Impact of Trade Openness and Economic Freedom on Economic Growth: A Panel Analysis Study (2000-2018)

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Abstract :
This paper investigates the impact of both trade openness and economic freedom on economic growth using data from 4 selected North African countries over the period of 2000 to 2018. The study involves two stages of analysis. The results of panel data analysis reveal that trade openness is positively and significantly correlated with economic growth; whereas it is found that economic freedom has a negative significant impact on economic growth. However both economic freedom and trade openness have a positive impact on economic growth. The investigation into the effect of trade openness on economic freedom resulted in negative significant relationship. Thus economic freedom does matter for economic growth.
***Key Words*:** Economic Freedom Economic Growth, Panel Data, Trade Openness.
JEL Classification: F43, C33.

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Introduction

The relationship between economic growth and trade openness in hand, and the economic freedom in the other hand remains to be one of the pivotal issues in both theoretical and policy-making context. These issues have brought widespread attention among countries, especially developing one. Since the trade is considered as the determinant factor for growth within the growing of international trade integration, the process of transition economies should reflect dynamics of their integration into the global economy. This new structure allows more efficient allocation of resources through economies of scale as well as increasing competition.

Besides economic freedom can subject the main target, it represents the whole context in which economy works. Therefore, economic freedom refers to the different aspects of economy; it measures how a country interacts with the world economy such as financial liberalization, trade openness and investment. More freedom achievement leads to more integrity of economy.

Research Problem

Based on the above, the following problem has been formulated:

Do trade openness and economic freedom have positive significant affect on economic growth in North African countries over the period 2000-2018?

Research Hypotheses

In the light of the problem, the following hypothesis was put forward:

- Trade openness and economic freedom have a positive significant impact on economic growth for all countries ;
- Trade openness and economic freedom have random impact for each country.

Research Objectives

Through this research paper, we seek to achieve a set of goals summarized below:

- To contribute to the general body of economic literature on both trade openness and economic freedom ;
- To investigate into significant relationship between variables for selected countries;
- To suggest some implications and policies focusing on enhancing economic growth via the economic freedom.

Research Structure

The study covers both theoretical and applied sides. The first one develops briefly concepts of trade openness and economic freedom. The second outlines the empirical study by the use of panel data approach for North African countries from 2000 to 2018 to draw results discussion and recommendations.

I. Literature Review

In general, there were several empirical studies which examine the impact of trade openness or the impact of economic freedom on economic growth separately; but few of them which investigate the impact of both to gather.

Trade openness is one of the important variables of sustainable economic growth in the globalized world. Endogenous growth theories provide a theoretical basis for the relationship between trade openness and economic growth. In the context of these theories, trade openness possibly has an impact on economic growth via knowledge spillovers, capital accumulation, and factor price equalization (Hye & Lau, 2015).

Various groups of empirical studies have reached mixed findings on the relationship between trade openness and economic growth. Some studies, such as those by Marelli & Si-gnorelli (2011), Sakyi & al (2012), Mercan & al(2013), Zakaria & Ahmed (2013) and Razmi & Refaei (2013), found that trade openness has a positive impact on economic growth, while some studies, such as those by Menyah & al(2014) and Ulasan (2015), have found that trade openness has no significant impact on economic growth. On the other hand, other studies, such as those by Kim (2011) and Hye & Lau (2015), found that the relationship between trade openness and economic growth could be different depending on the level and duration of development.

There have been a large number of empirical studies on the relationship between economic freedom and economic growth that support the idea of economic freedom affects significantly and positively the economic growth such as Nelson & Singh (1998), Yun-Peng & Tuan-Yuen (2009), Paakkonen (2010),

Peev & Mueller (2012), Piątek & al (2013), Razmi & Refaei (2013) and Akıncı & al (2014) (Razmi & Refaei, 2013) (Menyah, Nazlioglu, & Wold-Rufael, 2014).

Gwartney & Lawson (2004), who performed analysis through formed aggregated index in their study, while they revealed the positive effect of economic freedom on economic growth (Gwartney, Holcombe, & Lawson, 2004), Islam (1996) supported the idea that there is a positive relationship between economic freedom and per capita income in all countries with low, medium or high income levels (Islam, 1996).

Similarly, Sturm & De Haan (2001) found a positive relationship between the level of economic freedom and economic growth (Sturm & De Haan, 2001). Levine & Renelt (1992) has also consistent findings with those belonging to Sturm & De Haan (2001). Levine and Renelt tested the compatibility with the models and thus consolidated the study. The way of the effects of economic freedom on economic growth while querying the index of the effects of the sub-components may be different (Levine & Renelt, 1992).

The following study emphasizes on impact of trade openness and economic freedom on transition countries outlined by Ulasan (2015). He examined the impact both of them on the economic growth of the transition economies in the European Union during the 1996-2012 periods, through the use of panel data analysis. He found there was long-run relationship among the variables and both economic freedom and trade openness had a positive impact on economic growth, while financial openness had a negative impact on economic growth (Ulasan, 2015).

Our study makes differences from the previous studies, it emphasizes only in Arab countries belongs to the same continent as well as it introduces impact of both trade openness and economic freedom in the same model.

II. Model specification and data introduction

In this study, we investigated the impact of trade openness, financial openness and economic freedom on economic growth in 4 North African countries which are: Algeria, Tunisia, Morocco and Egypt. The study covers the period from 2000-2018. To achieve this target a panel data analysis is used to check whether the countries have the fixed effect or random effect.

Following the existing variables, the used model is defined as:

$$Y_{i,t} = \beta_0 + \beta_1 * X_{i,t} + \beta_2 * Z_{i,t} + e_{i,t}$$

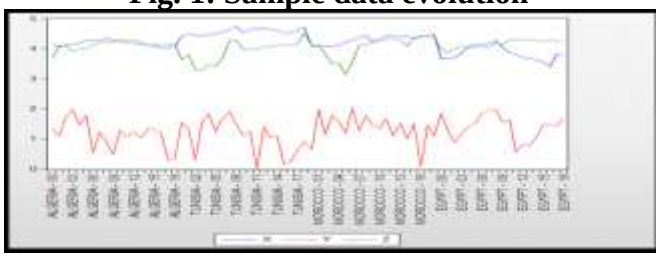
Where the variables used are:

- The real GDP per capita growth (Y) as a proxy for economic growth (dependent variable;
- The sum of export and import as a percentage of the GDP as a proxy for trade openness (X);
- Economic freedom index (Z) as calculated by The Heritage Foundation (2018).

The data of economic growth and trade openness were obtained from the World Bank, and the data of economic freedom from The Heritage Foundation provided by global economy. Our sample and study period were dictated by data availability.

Variables used in the econometric analysis and their evolution are presented in graph 1. It illustrates a negative relationship between the trade openness and economic freedom, but their development almost identical. However, economic growth changes once up and once down all over the period studied for the selected countries.

Fig. 1: Sample data evolution



Source: Outputs, Eviews.10.

III. Results and discussion

1. Characteristics of sample data

The table (1) recaps characteristics of sample dat**a** collected from 2000 to 2018 for the selected countries. These characteristics combine mainly the mean, the median and the standard deviation; and its evaluations differ from variable to another. Whereas the kurtosis coefficient is upper than 1 in all variable that interpret the leptokurtic shape. In the other side the skewness coefficient denotes negatively-skewed means left skewed for all of variables. Similarly variables have not the normal distribution except Z variable, the probabilities are upper than 5%.

Table 1: Characteristics of sample data

	Y	X	Z
Mean	1.235306	4.216716	4.059288
Median	1.294633	4.232483	4.110874
Std. Dev	0.494181	0.304033	0.285747
Skewness	-	-	-
Kurtosis	2.907520	2.722733	4.452892
Jarque Berra	5.528637	3.411479	30.39552
Probability	0.063019	0.181638	0.000000
observations	76	76	76

Source: Outputs, Eviews.10.

2 .Stationary test of variables

The ADF was applied to data series and the results are reported in table (2). It shows that the variables are non-stationary in levels, but they become stationary after taking the first difference for economic growth, economic freedom; and taking the second difference for trade openness. The results are significant at 1% or 5% or 10%.

Table 2: ADF test for variables

Variables	Models	At Level	1st Difference	2nd Difference
Y	**intercept**	8.19756	38.8456	/
	Trend &	9.44308	28.2459	/
	none	7.54772	61.5535	/
X	**intercept**	4.84773	19.8327	42.7424
	Trend &	8.73258	12.3475	29.9655
	none	1.98842	35.3563	68.6436
Z	**intercept**	5.47528	30.2256	/
	Trend &	0.51055	21.0588	/
	none	1.77272	47.6488	/

Source: Outputs, Eviews.10.

3. Estimation of model

Testing empirically the relationship measures the effect of both open trade and economic freedom on economic growth for North African countries via the panel data. Hence, we should estimate the fixed model and the random one. The results are summarized in table (3).

Table 3: Estimation of model

	Pooled Model	Fixed Model	Random Model
C	3.401882 (0.0058)	0.597315 (0.7004)	2.690630 (0.0340)
X	-0.207379 (0.2717)	0.695921 (0.0714)	0.045583 (0.8568)
Z	-0.318318 (0.1144)	-0.565742 (0.0096)	-0.386899 (0.0533)
Ajusted R^2	0.730561	0.94915	0.723563
Durbin- W stat	1.615842	1.887064	1.700932

Source: Outputs, Eviews.10.

To choose the appropriate model, we have to apply Hausman Test (1978) in which the null hypothesis is defined as:

H_0: Random Effect Model is the appropriate model using the GLS estimator;

H_1: Fixed Effect Model is the appropriate model using the OLS estimator.

The result of Hausman Test, reported in table 4, indicates that the fixed effect model is the most suitable. Naturally, the p-value is lowerhan 5%.

Table 4: Hausman test result

Chi- square statistic	p-value
6.166246	0.0130

Source: Outputs, Eviews.10.

4. Estimation of fixed effect model

The findings of estimation are illustrated in the following table using the OLS method:

Table 5: Estimation of fixed effect model

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	0.597315	1.27761	2.055773	0.7004
X	0.695921	0.251635	0.181148	0.0714
Z	-0.565742	0.196971	-1.964245	0.0096
Ajusted R^2	0.94915			
Durbin-W Stat	1.887064			
Prob(F-statitic)	0.013324			
Cross- Effect				
Algeria	-0.037054			
Tunisia	-0.481098			
Morocco	0.052148			
Egypt	0.466004			

Source: Outputs, Eviews.10.

Based upon the estimation results, the significance and sign of the trade openness and economic freedom are expected to be positive and negative for all countries but statistically significant at 10% and 1%.

Solely 1% increase occurs in trade openness index leads to 6.9% rise in economic growth for all countries. Unlike, 1% increase occurs in composite economic freedom index runs down economic growth approximately 5.6% for all countries. This result is absolutely contrary of the existing literature, but there are a small number of studies yielding insignificant such as Ayal & Karras (1998) and Sala-i-Martin (1997) (Yung-Peng & Tuan-Yuen, 2001).

Despite the negative coefficient, there was a positive impact, in over all, on economic growth evaluated of 1.3 %. Thus, it is clear that economic freedom for the countries chosen was considered as handicap to boost economic growth.

In the other side of analysis, the adjusted R^2 value showing the power of all the independent variables to explain the movements in the dependent variable is in the range of 94.91%. The same F-test value expresses the unified explanatory power of variables.

Furthermore, the Durbin-Watson statistic test the null hypothesis that the residuals from an ordinary least-squares regression are not auto correlated against the alternative that the residuals follow an AR1 process.

The sample size is 76, there are two regressors, and there is an intercept term in the model. The Durbin-Watson test statistic value is 1.887064; the bounds are dL = 1.442 and dU = 1.529. In this case, Durbin-Watson test statistic value is upper the of bounds values and near of 2 than we accept the null hypothesis of non-auto correlated errors. To sum up, the model is accepted statistically and economically.

5. Investigation into impact of trade openness on economic freedom

From above, the analysis is postulated that trade openness would improve the general framework of country's economy, but findings prove the opposite. The concentration now is about whether the trade openness has a negative effect on economic freedom.

As done before, the panel data process is applied and the results are reported in table 6.

Table 6: Estimation of model

	Fixed Model	Random Model
C	3.460816 (0.0000)	3.554966 (0.0000)
X	-0.186215 (0.0040)	-0.163021 (0.0108)
Ajusted R^2	0.769411	0.504883
Durbin-W Stat	0.451922	0.354231

Source: Outputs, Eviews.10.

The result of Hausman Test indicates that the fixed effect model is the appropriate model the p-value is lower than 5%.

Table 7: Hausman test result

Chi- square statistic	p-value
16.423492	0.0001

Source: Outputs, Eviews.10.

Then the estimation of model is expressed in the following table using the OLS method:

Table 8: Estimation of fixed effect model

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	3.460816	0.254677	13.58902	0.0000
X	-0.186215	0.062604	-2.974507	0.0040
Ajusted R^2	0.769411			
Durbin-W Stat	0.451922			
Prob (F-statitic)	0.000000			

Source: Outputs, Eviews.10.

The results reveal that there is a negative significant relationship between trade openness and economic freedom. This means that rise of 1% in trade openness index conducts decline of 1.8% in economic freedom index.

The adjusted R^2 value showing the power of all the independent variables to explain the movements in the dependent variable is proxy of 76.94%, and F-test value which expresses the unified explanatory power of the all coefficients are significant at 1%. The Durbin-Watson statistic test is 0.451922; the bounds are dL = 1.448 and dU = 1.501 for sample size of 76 and one regressor. The test statistic is less than the tabulated lower bound, and then we should reject the null hypothesis of non-auto correlated errors in favor of the hypothesis of positive first-order autocorrelation.

To recap that the trade openness has the role to restrict the performance of state instead of developing institutional performance, i.e., this is expressed in actions of government.

Conclusion

The research area of the study is to investigate the impact of the level of economic freedom and trade openness on economic growth for North African countries from 2000 to 2018. For this reason, the basic hypothesis is as follows: "there is a statistically significant positive relation between economic growth and the level of trade openness and economic freedom." As a result of the application of the panel data, it was found that the group of countries has generally a positive significant impact on economic growth but it was subjected by the bad performance of state in matter of economic freedom.

The result seems near of the Arab country reality where still far from centralize the practices of freedom that refers to the extent to which the economic system that controls choice reflects the expressed preferences of majority of the citizenry rather than those of a ruling few. Therefore, trade openness cannot enhancing these practices, but it has in most cases the role of spreading corruption and the misused of money.

In terms of further studies, one may include the components of the economic freedom index to the model as explanatory variables through the separation of the index in order to evaluate the effects of components constituting the freedom index separately such as government size, legal structure, security of property and rights protection.

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Appendices

Data Base used for the analysis of the Algerian case (2000-2018)

Year	Economic growth	Trade openness	Economic freedom%
2000	3,8	62,86	40
2001	3	58,71	60
2002	5,6	61,14	60
2003	7,2	62,12	50
2004	4,3	65,7	55
2005	5,9	71,28	54
2006	1,7	70,73	61
2007	3,4	71,94	66
2008	2,4	76,69	69
2009	1,6	71,32	69
2010	3,6	69,87	71
2011	2,9	67,47	73
2012	3,4	65,4	73
2013	2,8	63,61	68
2014	3,8	62,15	61
2015	3,7	59,7	61
2016	3,2	55,93	61
2017	1,3	55,88	63
2018	1,4	57,98	64

Source: Global Economy

Data Base used for the analysis of the Tunisian case (2000-2018)

Year	Economic growth%	Trade openness%	Economic freedom%
2000	4,71	82,47	38
2001	3,8	89,55	45
2002	1,32	85,34	27
2003	4,7	82,39	27
2004	6,24	86,95	32
2005	3,49	90,25	30
2006	5,24	93,94	39
2007	6,71	104,08	72
2008	4,24	114,95	72
2009	3,04	93,02	53
2010	3,51	104,05	54
2011	1	104,53	54
2012	4	106,53	58
2013	2,88	103,45	58
2014	2,97	100,83	62
2015	1,19	92,23	61
2016	1,26	92,01	62

2017	1,82	101,32	64
2018	2,48	110,96	92

Data Base used for the analysis of the Morrocan case (2000-2018)

Year	Economic growth%	Trade openness%	Economic freedom%
2000	1,91	59,16	61
2001	7,32	59,42	61
2002	3,12	60,53	46
2003	5,96	58,33	33
2004	4,8	61,6	34
2005	3,29	67,91	23
2006	7,57	71,5	35
2007	3,53	78,49	61
2008	5,92	85,67	63
2009	4,24	67,92	68
2010	3,82	75,25	71
2011	5,25	83,43	75
2012	3,01	85,12	76
2013	4,54	80,02	71
2014	2,67	81,77	59
2015	4,54	77,2	78
2016	1,06	80,86	82
2017	4,23	83,97	84
2018	2,99	87,99	79

Data Base used for the analysis of the Egyptian case (2000-2018)

Year	Economic growth%	Trade openness%	Economic freedom%
2000	6,37	39,02	55
2001	3,54	39,81	47
2002	2,39	40,59	55
2003	3,19	46,18	58
2004	4,09	57,82	57
2005	4,47	62,95	58
2006	6,34	61,52	58
2007	7,09	65,08	57
2008	7,16	71,68	66
2009	4,67	56,55	63
2010	5,15	47,94	74
2011	1,76	45,26	74
2012	2,23	40,71	74
2013	2,19	40,37	74
2014	2,92	36,92	71
2015	4,37	34,85	70
2016	4,35	30,25	71
2017	4,18	45,13	70
2018	5,31	43,28	71

Sources: Global Economy.