



THE DYNAMICS OF CORRUPTION, FDI, AND OTHER MACROECONOMIC  
VARIABLES: EVIDENCE FROM DEVELOPED AND DEVELOPING  
COUNTRIES

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*Abstract*

*Studies of corruption and its relationship with Foreign Direct Investment (FDI) seek to find an answer of one question: the corruption deters FDI or not. This paper re-examines the relationship between bilateral foreign direct investment flows and the quality of institutions - and in particular corruption - in origin and destination countries. We test the linkages between Corruption, FDI and other key macroeconomics indicators in short and long term run. We employ a vector autoregressive model to test Granger Causality and cointegration test for the 14 Countries over the period 1995-2014. Our aim is to demarcate the short-run and long-run relations between the economic variables.*

*Keywords: Foreign Direct Investment (FDI), corruption, cointegration, short and long term, relation, Granger.*

**I. INTRODUCTION**

Today, corruption is considered an ordinary thing in our economic and financial systems. All countries admit an index and rank that measures the level of corruption. Many subjects



made in this analyzing and explaining the effect of corruption on Foreign Direct Investment (FDI). what is really surprising is that instead of finding solutions to fight against this phenomenon, we find that investors who want implant their projects in host countries seek to find the countries least affected by corruption with the verification of other macroeconomic variables such as political stability and trade openness.

In some empirical work aiming the study of the relationship between corruption and economic growth, corrupt effects of this social evil have bad allocation of public resources, causing a social conflict, political instability and weak economic growth. Celentani and Ganuza (2002) [7], Isse and Ali (2003) [3] and LaFree and Morris (2004) [16] were interested in the interrelationships that may exist corruption and private investment. They confirm that corruption

Other works have highlighted the negative effects of corruption on public investment such as the researches of Ades and Tella, (1999) [4]. Moreover, the structure of public spending is affected to programs facilitating economic waste in several types of projects inadequate because corruption tax evasion and deteriorates the quality of services and goods purchased or controlled. We finds the work of Tanzi and Davoodi(1997) [22] from wish they support the same idea and validate that there is a strong correlation between corruption and inefficiency of public investment in most industrialized and emerging countries. Consequently, the phenomenon, the corruption has an important influence of government spending and waste. Also these researchers adds that corruption have negative effect on the quality of infrastructure and on the productivity of public investment. Others negative effects from corruption on variety of levels: on health care and education services (Gupta, Davoodi, and Tiongson (2000) [11]), and on income inequality (Gupta, Davoodi, and Alonso-Terme (1998[12]); Li, Xu, and Zou (2000) [17]).

Despite the variety of studies, the empirical findings provide conflicting results. Indeed, while corruption appears to affect growth for some countries (Del Monte and Papagni (2001) [9], Akai et al (2005) [2]. Ajie and Wokekoro (2012) [1], Nguyen and Van Dijk (2012) [19], Donga and Torgler (2013) [8], Beekman et al (2014) [5]), it does not have any effects for other countries. So the affect of corruption is aymetric: Some researches show that corruption could even be profitable (Leff (1964) [18], Huntington (1968) [15], and Friedrich (1972) [10] Hines (1995) [14]). But for other countries, it makes a negative influence mostly on FDI

Bardhan (1997) [6] affirmed that it can exist positive effects of corruption on FDI inflows. Indeed, in the presence of a rigid regulation and an inefficient bureaucracy, corruption may increase bureaucratic efficiency by speeding up the process of decision making. However, this view has been rejected empirically. But two recent studies show that the effects of corruption depend on the country's rule of law and economic freedom. Houston (2007) [13], studying the effects of corruption on a country's economic performance, finds that corruption has positive effects on economic growth in countries with a weak rule of law, while it has negative effects in countries with sound institutions. Also, Swaleheen and Stansel (2007) [20] find that corruption enhances economic growth in countries with high economic freedom, while it hinders economic growth in countries with low economic freedom.

The main findings of this paper show to test the relationship in short and long run term between corruption and FDI in two levels of countries: developed and in developing (MENA) The rest of the paper is organized as follows: section 2 provides the methodology; section 3 gives the empirical results and finding while section 4 concludes.



## II. METHODOLOGY: DATA and Specification Model

This article employs panel data for 14 countries (see Table 1) over the period 1995–2014. All countries (developed and developing) for which data are available over this period are included in this study. The data introduced from World Bank and the journal of heritage foundation.

The countries are divided in two levels: 5 developed (Germany, French, USA, Canada and UK) and 9 developing (MENA countries: Tunisia, Morocco, Algeria, Egypt, Turkey, Qatar, Saudi.A, Kuwait and Jordan.

The variables chosen are:

- FDI : Foreign direct investment
- CP : Corruption
- GPD : Gross Domestic Product
- RL : Rules of law (index : [www.heritage.org](http://www.heritage.org))
- FF : Fiscal Freedom
- Unem :Unemployment Rate
- GS : Government Spending
- ND : National Debt
- OP : Trade Openness

This section presents first the methodology for investigation testing the interaction between corruption and FDI, and other macroeconomic variable. We utilize a vector autoregressive (VAR) model in order to identify the possible causal relationship between the variables. The advantage of this approach is the ability to capture the dynamic nexus among the economic variables of interest. A VAR model has been frequently used to analyze the impact between economics variables. We use annuals data of the all variables in our empirical model.

The VAR (p) model with k variables and p lags can be written in equation 1:

$$Y_t = A_0 + A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + v_t \quad (1)$$

Where:

$$Y_t' = [CP, FDI, GPD, RL, FF, Unem, GS, ND, OP]$$

With :

$$A_p = \begin{bmatrix} a_{1p}^1 & a_{1p}^2 & \dots & a_{1p}^k \\ a_{2p}^1 & a_{2p}^2 & & a_{2p}^k \\ & & \cdot & \\ & & & \cdot \\ a_{kp}^1 & a_{kp}^2 & & a_{kp}^k \end{bmatrix};$$



Before deciding on either VAR or VEC model, we need to test if  $y$  are **integrated at level I(0) or in first difference I(1)**. If the vector  $y$  follows I(0), we can build a VAR model using vector  $y$ . But if  $y$  or some components of  $y$  follow I(1), the using of a cointegration test will be more performed on the variables that are of I(1). In this case, the VEC model is estimated as shown below (equation 2):

$$\Delta Y_t = A_0 + BY_{t-1} + \sum_{i=1}^{p-1} A_i \Delta Y_{t-1} + \varepsilon_{1t} \quad (2)$$

If the I(1) variable in  $y$  do not exhibit cointegration relations, we opt for the following VAR model for analysis.

### III. EMPIRICAL RESULTS

#### Analyze of the correlation between the time series

In this section, we will proceed to a description of the relationship between the variables involved. In a first step, we present the correlations between the variable of FDI, corruption and variables representing economic growth and the variables representing economic growth.

We calculated correlation coefficients that have affirmed the reliability and robustness of these coefficients for different countries using historical data. In Table 1 we present the correlations between the Foreign Direct Investment (FDI), Corruption, GPD and other economic aggregates.

TABLE I. CORRELATION BETWEEN VARIABLES

Country/variable	FDI	GPD	RL	FF	Unem	DG	ND	OP
France	-0,144	-0,069	0,516	0,697	0,382	-0,0593	-0,373	-0,553
Tunisia	-0,238	-0,833	0,713	-0,796	0,215	-0,152	-0,785	-0,686
Algeria	-0,806	-0,835	0,65	-0,808	0,934	0,214	0,889	-0,753
Egypt	-0,157	-0,428	0,361	-0,397	-0,2606	0,00178	0,4404	0,0773
Jordan	0,629	0,376	-0,595	0,755	-0,144	-0,513	-0,328	0,137
Morocco	-0,765	-0,778	0,658	-0,623	0,6305	0,658	0,855	-0,884
Kuwait	-0,629	-0,907	0,837	0,255	-0,7404	-0,763	0,853	-0,354
Turkey	-0,144	-0,069	0,653	0,697	0,3825	-0,059	-0,373	-0,553
Qatar	-0,640	-0,126	0,172	-0,6504	-0,0652	-0,728	0,98	-0,123
A.Saudi	0,597	0,745	-0,472	0,432	-0,152	-0,132	-0,666	0,525
Germany	-0,151	-0,084	0,523	-0,506	-0,083	-0,227	-0,334	-0,422
USA	-0,497	-0,758	0,419	-0,447	-0,339	0,197	-0,367	-0,5801
UK	0,183	-0,627	0,507	0,708	-0,287	0,529	-0,773	-0,7407

b. Source: the Author from the data of the model.

Our results support in this table args that corruption would negatively affect attractiveness of financial directly investment. Indeed, this link affects negatively economic increase by introducing insecurity and uncertainty into economic relations. It also reduces economic vitality by increasing unemployment and shifting resources into unproductive activities.

Consequently, the index of corruption is an important component of identifying the attractiveness of country. This is validated by its links of different others economic



aggregates: GPD, Unemployment, trade openness. But this links is tributary of type of country: developed or in developing

#### Analysis of the correlation between the series of cross-sections

In the interest of further investigation on the relationship between different variables FDI, corruption and various indicators of economic growth, we perform another type of correlation test. This is to estimate the correlation between the variables in cross section. We calculated the average of variables between 1995 and 2014. In a first step, we tested les correlations for developed countries and in a second step to developing countries. Finally, we grouped all countries to test this correlation for all countries. The results are presented in Table (2).

TABLE II. CORRELATION BETWEEN VARIABLES AND COUNTRY TYPES

Countries	FDI	GPD	RL	FF	Unem	DG	ND	OP
<b>Developped</b>	-0.067	-0.023	-0.192	-0.473	0.002	0.066	-0.252	-0.282
<b>p-value</b>	-0.301	0.205	-0.980	-2.214	0.008	0.078	-1.375	-1.222
<b>Developping</b>	-0.155	-0.167	0.675	-0.361	0.588	0.426	-0.704	-0.415
<b>p-value</b>	0.612	0.807	3.008	1.816	3.514	2.208	4.556	3.138

b. Source: the Author from the data of the model.

After calculating and estimating related to the causes and consequences of corruption, this table offer varied results: it show that corruption has an asymmetrical impact. Indeed, it is different to analyze the relationship between corruption and other economic aggregates. In fact, corruption in developing countries have more influences, on Foreign Investment (FDI) and consequently on economic increase (GPD), than the developed countries. Also this phenomenon, according to the table, has a more effect coefficient in developing countries than developed ((-0.155 to -0.67), (-0.167 to -0.023), (0.588 to 0.02) ...). This result may be related to the actual conjuncture from which people, in certain countries, is not satisfied to politicians who accused of many actions of corruptions.

Table 2, shows the unit root test on the order of integration (stationarity test) of the variables (dependent and independent) based on the Augmented Dickey Fuller (ADF) classes of unit root tests. The ADF test the null hypothesis for variables of interest that are non stationary and as certain the number of times a variable needs to be differenced to arrive at stationarity. As seen in the unit root test result, foreign direct investment (FDI) and other variables are stationary at first difference.

It is when all the variables have attained the stationary state that we can call for long run relationship. We can determine the existence of long run relationship between the variables. The co-integration test indicates there is one cointegrating. This confirms the existence of long run relationship among the variables.

So it is necessary to analyze and propose the causal effect of corruption in our study by testing co integration between economic aggregates.



TABLE III. JOHENSAN COINTEGRATION TEST

Countries	Trace test	FDI	GPD	RL	FF	Unem	GS	ND	OP
ARABIA,S	Trace	7.992	1.362	25.97	587.8	326.8	5.499	4.804	0.032
	p-value	0.005	0.243	0.0000	0.000	0.29	0.019	0.028	0.857
	cointegration	Yes	no	yes	yes	no	yes	yes	No
TUNISIA	Trace	2.446	1.644	0.526	1.407	1.138	1.59	0.612	0.021
	p-value	0.117	0.2	0.001	0.235	0.286	0.206	0.431	0.885
	cointegration	No	no	yes	no	no	no	no	No
ALGERIA	Trace	5.482	7.44	1.151	0.339	4.71	0.187	8.816	1.884
	p-value	0.019	0.996	0.283	0.56	0.03	0.366	0.003	0.169
	cointegration	Yes	no	no	no	yes	no	yes	No
EGYPT	Trace	4.08	0.049	4.589	3.84	3.841	7.831	1.132	2.956
	p-value	0.043	0.354	0.032	0.277	0.06	0.005	0.287	0.086
	cointegration	Yes	yes	yes	no	no	yes	no	No
QATAR	Trace	0.3	3.487	0.374	2.729	0.189	12.82	4.272	12.59
	p-value	3.841	0.062	0.504	0.099	0.663	0.0003	0.039	0.004
	cointegration	No	no	no	no	no	yes	yes	yes
JORDAN	Trace	1.996	1.294	2.712	0.468	2.782	7.515	1.921	7.136
	p-value	0.157	0.255	0.1	0.493	0.095	0.006	0.166	0.008
	cointegration	No	no	no	no	no	yes	no	yes
KUWEIT	Trace	9.723	0.781	0.334	0.536	0.803	13.53	4.87	2.699
	p-value	0.002	0.376	0.563	0.012	0.369	0.002	0.027	0.1
	cointegration	Yes	no	no	yes	no	yes	yes	no
MOROCCO	Trace	0.992	0.259	0.21	0.148	5.642	0.21	1.756	7.552
	p-value	0.319	0.611	0.646	0.699	0.017	0.646	0.184	0.006
	cointegration	No	no	no	no	yes	no	no	yes
TURKEY	Trace	1.13	1.464	601	1.446	6.311	4.957	0.001	0.131
	p-value	0.287	0.226	0.000	0.229	0.012	0.026	0.973	0.131
	cointegration	No	no	yes	no	yes	yes	no	No
UK	Trace	5.95	3.841	12.7	3.841	4.918	5.906	0.699	6.23
	p-value	0.014	0.364	0.0042	0.027	0.026	0.015	0.403	0.013
	cointegration	Yes	no	yes	yes	yes	yes	no	yes
USA	Trace	8.75	0.16	0.794	0.125	10.63	0.415	1.67	0.053
	p-value	0.003	0.688	0.372	0.722	0.001	0.519	0.195	0.818
	cointegration	Yes	no	no	no	yes	no	no	no
GERMANY	Trace	8.188	0.002	0.462	5.668	0.037	1.818	0.301	1.935
	p-value	0.004	0.961	0.0032	0.017	0.846	0.178	0.583	0.164
	cointegration	Yes	no	yes	yes	no	no	no	no
FRANCE	Trace	4.103	1.464	601	1.446	6.311	4.957	0.001	2.281
	p-value	0.043	0.226	0.000	0.229	0.012	0.026	0.973	0.131
	cointegration	Yes	no	yes	no	yes	yes	no	no
CANADA	Trace	15.06	4.667	2.315	3.25	7.264	5.152	2.317	1.724
	p-value	0.004	0.031	0.001	0.523	0.007	0.023	0.127	1.892
	cointegration	Yes	yes	yes	no	yes	yes	no	no

b. Source: the Author from the data of the model.



The table 3 is a Johansen cointegration test from which show that, it answers the question about existence of a long run relationship between the phenomenon of corruption and FDI with the sensitivities of control variables (unemployment, Rules of rights ...).

The test presents that corruption had a long run relationship with FDI variable, GDP and other in many countries developed or in developing. Therefore, it can be concluded that corruption exerts significant control on growth and investment in the short-run and this implies that corruption has overbearing and predictive power in economies.

Also, corruption can influence other economics levels such as, the government spending in majority of countries. But the other economic aggregates, it has a partial affect such as the trade openness of country... Indeed, for example the phenomenon of corruption has long term sensitivity on unemployment in countries excluding the golf countries (SAUDI.A, Qatar...)

#### IV. CONCLUSION

To answer some questions related to the empirical results reported in the new literature, this work focuses on the evaluation of the role of one of the indicators of institutional quality (corruption) in the determination of economic system namely investment and economic growth. Indeed, the analysis takes as sample the MENA region and developed countries that comprise 14 countries during the period 1995 to 2014. According to the main findings of this paper, we first note, the "institutional indicator (corruption) plays an important role in the attraction of investors. Its disappearance is a catalyst for growth in some countries.

The exam of correlation demonstrates the effects of corruption are asymmetric. Indeed, the influence is greater in developing countries than the developed. It means that the hosted countries of FDI are more risky in its attractiveness.

But, when we studied the long-term relationship, the influence of corruption is not generable for all countries. This constraint is the specificity of savings in terms of compliance with domestic laws such as the right to property (Rules of Law), fiscality,...

The results of our study interestingly imply that reducing corruption may weaken the contribution effect of FDI on economic growth. However, it is important to maintain that, because corruption negatively affects the society in many ways beyond just economic development, our findings should be interpreted with caution; they do not imply that corruption should be encouraged.

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	FDI		Cp		GPD		RL		FF		Uem		GS		ND		OP	
	Level	Diff	Level	Diff	Level	Diff	Level	Diff	Level	Diff	Level	Diff	Level	Diff	Level	Diff	Level	Diff
<b>France</b>	-0,97 (0,287)	-4,44 -0	-1,16 -0,213	-4,17 -3E-04	1,46 -0,958	-3,09 (0,0041)	1,462 -0,93	-3,52 -0,07	-0,81 (0,349)	-4,13 (0,000)	-0,74 (-0,384)	-3,287 (-0,002)	-1,15 (-0,218)	-3,552 (-0,001)	3,195 (-0,998)	-0,74 (-0,396)	1,12 (-0,925)	-4,142 (-0,003)
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	
<b>Tunisia</b>	-0,438 -0,509	-7,996 0	-1,15 -0,217	-4,985 0	3,118 -0,998	-2,284 -0,02	-1,673 (0,979)	0,163 (0,021)	0,850 -0,889	-4,034 -4E-04	-0,547 -0,464	-6,137 0	-0,208 -0,597	-6,460 0	2,339 -0,992	-3,269 -0,003	0,1314 -0,718	-5,206 0
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	
<b>Algeria</b>	-0,204 -0,577	-4,705 -1E-04	-1,123 -0,226	-4,381 0	2,42 -0,994	-3,587 -0,001	-1,525 (0,499)	-4,242 -0,004	1,395 -0,953	-1,024 -0,002	-2,004 -0,046	-3,047 -0,004	-0,818 (0,346)	-4,276 -0,003	-3,494 -0,001	-3,595 -0,017	-1,333 -0,591	-3,933 -0,008
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	
<b>Egypt</b>	-0,86 -0,33	-3,498 -0,001	-0,493 -0,488	-3,589 (0,0016)	-0,018 -0,66	-1,481 (0,125)	-0,494 -0,488	-5,049 0	1,015 -0,911	-4,513 0	0,132 -0,712	-3,886 -0,01	-0,0184 -0,66	-4,925 0	-1,276 -0,177	-2,75 -0,009	-0,628 -0,431	-2,800 -0,007
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	
<b>Jordan</b>	-0,403 -0,523	-3,789 0	0,281 -0,757	-3,609 -0,001	8,14 -1	-8,451 0	-0,679 -0,409	-4,123 0	1,053 -0,91	-4,149 0	-0,560 -0,46	-5,117 0	-0,370 -0,54	-4,584 0	-1,054 -0,252	-2,785 -0,008	-0,433 -0,512	-3,612 -0,001
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	
<b>Morocco</b>	-1,098 (0,692)	-5,594 -0,002	-1,153 -0,217	3,315 (0,99)	-2,641 -0,001	-1,640 -0,093	-1,640 -0,93	-4,123 (0,000)	2,451 -0,994	-2,557 -0,12	-0,759 -0,37	-4,454 0	-1,64 -0,093	-4,123 0	-1,246 -0,628	-2,642 -0,104	-1,196 -0,653	-5,009 0
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	
<b>Kuwait</b>	-1,285 (0,176)	-3,228 (0,002)	-1,492 (0,123)	3,0317 (0,004)	-1,492 (0,123)	-3,031 (0,004)	-1,703 (0,083)	-1,611 (0,09)	2,154 -0,986	0,196 (0,0148)	2,189 (0,984)	-4,023 (0,000)	0,098 (0,701)	4,926 (0,000)	-4,852 (0,000)	-1,788 (0,007)	0,135 (0,712)	-5,22 (0,000)
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	
<b>Turkey</b>	-0,973 (0,283)	-4,44 (0,000)	-1,164 (0,213)	-4,173 (0,000)	1,461 (0,958)	-3,088 (0,004)	-1,164 (0,213)	-4,17 (0,000)	-0,815 (0,349)	-4,134 (0,000)	-0,736 (0,384)	-3,287 (0,0025)	-1,150 (0,218)	-3,552 (0,001)	3,195 (0,998)	-0,735 (0,379)	1,12 (0,925)	-4,142 (0,000)
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	
<b>Qatar</b>	-1,386 (0,148)	-4,153 (0,000)	-0,930 (0,297)	-3,348 (0,002)	3,483 (0,999)	-2,448 (0,017)	1,244 (0,937)	-2,645 (0,01)	0,914 (0,894)	-3,605 (0,001)	-0,589 (0,477)	-3,224 (0,003)	0,746 (0,864)	-4,44 (0,000)	-0,686 (0,406)	-3,181 (0,003)	0,588 (0,833)	-4,879 (0,000)
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	
<b>A. Saudi</b>	-1,305 (0,169)	-2,504 (0,015)	1,308 (0,943)	-4,44 (0,002)	2,614 (0,996)	-3,066 (0,004)	-2,576 (0,0137)	-2,553 (0,0142)	1,308 (0,943)	-4,446 (0,000)	-0,120 (0,628)	-4,495 (0,000)	-0,097 (0,635)	-6,416 (0,000)	-0,120 (0,628)	-4,495 (0,000)	0,499 (0,814)	-3,281 (0,002)
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	
<b>Germany</b>	-2,12 (0,035)	-6,26 (0,000)	-0,879 (0,322)	-4,048 (0,000)	1,172 (0,931)	-3,28 (0,002)	-2,381 (0,043)	-2,012 (0,0195)	1,069 (0,918)	-4,983 (0,000)	-1,195 (0,201)	-3,397 (0,002)	0,190 (0,730)	-4,595 (0,000)	1,293 (0,9443)	-2,799 (0,008)	1,914 (0,982)	-3,587 (0,001)
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	



<b>USA</b>	-0.916 (0.306)	-3.896 (0.000)	-1.489 (0.124)	-4.175 (0.000)	2.051 (0.986)	-0.860 (0.329)	-1.428 (0.138)	-1.945 (0.0517)	1.002 (0.916)	-3.591 (0.0238)	0.251 (0.746)	-2.44 (0.018)	-0.714 (0.393)	-3.180 (0.003)	1.058 (0.916)	-1.573 (0.106)	0.783 (0.873)	-4.88 (0.000)
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	
<b>UK</b>	-1.483 (0.125)	-5.377 (0.000)	-1.411 (0.142)	-5.664 (0.000)	-0.723 (3.89)	-6.294 (0.000)	-0.706 (0.396)	-3.29 (0.000)	1.36 (0.0239)	-2.12 (0.0321)	-0.706 (0.396)	-3.29 (0.002)	-0.525 (0.476)	-3.726 (0.000)	1.099 (0.921)	-1.556 (0.109)	1.099 (0.921)	-1.556 (0.000)
<i>Integration</i>	I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)		I(1)	

TABLE IV. UNIT ROOT TESTING ( DICKEY-FULLER TEST)