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Financial development and human development: A non-linear analysis for Oil-exporting and Oil-importing countries in MENA region

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Abstract

The purpose of this study is to define the optimal threshold of financial development that might affects human development in a panel of 13 MENA countries that are divided into two sub-samples: oil-exporting and oil-importing countries. Results of the panel smooth transition regression (PSTR) model show that the threshold of financial development is 0.389 in oil-exporting 0.588 for oil-importing countries. Hence, below these thresholds, financial development acts negatively and significantly on human development and above them its effect become positive.

1. Introduction

Since the pioneering work of Schumpeter (1911), a growing literature has been focused on the finance-growth relationship. Several economists have attributed a particular attention to the role of the financial sector (Gurley and Shaw, 1955; Goldsmith, 1969; McKinnon, 1973 and Shaw, 1973). According to these authors, dynamic, modernize and well-developed financial sector promotes and spurs growth and economic development. The recommendation of McKinnon (1973) and Shaw (1973) has motivated several authors to explore the causal relationship between finance and growth which remained inconclusive. In fact, an important part of literature on the finance-growth nexus has reported a positive association between finance and growth (Sachs and Warner, 1995; Wacziarg and Welch, 2008 and Lucas, 2009) while some other has shown the existence of a negative relationship (Demirguç-Kunt and Detragiache, 1998).

While literature on financial development was widely focused on the finance-growth nexus, less abundant studies have investigated the relationship between financial development and human development measured by the Human development index (HDI henceforth). HDI is a statistic composite index of three main indicators; life expectancy, education and per capita income. In fact, finance can exert either a direct or indirect effects on the level of human development. Several studies analyzed the causal relationship between financial development and human development and most of them have confirmed the positive effect. For example, Alam et al. (2015) investigated the role of financial development and economic misery on life expectancy for the Indian context over the period 1990QI– 2013QIV. Results of the combined cointegration approach confirm that financial development, economic growth and education expenditure have a positive impact on life expectancy. However, economic misery and income inequality exert a negative impact. In the same context, Sehrawat and Giri (2014) explored the relationship between financial development and human development during in India during the period 1980-2012. The cointegration technique and the ARDL bounds tests are used as empirical approach. Findings show that there is a long run relationship between the two indicators. However, granger causality test indicates that it exist unidirectional causality running from financial development indicators to human development index.

Another study conducted by Akhmat et al. (2013) analyzed the impact of financial development on SAARC'S human development over the period 1988-2008. The authors used broad money supply, credit to private sector and bank deposit liabilities as measures of financial development. Results of panel cointegration technique indicate that there is a long-run relationship running from financial development and economic growth to human development. Findings also indicate that bank deposit liabilities is considered as the indicator that contributes the most to human development in the SAARC region followed by broad money supply and finally by credit to private sector. Recently, Abdulnasser and Mrittika (2016) studied the causal interaction between financial development and human development in Bangladesh during the period 1980-2011. In this study, credit to private sector in percentage of GDP is used to measure financial development and the Barro-Lee index is served as an indicator of Human development. Empirical results show that there is no significant causality running from financial development on human development.

Few studies have focused on the opposite causal relationship which aimed at testing the effect of human development on financial development. As an example, Filippidis and Katrakilids (2015) investigated the relationship between institutions, human development and financial development for a sample of 52 developing economies during 1985–2008. Empirical results

indicate that institutional quality and human development explain significantly the difference in the level of financial development proxied by the level of banking sector development.

From the development above, we noticed that most of the studies have investigated the causal linear relationship between human development on financial development. However, nothing has been done yet on the possible non-linear relationship. The current research tries to fill this gap. To the best of our knowledge, there is no study that investigated the optimal threshold of financial development that affects the level of human development in the MENA region. This region is an interesting case study due to several socioeconomic differences between countries such as the level of income, disparities in natural resources like oil and gas, difference in level of education and health. To get better results, we divide our sample in two categories: oil-exporting countries and oil-importing countries and we conduct the Panel Smooth Transition Regression (PSTR) model. Overall, the results indicate that there is a threshold effect in the financial development and human development relationship. The effects of the thresholds differ from one group of country to another. For oil-exporting countries, below these thresholds, indicators of financial development exert a negative and significant effect on human development and above them, the effects become positive. On the contrary, below thresholds, financial development tends to improve human development in oil-importing countries. However, surpassing the optimal thresholds the effects become negative.

The remainder of this paper is structure as follows. Section 2 describes financial development and human development in the MENA region. Results and empirical discussions are provided in section 3. Section 4 concludes and addresses some policy implications.

2. Financial development and Human development in MENA region

The MENA region is made up of two blocs of countries. The first bloc covers high income countries with a strong economic growth. Bahrain, Saudi Arabia, Oman and United Arab Emirates are part of this group and they are in reality oil-exporting countries. The second bloc covers middle and low income countries with weak level of economic growth. Algeria, Egypt, Libya, Morocco, Tunisia, Jordan are part of this group and they are oil-importing countries.

Financial sector in MENA region is characterized by some strength relative to the strong regulation, supervision and financial openness and also some weaknesses due to the institutional environment and nonbank financial sector (Creane et al. 2003). According to Creane et al. (2003), several actions and steps have been taken to respect international Basel standard in term of increasing capital adequacy ratio and reducing nonperforming loans. Also, financial openness has been well improved in MENA region. Several countries have opened their financial sector.

Banking sector is considered as the most involved sector in financing the economy of this region. Bank assets account for 60% to over 100% of GDP across MENA countries (Ghosh, 2017). Banking sector in this area in general in GCC countries in particular is well developed and stable[1]. However, in the other countries[2], it is dominated by public banks which are more exposed to credit and liquidity risk and consequently less stable.

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[1] Bahrain, Oman, Qatar, Saudi Arabia and the UAE
[2] Jordan, Egypt and Tunisia.

In MENA region, the other financial institutions cover stock markets, insurance companies and corporate bond market. All these nonbank institutions are qualified as less developed and need more actions and decisions to be more strengthened.

Figures 1 and 2 below describe the annual evolution of the financial development index (FINDEX) in oil-exporting and oil-importing countries. According to the IMF, FINDEX is a statistic composite index of nine aggregated indices that summarize developed financial institutions and financial markets in terms of their depth, access, and efficiency. We can analyse this evolution based on two periods. The first one spans from 1990 to 2007 and the second one covers the period 2008-2014. For the first period, we notice an increase in the FINDEX which crossed from 0.230 in 1990 to reach 0.392 in 2007 for oil exporting countries. The same trend was recorded for the oil-importing countries. The financial development index was 0.242 in 1990 and becomes 0.397 in 2007. Turning now to the second period of 2008-2014, it illustrates a down trend of the FINDEX. For oil-exporting countries, the value of this index decreases from 0.375 in 2008 to be 0.319 in 2014. Similarly, the FINDEX decreases from 0.383 in 2008 to reach only 0.351 in 2014.

Figure1. Average annual evolution of FINDEX   **Figure 2.** Average annual evolution of HDI
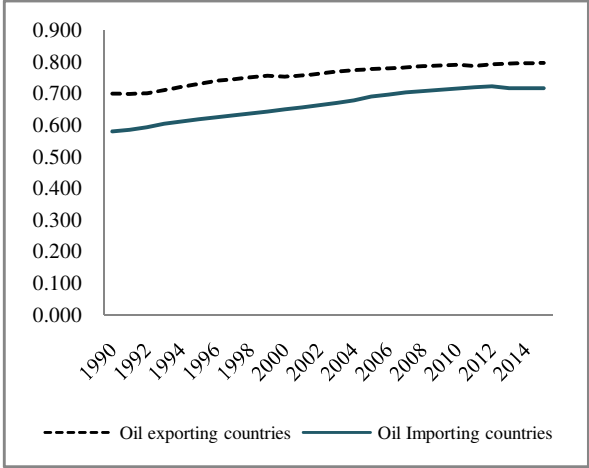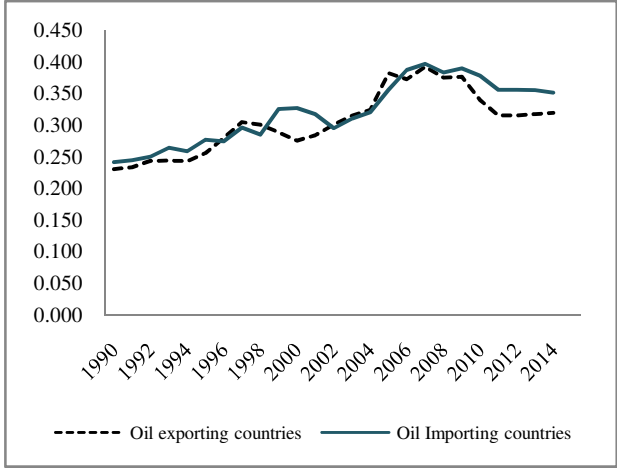
Source: Authors calculation from the IMF's financial development index and the human development report of the UNDP

The MENA region has made significant efforts to improve the human development. Improving education is considered as one of the most important strategic priorities. MENA region has taken several actions to improve the education system in order to promote knowledge pillar of economic development. With regard to health conditions, significant efforts have been done to reduce the mortality rates among infants and children. However, health sector in this region is faced to several hurdles like epidemiologic changes, rapidly changing technologies

Human development index in MENA region has improved during the period 1990-2015 for the two groups of countries. The HDI index records an upward trend during this period. In oil-importing countries, it crossed from 0.580 in 1990 to reach 0.716 in 2015. The same trend was registered for oil-rich countries. This index was 0.699 in 1990 and becomes 0.797 in 2015.

The UNDP classifies HDI into four intervals. Low HDI with a score below than 0.55, medium HDI if it is below 0.7, high HDI with a score below 0.8 and very high HDI if the score is above 0.8. Based on this, we can classify our sample in three groups of countries. The first one includes countries that have very high level of HDI that surpass 0.8 (Bahrain, Qatar, UAE, Algeria and Cyprus). The second includes countries that have a high level of HDI one (Kuwait, Oman, Libya, Jordan, Turkey and Tunisia) and the third group includes Egypt and Morocco that have medium level of HDI and which is below than 0.7.

Figures 3 and 4 inform about the evolution of financial development index and the human development index in oil-exporting (O.E.C) and oil-importing countries (O.I.C).

Figure 3. Evolution of HDI and FINDEX in O.Im.C   **Figure 4. Evolution of HDI and FINDI in O.Ex.C**

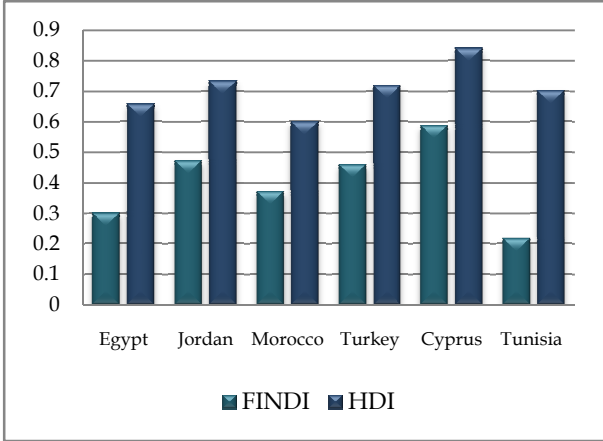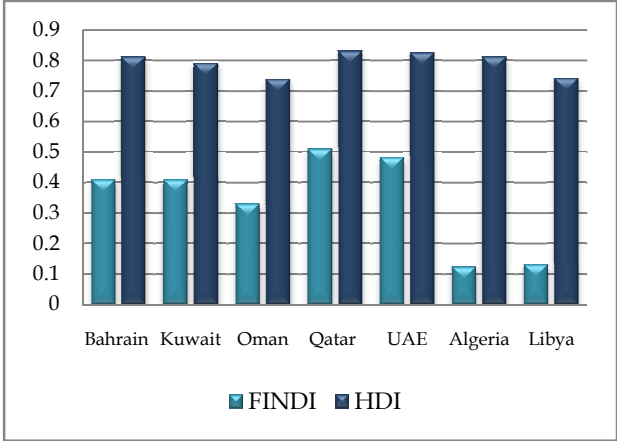*Source: Authors calculation from the IMF's financial development index and the human development report of the UNDP*

From these figures we notice that HDI for oil-exporting countries is more than 0.8 except for Oman and Libya with 0.74 and 0.79 respectively. Hence, all oil-exporting countries record a high level of HDI. With regard to the financial development index, these countries record a level more than 0.4 except for Algeria and Libya with a weak level of 0.124 and 0.131 respectively.

For the second group of countries, HDI ranges between 0.6 and 0.841. The highest level of HDI is relative to Cyprus which also records the highest level of financial development with 0.588. For the rest of oil-importing countries, FINDEX is higher than 0.3 except for Tunisia with only 0.219.

3. Empirical Analysis

3.1 Data, model specification and variables definition

To explore the effect of financial development on human development, we use a panel of 13 MENA countries over the period 2002-2015. The whole sample is divided into two sub-samples. The first includes 7 oil-exporting countries; while the second includes 6 oil-importing countries. To measure financial development, we use three proxies. The first is the IMF's financial development index. This indicator is a statistic composite index of nine aggregated indices that summarize developed financial institutions and financial markets are in terms of their depth, access, and efficiency. The financial development index is constructed

based on three steps. The normalization of variables is done in the first step. The second step is relative to the aggregation of normalized variables into the sub-indices representing a particular functional dimension. Finally, the third step is related to the aggregation of the sub-indices into the final index. The second and the third indicators are credit to private sector in percentage of GDP and broad money in percentage of GDP. These measures are considered as the classical indicators of financial development.

The human development index (HDI) is used as proxy of human development. It is a statistic composite index of three main indicators; life expectancy, education and per capita income. Data related to this index are collected from the human development report of the UNDP. All the rest of variables are collected from the World Development Indicators (WDI) database.

Assuming the possible nonlinear relationship between financial development and human development, we define a PSTR model firstly proposed by González et *al.* (2005); this model is an extension of the PTR model of Hansen (1999).

To define the threshold of financial development that may affect the human development, we introduce in our econometric model some main determinants of human development such as domestic investment (INVES), foreign direct investment (FDI), trade openness (OPEN), oil price (OILP) and oil rents (OILR). As Institutional quality also plays a crucial role in improving human development, we introduced regulatory quality (REGQ) as an exogenous variable. The nonlinear model can be presented as following in equation "(1)". All variables definitions are given in table 1.

$$HDI_{i,t} = \mu_i + \alpha HDI_{i,t-1} + \beta_0^1 FIND_{i,t} + \beta_0^2 INVES_{i,t} + \beta_0^3 FDI_{i,t} + \beta_0^4 OPEN_{i,t} + \beta_0^5 OILP_{i,t} + \beta_0^6 OILR_{i,t} + \beta_0^7 REGQ_{i,t} + [\beta_1^1 FIND_{i,t} + \beta_1^2 INVES_{i,t} + \beta_1^3 FDI_{i,t} + \beta_1^4 OPEN_{i,t} + + \beta_1^5 OILP_{i,t} + \beta_1^6 OILR_{i,t} + \beta_1^7 REGQ_{i,t}] g(FIND_{i,t}, \gamma, c) + \varepsilon_{i,t}$$ "(1)"

Table 1. Variables definition

Variables	Definitions and measurements	Source
HDI	Human development: measured by the index of human development	UNDP reports
Financial development		
FINDEX	Financial development index measured by the index of financial development.	IMF reports
DCPS	Domestic credit to private sector by banks (% of GDP).	WDI (2002-2015)
BMON	Broad money (% of GDP).	WDI (2002-2015)
Investments and openness		
INVES	Domestic investment: measured by the gross fixed capital formation in % of GDP.	WDI (2002-2015)
FDI	Foreign direct investment: measured by the net inflows of foreign direct investment in % of GDP.	WDI (2002-2015)
OPEN	Trade openness: measured by the sum of imports + exports in % of GDP	WDI (2002-2015)
Oil resources		
OILP	Price of crude oil per barrel	BP (2018)
OILR	Oil rents are the difference between the value of crude oil production at regional prices and total costs of production.	WDI (2002-2015)
Institutional quality		
REGQ	Regulatory quality: variable that ranges between -2.5 as weak regulatory quality and 2.5 as strong regulatory quality	WGI (2002-2015)

3.2 Descriptive statistics and correlation matrix

In this sub-section, we analyse the descriptive statistics used in this study to make comparison between oil-exporting countries and oil-importing countries.

Table 1. Descriptive statistics

Variables	Oil-exporting countries					Oil-importing countries				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
HDI	98	0.784	0.046	0.663	0.856	84	0.710	0.078	0.551	0.856
FINDEX	92	0.343	0.156	0.114	0.638	78	0.403	0.132	0.190	0.699
DCPS	98	41.386	21.953	6.172	98.511	85	77.951	61.639	14.135	253.146
BMON	98	61.296	23.036	25.995	185.679	71	85.144	31.146	33.537	139.937
INVES	71	24.324	6.489	8.949	42.160	84	23.474	5.217	11.657	34.417
FDI	97	2.593	2.791	-3.153	15.751	84	6.732	23.359	-43.463	198.075
OPEN	98	106.418	30.893	59.733	191.878	84	84.897	31.226	34.846	147.539
OILP	98	69.276	28.836	24.360	109.450	84	69.276	28.861	24.360	109.450
OILR	94	28.504	16.744	2.335	62.434	84	2.026	3.348	0.000	12.115
REGQ	98	0.039	0.855	-2.232	1.121	84	0.160	0.554	-0.836	1.423

Table 1 above indicates that the average value of Human Development index is 0.784 for oil-exporting countries and 0.710 for oil-importing countries. From these statistics, we conclude that there is no strong difference between levels of human development index in the 13 countries regardless the classification oil-exporting or oil-importing countries.

For the financial development index, descriptive statistics show that the average level of for oil-exporting countries is 0.343 with a minimum value of 0.114 and a maximum value of 0.638. With regard to oil-importing countries, the mean of level of financial development is 0.403. The maximum and the minimum values are respectively 0.699 and 0.190. Based on this index, these statistics indicate that on average, financial development in oil-importing countries is more developed than that of oil-exporting countries. Domestic credit to private sector registers on average a value of 41.386% for oil-exporting countries and 77.951% for oil-importing countries. With regard to broad money, statistics show that the mean value was 61.296% for the first group of countries and 85.144% for the second group.

Statistics related to investment in these two groups of countries indicate that on average domestic investment registered almost the same level for both oil-exporting and oil-importing countries with 24.324% and 23.474% respectively. However, it is clear that oil-importing countries attract more foreign direct investment than oil exporting countries. This conclusion was justified either by the average[3] value or the maximum[4] value. Regarding openness, statistics show that on average, the ratio of imports and exports to GDP in oil-exporting countries is 106.418% which is greater than 84.897% recorded by oil-importing countries.

Regulatory quality is considered as an institutional variable. It reflects the quality of governance. Values of this variable run from -2.5 to 2.5, with higher values corresponding to better governance. The most remarkable from Table 1 that oil- importing countries registered

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[3] 2.59% for oil exporting countries compared to 6.732% for oil-importing countries.
[4] 15.75% for oil exporting countries compared to 198.075% for oil-importing countries.

a governance quality better than oil-exporting countries. For example, statistics indicate that the average value of regulatory quality is 0.160 in oil-importing countries which seemed better than oil-exporting countries with only 0.039. The same comparison is confirmed for the maximum values of this indicator. We found that oil-importing countries registered a level of 1.423 compared to 1.121 for oil-exporting countries. From these statistics, we can conclude that institution quality is poor for the two groups of countries. However, it seems that oil-exporting countries suffer from weak institution quality and weak level of governance rather than oil-importing countries.

Table 3 gives information about the level of correlation between independent variables. It leads to confirm the presence or the absence of multicollinearity problems.

Table 3. Correlation matrix

		Oil-exporting countries								
		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
findex	**(1)**	1.0000								
Dcps	**(2)**	0.4510	1.0000							
bmon	**(3)**	0.0418	0.4127	1.0000						
inves	**(4)**	-0.2027	-0.1242	0.2578	1.0000					
Fdi	**(5)**	0.2908	0.0076	-0.1623	0.1301	1.0000				
open	**(6)**	0.4299	0.4608	0.2209	-0.1129	0.3861	1.0000			
Oilp	**(7)**	-0.0134	0.1291	0.1418	0.3886	0.0167	0.3065	1.0000		
Oilr	**(8)**	-0.1748	-0.2084	-0.4202	-0.4234	-0.2391	-0.3586	0.1179	1.0000	
Regq	**(9)**	0.3919	0.2757	-0.2368	-0.1333	0.2398	0.3964	-0.0728	-0.3545	1.0000
		Oil-impoting countries								
		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
findex	**(1)**	1.0000								
Dcps	**(2)**	0.4489	1.0000							
bmon	**(3)**	0.3540	0.4342	1.0000						
inves	**(4)**	0.2064	-0.2403	0.2161	1.0000					
Fdi	**(5)**	0.2095	0.3307	0.5277	-0.1258	1.0000				
open	**(6)**	0.3542	0.5802	0.3993	0.0661	0.1942	1.0000			
Oilp	**(7)**	0.1430	0.1378	0.0872	0.1034	0.0705	0.0827	1.0000		
Oilr	**(8)**	-0.5605	-0.3254	-0.1399	-0.4994	-0.0798	-0.3265	0.0829	1.0000	
Regq	**(9)**	0.4992	0.4200	-0.0336	0.0142	0.2507	0.5035	0.0351	-0.5258	1.0000

From table 3 we notice also, that the level of correlation is weak between independent variables introduced in our econometric model. The only exception is for the association between domestic credit to private sector and board money which is 61.27% for oil-exporting countries and 63.42% for oil-importing countries. It is worth to inform that these two variables are dependent variables and they are tested separately in our econometric model. Hence, we confirm the absence of multicollinearity.

3.3 Results of pre-tests for PSTR model

As econometric approach, the PSTR model requires some pre-tests that should be tested before. The first one tested for nonlinearity which is considered as a necessary condition. The second test aims to test the number of regimes. However, the third one defines the optimal threshold of the transition variable.

3.3.1 The test of linearity

To test for linearity, we use statistics of three tests, Lagrange Multiplier (W), Lagrange Multiplier (F) and Likelihood-ratio test (LR). Table 4 displayed rest of linearity test.

Table 4. Linearity test

Transitions variables	Oil-exporting countries			Oil-importing countries		
	FINDEX	DCPS	BMON	FINDEX	DCPS	BMON
Lagrange Multiplier (W)	26.789	30.436	13.803	15.998	48.791	19.048
	(0.000)	(0.000)	(0.031)	(0.013)	(0.000)	(0.004)
Lagrange Multiplier (F)	6.395	7.859	2.383	2.795	16.398	3.511
	(0.000)	(0.000)	(0.041)	(0.017)	(0.000)	(0.004)
Likelihood-ratio test (LR)	35.278	41.309	15.548	17.904	73.040	22.233
	(0.000)	(0.000)	(0.016)	(0.006)	(0.000)	(0.001)

P-values are in parentheses
FINDEX *is the financial development index,* **DCPS** *is the domestic credit to provide sector in % of GDP and* **BMON** *is broad money in% of GDP*

Table 4 indicates that linearity between financial development with its three indicators (FINDEX, DCPS and BMON) and human development is rejected at the 1% level for the three tests. Hence, the relationship between the two indicators is non-linear for both oil-importing and oil-exporting countries.

If the non-linearity hypothesis is tested between financial development and human development, the second step consists to determine the number of regime. This test aims to check if the PSTR model has one transition function *(m=1)* against the alternative hypothesis *(m=2)* when the PSTR model has at least two transition functions.

3.3.2 The test of the number of regimes

Table 5 gives information about the number of regime for the two groups of countries. Statistics of Lagrange Multiplier (F) and Likelihood-ratio test (LR) tests are used for decision.

Table 5: Test for the number of regimes

Hypostases	Tests	Oil-exporting countries			Oil-importing countries		
		FINDEX	DCPS	BMON	FINDEX	DCPS	BMON
(1)H0 : r = 0;H1 : r = 1	LR	34.526	67.776	48.157	59.498	75.368	66.325
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	F	5.977	23.439	14.691	19.563	57.483	96.275
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(2)H0 : r = 1;H1 : r = 2	LR	57.524	74.853	61.269	62.943	77.841	68.175
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	F	33.791	49.742	48.622	11.844	38.483	90.282
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

P-values are in parentheses
FINDEX *is the financial development index,* **DCPS** *is the domestic credit to provide sector in % of GDP and* **BMON** *is broad money in% of GDP*

Results from table 5 show that for both oil-importing and oil-exporting countries, statistics of LM and LF tests are statistically significant at level of 1% for the two hypotheses *(m=1)* and *(m=2)*. Hence, we can reject the null hypothesis and we admit that it exist at least two functions of transition and one threshold.

3.3.3 Threshold values

The third test aims to define the optimal thresholds of financial development that affects human development. As the transition variable is a composite index that ranges between 0 and 1, results displayed in table 6 indicate that the threshold of financial development index is 0.471 for oil-exporting countries and 0.538 for oil-importing countries. Threshold of DCPS as the second indicator of financial development are respectively 50.327% for oil-exporting countries and 58.923% for oil-importing countries. With regard to threshold of BMON; to have a significant impact on human development, it seems that oil-importing countries require more broad money than oil-exporting countries. Thresholds are 51.635% for the first group and 99.843% for the second group. From these thresholds, we notice that for the three indicators, oil-importing countries should take several actions to strength their financial system.

Table 6: Threshold values

Countries	Oil-exporting countries			Oil-importing countries		
Thresholds	FINDEX	DCPS	BMON	FINDEX	DCPS	BMON
γ	5.000	5.000	5.000	5.000	0.900	4.000
C	0.471	50.327%	51.635%	0.538	58.923%	99.843%
AIC	-9.892	-9.564	-9.421	-9.212	-8.881	-8.653
BIC	-9.373	-8.095	-8..915	-8.759	-8.447	-8.139

FINDEX *is the financial development index,* **DCPS** *is the domestic credit to provide sector in % of GDP and* **BMON** *is broad money in% of GDP*

3.4 Discussion of results

Results of the PSTR model are displayed in table 7. Empirical results for each group of countries contain three columns. The first presents findings when financial development index FINDEX is the transition variable. In the second column, transition variable is domestic credit to private sector DCPS. In the third column, we present empirical findings when broad money BMON is the transition variable.

Table 7: Results of PSTR model

	Oil-exporting countries			Oil-importing countries		
Transition variables	FINDEX	DCPS	BMON	FINDEX	DCPS	BMON
Findex	-0.2504	—	—	0.1547	—	—
	-2.2776**	—	—	3.5042***	—	—
DCPS	—	0.0018	—	—	0.0089	—
	—	1.3421	—	—	3.2752***	—
BMON	—	—	-0.0016	—	—	0.0074
	—	—	-1.1142	—	—	2.9451***
Inves	0.0011	0.0010	0.002	0.0029	0.0479	0.0012
	2.1840**	2.5951***	2.7269***	4.2164***	2.7547***	0.1108

Fdi	-0.0012	-0.0017	-0.005	0.0015	0.0123	0.0052
	-0.6683	-1.1804	-0.6334	2.8432***	2.1347**	1.4312
Open	0.0015	-0.0016	0.0061	-0.0161	-0.0034	-0.0017
	2.2485***	-1.0535	2.6824***	-2.1542***	-2.1927**	-0.8324
Oilp	0.0017	0.006	0.002	-0.0016	-0.0092	-0.0812
	8.1299***	7.9833***	1.866*	-11.257***	-7.242***	-5.382***
Oilr	0.0281	0.0192	0.0032	-0.0051	-0.0271	-0.0091
	4.0301***	2.6807***	0.7458	-1.2166	-1.5712	-0.9247
Regq	-0.0028	-0.0068	-0.013	0.0307	0.0032	0.0019
	-2.6953***	-0.9672	-2.6271***	2.8076***	0.7492	2.8124***
Findex*$g(q_{i,t}, \gamma, c)$	0.2510	—	—	-0.01846	—	—
	2.5124**	—	—	-0.1575	—	—
Dcps*$g(q_{i,t}, \gamma, c)$	—	0.0021	—	—	-0.0271	—
	—	2.5076**	—	—	-2.5124***	—
Bmon*$g(q_{i,t}, \gamma, c)$	—	—	0.0027	—	—	-0.0024
	—	—	2.6327***	—	—	-1.3457
γ	5.000	5.000	0.200	5.000	0.900	4.000
C	0.471	50.327%	51.635%	0.538	58.923%	99.843%
R^2	90.36	87.058	85.075	85.27	88.52	84.29
Obs	68	72	70	78	84	84

*****and ** indicate level of significance at 1% and 5%*

Results displayed in table 7 show that thresholds of financial development in oil-exporting countries are lower than those in oil-importing countries. Findings also indicate that below the threshold (FINDEX), financial development acts negatively and significantly on human development in oil-exporting countries. However, above theses thresholds (FINDEX, DCPS and BMON), its effect becomes positive. The opposite results are found for oil-importing countries. We found that below thresholds, financial development (FINDEX, DCPS and BMON) improves human development. If these indicators surpass the optimal thresholds, their effects on human development become negative.

Compared to the mean values for the three indicators of financial development, we notice that for FINDEX, the optimal threshold is higher than the mean values for oil-exporting and oil-importing countries. With regard to DCPS in oil-exporting countries, the optimal threshold of 50.327% is also higher than the average value of 41.386%. However, threshold of DCPS in oil-importing countries 58.923% is found to be lower than the mean values of 77.951%. Statistics on the third indicator of financial development indicate that for oil-exporting countries, threshold of BMON 51.635% is lower that the mean value of 61.296%. This result is different for the oil-importing countries since we found that the threshold value of 99.843% is higher than the mean value of 85.144%. This development is made to compare thresholds to mean values. Hence, within this comparison, countries are able to decide whether to increase or decrease these indicators to be more appropriate with the optimal thresholds that can affect human development.

For oil-exporting countries, above the optimal thresholds, financial development is considered as an important factor that improves human development. In addition to the importance of oil resources in the oil-rich countries, these countries should focus on the importance of

strengthening their financial system. In other words, oil-exporting countries are encouraged to continue to modernize and develop their financial institutions and also their financial market. Furthermore, these countries are recommended to grant more credit to private sector in order to create more added values and more jobs 'opportunity which are able to improve human development.

In oil-importing countries, we found that below the optimal thresholds of the three indicators (FINDEX, DCPS and BMON), financial development improves significantly human development. However, surpassing these thresholds; their effects become negative and significant only for DCPS. This means that above optimal thresholds, there are other factors that improve human development. As for example, we quote principally domestic and foreign direct investments which are positively and significantly correlated with human development.

Empirical findings indicate that the coefficient of FDI is positive and statistically significant with HDI for oil-importing countries. FDI is associated with a technological transfer that enhances skills and narrows gap between education and employability. FDI creates more opportunity of jobs that improve human being. Moreover, FDI makes the host country's economy more competitive (Hakimi and Helmi, 2016). Local firms will follow multinational firms regarding work methods and processes. This positively turns on the business strategy and the customer services.

Trade openness exerts a significant effect on human development. However, this effect differs from a group of countries to another. Results displayed in table 7 show that OPEN has a positive and significant impact on Human development for oil-exporting countries. Contrary to the findings of oil-exporting countries, trade openness exerts a negative and significant impact on HDI. For oil-importing countries, trade openness can affect indirectly human development through economic growth (Gross National Income), environmental quality and health conditions. Several studies have confirmed the positive association between openness and non-clean energies consumption and consequently carbon dioxide CO_2 or sulfur dioxide (SO_2) emission. In this case, trade openness harms the environmental quality. Our results are in line with Chang (2015), Hua and Boateng (2015) and Naranpanawa (2011).

Oil price and oil rent are introduced in our econometric model given their importance in MENA economy and their role in improving human development. Results indicate that the effect of these two variables is positive and significant for oil-exporting countries. This result is not surprising especially for GCC countries where oil revenue represents on average more than 75% of total government revenue and more than 60% of total exports. However, we notice that oil rent is insignificant for the second group. The oil rent for oil-impoting countries is weak and it has no obvious impact on their economy and thus on human development.

As for institutions quality, findings indicate that regulatory quality improves significantly the human development in oil-importing countries. However, the effect of this variable is either negative or insignificant for oil-importing countries. From descriptive statistics, we have concluded that on average oil-importing countries registered better governance quality than oil-exporting countries. These statistics can explain the positive association between institution quality and human development in oil-importing countries and the negative effect for oil-exporting countries. This negative effect of regulatory quality could be explained by the fact that oil exporting countries, notably the GCC countries have adopted taught regulation on bank which in turn has limited credit allocation of banks. This is mainly because

in some GCC countries, credit growth is mostly concentrated into construction and real estate lending, stimulating a real estate boom. It is worth recalling that as consequence of this loans concentration, the Subprime crisis has devastated the banking sector of many oil exporting countries notably the UAE with the so called the Dubai crisis. According to Woertz (2008) the GCC equity markets have suffered much more than the ones in the US and other developed markets. Furthermore, indices in Saudi Arabia and the UAE (Dubai) have shed more than 40 percent since the beginning of 2008. As a response, policymakers have strengthened regulation on banks. As, for the case of oil importing countries, regulation appears to be more flexible and better quality which support the development of the banking sector and the industry as a whole.

Institutions quality also considered as a crucial factor for explaining variation in governance and economy. Empirical findings indicate that regulatory quality improves the human development in oil-importing countries. Human development depends on the effectiveness of public administration especially education and health. In countries with good regulatory quality and strong rule of low, it results an improvement of health conditions and quality of public and private education. Consequently, human development will be improved. Our finding is in line with Welsch (2004) and Duit (2005).

4. Conclusion and policy recommendations

The purpose of this paper is to investigate the non-linear relationship between financial development and human development in the MENA region. Particularly, it aims to define the optimal threshold of financial development index, domestic credit to private sector and broad money that affect human development in this area. This query is crucial since very limited studies investigated this topic.

In this paper, we use a sample of 13 MENA countries among them 7 oil-exporting countries and 6 oil-importing countries. The time span covers the period 2002-2015. The subdivision of the whole sample into two sub-samples is to compare the two groups of countries since they present several socioeconomic differences. Starting from the possible non-linear relationship between financial development and human development, we apply the PSTR model developed by González et al. (2005). Empirical findings indicate that in oil-exporting countries, thresholds of financial development are respectively 0.471 for financial development index (FINDEX), 50.327% for credit to private sector (DCPS) and 51.635% for broad money (BMON). For oil-importing countries, thresholds are 0.538 for FINDEX, 58.923% for DCPS and 99.843% for BMON. From these thresholds, we conclude that thresholds of financial development in oil-exporting countries are lower than those in oil-importing countries. Findings also indicate that below thresholds, financial development acts negatively and significantly on human development in oil-importing countries. However, above the threshold of DCPS, its effect becomes positive. The opposite results are found for oil-importing countries.

Besides indicators of financial development that affect human development, results displayed in table 7 show that domestic investment and foreign direct investment improves significantly the level of HDI in oil-importing countries. Also, institution quality proxied by the regulatory quality plays a significant role in improving human development in these countries. For oil-exporting countries, we found that variables that represent oil resources like oil price and oil rents are the main factors that affect positively and significantly human development in these

countries. However, institution quality exerts (regulatory quality) a negative and significant effect on the level of HDI.

This study is important for policy makers since it gives the estimated level of financial development that can affect human development for both oil-exporting and oil-importing countries. In addition to the importance of oil resources in the oil-rich countries, these countries should grant more importance to strengthen their financial system. Also, these countries are recommended to grant more credit to private sector in order to create more added values and more jobs' opportunity. For oil-importing countries, we found that above optimal thresholds, there are other factors that improve human development. These countries are recommended to grant more importance to domestic and foreign direct investments since they improve significantly the level of human development.

Appendix 1. Country Evolution of HDI and FINDEX (Oil-exporting countries during 2002-2015)

Countries	**Bahrain**	**Kuwait**	**Oman**	**Qatar**	**UAE**	*Algeria*	*Libya*
FINDEX	*0.409*	*0.409*	*0.330*	**0.510**	**0.482**	*0.124*	*0.131*
HDI	0.812	0.791	0.738	0.830	0.825	0.812	0.741
Threshold of FINDEX is 0.471 DCPS is 50.327% BMON is 51.635%							

Note: *Bold font style represents countries above the optimal threshold of FINDEX. However, italic font style represents countries below threshold.*

Appendix 2. Country Evolution of HDI and FINDEX (Oil-importing countries during 2002-2015)

Countries	*Egypt*	*Jordan*	*Morocco*	*Turkey*	**Cyprus**	*Tunisia*
FINDEX	*0.302*	*0.473*	*0.372*	*0.460*	**0.588**	*0.219*
HDI	0.658	0.734	0.601	0.719	0.841	0.703
Threshold of FINDEX is 0.538 DCPS is 58.923% BMON is 99.849%						

Note: *Bold font style represents countries above the optimal threshold of FINDEX. However, italic font style represents countries below threshold.*

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