

***Prerequisites for Financial Integration: Empirical Evidence from North African Countries***

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***Abstract:***

This paper examines the preconditions for the successful financial integration of North African countries from 1995 to 2017. The results of the GMM show that financial development and the opening of the capital account attract capital flows, the opening of the current account attracts only foreign direct investment, portfolio investments are not dependent on the opening of the current account and the exchange rate regime, the real effective exchange rate has a significant negative effect on foreign direct investment, and the real interest rate has a significant negative impact on foreign direct investment and portfolio investment.

**Keywords:** Foreign direct investment, portfolio investment, dynamic panel data, GMM.

**JEL classification code :** F23, F0.

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## **1. Introduction:**

The opening of the capital account, economic and financial development, commercial openness and the good quality of economic and legal institutions are factors explaining the best position of an economy at the international level.

Financial integration contributes to the growth of gross domestic product either directly through the better allocation of external resources and the identification of the best insurance opportunities or indirectly through the commitment of public authorities to insist on the improvement of macroeconomic policies and the implementation of structural reforms.

In the light of the various results of theoretical and empirical research, the preconditions for opening the capital account are the reorganization of the national banks, the preparation of the national exchange market for opening, preparation of a well-regulated macroeconomic framework, good coordination of macroeconomic policies on inflation and exchange rate determination.

This article is organized as follows: the second section presents the literature of international financial integration. The third section deals with econometric specificity. The fourth section interprets the results. The fifth section presents the conclusion and recommendations.

## **2. Literature review:**

### **2.1. Review of theoretical literature:**

Under the various sub-indices, financial development facilitates financial integration processes. Khalouki (2016) showed that financial development improves the effect of financial integration and the total productivity of factors of production in the long run. This relationship is explained by the foreign companies are financed by the foreign financial institutions. This operation facilitates the financing of the most profitable investments.

Sekali (2018) confirms that financial development sub-indices reinforce the effect of financial integration on economic growth. It announced that the removal of credit ceilings facilitates the obtaining of sources of finance from agents with financial needs and the liberalization of the interest rate and encourages agents with financing capacity to place their funds with banks. This operation, therefore, facilitates the investment financing processes. However, in this situation, it is important to keep the risks related to the credit cycles.

Financial development is the main prerequisite for successful financial integration. However, financial development must be optimal. That is to say, internal liberalization (restriction and privatization of the domestic banking system and the creation and reactivation of the money market) leads to external liberalization (removal of barriers on capital flows and total currency convertibility). From the development of the financial system, there are other prerequisites related to the real sphere such as macroeconomic stability.

Guesmi & Nguyen (2014) show that the degree of intra-regional financial integration depends on the degree of commercial openness, currency risk and the development of the local stock market.

Macroeconomic stability allows local businesses to choose the most profitable and efficient investments. In this context, the privatization of enterprises requires greater competitiveness in order to face competition on the one hand and is a stage in the liberalization of the real sector. Optimum liberalization is a prerequisite for the success of financial integration and subsequently the positive allocation of financial integration to economic growth.

Levine & Renelt (1992), Porta & al. (1998), Tirole (2002), Obstfeld (2008), Kose & al. (2009), Furceri & al. (2011), Djogap & Song (2016), Manasseh & al. (2017) and Amirouche & Fares (2018) have shown that the effect of capital on economic growth and well-being depends on the strength and quality of economic and legal institutions.

Bruno & Olivier (2018) consider that the legal origin of countries is an explanatory tool for differences in the development of financial markets and economies. The other theory is the endowment theory of Johansen & Rabinson (2001). The principle of endowment theory is the impact of institutions on economic performance as measured by the mortality rate of settlers. This theory integrates the geographic and health environment's role in the formation of institutions. According to this theory, the impact of institutions on financial development depends on the hostility of the political, economic and social environment.

According to the logic of Kpego & Anatole (2018), political stability minimizes uncertainties about the activities of financial institutions. The result is a decrease in credit losses on the one hand and an improvement in profitability on the other. They note that it is important for countries with political instability to avoid the change of governments, to avoid rape and terrorism... in order to increase the confidence of foreign investors and avoid uncertainties and subsequently the attractiveness of capital flows.

Jlassi (2015) announces that the prerequisites for financial integration for developing countries are the development of the financial sector, the good quality of institutions, the flexibility of national macroeconomic policies and the opening of the current account before the capital account.

Financial development and the development of regulatory institutions (economic and political) are two prerequisites for successful financial integration. Financial development must be optimized to avoid risks and allocate resources effectively. The development of political institutions ensures and respects the rights of private property. The development of economic institutions contributes to the efficiency of credit institutions by strengthening and improving supervisory instruments and supervision of the banking sector.

There are other prerequisites for the success of financial integration such as sequentialization. In this respect, sequentialization refers to the order of the stages of financial liberalization. But as we said earlier financial development is based on the liberalization of services of the financial system. . Therefore, sequentialization refers to the sequencing of the stages of financial system liberalization. Sequentialization is the time series of liberalization of the financial system that plays an intermediate role between the monetary and real spheres. On the basis of the empirical work we distinguish between two main principles that allow choosing the liberalization of the financial sector or the real sphere.

Mouley (2012) shows that the liberalization of the capital account of the countries of the South of the Mediterranean should respond to a sequentialisation based on the stability of the macroeconomic framework, the adoption of sound macroeconomic policies, improving and strengthening the prudential rules of the financial and monetary system, improving the quality of governance and the business climate, the modernization of capital market infrastructure and the consolidation of efforts to control external public debt.

Amaira (2017) believes that achieving balance requires financial liberalization assembled through optimal sequentialization. According to Amaira (2017), sequentialization characterized by consistency that expresses a process of several different but complementary stains and the flexibility that appears in its exposure in case of a causal and not univocal chain.

Sequentialization refers to the order of steps and executive liberalization programs that are based on the liberalization of the capital account and financial transactions (depending on the exchange rate regime, liberalization

of the current account, liberalization of the capital account and control of the exchange rate) and reforms (of the real, financial and monetary sector).

## **2.2. Review of empirical literature:**

As we have highly indicated that successful financial integration requires financial development and macroeconomic stability, Jamal (2018) is conducting a major empirical study of the Moroccan economy for the period 1980-2015. In this study, Jamal uses the time-lagged autoregressive model to identify the short-term and long-term financial development effect. The researcher estimates the real gross domestic product per capita based on the interest rate, the private ownership index, human capital, the national investment rate as macroeconomic variables and bank credit, bank deposits, financial depth and financial transactions as financial development variables. The long-term model estimate justifies the presence of the positive effect of gross fixed capital formation, secondary education and the interest rate. The variable private property right has a negative effect on Moroccan growth. For financial development variables, all financial variables have a negative effect except bank credit and market capitalization. In the short term, all macroeconomic variables have a negative effect on economic growth except for private investment which has a positive but not significant effect.

Sekali (2018) notes that it is important for Morocco to improve the quality of political institutions, to guarantee the private property rights of investors in order to increase the volume of private investment and subsequently economic growth, develop the financial system to improve banking intermediation services primarily through the removal of barriers to trading and the development of appropriate market infrastructure and international standards.

Amirouche & Fares (2018) explain the effect of regulatory institutions on the development of the Algerian financial system from 1972 to 2015. In order to test the stationarity of the model by augmented Dickey–Fuller test and the cointegration by the Granger and Engel test, the authors estimate the Vector Error Correction model and justify that the effect of the institutions is not significant. This result explained by the adoption of reforms of the financial system and by reforms of political institutions. The researchers report that the liberalization of the financial system has a negative effect on the development of the financial system. This result explained by the strong presence of the public monopoly in the Algerian banking system.

In light of the results of Amirouche & Fares (2018), it is noted that it is important for Algeria to guarantee private property rights, improve the rules for building and implementing laws so that political institutions can properly

play their role in financial development and reduce the burden of state intervention in the banking sector.

In the second stage, Amirouche & Fares (2018) seek to identify the contribution of good governance and regulatory institutions to financial development for 11 countries based on a core component analysis. The researchers measured financial development by the independence of the Central Bank, the share of public banks in the granting of loans to the private sector, the administered interest rate and the operation of the banking system. They measured good governance through the quality of regulatory institutions, transparency of the public market and regulatory institutions through the adoption of banking prudential rules, the degree of competition and the stability of the financial system. The results show that financial development, governance and regulatory institutions are positively correlated. The main outcome of the countries' factorial projection is governance and the Tunisian and Algerian regulatory institutions are two factors implying financial underdevelopment. Amirouche & Fares (2018) conclude that it is important for Tunisia and Algeria to improve the framework government and regulation.

Conversely, a good governmental and regulatory framework characterizes France and Switzerland. This result is explained by the independence of the judiciary, good compliance with banking regulations and the high transparency of public procurement. The combination of these factors implies a good quality of regulatory institutions that guarantees the rights of investors, facilitates financing transactions, etc. and subsequently the development of the financial system which is a factor of economic growth. Other countries (Tchad, Togo, Nigeria, Jordanie ,Cambodge, Kuwayt and Maroc) are lagging behind the reference country (France and Suisse).

According to McKinnon (1973), Shaw (1973), Fry (1997), De Sola Perea & Van Nieuwenhuyze (2014), Christophe & al. (2015), Amirouche & Fares (2018), Kpego & Anatole (2018) and Sekali (2018) and on the basis of the results of the experiences of the opening of the capital account of the countries it is concluded that the success of the financial integration on the regional scale so global requires a combination of conditions such as the development of the financial system (supervision of the banking sector, adequate regulation of prudential instruments, ...), the development of regulatory institutions whether economic (Central Bank, financial and monetary markets), legal or political, macroeconomic stability (price

stability, control of public debt and deficit fiscal and fiscal discipline and human capital development.

With regard to sequentialization, Jlassi (2015) seeks to explain the relationship between financial development and economic growth in 55 developing countries over the period 1983 to 2010. Prior to the verification of the presence of the random effect by the Hausman test and the serial autocorrelation by the Wald test (2002), the researcher estimates the model by MCO and justifies that the general increase in prices, the number of people and public expenditure have a negative and significant effect on economic growth. Conversely, credit to the private sector and trade openness has a positive and significant effect.

Jlassi (2015) noted that the Facto index has a negative and significant effect on economic growth. However, the Jure index does not affect gross domestic products. Jlassi (2015) explained the negative effect of the Jure index by the ineffectiveness of the order of the steps of liberalization of the current account and the capital account. In this case, it is found that it is necessary for developing countries to open the current account before the capital account.

Amaira (2017) has shown that from 1987 to 1997 all the liberalization criteria of the Tunisian financial system are verified and the duration of the sequentialization of Tunisian financial liberalization is 11 years. The liberalization index holds the top from 1995 under the six indices. Amaira (2017) considers that financial liberalization concerns privatization and the elimination of credit control, regulation, bank supervision, barriers and tax reforms.

Using a descriptive, non-synthetic approach Amaira (2017) analyzes the processes of the liberalization of the financial system and the duration of the progress of the liberalization process and the real activities of the Tunisian economy. Amaira (2017) shows that in 1997 liberalized reached its maximum under 6 indices. On the basis of this result, it is concluded that it is important for Tunisia to open the capital account, but before it is important to verify macroeconomic stability.

### **3. Econometric specification, data processing and interpretation of results:**

#### **3.1. Variable definition and general model specification:**

- Foreign direct investment: Foreign direct investment defined as the net inflows of investments to acquire a sustainable management interest (10% or more of the voting shares) in a company operating in

an economy other than that of the investor. This series extracted from the World Bank databases (2018).

- Portfolio investment: Portfolio investment covers transactions in equity and debt securities. This series extracted from the World Bank database (2018).
- Opening the current account: Opening a country's current account is a step in the process of financial integration. In this study, we measure the opening of the current account by the ratio of total exports plus imports to gross domestic product. This series extracted from the World Bank database (2018).
- The opening of the capital account: In our study, we will measure the opening of the capital account by the index of Chinn and Ito. This series extracted from [http://web.pdx.edu/~ito/Chinn-Ito\\_website.htm](http://web.pdx.edu/~ito/Chinn-Ito_website.htm).
- Financial Development: We measure financial development through domestic credits to the private sector as a percentage of gross domestic products. Domestic credits to the private sector contain resources provided to the private sector by financial corporations such as banks, leasing companies, lenders, insurance companies, pension funds and foreign exchange corporations. This series extracted from the World Bank Global Indicators (2018).
- Exchange rate: The real effective exchange rate is the nominal effective exchange rate (measure of the value of a currency relative to the weighted average of several foreign currencies) divided by a price deflator or cost index. This series extracted from the World Bank database (2018).
- Real interest rate: The real interest rate measured by the inflation-adjusted borrowing interest rate, as measured by the gross domestic products deflator. This series extracted from the World Bank database (2018).

The complete formulation of our econometric model inspired by the work of Lahlou (2019) which written as follows:

$$CI = \alpha_0 + \alpha_1 FD_{it} + \alpha_2 EXR_{it} + \alpha_3 EXRI_{it} + \alpha_4 OCA_{it} + \alpha_5 KAOPEN_{it} + \varepsilon_{it} \quad (1)$$

With:

$$\varepsilon_{it} = \gamma_i + \mu_t + \theta_{it}$$

And

$\gamma_i$ : The heterogeneity factor of the countries, which takes into account all unobserved factors, constant over time.



$\mu_t$  : The specific effect in the temporal dimension.

$\theta_{it}$  : Refers to the term error that takes into account unobserved factors that vary over time.

t = 1995 ... 2017

And

i = 1,2,3,4

Identification of foreign direct investment determinants requires estimation of the model below:

$$FDI_{it} = \alpha_0 + \alpha_1FD_{it} + \alpha_2EXR_{it} + \alpha_3EXRI_{it} + \alpha_4OCA_{it} + \alpha_5KAOPEN_{it} + \varepsilon_{it} \tag{2}$$

Identification of investment portfolio investment requires estimation of the model below:

$$PI_{it} = \alpha_0 + \alpha_1FD_{it} + \alpha_2EXR_{it} + \alpha_3EXRI_{it} + \alpha_4OCA_{it} + \alpha_5KAOPEN_{it} + \varepsilon_{it} \tag{3}$$

**3.2. Data processing:**

In the subsection, the first step is to analyze the descriptive statistics of the variables, the second step is to treat the stationary of the series and the third step is to estimate the model.

**Descriptive statistics**

The summary of the descriptive statistics of the variables displayed in tables 1 and 2. Table 1 shows the average, minimum and maximum value and standard deviation of foreign direct investment and portfolio investment of North African countries.

*Table 1: Descriptive statistics of foreign direct investment and portfolio investment*

Variable	N	Average	Deviation	Maximum	Minimum
FDI	4	2.215	1.620	9.424	-0.324
PI	4	1.379	0.887	8.424	-1.204

*Source: Calculated by author using Eviews 9*

The net inflow of foreign direct investment as a percentage of gross domestic products from 1995 to 2017 averaged 1,379 with a standard deviation of 0,887. -1.204 and 8.424 are the minimum and maximum values of net foreign direct investment input.

The North African region from 1995 to 2017 recorded an average portfolio investment value of 2,215 of gross domestic products with a standard deviation of 1,620. The minimum and maximum values are -0.324 and 9.424

respectively. The table above displays the descriptive statistics of the other variables in the model.

**Table 2: Descriptive statistics of independent variables**

Variables	N	Average	Deviation	Maximum	Minimum
<b>OCA</b>	4	67.47	65.24	114.35	30.24
<b>KAOPEN</b>	4	1.26	1.20	2.36	0.14
<b>EXR</b>	4	22.87	8.07	110.97	0.94
<b>EXRI</b>	4	13.28	6.06	54.93	-10.31
<b>FD</b>	4	1.72	1.85	2.33	0.48

**Source:** Calculated by author using Eviews 9

From 1995 to 2017 the North African region recorded an average opening value of the capital account of 1.26 with a standard deviation of 1.20. The minimum and maximum values are 0.14 and 2.36 respectively. Compared to the Chinn and Ito Index interval (2017), in 2017 the North African region is well integrated internationally over the period 1995 to 2017.

From 1995 to 2017 the real effective exchange rate recorded an average value of 22.87 with a standard deviation of 8.07. The maximum and minimum values are 110.97 and 0.94. According to these values, the North African region is said to have a floating exchange rate over the study period.

13.28 is the average of the actual interest rate over the study period. The real interest rate recorded a maximum value of 54.93 and a minimum value of -10.31. According to these values said the North African region characterized by a high real interest rate. This can be explained by the strategy of attracting capital flows or the strategy of controlling inflation.

From 1995 to 2017 the North African region recorded an average current account opening rate of 67.47 with a standard deviation of 65.24. The maximum and minimum values are 114,35 and 30,24 respectively. According to the maximum and minimum values the North African region is said to be commercially integrated. This can attract capital flows and facilitate financial integration processes.

From 1995 to 2017, the value of credits granted to the private sector averaged 1.72 with a standard deviation of 1.85. 2.33 and 0.48 are the maximum and minimum values of credits granted to the private sector respectively. According to these values, credits granted to the private sector vary from year to year.

### Stationary Test

Unit root tests of de Levin, Lin, Chu, Im, Pesaran, Shin, ADF - Fisher Chi-square and PP - Fisher Chi-square is the most used dynamic panel data. Im, Pesaran & Shin (2002) sought to develop a test allowing under the

alternative hypothesis not only a heterogeneity of the autoregressive root also heterogeneity as to the presence of a unit root in the panel. In our research, we are interested only in Im, Pesaran & Shin (2002). The table below summarizes the unit root test of the different series.

**Table 3: Unit root test**

<b>Variables</b>	<b>FDI</b>	<b>PI</b>	<b>OCA</b>	<b>KAOPEN</b>	<b>FD</b>	<b>EXR</b>	<b>EXRI</b>
<b>Level</b>							
<b>Im, Pesaran and Shin</b>	0.000 (***)	0.000 (***)	0.326 (n.s)	0.550 (n.s)	0.626 (n.s)	0.701 (n.s)	0.999 (n.s)
<b>1<sup>st</sup> difference</b>							
<b>Im, Pesaran and Shin</b>	0.000 (***)	0.000 (***)	0.000 (***)	0.000 (***)	0.490 (n.s)	0.000 (***)	0.458 (n.s)
<b>2<sup>nd</sup> difference</b>							
<b>Im, Pesaran and Shin</b>	0.000 (***)	0.000 (***)	0.000 (***)	0.000 (***)	0.000 (***)	0.000 (***)	0.000 (***)

\*\*\*, \*\*, \* significance at 1%, 5%, and 10% threshold. Values in brackets are probabilities

**Source: Calculated by author using Eviews 9**

According to the table above the null hypothesis of unit root test at the level for the opening of the current account, the opening of the capital account, financial development, real effective exchange rate and real interest rate is not rejected. At the same level, foreign direct investment and portfolio investment are stationary and statistically significant at the 1% threshold. When we go to 1st difference we notice that all the variables become stationary and significant at the 1% threshold except financial development and the real interest rate. In the second difference, we notice that all the variables become stationary and significant at the 1% threshold.

**Estimation**

Econometric technique generalized method of moments allows econometrics to simplify the endogenous of the variables essentially in case of presence of one or more delays of the variable to explain appear as explanatory variables. It also allows controlling specific effects.

➤ **Hausman test**

The Hausman test is a test that is used to discriminate between fixed effects (within estimation) and random effects (CWM estimation) in a panel data model. At this level two cases occur; the estimate is made by the CWM estimator when the probability of acceptance of the null hypothesis, which predicts that the CWM estimator is better than the within estimator, is greater than 5%. Although, the estimation is done by the within estimator when the probability of acceptance of the null hypothesis, which predicts that the within estimator is better than CWM, is less than 5%. In other words, if the

probability of the Hausman test is less than 5% the null hypothesis is rejected. That is, the model must be specified with fixed individual effects. According to Tables 15 and 16 it is concluded that the probability of Hausman test is less than 5% for both models therefore the null hypothesis is rejected.

**Table 4: Hausman Test**

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	84.380108	5	0.0000

*Source: Calculated by author using Eviews 9*

**Table 5: Hausman Test**

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	51.157602	5	0.0000

*Source: Calculated by author using Eviews 9*

#### 4. Interpretation of the results:

##### 4.1. Foreign direct investment:

The table below shows the coefficient, T-statistic and probability of the different variables of the estimates with the use of the generalized method of moment method.

**Table 6: Impact of independent variables on foreign direct investment**

Variables	Coefficient	T-statistic	Probability
Constant	-68.097	-1.978	0.052 10 %
OCA	2.207	5.517	0.000 1%
KAOPEN	6.160	10.822	0.000 1%
FD	0.850	1.937	0.057 5%
EXR	-0.026	-2.334	0.022 5%
EXRI	-2.858	-9.112	0.000 1%
$R^2 = 0.937$			
$R^2 \text{ adjusted} = 0.911$			
$P(H) = 0.000$			

\*\*\*, \*\*, \* significance at 1%, 5%, and 10% threshold.

*Source: Calculated by author using Eviews 9*

Our results show that the opening of the capital account, the financial development and the opening of the current account have a positive

and statistically significant effect on foreign direct investment. The real effective exchange rate and the real interest rate have a negative and significant effect on foreign direct investment. The explanatory power of the model has a coefficient of determination of 0.937 and explained variance adjusted  $R^2$  of 0.911 of the total variance.

### **Financial development and foreign direct investment**

The sign associated with the financial development variable is equal to 0.850 with a probability of 0.057. That is, financial development has a positive and statistically significant effect on foreign direct investment at the 5% threshold. Thus, a 1% increase in domestic credits granted to the private sector causes an increase in foreign direct investment inflow by 0.850. This finding corroborates the studies of Khalouki (2016) & Sekali (2018).

The positive relationship between financial development and foreign direct investment is explained by the adaptation of financial development strategies in North African countries since the 1990s. That is, the removal of credit limits for the private sector that facilitates the financing processes of foreign companies.

In light of our result it is concluded that it is important for North African countries to further develop the financial system through the development of the money market, the removal of restrictions related to the movement of long-term capital flows (granting of bank credit in foreign currency by residents to non-residents).

### **Current account and foreign direct investment**

In our search the sign associated with the variable opening of the current account is 2.207 at a probability of 5.517. So, based on our results, the opening of the current account of North African countries has a positive and statistically significant effect at the 1% threshold on foreign direct investment. That is to say, a 1% increase in the degree of opening of the current account causes a 2.207 increase in the inflow of foreign direct investment. This finding confirms the findings of a few econometric studies on the subject Karolyi & Stulz (2002) among others.

From an economic point of view, the relationship between the two is explained by the establishment of multinational exporting firms in the North African region. That is, the removal of customs barriers that can facilitate external operations, making foreign companies more competitive on the outside. In addition, the adaptation of international accounting rules that facilitates payment transactions with the outside.

In light of our findings and explanations, we urge North African countries to integrate more into foreign trade through lower tariffs and the removal of

non-tariff trade barriers. In other words, it is important for the countries of North Africa to integrate regionally among themselves (until a customs union is achieved, a coherent union is built) and subsequent integration on a global scale.

### **Real interest rate and foreign direct investment**

The real interest rate of North African countries has a negative effect of -2,858 and statistically significant at the 1% threshold. Thus, the real interest rate of North African countries does not encourage capital flows in the form of foreign direct investment. In the light of our result, it is said a 1% increase in the real interest rate causes a decrease of 2,858 of the foreign direct investment inputs. This result confirms the result of the Arouri (2015). From an economic point of view, the negative effect of the real interest rate on foreign direct investment is explained by the gap in the real interest rate between the North African region and other countries which makes investment costs higher. In light of our result and explanation we insist the leaders of the countries of North Africa to determine the real interest rate according to the requirements of our economies (inflation, investment) in order to restructure the economy and subsequently the determination of the real interest rate according to external requirements.

### **Real effective exchange rate and foreign direct investment**

The real effective exchange rate has a negative effect of -0.026 and statistically significant at the 5% threshold. Thus, the exchange rate regime of North African countries negatively affects foreign direct investment inflows. Economically, the inverse relationship between the exchange rate and foreign direct investment explained by the continued devaluation of the local currency of most North African countries. However, depreciation makes the costs of imports very high, which puts foreign companies at a disadvantage. In addition, exchange rate volatility makes short-term flow yield more uncertain.

In the light of our result and explanation, we see that it is important for North African countries to reassess the national currency in order to control economic stability, to adapt an exchange rate regime according to economic situations. For example, the coincidence of the increase in public debt with the low flow of capital requires the adaptation of a fixed exchange rate regime.

### Capital account and foreign direct investment

The sign associated with the variable KAOPEN is positive and statistically significant at the 1% threshold. That is to say, the opening of the capital account of North African countries has a positive effect of 6,160 on foreign direct investment. Indeed, a 1% increase in the opening of the capital account causes an increase in the inflow of capital in the form of foreign direct investment of 6,160.

As an economic lifeline, the positive relationship between the opening of the capital account and foreign direct investment explained by the lack of long-term capital control of the North African region and the adaptation of a policy of gradual liberalization of the capital account. Tunisia, Morocco and Egypt grant non-residents the right to invest in all sectors. In addition, foreign investors can freely invest in all economic activities (exporters and non-exporters).

According to our result and our explanations it is said to attract the attention of foreign investors in the long term, it is therefore important for the countries of North Africa to remove the restrictions on the transactions of the current account and the capital account and to reduce the requirements of export product restrictions.

### 4.2. Portfolio investment:

The table below shows the coefficient, T-statistic and the probability of the different variables of the estimates with the use of the generalized method of moment.

**Table 5: The impact of independent variables on portfolio investment**

Variables	Coefficient	T-statistic	Probability
Constant	33.413	4.344	0.000 1%
OCA	4.020	0.364	0.716 NS
KAOPEN	0.047	2.414	0.018 5%
FD	0.623	6.480	0.000 1%
EXR	-0.239	-1.301	0.197 NS
EXRI	-0.006	-2.786	0.007 1%
$R^2 = 0.769$ $R^2 \text{ adjusted} = 0.671$ $P(H) = 0.000$			

\*\*\*, \*\*, \* significance at 1%, 5%, and 10% threshold.

*Source: Calculated by author using Eviews 9*

According to the table above, the opening of the capital account and financial development have a positive and significant effect on portfolio investment. The real effective exchange rate and the opening of the current account have

a positive and non-significant effect. The real interest rate has a negative and significant effect on portfolio investment. The explanatory power of the model has a determination coefficient of 0.769 and explained variance adjusted  $R^2$  of 0.671 of the total variance.

### **Financial development and portfolio investment**

Financial development has a positive and statistically significant effect on portfolio investment at the 1% threshold. That is to say, an increase in the ratio of loans granted to the private sectors of 1% causes an increase of the portfolio investment of 0.623. Our result corroborates the study by Quignon (2018). The positive effect of financial development on portfolio investment is explained by the privatization and liberalization of the banking system in most North African countries.

According to our result, it therefore said that it is important for North African countries to develop the financial market in order to encourage national companies, including the stock exchange listing, and the transfer of risks on derivatives markets, provide more liquidity and reduce information asymmetry.

### **Current account and portfolio investments**

The effect of the opening of the current account of North African countries on portfolio investment is not significant. On the basis of our result, the opening of the current account does not affect short-term capital flows. Our result contradicts the Lahlou (2019).

The non-significant effect of opening the current account on portfolio investment explained by the low market capitalization of listed domestic companies in North African countries due to strict stock market regulation.

### **Real interest rate and portfolio investment**

The real interest rate of North African countries has a negative effect of -0.006 and statistically significant at the 1% threshold on portfolio investment. Indeed, a 1% decrease in the interest rate generates an increase in investment of 0.006. Our result contradicts the studies of Arouri (2015) and Anne-Marie (2018).

Our result explained by the volatility of the real interest rate in North African countries. However, volatility does not guarantee the return on capital in the short term. In addition, the small gap between the interest rate of North African countries and developing countries does attract the attention of foreign investors.

Our result says that it is important for North African countries to increase the real interest rate. This transaction can increase the yield of equities and bonds



and subsequently the attractiveness of foreign investors. It recommended that North African region managers control the real interest rate over a long period to guarantee the return of the funds.

### **Real effective exchange rate and portfolio investment**

In our research, the sign associated with the real effective exchange rate variable is negative but statistically insignificant. Therefore, the exchange rate regime in North African countries does not affect portfolio investment. The non-allocation of the real effective exchange rate of portfolio investment can be explained by the volatility of the real effective exchange rate of North African countries, which makes the return on capital uncertain and random.

In light of our result and explanation, we see that it is important for the North African region to control the exchange rate. That is to say, reassessing the exchange rate to control inflation and subsequent economic stability, this is an explanatory factor for the attractiveness of portfolio investments.

### **Capital account and portfolio investment**

The sign associated with the variable KAOPEN is positive and statistically significant at the 5% threshold. That is, the opening of the capital account of North African countries has a positive effect of 0,047 on portfolio investment. Thus, a 1% increase in the KAOPEN index causes a 0.047 increase in portfolio investment. Our result corroborates the Lahlou (2019).

The positive effect of the opening of the capital account on portfolio investment is explained by the weak control of portfolio investment for Morocco, Tunisia and Egypt. That is, the absence of restrictions on the capital account transactions and the requirements of the export product transactions.

According to our result and the explanation, it is found that it is important for the countries of North Africa to develop the stock markets by the total removal of the obstacles related to access to the stock exchange and the agreement of the right to foreign residents to transfer capital in foreign currencies.

## **5. Conclusion:**

We guided our study to identify the determinants of foreign direct investment and portfolio investment for Tunisia, Algeria, Egypt and Morocco from 1995 to 2017. The result of the generalized method of moment econometric technique shows that financial development, the opening of the capital account is the most explanatory factors of foreign direct investment and portfolio investment. Indeed, financial development and the opening of

the capital account have a positive and statistically significant effect on foreign direct investment and portfolio investment.

The opening of the current account positively affects Foreign direct investment. However, portfolio investment does not depend on the opening of the current account and the exchange rate regime of North African countries. The real effective exchange rate has a negative and statistically significant effect on foreign direct investment. The real interest rate in North African countries has a negative and statistically significant effect on capital flows.

In light of our findings and explanations, it is important for the countries of North Africa

- Develop the financial system by removing restrictions on capital flows to attract more attention and sight of foreign investors. That is to say, the improvement of financial services facilitates the financing of foreign companies. It facilitates the financing of export and import operations with the outside world. Therefore, the combination of these factors can attract foreign capital flows.

- Develop the financial markets by liberalizing the interest rate, removing obstacles linked to the transfer of shares and bonds in order to share risks and transfer liquidity. These can attract the sight of foreign investor.

- To integrate more into foreign trade by the reduction of customs tariffs, elimination of non-tariff trade barriers to encourage exports and imports.

- Revalue the real effective exchange rate to reduce the costs of exports and imports in order to attract exporting companies.

- Raise the real interest rate to increase the return on short-term capital flows. This is the return on stocks and bonds. This operation may therefore attract the attention of foreign investors.

- Strengthen the integration and cohesion processes of the North African region.

- Determine the real interest rate according to the needs of the North Africa region to restructure the economy of North African countries. That is to say, the interest rate must be fixed according to the domestic investment. This operation can therefore constitute a source of economic stability, which is a precondition for financial integration.

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