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Foreign Direct Investment, Financial Integration, and Growth: Panel Data Analysis for North African Countries

ZENASNI Soumia[1] and BENHABIB Abderrezak[2]
University of Tlemcen, Algeria

Abstract:

The purpose of this work is to examine empirically the relationship between foreign direct investment (FDI), financial integration and economic growth of North African economies. The study of the relationship between foreign direct investment, financial integration and economic growth has been largely analyzed in the economic literature (*Bornschier and al 1978; Borensztein and al 1992; De Gregorio 1993; Alesina and al 1994; Quinn 1997; Levine and Zervos 1998; Borensztein and al 1998; Edwards 2001; Agénor 2001; Prasad and al. 2003; Güner and Yılmaz 2007; Massoud 2008; Tiwari and Mutascu 2010; Mensi and al. 2010; Rogmans 2011; Adeniyi and al 2012; Chen and Quang 2012)*. The results are mixed. Our empirical investigation uses a dynamic panel system GMM estimator proposed by *Blundell and Bond (1998)* and tested by *Berthelemy and Demurger (2000), Carkovic and Levine (2002), Basu and Guariglia (2007), Tiwari and Mutascu (2010), Agrawal and Khan (2011)*. Results suggest that, under particular economic and financial conditions, FDI plays a positive role in boosting the economic growth of North African countries. Results suggest also that FDI allows these countries to reinforce their economies through the establishment a monetary, commercial, and financial union between them as well as the adoption of a common currency and the creation of a free trade area.

Keywords: FDI, financial integration, economic growth, North African countries, Panel data.

JEL Codes: F21, F36, F43, G01, C3.

[1] ZENASNI Soumia (**Corresponding Author**), PhD student in Economics and Finance, Tlemcen University, Algeria. ***E-mail*** **:** soumia_zenasni1@yahoo.fr

[2] BENHABIB Abderrezak, Professor of Economics and Management, Director of Tlemcen School of Economics, Algeria. ***E-mail*** **:** abenhabib1@yahoo.fr

Introduction

Since the early 1990s, FDI became the largest single source of external finance for developing countries. This important source of private external financing has grown at a phenomenal rate, and the world market for it has become more competitive. Indeed, the rapid growth of FDI and its overall magnitude had aroused many studies relating on the determinants, the transmission channels and the effects of FDI on economic growth in developed and developing countries. The most of these countries have embarked in a process of financial integration characterized by a reduction of impediments to cross-border financial transactions and an increased participation of foreign institutions in the domestic financial systems. Like other developing economies, North African countries have developed in recent times, an economic policy aimed at promoting the development of its economy through FDI. However, the flows of these attracted investments remain relatively low and their impact on growth is ambiguous.

Along with the rapid growth of FDI flows and the application of financial integration process, the study of the relationship between foreign direct investment, financial integration and economic growth has been largely analyzed in the literature (*Bornschier and al 1978; Borensztein and al 1992; De Gregorio 1993; Alesina and al 1994; Quinn 1997; Levine and Zervos 1998; Borensztein and al 1998; Edwards 2001; Agénor 2001; Prasad and al. 2003; Güner and Yılmaz 2007; Massoud 2008; Tiwari and Mutascu 2010; Mensi and al. 2010; Rogmans 2011; Adeniyi and al 2012; Chen and Quang 2012).* Their results are mixed. Some of the theoretical and empirical studies have shown that there is no positive relationship between foreign direct investment and economic growth (*Bornschier and al 1978; Alfaro and al 2002; Carkovic and Levine 2002; Effendi and al 2003; Massoud 2008*), while others have found that FDI positively and significantly affect the long-term economic growth (*Fry 1993; De Mello 1999; Bengoa and al 2003; Basu and al 2007; Türkcan and al 2008; Agrawal and Khan 2011; Adeniyi and al 2012*).

The purpose of this work is to empirically examine the effects of financial integration and foreign direct investment on the economic growth of North African by addressing the following issue: ***what are the potential effects of foreign direct investment and financial integration on economic growth of North African countries?*** Using dynamic panel system GMM estimator proposed by *Blundell and Bond (1998)* over the period 1980-2010, our empirical investigation suggests that, under particular economic and financial conditions such as the adoption of an export promotion trade regime, restoring international competitiveness

and diversification of exports, foreign direct investment positively affects the level of economic growth in the long-run. Results suggest also that financial integration allows financial system to become more sophisticated which can, thereby, improve the economic situation in the North Africa.

This paper is organized as follows. The first section presents a selective survey of the literature on the link between FDI and economic growth. Thereafter, the second section describes the relationship between financial integration and growth. Indeed, section 3 highlights the characteristics of economic growth and FDI in North Africa. Section 4 gives an overview of financial integration project in some North African countries. Section 5 describes the data and the estimation methods. Finally, section 5 presents the empirical results.

1. Literature review on the link between FDI and economic growth

In the economic literature, there is a large body of studies on the impact of foreign direct investment (FDI) on economic growth. This literature explores various aspects of the spillover effects of FDI such as (i) technology transfer (ii) introduction of new processes (iii) productivity gains and (iv) opening of new market opportunities. FDI is usually viewed as a channel through which technology is able to spread from developed to developing countries. According to *Chen (1992)*, the positive developmental role of FDI in general is well documented. He argues that FDI produces a positive effect on growth in host countries.

Moreover, *Blomström and Kokko (1997)* reveal that economic theory provides two approaches to studying the effects of FDI on host countries. One is rooted in the standard theory of international trade and dates back to MacDougall (1960). This is a partial equilibrium comparative-static approach intended to examine how marginal increments in investment from abroad are distributed. The main prediction of this model is that inflows of foreign capital -whether in the form of FDI or portfolio capital- will raise the marginal product of labor and reduce the marginal product of capital in the host country. The other approach departs from the theory of industrial organization, and was pioneered by Hymer (1960)[1]. This approach suggests that to be able to invest in production in foreign markets, a firm must possess some asset (for example, product and process technology or management and marketing skills) that can be used profitably in the foreign affiliate. Firms investing abroad therefore represent a distinctive kind of enterprise. In their study, *Blomström and*

[1] Other important contributions have made by *Buckley and Casson (1976), Caves (1971), Dunning (1973), Kindleberger (1969), and Vernon (1966)*.

Kokko (1997) suggest that foreign direct investment may promote economic development by helping to improve productivity growth and exports.

In a research focusing on China, *Dess (1998)* finds that the FDI affects Chinese growth through the diffusion of ideas. Indeed, FDI presents a significant positive effect on Chinese long-term growth through its influence on technical change. Although some empirical literature suggests a positive correlation between FDI and growth, several others posit that no such linkage exists. In their study elaborated on the benefits of FDI for domestic firms, *Aitken and Harrison (1999)* show that the net effect of FDI on firm level productivity is negligible. *Bosworth and al. (1999)* used panel regression techniques to evaluate the impact of capital inflows on investment on a group of 58 developing countries for the period 1978-95. They found that FDI flows have a positive (and almost one for one) impact on investment, whereas portfolio flows have no discernible effect. Additionally, *Ogutucu (2002)* argues that the foreign direct investment is a major catalyst for the development and the integration of developing countries in the global economy.

Using cointegration technique and the error correction model to examine the link between FDI and economic growth in India, *Chakraborty and Basu (2002)* suggest that FDI does not cause India's GDP. In the same perspective, *Alfaro (2003)* has made a sectorial panel OLS analysis, using cross-country data over the period 1981-1999. *Alfaro* affirms that, although it may seem natural to argue that FDI can convey great advantages to host countries, the benefits of FDI vary greatly across sectors by examining the effect of foreign direct investment on growth in the primary, manufacturing, and services sectors. The main results indicate that FDI in the primary sector tend to have a negative effect on growth, while investment in manufacturing a positive one, and the effect of investment on growth in service sector is ambiguous.

Furthermore, *Kohpaiboon (2003)* has studied the Thailand's case (over the period 1970-1999) to examining the causal link between FDI and economic growth. By introducing an export variable in the growth-FDI equation, he finds that the growth impact of FDI tends to be greater under an export promotion trade regime compared to an import-substitution regime. These results have been affirmed by *Balamurali and Bogahawatte (2004)* in a study elaborated for the case of Sri Lanka. The authors emphasize that a better trade policy reforms (promotion of foreign direct investment and domestic investment) and restoring international competitiveness to expand and diversify the country's exports have the potential of accelerating economic growth in the future. Moreover, according to *Kose and al. (2005)* indicate that there are various direct and indirect theoretical channels through which

increased financial flows can enhance growth. The direct channels include augmentation of domestic savings, reduction in the cost of capital through better global allocation of risk, development of the financial sector, and transfer of technological knowledge. The main indirect channels are associated with promotion of specialization and inducement for better economic policies.

Baharumshah and Thanoon (2006) used a dynamic panel model to examine the link between FDI and growth in East Asian economies. They demonstrated that FDI positively contributes in the process of growth in studied countries. In other words, this study has argued that countries that are successful in attracting FDI can grow faster than those that deter FDI. Based on a number of determinants of the linkage between FDI and economic growth (such as human capital, learning by doing, exports, macroeconomic stability, level of financial development, public investment and other determinants), *Neuhause (2006)* shows that there are three main channels through which FDI can influence the technological change, improve the capital stocks and generate economic growth: (a) direct transmission (trough "*Greenfield Investments*"); (b) indirect transmission (trough "*Ownership Participation*") and (c) second-round transmission (trough "*Technology Spillover*").

In turn, the study of *Alfaro et al. (2006)* found that increased levels of FDI, regardless of the reason of the increase, generate three times more additional growth in financially well-developed countries than in financially poorly-developed countries. Based on the Generalized Least Squares models, the study of *Bhandari et al. (2007)* illustrate that an increase in the stock of domestic capital and inflow of foreign direct investment are main factors that positively affect economic growth in East European countries. Besides, *Won et al. (2008)* focused their analysis on the case of Asian newly industrializing economies. Using the panel vector autoregressive models, results show that the openness of the economy, measured by exports and FDI inflows, is the most common economic factor attributed to the rapid growth of the Asian newly industrializing economies.

In addition, *Anwar and Nguyen (2010)* examine the link between FDI and economic growth in Vietnam over the period 1996-2005. Using a simultaneous equations model, their results suggest that the impact of foreign direct investment on growth in Vietnam will be larger if more resources are invested in education, financial market development and in reducing the technology gap between the foreign and local firms. *Tiwari and Mutascu (2010)* have conducted an empirical analysis to examine the effects of FDI on economic growth for 23 Asian countries over the period 1986-2008. Results show that FDI and exports enhance the economic growth of Asian countries.

Besides, *Agrawal and Khan (2011)* investigated the impact of FDI on economic growth in five Asian countries (China, Japan, India, South Korea, and Indonesia) over the period 1993-2009. This study confirms that FDI promotes economic growth and further provides an estimate that one dollar of FDI adds about 7 dollars to the GDP of each of the five countries. Moreover, *Adeniyi and al (2012)* examines the causal link between FDI and economic growth with financial development in some small open developing economies. Using a trivariate framework which applies Granger causality tests in a vector error correction (VEC) over the period 1970-2005, results suggest that the extent of financial sophistication matters for the benefits of foreign direct investment on economic growth in studied economies.

Finally, we can observe that several studies have examined this relationship in particular in the case of developing countries. The major part of them stress that FDI, adjusted to other determinants, have a significant positive effect on economic growth.

2. Financial integration and economic growth: literature review

An overview of the literature shows that several studies have explored the link between financial liberalization and economic growth. Despite the existence of numerous contributions over this link, results remain conflicting about whether financial openness plays a positive or a negative role in real economic growth. *King and Levine* (*1993*) indicate that several studies show that financial development is important to promote economic growth, even after controlling for a variety of indicators such as physical capital accumulation that have been usually considered as determinants of growth. *Obstfeld (1994)* indicates that financial liberalization can stimulate economic growth by improving the allocation of capital through risk sharing. In practice, empirical analyses use either *proxy variables for government restrictions on capital flows* or *measures of actual international capital flows*.

In contrast, many studies show that capital account liberalization hasn't a significant effect on economic growth. The *Grilli and Milesi-Ferretti (1995)* study has not confirmed the robust long-term effect of international financial liberalization on growth. In their empirical studies, they use a large sample of developing and developed countries and ended up by showing that the financial integration hasn't significant effects on economic growth.

The *Quinn's (1997)* study is one of the first works that deals with the relationship between capital account liberalization and economic growth. *Quinn (1997)* uses his own *proxy* variable to measure capital account restriction degree. Quinn's empirical estimates using a cross-section of 58 countries, over the period 1960 to 1989, give credit to the argument that capital account liberalization has a strongly significant effect on real per capita GDP growth. Similarly, *Klein and Olivei (1999)* find that the effect of open capital accounts on financial

deepness and economic growth in a cross-section of countries over the period 1986-1995 is statistically significant and economically relevant. But, this result is largely driven by the developed countries included in the sample. Furthermore, *Levine (2001)* shows that financial sector liberalization can strengthen domestic financial systems leading to more investment, better efficiency in the allocation of capital and higher growth. *Edwards (2001)* finds also that capital account liberalization leads to growth in higher income countries. In addition, *Edison and al. (2002)* combine six measures of financial integration with different econometric techniques (OLS, DLS, Dynamic Panel methods) to test how the effect of financial development on growth may depend on financial, institutional and policy factors. Their analysis does not produce robust results, which indicates that international financial integration does not significantly affect economic growth.

In reviewing the literature on financial integration and growth, *Eichengreen (2001)* noted that various theoretical models imply inconsistent or weak effects from capital account liberalization. In contrary, several theoretical models have identified a number of channels (direct and indirect) through which financial openness process can promote economic growth in developing countries. As such, this process can stimulate growth directly through risk sharing; Moreover, indirect positive effects of financial openness on economic growth could come through its effect on the development of domestic financial markets. This can be true via two channels (*Brezigar-Masten and al., 2008*): (i) first, increased competition between foreign financial intermediaries can lead to reduced intermediation cost and can stimulate demand for funds which tends to increase the size of domestic financial markets. Moreover, financial liberalization can affect domestic markets through the improvements of institutional framework; in other words, improved regulation and corporate governance can enhance the overall stability and reduce asymmetric information problems; (ii) second, by allowing access to foreign financial markets in the form of direct lending by foreign financial intermediaries.

The economic literature suggests that financial development and capital flows liberalization are determining factors of economic growth because they provide a favorable support for financial integration between countries. In this regard, capital flows play a crucial role, in terms of promoting economic growth and increasing the flows of domestic and foreign investment (*Alessandrini 2010*). In general, financial integration helps domestic financial systems to allocate resources optimally across industrial sectors in a way which improves the overall diversification of the economy and lowers its volatility (*Manganelli and Popov, 2010*).

In sum, financial integration gives an access opportunity to world capital markets, provides for a better allocation of savings and investment, and offers more sophisticated instruments to manage risks better. Also, as financial capital liberalization process has brought new global challenges to financial systems, it then prepares them to strengthen their macroeconomic fundamentals, revise their legal and regulatory frameworks, and improve the international financial architecture, by adopting a more active role within the global community of central banks, regulators and other authorities.

3. Characteristics of economic growth and FDI in North Africa

In recent years, foreign direct investment is considered as a key factor towards progress in North African countries. This type of external funding has shown an increasing trend over time which can reflects, partly, the large-scale privatization programs that were implemented by these economies in recent years (*Reggad 2008*). The sustained efforts at policy reforms in North African countries (including privatizations by host countries, and intensified search for natural-resource), drove FDI inflows to the North African sub-region to $24 billion, although this was slightly lower than in 2007. In North Africa, there was an increase in FDI inflows, which was driven by investments in their oil and gas industries (in Algeria), and the agriculture, manufacturing and tourism (in Morocco and Tunisia), in addition to privatizations of public companies engaged in the oil industry (*UNCTAD Report, 2009*).

Table 1 provides some basic data on three North African countries as well as some statistics that are particularly relevant in the context of our research.

Table 1: Overview of AMU countries in 2008

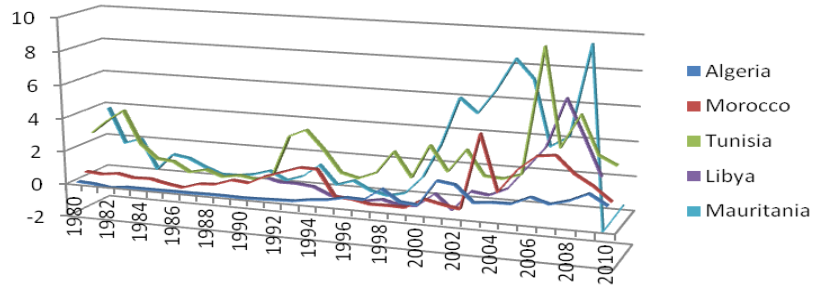
Country	Pop'n M	GDP US $ m	GDP per capita US $	FDI inflow US $ m	FDI stock US $ m	OPEC Y/N	WTO Yr joined
Algeria	34.4	166,545	4,845	2,646	14,458	Yes	No
Morocco	32.1	88,883	2,769	2,388	41,001	No	1995
Tunisia	10.3	40,309	3,903	2,761	29,083	No	1995

Source: Rogmans T. J. (2011), "The determinants of Foreign Direct Investment in the Middle East North Africa Region", PhD thesis, Supervised by Prof. Dr. Ebber H.A., Nyenrode Busines University, November, p 61.

From the table it can be seen that the region's top economy in terms of overall GDP is Algeria, the member of OPEC (Organization of the Petroleum Exporting Countries). In addition, WTO membership is important for countries in the sense that member states commit to a rules based framework for international trade and investment. In terms of Foreign Direct Investment, as per 2008, the three North African countries account between 2 and 3 US million $ of the FDI inflows; table shows also that Morocco is the most important country in the region in terms of FDI stock with 41 US million $. It is true that a substantial increase was recorded in these countries, but it is still insufficient on a global scale (*Reggad 2008*).

The achievements of North African countries in attracting FDI are still low compared to their potentiality and their performance[1] (see figure 2). This lower rate is mainly related to some economic obstacles. Comparing FDI between the five North African countries (Algeria, Morocco, Tunisia, Libya, and Mauritania), we can observe that Algerian economy has the most lower rate in attracting FDI; this situation is caused by the period of significant crisis that faced the country in the 1990s, as well as some other economic and financial barriers.

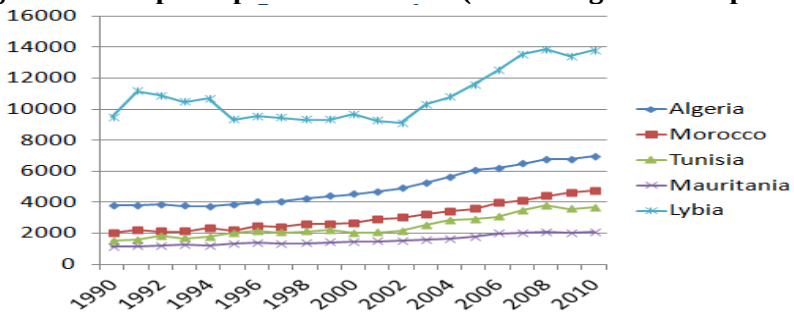
Figure 2: FDI, a comparison among five North African countries (net inflows, % of GDP)



Source : The African Development Indicators, Wolrd Bank, 2012.

Besides, the aggregate of growth performance conceals important differences between the five North African countries as shown in figure 3, reflecting not only differences in initial economic, social, and political conditions but also differences in pace and strength of economic reform (*Zenasni and Benhabib, 2013*). Thus, countries that have implemented deeper and broader structural reforms have reaped the highest growth dividend.

Figure 3: GDP per capita in PPP terms (Intra-Maghreb Comparison)



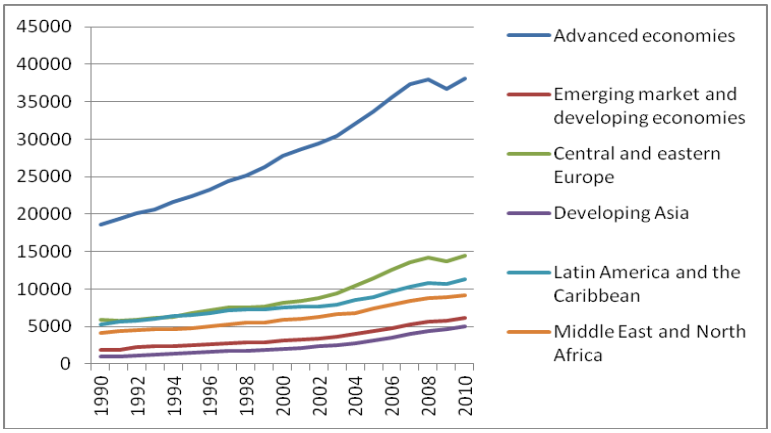
Source: The International Monetary Fund, World Economic Outlook Database, April 2011.

In addition, in terms of international comparison, figure 3 shows that the growth dividend has been relatively modest: growth in GDP per capita in purchasing power parity (PPP) terms in the North African countries has accelerated somewhat during the past decade but it has been weaker than in some other developing and emerging market economies (ex: Latin American economies). So, despite the establishment of the Arab Maghreb Union over two

[1] In the case of Algeria for example, 97.5% of Algerian economic returns are generated by the oil; so there are great potentialities and opportunities (in the entire region) to attract more foreign investments.

decades ago, the bulk of the Maghreb's trade is with Europe. The level of intra-Maghreb trade is lower than that of many of the world's trading blocs. In 2007, intra-Maghreb trade represented less than 2 percent of the subregion's combined gross domestic product (GDP) and less than 3 percent of the subregion's total trade (*Akhtar and Rouis 2010*). Some of the reasons for this low performance include high barriers to trade, lack of production base diversification, and political considerations

Figure 3: GDP per capita in PPP terms (International Comparison)



Source: The International Monetary Fund, World Economic Outlook Database, October 2012.

4. Overview of financial integration project in North Africa

Financial integration is essential for the region's development, both in terms of trade and internal cooperation, and for the North African's relations with its external partners, notably the European Union (*Darrat and Pennathur 2002)*. The Arab Maghreb Union (AMU) was founded on February 1989, when the five member states (Algeria, Libya, Morocco, Mauritania, and Tunisia) signed the constituting treaty. This treaty has the following objectives (*The World Bank Report, 2010*): (i) progressive implementation of free movement of capital, services, goods and persons between member states; (ii) adoption of a common policy in economic, industrial, financial, agricultural, and commercial terms; (iii) establishment of a free trade area with the dismantling of all trade tariff and non tariff barriers among member countries; (iv) creation of a unified custom space with the adoption of a common external tariff with other countries; and (v) strengthening the economic partnership in North Africa. Indeed, to strengthen monetary and financial linkages between the five member states, several multilateral trade and financial agreements have been signed on issues relative mainly to regional trade and tariffs, investment guarantees, tax provisions, interbank relationships, and financial settlements. Also, North African region needs to develop a strong institutional framework and make additional progress on trade liberalization and facilitation to foster integration.

Finally, we can say that the economic reforms that have been undertaken in the five North African countries (cited above) over the past two decades have generally achieved macroeconomic stability and contributed to raising growth in some countries. Despite these developments, financial sectors of these countries still need further modernization and regional and global integration. Some of the necessary reforms would also facilitate financial integration in the region (*Russo and Ugolini 2008*): (i) strengthen the soundness of the banking systems in all the five countries, (ii) increase competition in the banking systems, (iii) deepen the financial markets, (iv) strengthen financial sector oversight, and (v) upgrade financial sector infrastructure.

The remainder of the paper is organized as follows. Section 5 shows the empirical analysis on the effects of FDI and financial integration on economic growth rates of three North African countries. The first part of this section descries the data and the econometric methodology; while the second part presents the model of this study. Section 6 gives the empirical results.

5. Empirical investigation

5.1 Methodology and data

5.1.1 Descriptive data

To examine the effects of foreign direct investment, financial integration and economic growth in the three North African countries (Algeria, Tunisia, and Morocco), we use data from 1990 to 2010. The data utilized for the analysis have been collected from a various international databases: the World Development Indicators (WDI), Lane and Milesi-Ferretti (2007) database, the CNUCED, the UNCTAD stat, the SESRIC BASEIND (Basic Social and Economic Indicators) Database 2012, the Chinn-Ito index (2010)[1], and the World Economic Outlook Database (IMF), 2012. The exact source for each variable is presented in appendix (table A-2).

5.1.2 Estimation methodology

We use the recent developments in time series econometrics to analyze and determine causal relationships between FDI, financial integration and economic growth in three North African countries during the period 1980-2010. We first examine long-run equilibrium (cointegration) relationship among variables. Then, we use the econometrics of panel data; we estimate a dynamic panel system GMM estimator proposed by *Blundell and Bond (1998)*

[1] The Chinn-Ito index (*KAOPEN*) is an index measuring a country's degree of capital account openness. This index is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*.

and tested by *Berthelemy and Demurger (2000), Carkovic and Levine (2002), Basu and Guariglia (2007), Tiwari and Mutascu (2010), Agrawal and Khan (2011)*. This approach will be applied using three different econometric methods with fixed effects, Ordinary Least Squares method (OLS), Two Stages Least Squares method (TSLS), and Generalized Method of Moments (GMM).

5.2 Regression specification

The econometric model of this work is based upon studies undertaken by *Alfaro (2003), Brezigar-Masten and al (2008), Anwar and Nguyen (2010)*. It is as follows:

$$\mathbf{GROWTH_{i,t}} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\ \mathbf{FDI_{i,t}} + \boldsymbol{\beta_2}\ \mathbf{FI_{i,t}} + \boldsymbol{\beta_3}\ \mathbf{DINV_{i,t}} + \boldsymbol{\beta_4}\ \mathbf{CONTROLS_{i,t}} + \boldsymbol{\varepsilon_{i,t}}$$

where $GROWTH_{i,t}$ represents the logarithmic of growth in real GDP per capita for countries. $FDI_{i,t}$ represents foreign direct investment, that measures the inflows of capital accruing to country i in year t. $FI_{i,t}$ denotes financial integration measured by the sum of net foreign assets and external liabilities as a percentage of GDP as indicated in *Lane and Milesi-Ferretti (2007)*. $DINV_{i,t}$ is the nationally owned investments defined as gross fixed domestic investment. $CONTROLS_{i,t}$ is a vector of control variable (country fundamentals and other variables); it contains $TO_{i,t}$ variable which represents the Trade Openness measured by the sum of imports and exports in percentage of GDP; $ExRate_{i,t}$ denotes the exchange rate variable calculated from nominal exchange rates and CPIs; $Kaopen_{i,t}$ measures the extent of openness in capital account transactions; and $FDev_{i,t}$ variable which is a measure of the development of domestic financial systems; it is calculated by the money supply as a share of per capita GDP. $Inf_{i,t}$ variable measures the inflation rate in the three North African countries and represents the annual exchange rate of the Consumer Price Index. $\varepsilon_{i,t}$ is the error term.

6. Estimation Results

6.1 Stationarity and Cointegration tests results

6.1.1 Stationarity test results

Before testing the long-run relationship among variables, it is necessary to check whether studied series are stationary. We employ the ADF test (*Dickey and Fuller, 1981*) and the PP test (*Phillips and Perron, 1988*). The PP test corrects, in a non-parametric way, the possible presence of autocorrelation in the standard ADF test. Then, we use the Johansen Cointegration test to examine the long-run equilibrium relationship among variables.

Table 2 provides the results of the Augmented-Dickey-Fuller (ADF) and Phillips-Perron (PP) tests of the variables. The results of the unit root tests conducted on the exogenous and endogenous variables reveal that, in the 1st differences, the natural logs of real per capita

growth, foreign direct investment, gross domestic investment, trade openness, financial development, inflation, nominal effective exchange rate, and capital account transactions all are stationary. Given these test results, we can conclude that these time series are integrated of order one, or *I*(1).

Table 2: Unit Root Test Results

Variables in 1st Differences	Algeria		Morocco		Tunisia	
	ADF Test	PP Test	ADF Test	PP Test	ADF Test	PP Test
GROWTH	- 3.926***	- 4.132***	- 4.599***	- 6.299***	- 5.035***	- 5.022***
	(0.0055)	(0.0033)	(0.0010)	(0.0001)	(0.0003)	(0.0003)
FDI	- 3.473**	- 7.274***	- 4.612***	- 9.722***	- 6.715***	- 6.644***
	(0.0209)	(0.0001)	(0.0010)	(0.0000)	(0.0001)	(0.0001)
FI	- 1.598	- 3.724***	- 4.713***	- 4.684***	- 2.314	- 2.783*
	(0.4698)	(0.0090)	(0.0007)	(0.0008)	(0.9999)	(0.3809)
DINV	- 4.837***	- 4.826***	- 4.768***	- 4.769***	- 3.371**	- 3.486**
	(0.0005)	(0.0006)	(0.0006)	(0.0006)	(0.0209)	(0.0158)
TOpen	- 3.196**	- 3.606**	- 7.619***	- 8.027***	- 4.536***	- 4.966***
	(0.0317)	(0.0119)	(0.0000)	(0.0000)	(0.0012)	(0.0004)
FDev	- 4.382***	- 4.373***	- 4.875***	- 5.724***	- 4.726***	-10.365***
	(0.0018)	(0.0018)	(0.0005)	(0.0001)	(0.0008)	(0.0000)
Inf	- 5.991***	- 5.981***	- 3.105**	- 6.857***	- 2.672*	- 3.944***
	(0.0001)	(0.0001)	(0.0409)	(0.0001)	(0.0839)	(0.0028)
ExRate	- 4.827***	- 4.817***	- 3.645**	- 6.666***	- 4.812***	- 4.839***
	(0.0006)	(0.0006)	(0.0111)	(0.0001)	(0.0007)	(0.0007)
Kaopen	- 5.385***	- 5.385***	- 5.228***	- 6.354***	- 5.196***	- 5.196***
	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0002)

***: variable stationary at significant levels at 1%, 5%, and 10% (-3.679, -2.967, -2.622 respectively). Values between brackets are probabilities.

6.1.2 Cointegration test results

Table 3 presents the results of the Johansen cointegration test. It shows the existence of a cointegration relationship between the variables in all countries (Algeria, Morocco, and Tunisia).

Table 3: The Johansen Cointegration test results

Hypotheses of cointegration equation	Algeria		Morocco		Tunisia	
	Trace Test	Max. Eigen Test	Trace Test	Max. Eigen Test	Trace Test	Max. Eigen Test
None	93.212*	51.619*	72.998*	33.031	107.718*	49.370*
	(0.0002)	(0.0002)	(0.0273)	(0.0628)	(0.0000)	(0.0375)
At most 1	41.593	25.730	39.966	21.308	58.347*	30.405*
	(0.1704)	(0.0847)	(0.2237)	(0.2580)	(0.0038)	(0.6254)
At most 2	15.863	12.498	18.658	11.803	27.942	21.693*
	(0.7219)	(0.4993)	(0.5177)	(0.5671)	(0.0806)	(0.6534)
At most 3	3.364	2.323	6.854	6.506	6.249	6.126
	(0.9479)	(0.9813)	(0.5947)	(0.5492)	(0.6661)	(0.9465)
At most 4	1.041	1.041	0.348	0.348	0.123	0.123
	(0.3074)	(0.3074)	(0.5551)	(0.5551)	(0.7258)	(0.7258)

** denotes rejection of the hypothesis at the 0.05 level.*
Values between brackets are probabilities.

This table shows that, in Morocco and Tunisia, there is one cointegration equation at the 0.05 level based on the maximum eigenvalue test. In the case of Algeria, there is one cointegration equation at the 0.05 level based on the trace test, as well as the maximum eigenvalue test. Moreover, the stationarity and the cointegration test results will allow us to better specify the dynamic panel GMM estimator.

On the other hand, cointegration tests of the four variables for each country give us the results interpreted in the following equations:

Algeria: GROWTH = 0.054 FDI + 0.014 FI + 0.225 DINV - 0.010 CONTROLS
(0.010) (0.003) (0.204) (0.010)

Morocco: GROWTH = 0.106 FDI + 0.010 FI - 1.387 DINV + 0.133 CONTROLS
(0.029) (0.005) (0.358) (0.033)

Tunisia: GROWTH = 0.759 FDI + 0.157 FI + 4.626 DINV - 0.002 CONTROLS
(0.083) (0.017) (0.866) (0.103)

From the regression results, we find that foreign direct investment (FDI) is an important factor contributing to stimulate the economic growth of North Africa. However, its effect is relatively small; this can be justified by the many obstacles to attracting foreign investment projects. Moreover, the results show that the variable of financial integration affects positively the economic growth in the three countries, which means that the financial integration process allows financial system to become more sophisticated which can, thereby, improve the economic situation in North Africa. Besides, the effect of domestic investment is statistically positive in Algeria and Tunisia; this can confirm that this type of investment is an important determinant which can foster the economic growth of North African countries; however, it affects negatively the Moroccan economic growth rates.

In addition, the control variables (trade openness, financial development, exchange rate, etc.) have a positive impact on Moroccan economic growth; this is due to the implementation in recent years by the economic authorities of reforms in different economic and financial sectors. Nevertheless, the impact is negative for the Algerian and Tunisian growth rates, which means that the macroeconomic policy reforms are not significant. From these results, we confirm that the stimulation of foreign capital flows allows these countries to reinforce their economies through the establishment a monetary, commercial, and financial union between them as well as the adoption of a common currency and the creation of a free trade area.

6.2 Dynamic panel GMM test results

The empirical analysis using the dynamic panel GMM method gives the results reported in Tables 4, 5 and 6.

Table 4: FDI and economic growth, Least Squares method (LS)

Variables	Algeria	Morocco	Tunisia
FDI	1.574 (0.067)	2.827* (0.037)	5.784*** (0.070)
FI	2.042 (0.002)	1.521 (0.004)	0.798 (0.004)
DINV	19.130*** (0.110)	15.374*** (0.119)	10.704*** (0.145)
CONTROLS	1.480 (0.037)	2.790* (0.036)	0.266 (0.079)

Dependant variable: growth rate of real per capita GDP. (***), (**) and (*) indicate statistical significance at the 1%, 5% and 10% level, respectively. *Values between brackets are Standard Error*.

Table 5: FDI and economic growth, Two-Stage Least Squares method (TSLS)

Variables	Algeria	Morocco	Tunisia
FDI	1.345 (0.402)	1.068 (0.323)	2.823* (0.409)
FI	0.101 (0.009)	1.713 (0.279)	1.015 (0.042)
DINV	3.292** (1.048)	- 3.171** (0.246)	3.159** (0.814)
CONTROLS	- 0.145 (0.423)	0.786 (0.348)	- 0.182 (0.718)

Dependant variable: growth rate of real per capita GDP. (***), (**) and (*) indicate statistical significance at the 1%, 5% and 10% level, respectively. *Values between brackets are Standard Error*.

Table 6: FDI and economic growth, Generalized Method of Moments (GMM)

Variables	Algeria	Morocco	Tunisia
FDI	1.339 (0.409)	1.101 (0.022)	2.897* (0.393)
FI	1.102 (0.009)	1.103 (0.158)	1.325 (0.032)
DINV	3.323** (1.034)	- 2.681* (0.192)	2.634* (0.731)
CONTROLS	- 0.145 (0.422)	1.141 (0.023)	- 0.231 (0.565)

Dependant variable: growth rate of real per capita GDP. (***), (**) and (*) indicate statistical significance at the 1%, 5% and 10% level, respectively. *Values between brackets are Standard Error*.

Interestingly, the effect of foreign direct investment (FDI) is positive and statistically significant at the 99% level of confidence in the three countries and in all specifications (LS, TSLS, and GMM), suggesting that FDI is beneficial for economic growth in the three studied countries. Nevertheless, its effect is relatively small; this can be justified by the existence of many obstacles to attracting foreign investment projects. In addition, the effect of domestic investment is positive and statistically significant at the significance level of 99% in the three countries and in all specifications (LS, TSLS, and GMM); this can confirm that this type of investment is an important determinant which can foster the economic growth of North African countries.

Besides, the estimation shows that the effects of financial integration on economic growth is positive in the three studied countries, which means that financial integration can stimulate the evolution of financial systems and improve the economic situation in North Africa. We can check also the observation that the macroeconomic fundamentals as well as other internal and external variables have, in sum, a positive impact in Moroccan and Tunisian economic growth; however, it negatively affects growth in Algeria, that's indicate that Moroccan and Tunisian economy have a better macroeconomic stability. As shown in Table 6, the estimation using GMM method gives more relevant results than the OLS and the TSLS methods; this is due to the specificity of estimators in this method.

In sum, results show that foreign direct investment is an important factor which contributes to increasing economic growth of the studied countries. In other words, estimation tests confirm that under particular economic and financial conditions, such as adopting better trade policy reforms[1], restoring international competitiveness, and diversifying the country's exports, foreign direct investment positively affects the long-run economic growth. Results reveal also that financial integration process can allow the North African economies to develop their financial systems and obtain a long-run financial stability.

Conclusion

After reviewing the theoretical and the empirical literature over the link between foreign direct investment, financial integration and economic growth this study examines empirically this relationship for the case of three North African countries using the dynamic panel system GMM estimator proposed by *Blundell and Bond (1998)* over the period 1980-2010. This study emphasizes that FDI plays a positive role in boosting the economic growth of Maghreb countries. It also emphasizes that these countries has been relatively successful over the last decade in attracting FDI inflows that have not shown a significant performance. Moreover, results suggest that FDI allows North African countries to reinforce their economies through the establishment a monetary, commercial, and financial union between them as well as the adoption of a common currency and the creation of a free trade area.

We can assert that FDI inflow could bring important benefits to North Africa in the form of capital inflows, technology spillovers, human capital formation, international trade and financial integration, job creation, the enhancement of enterprise development. However, government policies are needed to enhance benefits and minimize negative effects on the

[1] Including the promotion of the foreign direct investment as well as the domestic investment.

local community. The role of political stability as a key factor in attracting and maintaining investors cannot be overemphasized, and maximizing a country's potential for attracting FDI inflows need to include policies improving the legal framework, adequate infrastructure, good governance, an effective judicial system and respect for the rule of law among others.

Finally, we can say that, although, the economy of each North African country has achieved, these recent years, significant steps leading them to achieving higher level of economic and financial developments, it remains nevertheless that these countries should firstly elaborate structural economic policies especially on the commercial, banking and financial plans, secondly improve the investment climate, and thirdly, create the conditions for an attractive and sound economic environment for foreign investments. Besides, these some obstacles should be removed in order to facilitate free movements of capital that may lead to the establishment of a common currency and a free trade area. This can allow them to increase the degree of financial integration and to improve economic growth rates in each country.

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Appendix

Table A-1: Overview of studies on the impact of FDI and financial integration on growth

Studies	Countries	Period	Estimation Methods	Main results
Bornschier, Chase-Dunn and Rubinson (1978)	76 less developed countries	1960-1975	OLS	FDI has negative impact on economic growth in developing countries. Also, this impact increases when income level increases.
Fry (1993)	16 developing countries	1975-1991	OLS	In 11 developing countries, FDI negatively affects growth. But in Pacific Basin countries FDI affects positively growth.
Borensztein, Gregorio and Lee (1998)	69 developing Countries	1979-1989	Seemingly Unrelated Regressions Technique	FDI is an important tool for technology transfer. Also, it makes more contributions to economic growth than domestic investment.
Aitken et Harrison (1999)	Venezuela	1975-1989	Panel Data	The net effect of FDI on firm level productivity is negligible.
Berthelemy and Demurger (2000)	24 Chinese Provinces	1985-1996	GMM	FDI plays an important role in the economic growth of Chinese provinces.
Duttaray (2001)	66 developing Countries	1970-1996	Granger Causality Test	FDI positively affects growth in less than 50% of selected countries.
Carkovic and Levine (2002)	72 developed and developing Countries	1960-1995	GMM	The exogenous component of FDI does not exert a robust, independent influence on growth.
Mencinger (2003)	8 EU countries	1994-2001	Granger Causality Test	FDI affects economic growth but economic growth doesn't affect FDI.
Bengoa and Sanchez-Roblesµ (2003)	18 Latin American countries	1970-1999	Hausman Test ; OLS	Foreign direct investment is positively correlated with economic growth in the host countries.
Balamurali and Bogahawatte (2004)	Sri Lanka	1977-2003	VAR model	The promotion of foreign direct investment can accelerate the long-run economic growth.
Hansen and Rand (2006)	31 developing countries	1970-2000	Panel VAR Model	FDI has an impact on GDP via knowledge transfers and adoption of new technology.
Basu and Guariglia (2007)	119 developing Countries	1970-1999	GMM	FDI enhances economic growth in developing countries.
Massoud (2008)	Egypt	1974-2005	Two Stage Least Squares	The main argument of the paper is that FDI is not an aggregate phenomenon. FDI has an ambiguous effect on growth.
Tiwari and Mutascu (2010)	23 developing Asian countries	1986-2008	Dynamic Panel Model ; OLS	Both foreign direct investment and exports enhance growth process in Asian countries.
Agrawal and Khan (2011)	5 Asian economies	1993-2009	Panel data Regression	FDI promotes economic growth and further provides an estimate that one dollar of FDI adds about 7 dollars to the GDP of each of the five countries.
Adeniyi and al (2012)	5 Small Developing African Countries	1970-2005	Vector Error Correction (VEC) model	The extent of financial sophistication matters for the benefits of foreign direct investment on economic growth in small open developing countries.

Table A-2: Summary of evidence on financial integration and economic growth

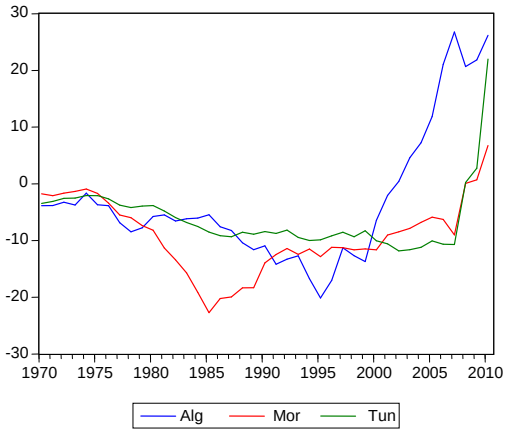
Studies	Countries	Period	Liberalization measures	Methods	Empirical results
Quinn (1997)	65 (20 advanced countries, 45 emerging economies)	1958-1989	IMF; QUINN index	Cross-section regressions	Capital account liberalization has a positive effect on economic growth
Klein and Oliver (1998)	93	1986-1995	IMF; SHARE	Cross-section; OLS; 2SLS	Capital account liberalization affects positively and significantly economic growth.
Bailiu (2000)	40 developing countries	1975-1995	IMF	Dynamic panel data; OLS; GMM	International capital flows promote economic growth.
Edwards (2001)	61 to 65 (emerging economies and advanced countries)	1975-1997	IMF; NUYCO index; QUINN index	Weighted LS; Weighted TSTS	Capital account openness has positive effects on economic growth in advanced economies and negative effects at very low levels of local financial development.
Edison and al. (2002)	57	1980-2000	IMF; QUINN measure	OLS; 2SLS; GMM; dynamic panel; cross-section	International financial integration does not significantly affect economic growth.
Bekaert and al. (2005)	95 and 75 countries	1980-1997	IMF; QUINN measure	OLS; GMM; cross-section;	Equity market liberalizations increase real economic growth.
Brezigar-Masten and al. (2007)	31 European countries	1996-2004	IMF	GMM; cross-country panel	Financial integration affects positively economic growth.
Honig (2008)	122	1970-2005	IMF; QUINN (1997); Chinn and Ito (2007)	OLS; instrumental variables	Capital account liberalization has significant positive effect on economic growth.
Xiu Yang (2010)	83 (44 developed countries and 39 emerging countries)	1960-2008	IMF measure	GMM	Financial integration promotes real economic growth.
Hassana, Sanchezb, Yu (2011)	166 countries	1980-2007	Proxy measures	VAR Cross section	Positive relationship

Table A-2: Definition and sources of variables

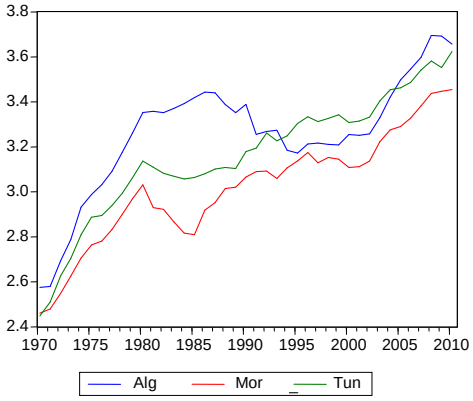
Variable	Definition	Source
GDP growth	This variable represents the growth of the real per capita gross domestic product.	• IFS; • SESRIC Database.
FDI	Direct Foreign Investment flow as % of GDP. This variable measures the inflows of capital in countries. It is the sum of equity capital, reinvestment of earnings, other long-term capital and short-term capital.	• CNUCED • UNCTADstat
FI	FI denotes financial integration measured by the sum of net foreign assets (NFA) and external liabilities (EL) as a percentage of GDP. The NFA data for the Maghreb countries are available at the Lane and Milesi-Ferretti (2007) database; and the EL data are calculated using the sum of portfolio liabilities and FDI liabilities as a share of total liabilities (available on the database mentioned above).	• Updated and extended version of Lane and Milesi-Ferretti (2007) database. • The World Bank Indicators (African Development Indicators), and authors' calculations.
DINV	It is the nationally owned investments defined as "gross fixed capital formation".	African Development Indicators, World Bank.
TOPEN	Trade Openness (Export and import volume of goods and services) as a share of GDP. This variable measure the openness degree of domestic banking and financial system.	• The SESRIC BASEIND (Basic Social and Economic Indicators) Database 2012.
DShocks	*D*shochs is a dummy variable of external shocks taking on a value of one if country i experiences a financial disturbances in period t and zero otherwise.	/
FDev	Financial Development measured by money and quasi money (M2) as share of GDP: comprises the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. This variable measures financial market development.	• International Financial Statistics (IFS). • The SESRIC BASEIND (Basic Social and Economic Indicators) Database 2012.
Inf	This variable measures the inflation rate in the three Maghreb Countries. It represents the annual rate of change of the Consumer Price Index.	• International Monetary Fund, World Economic Outlook Database, April 2012.
ExRate	Exrate denotes the exchange rate variable; it is calculated from nominal exchange rates and CPIs.	• IFS, Global Insight, Oxford Economic Forcasting and ERS Baseline Regional Aggregations.
Kaopen	This variable measures the extent of openness in capital account transactions.	• The Chinn-Ito index (2010 Update Version).

Figure A-2: Correlations between studied variables

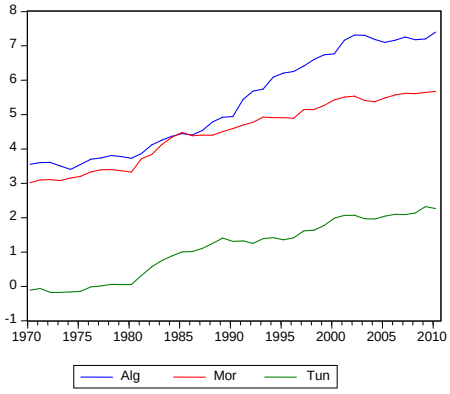
Financial Integration



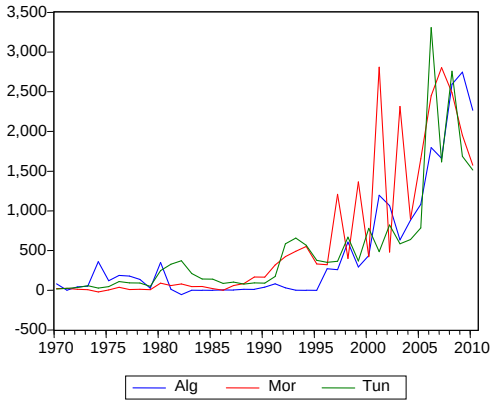
GDP growth



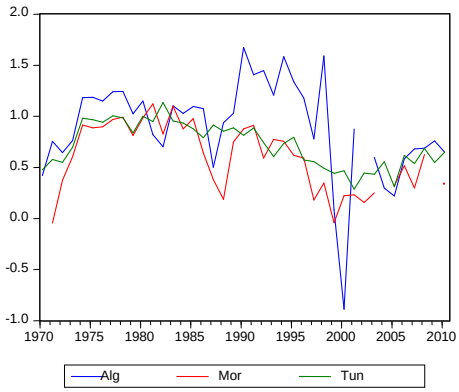
Financial Development



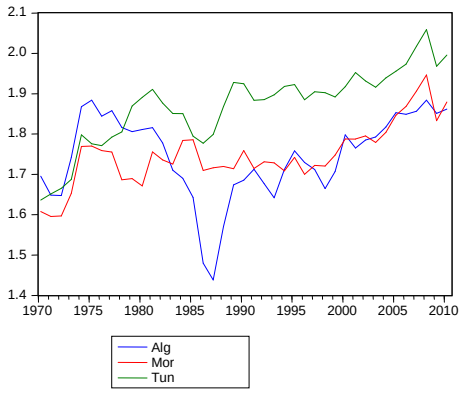
Foreign Direct Investment



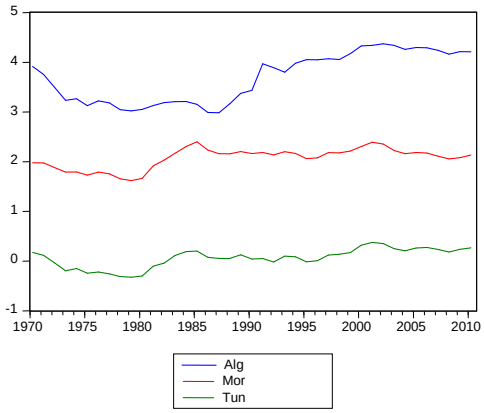
Inflation



Trade Openness



Exchange Rate



Capital Account Openness