Does the Rule of law affect the relation between IHDI and FDI ? An Empirical Evidence for the MENA region from 2010 -2019

هل تؤثر سيادة القانون على العلاقة بين IHDI والاستثمار الأجنبي المباشر؟ دليل تجريبي لمنطقة الشرق الأوسط وشمال إفريقيا من 2010 إلى 2019

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Abstract:

This paper investigates the relationship between Inequality Adjusted Human Development Index (IHDI) and The Foreign Direct Investment inflows (FDI) given a set of controlled variables. Using panel data for nine (9) MENA countries during the period of (2010-2019). The analysis begins with the pre-elementary examination of the variables, using descriptive statistics and correlation matrix, and uses the Generalized method of moments (GMM) . The paper found a significant positive relationship between FDI on IHDI, where a nonlinear relationship between FDI and IHDI was tested. The paper finally figured out that the interaction between the FDI and Rule of Law has a positive impact on IHDI.

Keywords: Foreign Direct Investment, Adjusted Human Development Index, World Governance indicators, MENA region

المستخلص:

تبحث هذه الورقة في العلاقة بين مؤشر التنمية البشرية المعدل لعدم المساواة (IHDI) وتدفقات الاستثمار الأجنبي المباشر (FDI) بالنظر إلى مجموعة من المتغيرات الخاضعة للرقابة. استخدام بيانات لوحة لتسع (9) دول في منطقة الشرق الأوسط وشمال إفريقيا خلال الفترة (2010–2019). يبدأ التحليل بالفحص ما قبل الابتدائي للمتغيرات ، باستخدام الإحصاء الوصفي ومصفوفة الارتباط ، ويستخدم طريقة اللحظات المعممة (GMM). وجدت الورقة علاقة إيجابية كبيرة بين الاستثمار الأجنبي المباشر على IHDI ، حيث تم اختبار العلاقة غير الخطية بين الاستثمار الأجنبي المباشر و IHDI. توصلت الورقة أخيرًا إلى أن التفاعل بين الاستثمار الأجنبي المباشر وسيادة القانون له تأثير إيجابي على معهد التنمية البشرية الدولية.

الكلمات المفتاحية: الاستثمار الأجنبي المباشر، مؤشر التنمية البشريه المعدل، مؤشرات الحوكمه العالمي، دول الشرق الأوسط وشمال إقريقيا

1. Introduction

The MENA region performed notably in attracting FDI inflows before the onset of the global financial crisis. As In 2005, MENA FDI inflows relative to GDP surpassed the average for other emerging and developing economies. In 2008, FDI inflows peaked at USD 78 billion. Following the global financial crisis, FDI inflows into MENA started down a path of decline followed by stagnation, as the region had witnessed, a wave of protests and political instability, conflicts and large-scale flows of refugees since 2011 have considerably slowed down the economic prospects of several countries in the MENA. Yet the countries in the region make notable efforts to fulfill the sustainable development goals. (OECD,2018)

This dramatic situation urges a response by the international community connected to long-term social and economic development policies. For example, Egypt had witnessed a significant volatility in its FDI inflows over the past decade. In 2011 these fluctuations resulted in an even more quick decrease in FDI inflows, which hit a negative USD 482.7 million, then recovered steadily, to reach USD 8.1 billion in 2016. And from this context most of the MENA governments, had recently streamlined their investment regulations, where new investment laws were approved

in Jordan (2014) and Egypt (2017) aiming at strengthening of the institutional framework and more efficient investment. (OECD, 2018)

Until now the Human development index HDI is the most popular index used to rank countries into four tires of human development. But the UNDP since 2010 had designed the Inequality adjusted human index IHDI to overcome the shortcomings and disadvantages of the HDI which is did not take into consideration of inequality in human development across regions.

Given that unequal distribution of resources that had become a big social concern, the IHDI is considered a more accurate proxy for human development that gives an indication of inequality, as it takes into consideration the average achievements of a country in health, education and income while distributed among its population (www.UNDP.org)

Foreign direct investment FDI inflows to the host countries is considered one of the main controversial issues in research, many scholars have argued that FDI is contributing significantly to economic growth and social and economic development, on the contrary others argued that FDI has its negative consequences on the host countries. Specifically, some researchers examined the impact of FDI inflows on HDI of host countries before and after receiving FDI. Nevertheless, not many researches have examined the impact of FDI inflows on the IHDI. *Cao et al (2018)*

The main objective of this paper is to examine the impact of FDI inflows on IHDI in some selected countries in the MENA region. the paper addresses, three basic questions: (1) is there an impact of FDI inflows on Inequality adjusted human index, (2) is there a nonlinear relationship between IHDI and FDI, (3) did the higher institutional quality represented by the rule of law raised the countries IHDI

The rest of the paper is organized as follows. Section 2 presents the literature review, whereas Section 3 presents the data, econometric specification and methodology, Section 4 is about the empirical results, and the final section is about conclusion.

Research Problem:

The main research problem is investigating the impact of FDI on the IHDI highlighting the importance of the Rule of law of as one of the World Governance indicators in the MENA Region, as it will be strengthening the effect of FDI and IHDI

Research Hypothesis:

This research examines the following hypotheses

H1: Foreign Direct Investment has a positive and significant impact on IHDI

H2: The Squared of FDI has a positive and significant impact on IHDI

H3: The interaction between Foreign Direct Investment and rule of law has a significant positive relationship with IHDI

Research Methodology:

The Paper will use the Panel Regression Model - Generalized Method of Moments (GMM) to investigate the significant impact of the variables, as GMM is one of the most flexible and dynamic methods that provide consistent results. So in order to investigate the relationships between the IHDI and the FDI, GDP per capita, inflation rate, trade openness, population growth, and rule of law. The methodology started with examining the variables using descriptive statistics and a correlation matrix. Three models had been used to investigate the relationship, the first model was used to investigate the relationship between FDI and IHDI, the second was used to investigate the linear relationship between the two variables, and the third to see the effect of the interaction between the FDI and the Rule of law on IHDI.

2. Literature review:

As mentioned above, there is very few literatures that directly investigated the impact of FDI inflows on Inequality-adjusted Human development index (IHDI), as most researches had studied the impact of FDI on either HDI or income inequality.

Regarding the impact of FDI on IHDI, only two studies by Cao et al (2017) and Cao et al (2018) addressed this empirical evidence. On their study (Cao et al, 2017) found that FDI did not significantly affect the IHDI, for their study that had been conducted on (23) Asian countries from the period from 2013 till 2015, this insignificant relationship was the result although the study had grouped the countries of the study to the very high, high, and medium level of human development. On the same platform (Cao et al,2018) divided the data of (106) countries according to its continent, and along a period from 2010 to 2015, the study had found that the FDI is significantly and negatively affecting IHDI, as FDI inflows increased the gap in income for the Asian countries.

Regarding the impact of FDI on income inequality:

The direct and the insignificant effect of FDI on income inequality had been proved in the study of (Fazalloh,2009), as the study used panel data regression model with panel-corrected standard errors (PCSE) technique to analyze data from 33 provinces during the period from 2012 to 2016 in Indonesia. The study also showed that the insignificance effect of FDI on income inequality through education and trade.

On a study conducted to evaluate the effect of FDI on wage inequality, (Figini & Gorg, 2011) had divided the investigated 100 countries into developed and developing countries along a time period from 1980 to 2002. For the study that used the panel data, it had found that the effect of FDI on wage inequality depend on the development pattern of each country. The study couldn't confirm the non-linear relation between FDI and income inequality.

(Le et al,2021) had showed in their study on Vietnam that FDI tends to increase income inequality. The researchers used Generalized Method of Moment (GMM) model to conduct the estimation. The study also validated the non-linear relationship between FDI and income inequality. It found that the effect of FDI on income inequality is subject to the level of education and institutions in each provinces in Vietnam.

Regarding the impact of FDI on Human Development:

The study of Reiter and Steensma (2010) concluded the positive effect of FDI on the human development for the study that had been conducted on (49) developing countries for the period from 1980-2005. The study also found that FDI has a positive impact on the human development for the countries that restrict the investors

to enter some sectors. The study also found the negative effect of FDI on human development for the countries that experience a high level of corruption. On another side, (Muhammad et al,2010) found that the effect of FDI on human development is positive for the study conducted on Pakistan for the period from 1975 to 2008.

In their studies (Lehnert et al,2013) had also found the positive effect on FDI inflows on human development for the study that conducted on (175) countries for the period from (1997-2007). Agusty and Damayanti (2015) for their study that conducted on (124) developing countries discovered that FDI inflows positively affected human development. Zhuang (2017) also researched the impact of FDI on human capital development in 16 East Asian countries for the period of 1985- 2010 through panel data analysis and disclosed that FDI positively raised the secondary schooling, but decreased the tertiary schooling.(Gökmenoğlu et al.,2018) for their study for Nigeria during 1972-2013 period through Johansen cointegration test and Toda-Yamamoto test and revealed that FDI positively affected human capital development in the long run and also a two-way interaction between two variables.

Whereas, Baranwal (2019) also investigated the effect of FDI on human capital development in India for the period 2001–2015 through dynamic regression analysis and revealed no significant effects of FDI on human capital development.

Also, The paper of (Bayar & Gunduz, 2020) examined the effect of foreign direct investment inflows and trade liberalization on human capital development in (11) countries of the European Union, during the period from 1995 to 2018. The paper used panel regression analysis, which revealed that the impact of FDI inflows on human capital development was negative, while trade liberalization positively affected the human capital development.

And finally regarding the relationship between the institutional quality and HDI, the paper of (Nandha & Smyth, 2013) examined the linkage between the quality of governance (indicated by six Worldwide Governance indicators) and human development (determined by the Human Development Index (HDI)) over the timeframe from 1995 to 2011 for (186) countries. The paper had come to the result that the quality of governance has a significant impact on human development and vice versa. In addition, the magnitude of the impact of human development on the quality of governance is much larger than the impact of governance on human development.

What does this paper add to research?
There is a limited number of researches that investigated the impact of FDI inflows to IHDI, and nearly there is no researches that investigate this relation in the MENA region, Moreover, the paper presented an empirical analysis of an interaction term measuring the institutional quality represented by the rule of law and FDI inflows and its relation to IHDI.

3 ECONOMETRIC SPECIFICATION AND METHODOLOGY

In order to investigate the relationships between the IHDI and the FDI , GDP per capita, inflation rate, trade openness , population growth, and rule of law as one of the most important world governance indicators, Panel regression model was built. As it is one the most powerful techniques to give more informative data, more variability, less collinearity among variables, more degrees of freedom and efficiency. Also, panel data are better suited to study the dynamics of change (Gujarati, 2003) Generalized Method of Moments (GMM) was used to estimate the model, GMM is one of the most flexible and dynamic methods that provides consistent results in the presence of different sources of endogeneity

3.1 Data

 Annual data that covers (9) countries were collected from World Bank Development Indicators (WDI), Human Development Index and the World Governance Indicator during the period from 2010 to 2019

Countries were chosen from MENA region, namely Algeria, Egypt, Iran, Iraq, Israel, Jordan, Oman, Tunisia, and Turkey, It worth mentioning in this context that the choice of these specific (nine) countries is based on availability of data and other countries were excluded for data limitation

The variables of the study are IHDI (is an indicator) for national average of human development achievements adjusted for inequality, FDI net inflows in currency US dollars, World Governance Indicators measured by the rule of law index, GDP Per capita growth rate, Inflation rate, population growth rate, Trade openness index.

3.2. Model

Based on the theoretical model of Aghion and Howitt (2009) and Le et al.,(2021), the authors estimate the impact of FDI on income inequality in MENA countries by using the following empirical model

$$INQ_{it} = \beta_0 + \beta_1 FDI_{i,t} + \beta_j X_{i,t} + \varepsilon_{it} \quad (1)$$

Where, i and t denote country i and year t respectively. The variable INQ Inequality adjusted- human development index for country i in period t; where INQ is used to calculate the " IHDI that combines a country's average achievements in health, education and income discounted with the level of inequality"(UNDP, 2010). The variable FDI is the FDI inflow in current US dollars in country i year t. $X_{i,t}$ In this study is the vector of the controlled variables that includes GDP per capita, inflation rate, trade openness , population growth, and the rule of law.

Theoretically, this model i.e, model (1) and along the coming models (2) and (3), they contain these set of controlled variables and disregarding them can lead to inaccurate estimates and have an impact on measuring the relationship between the (FDI) and income disparity (INQ)

The study also consider the presence of an inverse U-shape relationship between FDI and income inequality that can be illustrated by adding the squared of the FDI variable based on the study of Aghion and Howitt (2009), denoted by FDIsq in model (2) .

$$INQ_{it} = \beta_0 + \beta_1 FDI_{i,t} + \beta_2 FDIsq_{i,t} + \beta_j X_{i,t} + \varepsilon_{it} \quad (2)$$

Also, as it was mentioned before in earlier parts of the paper that studying the impact of the FDI on income inequality relies on the governance level of the institutions in a country specifically the rule of law which is considered as one of the most significant indicators, therefore for investigating whether FDI affects income inequality under the constraint of rule of law and regulation, the interaction term between FDI and rule of law (FDI x rule of law) is added to the model.

$$INQ_{it} = \beta_0 + \beta_1 FDI_{i,t} + \beta_2 FDI_{i,t} x Rule\ of\ law_{i,t} + \beta_j X_{i,t} + \varepsilon_{it} \quad (3)$$

It is important to mention that for this study and for dealing with the endogeneity problem the GMM with robust standard errors is used (Arellano and Bond 1991). The endogeneity problem appeared as : First, countries with higher economic growth are more likely to attract foreign direct investment. Second, certain macroeconomic policies may simultaneously enhance economic growth and attract foreign direct investment inflows. Furthermore, the FDI variable may be linked to those elements in the regression model that are out of control. Therefore, the FDI variable may be endogenous since economic growth affects income inequality. If we are using the pooled OLS or the fixed or the random model, this problem can bias the estimation results. Therefore, for addressing the endogeneity problem a system of GMM model is applied to perform the estimation.

3.3 Empirical Results

Descriptive Statistics and Correlation Analysis

The analysis begins with the preliminary examination of the variables using descriptive statistics and correlation matrix. Descriptive statistics help the reader understand the basic statistical facts of the data. They include the number of units (N), the minimum and maximum value of each variable, the mean value of each variable, and the standard deviation for each variable under the study, while the correlation matrix present a brief relationship amongst all the variables, both the dependent variables (the inequality adjusted- human development index) and the independent macroeconomic variables (foreign direct investment, inflation rate, population growth, Gdp per capita, trade openness and rule of law).

Table 1: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
fdi	90	4.11e+09	5.82e+09	-1.02e+10	2.15e+10
rl	90	29.76322	18.65445	5.16	71.92
ihdi	90	0.6140889	0.0952902	0.48	0.82
tr	90	73.97014	21.08922	39.02	118.6997
pop	90	2.32071	1.644033	0.3	7.35
inf	90	6.636431	7.618795	-.87685	39.9073
Gdp	90	0.7946272	3.595697	-8.5533	11.8687

Note: Obs denotes Observation, Std. Dev. is standard deviation, min and max are minimum and maximum respectively

For Table (1) above it shows that the trade openness has the largest values among all the other variables as it is minimum value is 39.02, its maximum value equals 118.6997 and has an average of 73.97014 with a standard deviation of 21.08922. Then, for the other variables, it is clear that the IHDI has the smallest mean and standard deviation, with 0.6140889 and 0.0952902 respectively. The variance in the FDI is large compared to the other independent variables.

Table 2: Correlation Matrix

Variables	fdi	rl	ihdi	tr	pop	inf	gdp
fdi	1.0000						
rl	0.0267	1.0000					
ihdi	0.4855	0.2649	1.0000				
tr	-0.3332	0.1357	-0.0259	1.0000			
pop	-0.2966	-0.1440	0.2746	0.4225	1.0000		
Inf	0.1225	-0.4270	-0.3119	-0.3182	-0.3897	1.0000	
Gdp	0.3170	0.1683	-0.0990	-0.3225	-0.3078	-0.1264	1.0000

In addition, Table (2) represents the correlation matrix of the variables used in the study. The correlation coefficient between inequality adjusted- human development index, foreign direct investment, inflation rate, population growth, Gdp per capita, trade openness and rule of law revealed relationships that are reasonable enough to allow for robust estimation of the impacts of FDI and other independent variables on IHDI using GMM estimation.

3.4 Estimation Results :

Table 3: The impacts of FDI on IHDI.

Independent Variable	Model 1	Model 2	Model 3
FDI	1.19e-11 (0.000)***	1.51e-11 (0.000)***	6.98e-12 (0.018)**
FDIsq		-2.66e-22 (0.081)*	
GDP	-0.0084878 (0.013) **	-0.0089068 (0.010)***	-0.0080511 (0.026)**
Inflation(inf)	-0.0027376 (0.044)**	-0.0032162 (0.046)**	-0.0026563 (0.065) *
Population growth (pop)	0.0250621 (0.008)***	0 .0260997 (0.005)***	0.0231767 (0.008)***
Trade openness(tr)	-0.008549 (0.085)*	-0.0010908 (0.030)**	-0.0007577 (0.059)*
Rule of law(rl)	0.0016533 (0.028)**	0.0017221 (0.015)**	0.0012137 (0.007)***
FDI x Rule of law			1.34e-13 (0.051)*

Constant	0.5460101	0.562496	0.5587622
	(0.000)***	(0.000)***	(0.000)***
M1 test (p-value)	0.097	0.101	0.064
M2 test (p-value)	0.122	0.041	0.316
Sargan test (p-value)	0.000	0.000	0.000
Hansen test (p-value)	0.997	0.999	0.975
Observations	90	90	90
Instrumental variables	17	18	18

Notes: Dependent variable: inequality adjusted- human development, 2010–2019. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. All the estimations include the standard errors corrected for heteroskedasticity.

M1 and M2 tests are conducted for first- and second-order serial correlation in the residuals, and the Sargan test or Hansen test is for over-identifying instruments in the GMM models, respectively

Table (3) presents the estimation results of the (three) different models**, the first column** in table (3) represents the estimation results of the direct impacts of FDI on IHDI. The results show the that there is statistically significant positive relationship between the FDI and the IHDI at 1 percent significant level, which means that the foreign direct investment will have a positive impact on the IHDI in the MENA region countries.

The second column in table (1) reports the estimation results of the second model which includes the squared of FDI variable to examine the non-linear relationship between FDI and IHDI. The results reveal that the squared of FDI is statistically significant at 10% with a negative sign which is confirm the prediction of Aghion and Howitt (2009), as there is a non-linear relationship between FDI and IHDI during the period of the study in the MENA region. This finding illustrates that any expansion in the FDI lead to an increase in the IHDI but at a decreasing rate. This result is similarly to the study of (Le et al., 2021) on the presence of an inverse U-shaped relationship between IHDI and foreign direct investment.

Column 3 in table 3 represents the estimation results of model 3 which tests the impact of the FDI on income inequality under the influence of institutional quality using the rule of law. Therefore, the main variable that have to be considered, is the interaction term between FDI and rule of law represented by (**FDI x Rule of law)**, which has a significant positive relationship at 10 percent. Estimated results suggest that FDI under the influence of institutional quality represented by the rule of law

will increase the IHDI in the MENA region countries, which is consistent with the result of the impact of rule of law on IHDI.

Moreover, it can be shown that the estimated coefficient of the economic growth has a negative sign and is statistically significant. So, economic growth in Mena region leads to a decrease in IHDI, which can be illustrated that a country's economic growth can reduce IHDI if everyone can't enjoy the results of economic development equally. Also, the variables of inflation rate and trade openness are significant at different significant level with a negative sign, indicating that high inflation rates and the expansion of the trade openness are associated with low IHDI in the MENA region, this result is to comply with (Elena et al, 2017) in which it was found that openness to trade had worsen income distribution in developing countries supporting the hypothesis that technological differentials between trading partners are important in shaping the distributive effects of trade openness.

 In addition, the population growth has a positive statistically significant relationship with the IHDI, thus any increase in the population rate can lead to the exacerbation of IHDI in the MENA region (Miyazawaet al,2005) . Similarly, the rule of law has a positive impact on IHDI, suggests that from 2010 to 2019 the MENA countries, the result came to comply with the result of (Nandha et al, 2013) who found that the quality of governance and human development are mutually reinforcing in the sense that the quality of governance has a significant impact on human development and vice versa. The thing that importantly stresses on the fact that if the countries in the MENA region didn't work properly in the improvements of the enforcement of law and upgrading the institution's ability, otherwise the effect of the FDI inflows on IHDI will be increasing in a decreasing rate.

4. Main findings and conclusion:

The Panel regression model was conducted to investigate mainly, the relationship between the IHDI and the FDI using a set of variables as control variables: GDP per capita, inflation rate, trade openness, population growth, and the rule of law.

The regression results for the MENA region had showed the positive effect of FDI on the Adjusted HDI with a decreasing rate, the thing that is complying with the

literature, the fact that highlights the importance of the rule of law as one of the world governance indicators (WGI), so working on the proper implementation of the rule of law in the MENA is expected to reverse the decreasing trend of the relationship between the FDI on the IHDI . The results of the regression is eventually complying with the literature and the studies that had showed the direct effect of the rule of law: rights protection, controlling corruption, and judicial independence on the FDI. i.e the rule of law is strengthening the effect of FDI on the IHDI.

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