0065)	(.0163)	(.0219)	(.0125)
*fin*natres*	.6238***	1.300***	.2552***	.3170***	.3522***	.2195***
	(.0308)	(.0242)	(.0248)	(.0605)	(.0701)	(.0479)
constant	8.5432***	8.8758***	8.2394***	8.5629***	8.5373***	8.5834***
	(.0782)	(.0550)	(.0807)	(.1454)	(.1493)	(.1458)
Low middle countries						
	FMOLS			DOLS		
	FD	FI	FM	FD	FI	FM

natres	-.0370***	-.2350***	.0166***	-.0422**	-.0572***	-.0096
	(.0096)	(.0114)	(.0061)	(.0169)	(.0179)	(.0092)
*fin*natres*	.3928***	.9423***	.0612	.3230***	.2585***	.2359***
	(.0582)	(.0451)	(.0512)	(.1026)	(.0716)	(.0780)
constant	7.3479***	7.6330***	7.3949***	7.5030***	7.5360***	7.5248***
	(.0988)	(.0944)	(.0909)	(.1646)	(.1380)	(.1316)
Developed countries						
	FMOLS			DOLS		
	FD	FI	FM	FD	FI	FM
natres	-.1591***	-.1192**	-.0284	-.0872	-.0745	-.0223
	(.0424)	(.0571)	(.0235)	(.0570)	(.0693)	(.0317)
*fin*natres*	.3897***	.3009**	.1022*	.2303*	.1960	.0771
	(.0996)	(.1324)	(.0533)	(.1345)	(.1611)	(.0735)
constant	10.0069***	9.9587***	9.9975***	9.9991***	9.9817***	10.0200***
	(.1224)	(.1339)	(.1265)	(.1327)	(.1486)	(.1403)

Notes: Standard errors in parentheses. Lead and lag lengths for DOLS are suggested by Akaike Info Criterion.*** indicates significance at 1% level.

For the sample of low- and middle-income countries, natural resource rents (*natres)* and their interaction with finance have a significant long-term impact on economic growth. More precisely, in the long run natural resources negatively affect economic growth. However, this negative effect is mitigated by the financialization of the economy measured respectively by the financial development index and its two sub-components, namely the financial market development index and the financial institutions development index. Both estimators used (FMOLS and DOLS) provide the same result, showing the robustness of the results. The estimation carried out on the overall sample also confirms these results.

For the developed countries sample, the impact of natural resources on growth is negative and significant only in the FMOLS estimator and if the financialisaton is captured by the financial development index (*fd*) and the financial institution index (*fi*). Considering DOLS estimator, the long-term impact of interaction with finance and natural resources is significant at 10% if financialisaton is captured by financial development index (*fd*). If financialisaton is captured by financial institution (*fi*) and financial market (*fm*), the impact is positive but not significant.

This result can be explained from two perspectives. On one hand, the economies of developed countries are relatively less dependent on natural resources to drive their growth, compared to most resource-rich developing countries. On the other hand, the economic literature on the relationship between finance and growth shows that there is a maximum point at which financial sector development is associated with slower growth. Developed countries may have reached this level of financial development, which explains the inability of finance to improve the impact of natural resources on growth in these countries.

The Nonlinearity Impact of Natural Resources and Financialisation on Economic Growth

Before estimating non-linearity the equation (5), it's important to test whether the non-linearity exists or not. In order to determine whether the non-linearity exists or not we run the non-linearity test (Hansen, 1999). We run the test using 300 bootstraps. The results are presented in table 3. For the full sample, the test confirms a double threshold model if financialisation is captured by *fd* and *fm*. For the developed countries sample the test confirm a single threshold model if financialisation is captured by *fd*. For the Low &Middle countries sample the double threshold model is accepted regardless of the measure of financialisation used.

TABLE 8
NON LINEARITY TEST (BOOTSTRAP = 300 300 300)

Full sample

	fd		*fi*		*Fm*	
Threshold	Fstat	Prob	Fstat	Prob	Fstat	Prob
Single	65.36	0.0200	97.27	0.0067	na	na
Double	78.66	0.0200	326.15	0.0000	na	na
Triple	58.93	0.4400	43.89	0.6600	na	na

Developed countries (LMCs=0)

	fd		*fi*		*fm*	
Threshold	Fstat	Prob	Fstat	Prob.	Fstat	Prob
Single	24.38	0.0633	16.08	0.2067	na	na
Double	9.13	0.5000	7.21	0.5700	na	na
Triple	5.21	0.7000	-	-	na	na

Low middle countries (LMCs=1)

	fd		*fi*		*fm*	
Threshold	Fstat	Prob	Fstat	Prob.	Fstat	Prob.
Single	58.30	0.0000	58.04	0.0000	45.42	0.0000
Double	72.89	0.0200	75.26	0.0000	37.30	0.0000
Triple	51.68	0.6800	28.42	0.3000	21.22	0.5400

The test is performed on all three samples. It reveals a non-linearity of natural resource and financial effects on growth. However, while the test on the aggregate and the low- and middle-income country samples indicates a two-threshold model, the test on the developed country sample indicates a single-threshold model when finance is measured by *fd* and rejects non-linearity when measured by *fi* and *fm*.

Based on this, the use of the non-linear panel model is justified for exploring the non-linearity impact of natural resources and financialisation on economic growth. The results of estimations are presented in table 9.

TABLE 9
FINANCIAL THRESHOLD IN THE RELATION BETWEEN NATURAL RENT RESOURCES AND GROWTH

	Full sample	Developed countries	Low Middle Countries	Full sample	Low Middle Counties	Low Middle Counties
Financial Variable	***fd***			***fi***		***fm***
Estimated threshold	τ_2 =0.1507*** τ_2 =0.1559***	τ_1 =0.2075***	τ_1 =0.1516*** τ_2 =0.1556***	τ_1=0.3323*** τ_2= 0.3352***	τ_1=0.1608*** τ_2= 0.1645***	τ_1=0.0103*** τ_2= 0.0108***
Natural rent resources regime						
$\hat{\beta}_1(fd < \tau_1)$	.0019*** (.0001)	.0206*** (.0047)	.0017*** (.0002)	.0018*** (.0001)	.0023*** (.0002)	.0011*** (.0002)
$\hat{\beta}_2(\tau_1 < fd \leq \tau_2)$	.0049*** (.0003)	.0002 (.0003)	.0023*** (.0004)	-.01453*** (.0008)	.0068*** (.0005)	.0048*** (.0004)
$\hat{\beta}_3(fd \geq \tau_2)$	.0005***		.0012***	.0008***	.0012***	.0013***

	(.0002)		(.0002)	(.0002)	(.0002)	(.0002)
Controls						
D.lgov	-.0402***	-.0054***	-.0287***	-.0400***	-.0302***	-.0290***
	(.0063)	(.0007)	(.0076)	(.0061)	(.0073)	(.0074)
D.linv	.0362***	.0036***	.0252***	.0379***	.0265***	.0238***
	(.0047)	(.0003)	(.0058)	(.0045)	(.0056)	(.0057)
linf	-.0009	.0002	-.0015*	-.0002	-.0013	-.0017**
	(.0006)	(.0009)	(.0008)	(.0006)	(.0008)	(.0008)
fdi	.0001	-.0000	.0008***	.0000	.0008***	.0009***
	(.0000)	(.0000)	(.0002)	(.0000)	(.0001)	(.0002)
D.pop		.0003	.0017		.0014	.0016
		(.0016)	(.0021)		(.0020)	(.0021)
pop	-.0039***			-.0043***		
	(.0009)			(.0009)		
D.inst	.0650***	.0451***	.0755***	.0550***	.0785***	.0782***
	(.0108)	(.0155)	(.0141)	(.0104)	(.0137)	(.0139)
D.trade	.0005***	.0011***	.0003*	.0005***	.0003***	.0003*
	(.0001)	(.0002)	(.0002)	(.0001)	(.0001)	(.0002)
constant	.0186***	.0163***	.0087***	.0172***	.0082***	.0106***
	(.0021)	(.0018)	(.0026)	(.0020)	(.0025)	(.0026)
Observations	3402	1155	2247	3402	2247	2247
Countries	162	55	107	162	107	107
Ftest (prob>F)	3.90 (0.0000)	3.11 (0.0000)	3.72 (0.0000)	3.85 (0.0000)	3.90 (0.0000)	3.26 (0.0000)

It turns out that natural resources have a negative influence on economic growth, as these negative effects are described as the curse of natural resources in the economic literature (Auty, 1993; Ross, 1999; Sala-i-Martin and Subramanian, 2008). The second column of Table 2 presents the effects of natural resources on per capita real GDP

Following the non-linearity tests, a two-threshold model is estimated on the overall sample, considering alternately the indicators *fd* and *fi* to measure finance. If finance is being measured by the *fd* index, the estimate finds two of 0.1507 and 0.1559. Thus, we have three financial development regimes. Each regime is associated with a coefficient that captures the impact of natural resources on growth ($\beta\hat{}\_1, \beta\hat{}\_2$ *and* $\beta\hat{}\_3$). The results show that these three coefficients are positive and significant at 1%. However, the coefficient $\beta\hat{}\_2$ is higher, thereby showing that the impact of natural resources on growth is greater when the value of the financial development index is framed by the two threshold values. The impact decreases when the second threshold (0.1559) is exceeded.

Still on the global sample, when finance is measured by the financial institutions development index *fi*, two thresholds are found ($\tau\_1=0.3323,\ \tau\_2=0.3352$). We thus have three *fi* regimes and three coefficients measuring the impact of natural resources according to each regime ($\beta\hat{}\_1, \beta\hat{}\_2$ *and* $\beta\hat{}\_3$). When *fi* is less than 0.3323, we find a positive relationship between natural resources and economic growth. On the other hand, when *fi* is framed by these two threshold values, the relationship becomes negative and then becomes positive when *fi* is greater than 0.3352.

If we consider the sample of developed countries, non-linearity exists only when finance is measured by *fd*. Thus, following the linearity test, a single threshold model is estimated. The estimates of this model show two financial development regimes separated by a threshold of $\tau\_1=0.2075$. A positive and significant relationship between natural resources and growth is found when *fd* is below the threshold value. When *fd* exceeds the threshold, the relationship becomes insignificant.

Following the results of the non-linearity tests, a double threshold model is estimated by considering alternatively the three indicators measuring finance. We find for *fd*, *fi* and *fm* respectively the following thresholds: ($\tau\_1=0.1516, \tau\_2=0.1556$); ($\tau\_1=0.1608, \tau\_2=0.1645$); ($\tau\_1=0.0103, \tau\_2=0.0108$). Thus, for each financial variable, three schemes are detected. We find a positive and significant relationship at

the 1% threshold between natural resources and economic growth in low- and middle-income countries, according to each financial regime. However, the impact of natural resources is greater when financial development is at a level framed by the two threshold values (τ_1 *and* τ_2).

Overall, the estimates suggest that financial development is a key variable in understanding the natural resource curse phenomenon and provides some reconciliation of the divergent findings in the literature. Developed financial systems offer opportunities for better use of natural resource annuities. For this reason, developing countries that are characterized by a low level of financial development may have difficulties in leveraging their resources.

CONCLUSION

This study investigates the relationship between the impact of natural resource on economic growth and the level of financial deepening. We use data from 162 countries, covering the period from 1996 to 2017. For exploring the non-linearity impact of natural resources and financialisation on economic growth, we used a nonlinear panel model methodology developed by Hansen (1999). The results of the estimates already show a differentiated long-term effect: natural resource income negatively affects long-term growth in low-income countries, while it has no significant effect for high-income countries. Moreover, while the degree of financial development can mitigate the adverse effects of natural resources, the phenomenon is non-linear in the sense that there are thresholds of financial development necessary to reverse the natural resource curse.

Some important implications for policymakers could be drawn based on the empirical results of this study. Firstly, it is necessary for countries, particularly those with natural resource abundance, to develop their financial systems. For developing countries, which are more affected by weakness of financial systems and therefore more exposed to the resource curse, strengthening financial capacities is essential. Secondly, it is necessary to link the development of financial systems with economic diversification. A well-functioning financial system makes it possible to mobilize resources from natural resource rents in order to finance and strengthen the other sectors essential for growth. Similarly, a well-developed financial system encourages production and export of high value-added products will reduce the impact of external shocks. Thirdly, the establishment of strong institutions for wealth management is essential. States must multiply initiatives for the transparent management of natural resource wealth by strengthening oversight bodies at all levels of activities related to the exploitation of natural resource rents.

This paper has some limitations and can be improved on several points. Future research could use more detailed financial development indicators including the depth, access and efficiency of financial systems. Another line of research would also be to explore whether there is a differentiated role of the financial system in the relationship between economic growth and natural resources, depending on whether it is based on conventional or Islamic finance. Finally, it would be interesting to identify the sectors of the economy that benefit more from the conditional effects of natural resources.

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REFERENCES

Ahmed, K. (2017). Revisiting the role of financial development for energy-growth-trade nexus in BRICS economies. *Energy*, *128*, 487–495.

Arin, K., & Braunfels, E. (2018). The resource curse revisited: A Bayesian model averaging approach. *Energy Economics*, *70*(C), 170-178.

Atkinson, G., & Hamilton, K. (2003). Savings, growth and the resource curse hypothesis. *World Development*, *31*, 1793-1807.
Auty, R.M. (1993). *Sustaining Development in Mineral Economies: The Resource Curse Thesis.* Routledge.
Bhattacharyya, S., & Hodler, R. (2014). Do natural resource revenues hinder financial development? The role of political institutions. *World Dev.*, *57*, 101–113.
Cai, H., & Treisman, D. (2006). Did government decentralization cause China's economic miracle? *World Polit.*, *58*(4), 505e535.
Čihák, M., Demirgüç-Kunt, A., Feyen, E., & Levine R. (2012). *Benchmarking Financial Development Around the World*. World Bank Policy Research Working Paper 6175. World Bank, Washington, DC.
Damette, O. (2017). Présentation. Ressources naturelles et développement : un nouvel éclairage entre malédiction des ressources, financiarisation et changement climatique. *Mondes en Développement*, *179*(3), 7-14.
Drukker, D., Gomis-Porqueras, P., & Hernandez-Verme, P. (2005). *Threshold Effects in the Relationship between Inflation and Growth: A New Panel-Data Approach*. MPRA Working Paper Series. No. 38225.
Dwumfour, R.A., & Ntow-Gyamfi, M. (2018). Natural resources, financial development and institutional quality in Africa: is there a resource curse? *Resour. Policy*, *59*, 411–426.
Erdogan, S., Yıldırım D. C., & Gedikli A. (2020). Natural resource abundance, financial development and economic growth: An investigation on Next-11 countries. *Resources Policy*, *65*(101559), 1-11.
Hansen, B.E. (1999). Threshold efects in non-dynamic panels: estimation, testing, and inference. J. *Econom.*, *93*, 334–368.
Havranek, T., Horvath, R., & Zeynalov, A. (2016). Natural resources and economic growth: a meta-analysis. *World Dev.*, *88*, 134–151.
Hooper, E. (2017). Financement des pays riches en ressources naturelles : le rôle des marchés financiers et des institutions. *Mondes en Développement*, *179*(3), 15-30.
IMF. (2019). Regional economic outlook. Sub-Saharan Africa: navigating uncertainty. *World Economic and Financial Surveys*, pp. 0258-7440.
Isham, J., Woolcock, M., Pritchett, L., & Busby, G. (2005). The varieties of resource experience: natural resource export structures and the political economy of economic growth. *World Bank Econ. Rev.*, *19*(2), 141–174.
Javadi, S., Motevaseli, M., & Farsi, J.Y. (2017). Oil rent and financial environment: A crosscountry examination. *Int. J. Econ. Financ. Issues*, *7*(1), 298–302, 2017.
John, J.D. (2011). Is there really a resource curse? A critical survey of theory and evidence. *Glob. Gov.*, *17*(2), 167–184.
Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. *J. Econom.*, *90*(1), 1–44.
Kao, C., & Chiang, M.H. (2000). On the Estimation and Inference of a Cointegrated Regression in Panel Data. In B. Baltagi (Ed.), *Nonstationary Panels, Panel Cointegration, and Dynamic Panels (Advances in Econometrics)* (pp. 161-178). JAI Press, Amsterdam. http://dx.doi.org/10.1016/S0731-9053(00)15007-8Karl, 1997
Khan, M.S., & Senhadji, A.S. (2001). Threshold effects in the relationship between inflation and growth. *IMF Staff Pap.*, *48*(1), 1–21.
Kremer, S., Bick, A., & Nautz, D. (2013). Inflation and growth: new evidence from a dynamic panel threshold analysis. *Empir. Econ.*, *44*(2), 861–878.
Law, S.H., & Moradbeigi, M. (2017). Financial development and oil resource abundance–growth relations: evidence from panel data. *Environ. Sci. Pollut. Control Ser.*, *24*(28), 22458 22475.
Lederman, D., & Maloney, W.F. (2007). *Natural Resources: Neither Curse nor Destiny*. Stanford University Press, Washington, DC.

Moradbeigi, M., & Law, S.H, (2017). The role of financial development in the oil-growth nexus. *Resources. Policy*, *53*, 164–172

Moshiri, S., & Hayati, S. (2017). Natural resources, institutions quality, and economic growth; A cross-country analysis. *Iranian Economic Review*, *21*(3), 661-693.

Nguyen Canh, P., & Nguyen Thong T. (2020). Nexus between financialisation and natural resources rents: Empirical evidence in a global sample. *Resources Policy*, *66*(101590), 1-16.

Obstfeld, M., & Rogoff, K. (2000). *The Six Major Puzzles in International Macroeconomics: Is there a Common Cause?* NBER Working Paper No. 7777.

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxf. Bull. Econ. Stat.*, *61*(S1), 653–670.)

Pedroni, P. (2004). Panel cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the ppp hypothesis. *Econom. Theory*, *20*(3), 597–625.

Pesaran, M.H. (2004). *General diagnostic tests for cross section dependence in panels*. Cambridge Working Papers in Economics 435.

Rashid K., Islam, T., Yousaf, S.U., Zaman, K., Shoukry, A. M., Sharkawy, M. A., . . . Hishan, S.S. (2019). The impact of financial development indicators on natural resource markets: evidence from two-step GMM estimator. *Resources Policy*, *62*, 240-255.

Robinson, J.A., Torvik, R., & Verdier, T. (2006). Political Foundations of the Resource Curse. *J. Dev. Econ.*, *79*(2), 447–468.

Ross, M. (1999). The Political economy of the resource Curse. *World Polit.*, *51*(2), 297–322.

Sachs, J.D., & Warner, A.M. (1995). *Natural resource abundance and economic growth*. NBER Working Papers 5398.

Sala-i-Martin, X., & Subramanian, A. (2013). Addressing the natural resource curse: an Illustration from Nigeria. *Journal of African Economies*, *22*(4), 570-615.

Sala-i-Martin, X., & Subramanian, A. (2008). Addressing the natural resource curse: An Illustration from Nigeria. In C.P. Collier, C.C. Soludo, & C. Pattillo (Eds.), *Economic Policy Options for a Prosperous Nigeria* (pp. 61–92). Palgrave Macmillan, London.

Svirydzenka, K. (2016). *Introducing a New Broad-based Index of Financial Development*. IMF Working Paper 16/5.

Westerlund, J. (2005). New simple tests for panel cointegration. *Econom. Rev.*, *24*(3), 297–316.

Zaidi, S.A.H., Wei, Z., Gedikli, A., Zafar, M.W., Hou, F., & Iftikhar, Y. (2019). The impact of globalization, natural resources abundance, and human capital on financial development: evidence from thirty-one OECD countries. *Resources Policy*, *64*, 101476.

Zallé, O. (2018). Natural resources and economic growth in Africa: The role of institutional quality and human capital, *Resources Policy*, *62*, 616 -624.

APPENDIX

TABLE 1
LIST OF COUNTRIES

High Income Economies					
Albania	Canada	Hungary	New Zealand	Spain	
Argentina	Chile	Iceland	Norway	Sweden	
Aruba	Croatia	Ireland	Oman	Switzerland	
Australia	Cyprus	Israel	Panama	United Arab Emirates	
Austria	Czech Republic	Italy	Poland	United Kingdom	
Bahamas	Denmark	Japan	Portugal	United States	
Barbados	Estonia	Korea	Qatar	Uruguay	
Belarus	Finland	Kuwait	Saudi Arabia	Saudi Arabia	
Belgium	France	Latvia	Seychelles	Slovak Republic	
Belize	Germany	Lithuania	Singapore		
Bosnia and H.	Greece	Malta	Slovak Republic		
Brunei Darussalam	Hong Kong	Netherlands	Slovenia		
Low- and Middle-Income Economies					
Algeria	Colombia	Guatemala	Libya	Niger	Sudan
Angola	Comoros	Guinea	Macedonia	Nigeria	Suriname
Armenia	Congo	Guinea-Bissau	Madagascar	Pakistan	Tajikistan
Bangladesh	Costa Rica	Guyana	Malawi	Papua New Guinea	Tanzania
Benin	Cote d'Ivoire	Haiti	Malaysia	Paraguay	Thailand
Bhutan	Dominica	Honduras	Maldives	Peru	Togo
Bolivia	Dominican Republic	India	Mali	Philippines	Tonga
Botswana	Ecuador	Indonesia	Mauritania	RDC	Tunisia
Brazil	Egypt	Iran	Mauritius	Romania	Turkey
Bulgaria	El Salvador	Jamaica	Mexico	Russian Federation	Turkmenistan
Burkina Faso	Equatorial Guinea	Jordan	Moldova	Rwanda	Uganda
Burundi	Eritrea	Kazakhstan	Mongolia	Samoa	Ukraine
Cabo Verde	Ethiopia	Kenya	Morocco	Senegal	Uzbekistan
Cambodia	Fiji	Kyrgyz Republic	Mozambique	Sierra Leone	Vanuatu
Cameroon	Gabon	Lao	Myanmar	South Africa	Venezuela
Central African Republic	Gambia	Lebanon	Namibia	Sri Lanka	Vietnam
Chad	Georgia	Lesotho	Nepal	St. Lucia	Zambia
China	Ghana	Liberia	Nicaragua	Vincent and the Grenadines	

TABLE 2
UNCONDITIONAL CORRELATIONS OF LOW MIDDLE INCOME ECONOMIES SAMPLE

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) lgdp	1.000									
(2) rent_res	-0.030	1.000								
(3) fd	0.574*	-0.259*	1.000							
(4) fi	0.644*	-0.291*	0.856*	1.000						
(5) fm	0.373*	-0.168*	0.887*	0.521*	1.000					
(6) inst_quality	0.466*	-0.478*	0.444*	0.580*	0.215*	1.000				
(7) gov	0.098*	-0.066*	0.092*	0.222*	-0.046*	0.245*	1.000			
(8) inv	0.192*	0.102*	0.122*	0.173*	0.046*	0.167*	0.106*	1.000		
(9) linf	-0.038	0.062*	-0.046*	-0.130*	0.041*	-0.178*	-0.090*	-0.031	1.000	
(10) trade	0.234*	0.131*	0.133*	0.210*	0.033	0.250*	0.204*	0.211*	-0.061*	1.000

* shows significance at the .05 level

TABLE 3
UNCONDITIONAL CORRELATIONS OF HIGH-INCOME ECONOMIES SAMPLE

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) lgdp	1.000									
(2) rent_res	0.125*	1.000								
(3) fd	0.756*	-0.179*	1.000							
(4) fi	0.679*	-0.356*	0.890*	1.000						
(5) fm	0.716*	-0.038	0.952*	0.708*	1.000					
(6) inst_quality	0.729*	-0.345*	0.711*	0.743*	0.603*	1.000				
(7) gov	0.095*	0.032	-0.041	0.032	-0.084*	0.039	1.000			
(8) inv	-0.120*	-0.047	-0.069*	-0.044	-0.077*	-0.107*	-0.135*	1.000		
(9) linf	-0.347*	-0.013	-0.280*	-0.329*	-0.213*	-0.252*	-0.107*	0.084*	1.000	
(10) trade	-0.007	-0.079*	-0.054	-0.019	-0.070*	0.058*	-0.180*	0.173*	-0.064*	1.000

* shows significance at the .05 level