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The Determinants of Foreign Direct Investment and Their Impact on Growth: Panel Data Analysis for AMU Countries

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ABSTRACT: The purpose of this paper is to study the determinants of foreign direct investment (FDI) and empirically examine their effects on the growth of the Arab Maghreb Union (AMU) countries. This relationship has largely been analyzed in the economic literature. The results are mixed, some of the theoretical and empirical studies have shown that there is no positive relationship between FDI and economic growth, while others have found that FDI affect positively and significantly the long-run economic growth. Indeed, AMU countries have developed in recent years, an economic policy aimed at promoting the development of their economy. In these economies, FDI is considered as a key factor towards progress in economic sectors. This type of external funding has shown an increasing trend over time; however, the achievements of AMU countries in attracting FDI are still low compared to their potential and their performance to attract more foreign investments. In this paper, we use a dynamic panel system GMM estimator to study the determinants and the growth effects of FDI in three Maghreb countries (Algeria, Morocco, and Tunisia) during 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 affects positively the growth rate in the long run and improves the economic situation in AMU countries.

KEYWORDS: Foreign direct investment, economic growth, Determinants and effects, AMU countries, Panel data analysis.

1 INTRODUCTION

Since the late 1990s, the literature on economic development has been renewed by focusing on the quality of foreign investment as a key explanation of cross-country differences in both growth rates and income per capita. In fact, there has been a growing interest in the determinants of foreign direct investment (FDI) in developing countries, as FDI is considered one of the most stable components of capital flows to developing countries and can also be a vehicle for technological progress through the use and dissemination of improved production techniques. Like other developing economies, Maghreb 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, abundant theoretical and empirical literature has been developed in recent years to determine the theoretical advantages of these flows on the economy of each country (*Bornschier and al 1978; Borensztein and al 1992; De Gregorio 1993; Borensztein and al 1998; Choe 2003; Güner and Yılmaz 2007; Massoud 2008; Tiwari and Mutascu 2010; Rogmans 2011*). The results are mixed; some of them have shown that there is no positive relationship between FDI 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

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economic growth (*Fry 1993; De Mello 1999; Bengoa and al 2003; Türkcan and al 2008; Agrawal and Khan 2011; Adeniyi and al 2012*).

The objective of this article is to estimate the main determinants of FDI in developing countries and examine their effects on the economic growth of AMU economies by addressing the following issue: ***what are the determinants and the potential effects of foreign direct investment on economic growth of AMU countries?*** Using the econometrics of panel data, we estimate a dynamic panel system GMM estimator proposed by *Blundell and Bond (1998)* during the period 1980-2010. The estimation results show 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 growth in the long-run and improves the economic situation in the studied countries.

This paper is structured as follows. In Section 1, we provide a review of the theoretical literature dealing with the determinants of direct foreign investment. The relationship between FDI and economic growth will be analyzed in section 2. Then the characteristics of FDI in the three studied countries will be highlighted in the third section that will be followed by the description of the data, the estimation methods and the specification of the regression model in section 4. Finally, section 5 presents the estimation results.

2 THEORETICAL AND EMPIRICAL LITERATURE REVIEW ON THE DETERMINANTS OF FDI IN HOST COUNTRIES

2.1 LITERATURE REVIEW

Foreign Direct Investment (FDI) is perceived as an important source of investment particularly in developing countries. Research has shown that the amount of FDI depends on a number of determining factors. One of the most important determinants of foreign direct investment is the population from which we can determine the market size as well as the growth prospect of the host economy. It is normally assumed that if the country has a big market, it can grow quickly from an economic point of view and it is concluded that the investors would be able to make the most of their investments in that country.

To explain the differences between the inflows of FDI in developing countries, many authors (*Bisat 1996; Alessandrini and Resmini 1999; Bennett 2003; El-Naggar 1990; Batra and al. 2000; Onyeiwu 2003; Véganzonès-Varoudakis 2004; Habash 2006*) have asserted that the failure of North African economies may be attributed to a combination of factors that include lack of democracy, lack of transparency, and lack of good governance as well as macroeconomic instability. *Tsai (1994)* analyzed the decades of 1970 and 1980 and addressed the endogeneity problem between FDI and growth by using a simultaneous equation model. The estimation results suggest that domestic market size and trade balance are two key determinants of FDI, though economic growth and labour costs are also important. On the other hand, results indicate that the impact of FDI on economic growth is quite limited [1]. In the same perspective, *Loree and Guisinger (1995)* studied the determinants of foreign direct investment in the U.S. using 1977 and 1982 Benchmark data. They concluded that variables related to host country policy are significant in developed countries only when infrastructure is an important determinant in all regions [2]. A number of studies suggest that investments in developing countries are also positively affected by the degree of openness of the host economy. This implies that foreign investors prefer countries with relatively liberal trade regimes, possibly within region with free trade agreements [3]. In addition, existing business linkages and knowledge of local markets may help foreign firms, especially small and medium-sized ones, to take advantages of the opportunities presented by a rapidly evolving market structure.

Asked on the factors that influence the location and the choice of the host country, most transnational enterprises are interested firstly by the "*economic and political stability"* followed by the "*dimension of the market*". The political and economic stability has a dimension that should inspire the legal and institutional framework: it must be stable, transparent and reliable. These conditions are important and their absence induces the enterprises to suspend their investment decisions or limits their financial commitments. Therefore, the availability of "*skilled labour"*, rather than low labour costs, is the third variable that affects investors' attractiveness and it should be connected to the type of investment as well as the introduction of more complex technologies and the tendency to externalize an increasing number of production phases. "*Structural conditions" within* Mediterranean countries reinforce the risk of marginalization of the area, if the adoption of corrective measures aimed at modernizing the domestic production and labour market continues to be postponed. Such a risk is real also in those countries that succeed in attracting foreign investors in the sixties and the seventies. It seems that the current competitive model driven the globalization contrasts with the old logic of tariff protectionism. Of growing importance is also the need for "*communications and infrastructure"* that allow the transfer of information and goods [4].

Alessandrini and Resmini (1999) analyze the determinants of FDI in the Mediterranean region and compare the recent experience of the Mediterranean (MED) countries with that of the Central and Eastern European countries (CEECs). The

authors use a panel data study in eight Central European countries[1] and 11 Mediterranean countries[2] for the years 1990-1997. Results suggest that the natural resource endowment still represents an important factor of attraction of FDI, relative to CEECs. Moreover, foreign investors have been attracted in the MED region by market considerations, concerning not only the single national markets, but also the regional one. This effect is stronger than in the CEECs, suggesting that a deeper regional integration may sound attractive to foreign enterprises. *Benacek and al. (2000)* have studied the determinants and effects of FDI in CEECs. They suggest that market seeking has been the primary motive of investors, and that the presence of foreign firms has increased productivity levels in Central Europe, but only to a limited degree [5].

Based on a dynamic panel estimation of 26 transition economies over the period 1991-1999, *Garibaldi and al. (2001)* analyzed a large set of variables divided into macroeconomic factors, structural reforms, institutional and legal frameworks, initial conditions, and risk analyses. Results indicated that macroeconomic variables, such as market size, fiscal deficit, inflation and exchange regime, risk analysis, economic reforms, trade openness, availability of natural resources, barriers to investment and bureaucracy all had the expected signs and were significant [6]. Among the several studies that examined FDI flows in developing countries, *Nunnenkamp and Spatz (2002)* studied a sample of 28 developing countries during the period 1987-2000. They find significant correlations between FDI flows and per capita GNP, risk factors, years of schooling, foreign trade restrictions, complementary production factors, administrative bottlenecks, and cost factors[3]. Population, GNP growth, firm entry restrictions, and technology regulation all proved to be non-significant. However, when regressions were performed separately for the non-traditional factors, in which traditional factors were controls (population and per capita GNP), only factor costs produced significant results and, even so, only for the 1997-2000 period [7].

The neo-classical theory of the determinants of FDI suggests that host countries' labour supply influences foreign investors' location decisions through the labour cost and the quality of the skills of the labour force. Locations with low labour costs and/or highly skilled labour force are expected to be more attractive for foreign investors, particularly for firms producing labour intensive goods. Studying the case of Middle East and North Africa (MENA) countries, *Onyeiwu (2003)* indicates that the MENA region is different from other developing countries with regard to FDI flows (i.e., some of determinants factors[4] of FDI flows in developing countries are not relevant for FDI flows to MENA countries). This author concludes that there are two significant factors explaining why FDI flows to MENA countries are less than other developing countries: corruption and limited trade openness [8]. This goes along the analysis presented by *Batra and al. (2003)* argue that MENA countries are faced with two major obstacles impeding FDI flows: political instability and corruption [9].

Campos and Kinoshita (2003) use panel data to analyze 25 transition economies between 1990 and 1998. They reached the conclusion that for the studied countries, FDI is influenced by economy clusters, market size, the low cost of labor, and abundant natural resources. Besides all these factors, the following variables presented significant results: sound institutions, trade openness, and lower restrictions to FDI inflows [10]. *Bennett (2003)* affirms that many of the MENA countries are grappling with the failed legacies of central planning, including unviable state companies, bloated bureaucracies, a narrow tax base, and expensive subsidies. He suggests that public sector reform is one of the keys to reinvigorating these stagnating economies that have been missing out on the benefits of globalization and world economic integration [11]. Along the same lines of studies undertaken by Bisat and al. (2000) and Onyeiwu (2003), *Chan and Gemayel (2004)* find that instability associated with investment risk is critical in explaining the level of foreign direct investment for the MENA countries, which generally have higher investment risk than developed countries [12]. According to *Ben-Taher and Giorgioni (2009)*, during the last two decades, the amount of FDI inwards to North African countries (including Algeria, Morocco, and Tunisia) was small both in absolute and relative terms in comparison with other developing countries [13].

In sum, the main variables normally used are the size of the market, the rate of GDP growth, economic stability, the degree of openness of the economy, as well as several other institutional variables. However, the relation between FDI and economic growth deserves special attention. If, on one hand, economic growth is a powerful stimulant to the inflow of FDI, on the other, an increase in foreign investment (an increase in the existing capital stock) would also be one of the factors responsible for economic growth, meaning the existence of an endogeneity problem. Thereafter, the main determinants of FDI in developing countries will be presented.

[1] The Visegrad group countries, Bulgaria, Estonia, Romania, and Slovenia.
[2] Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Malta, Morocco, Syria, Tunisia, and Turkey.
[3] Costs related to taxation, employment conditions, labor market regulation, and the power of labor unions.
[4] These factors include the rate of return on investment, infrastructures, and macroeconomic fundamentals such as GDP growth and inflation.

2.2 DETERMINANTS OF FDI IN DEVELOPING COUNTRIES

Based on the existing literature, it can be argued that FDI depend on a number of factors. Some of the main determinants are the followings (*Anwar and Nguyen, 2010*):

2.2.1 MARKET SIZE

The market size which is one of the most important determinants of FDI is usually measured by GDP per capita. Several empirical studies have shown that an increase in GDP per capita is associated with increased FDI inflows into host countries. Rising income levels are a signal of an increase in the market size and purchasing power. *Kravis and Lipsey (1980)* found a positive relationship between the market size in host nations and the location decision of US multinationals [14]. *Chakrabarti (2001)* found also a strong positive relationship between the market size of a host country and FDI.

2.2.2 THE QUALITY AND THE DEVELOPMENT OF BASIC INFRASTRUCTURE

Availability of international standard infrastructure (such as road transport, railway transport…) is a major determinant of FDI in host countries. In other words, a good infrastructure developed and evolved is essential to maintaining country's economic growth, because in such conditions the operating cost is low, which can increase the return on investment and therefore promotes FDI.

2.2.3 THE LEVEL OF TRADE OPENNESS

Attracting FDI is also dependent on the degree of integration into the global economy. The openness of an economy is measured by the ratio of imports and exports to GDP, it accounts for the fact that more open economies tend to be more vulnerable to losing access to foreign financing [15]. Indeed, a decrease in the level of restrictions imposed on trade exchanges tends to increase horizontal FDI in host countries. However, vertical FDI that is viewed as a non-market seeking investment may prefer to locate in more open economies (that is, where trade barriers are few). *Balasubramanyam and Salisu (1991)*, *Jackson and Markowski (1995)* have used export volume as a measure of the openness of an economy. They have found a positive relationship between exports and FDI inflow. *Grossman and Helpman (1991)* and *Barro and Sala-i-Martin (2004)* have argued that a more open trade regime leads to a greater ability to absorb technological progress and export goods that stimulates economic growth.

2.2.4 HUMAN CAPITAL

Human capital is long regarded as a determinant of economic growth. Human capital also affects growth through its interaction with FDI.

2.2.5 MACROECONOMIC STABILITY

While early studies, such as the Friedman's (1977) study, have highlighted the role of the inflation rate (measured by the index of consumer prices, CPI), which is an important indicator of a country's macroeconomic stability, recent studies have used the real exchange rate as an indicator of macroeconomic stability. The real exchange rate volatility is regarded as an indicator for poor macroeconomic policies that lead to real exchange rate misalignment thereby hindering economic growth.

Economic stability is often cited by investors as a key factor of their location decisions. From the empirical work on African countries, including North African countries, *Basu and Srinivasan (2002)* emphasize the decisive aspect of the macroeconomic stability for investors in an environment which can reduce the risk and increase return on investment [16]. *Lim (2001), Bloningen (2005), Froot and Stein (1991) Stevens (1998) and Klein and Rosengren (1994)*, confirms the particular importance of macroeconomic stability the stability of exchange rates. There is a macroeconomic dimension of country risk or the business climate for the particular characteristics of inflation, debt and deficit reduction, which can negatively affect the investment decisions of firms by creating conditions of uncertainty on the value of assets or future taxes.

2.2.6 LEVEL OF FINANCIAL DEVELOPMENT

Barro (1991) has argued that financial development has a significant positive impact on economic growth. King and Levine (1993) have suggested that higher levels of domestic investment are positively related to faster economic growth [17]. *Hermes and Lensink (2003)* have argued that that the development of the financial system of a host country is an important

precondition for FDI to have a positive effect on economic growth. They further argue that a well-developed financial system positively contributes to the process of technological diffusion associated with FDI [18].

2.2.7 RATE OF RETURN ON INVESTMENT

The profitability of investments is of primary interest to foreign investors. The decision to invest in a host economy, therefore, depends on the risk and return on investment in the economy. Portfolio theory contends that capital tends to flow to economies with low risks and high rates of return. In very risky economies, the risk-adjusted rate of return on investment must be reasonably high in order to attract FDI (*Onyeiwu 2003*).

In addition to these determinants of FDI, several economists (*Lim 2001; Bloningen 2005; Benassy and al, 2005*) emphasize the importance of ***political stability*** for investors. In other words, ***fiscal and institutional context*** can also improve the business climate and the potential attractiveness of a territory by acting as a facilitating factor for investment, particularly by reducing uncertainty and unforeseen costs which associated to foreign investors [19].

3 LITERATURE REVIEW ON THE LINK BETWEEN FDI AND 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 economic 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)[5]. 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 Kokko (1997)* suggest that foreign direct investment may promote economic development by helping to improve productivity growth and exports.

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 [20]. *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 [21]. 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 [22]. 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 [23].

Balamurali and Bogahawatte (2004) 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 [24]. 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

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

growth: (a) direct transmission (trough "*Greenfield Investments*"); (b) indirect transmission (trough "*Ownership Participation*") and (c) second-round transmission (trough "*Technology Spillover*") [25].

In turn, 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 [26]. 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 [27]. *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 [28]. *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 [29]. 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 [30].

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.

4 OVERVIEW OF FDI AND ECONOMIC GROWTH IN AMU COUNTRIES

In recent years, foreign direct investment is considered as a key factor towards progress in Maghreb 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 AMU 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 Algeria, Morocco and Tunisia, 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 World Investment Report, 2009*).

Table 1 provides some basic data on three North African countries as well as some data 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

***Rogmans T. J. (2011),* [31]**

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 (Algeria, Morocco, and Tunisia) 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 [32].

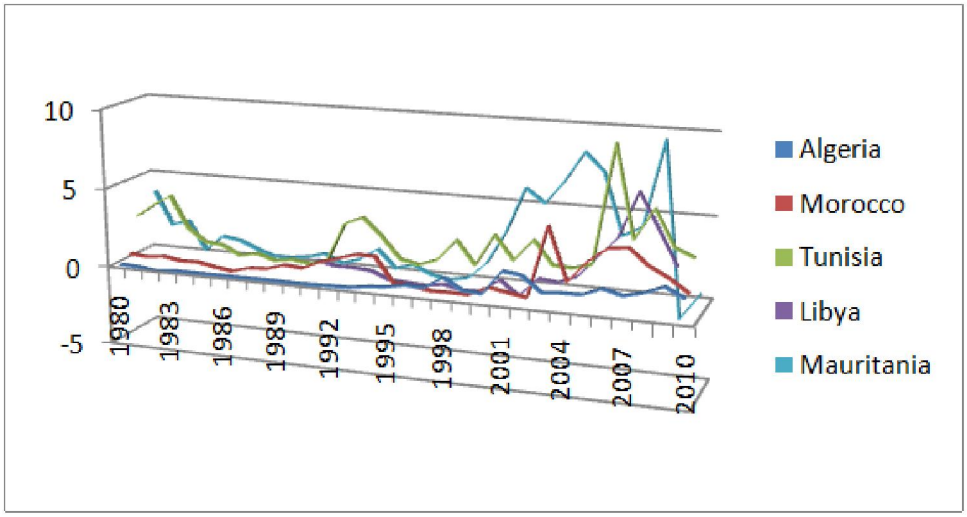

Fig. 1. FDI, A Comparison Among The Five Maghreb Countries (Net Inflows, % of GDP)

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

Fig. 1 shows that the achievements of AMU countries in attracting FDI are still low compared to their potentiality and their performance (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). 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 lowest 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.

Moreover, FDI flows to developing countries' sectors increased rapidly in the late 1980s and early 1990s in almost region of the world revitalizing the long and contentious debate about the costs and benefits of FDI inflows. Attracting FDI has been one of the key policy goals of developing countries and today everybody agrees that FDI has been an important vehicle to accelerating enterprise modernization and restructuring by introducing new technologies, management techniques and marketing practices. In contrast to other capital flows, FDI is less volatile and does not show a pro-cyclical behavior. It has therefore become the "favorite capital inflows" for developing countries. Many authors would argue that, given appropriate policies and a basic level of development, FDI can play a key role in the process of creating a better economic environment. On the other hand potential drawbacks do exist, including a deterioration of the balance of payments as profits are repatriated and negative impacts on competition in national markets.

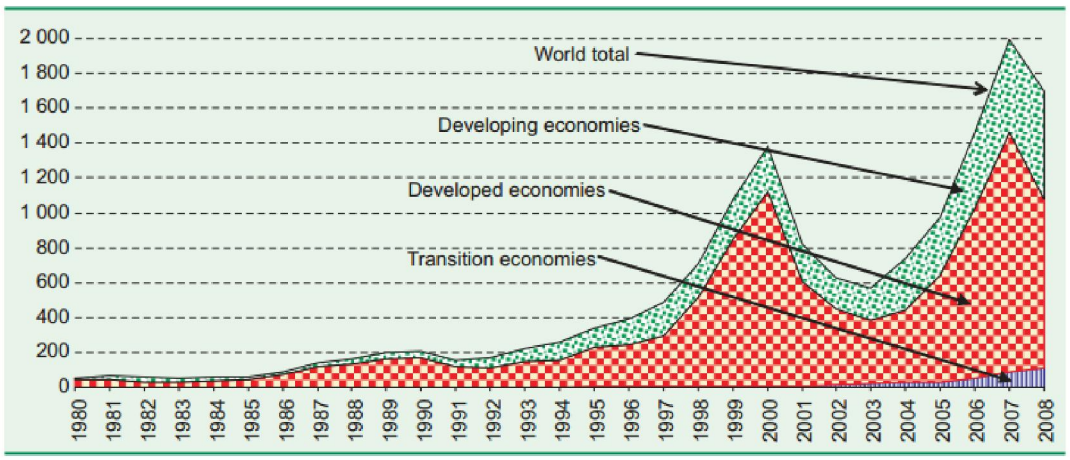

Fig. 2. FDI Inflows, Global and By Groups of Economies, 1980-2008 (In Billions of Dollars)

UNCTAD (2009), [33]

As shown in Fig. 2 and according to the *UNCTAD World Investment Report (2009)*, turmoil in the financial markets and the worldwide economic downturn progressively affected global FDI in 2008 and in the first half of 2009. After uninterrupted growth in FDI activity in the period 2003-2007, global FDI inflows fell by 14% in 2008 to 1,697 billion $, from a record high of 1,979 billion $ in 2007. While the 2008 level was the second highest in history, in late 2008 and the first few months of 2009, significant declines were recorded in all three components of FDI inflows: equity investments, other capital (mainly intercompany loans). Such a decline was caused mainly by the financial crisis that developed countries have experienced following the collapse of Lehman Brothers (one of the largest financial institutions in the United States).

Moreover, the pattern of FDI flows has varied by groups of economies. FDI inflows and outflows of developed countries plunged in 2008, with inflows declining by 29%, to 962 billion $, and outflows by 17%, to 1,507 billion $ (*UNCTAD World Investment Report, 2009*). In contrast, developing and transition economies saw FDI inflows rise in 2008 to record levels for both, with their shares in global FDI inflows growing significantly between 2003 and 2007. The decline in FDI flows in 2008-2009 in developing countries reflects the impact of the financial crisis of 2007.

However, most developing countries are disappointed about the continuing high levels of protection and subsidies for agricultural goods, mainly in developed countries. These measures hamper developing-country exports of agricultural products, and undermine the effective use of their comparative advantages.

5 EMPIRICAL ANALYSIS

5.1 DESCRIPTIVE DATA

To examine the effects of foreign direct investment on economic growth in the three Maghreb countries (Algeria, Tunisia, and Morocco), we use data from 1980 to 2010. The data utilized for the analysis have been collected from a various international databases: the World Development Indicators (WDI), the CNUCED, the UNCTAD stat, the SESRIC BASEIND (Basic Social and Economic Indicators) Database 2012, the Chinn-Ito index (2010)[6], and the World Economic Outlook Database (IMF), 2012. The exact source for each variable is presented in Appendix (table A).

5.2 ESTIMATION METHODOLOGY

We use the recent developments in time series econometrics to analyze and determine causal relationships between FDI and economic growth in the three North African countries. We first examine long-run equilibrium (cointegration) relationship among variables. Then, we use the panel data econometrics; we estimate a dynamic panel system GMM estimator proposed by *Blundell and Bond (1998)*. This approach will be applied using three econometric methods with fixed effects, Ordinary Least Squares method (OLS), Two Stages Least Squares method (TSLS), and Generalized Method of Moments (GMM).

5.3 REGRESSION SPECIFICATION

From the examination of theoretical and empirical literature review, aimed to study the effect of FDI on economic growth, we specify the model of our study. The econometric model of this work is based upon studies undertaken by *Alfaro (2003), Balamurali and Bogahawatte (2004), Anwar and Nguyen (2010)*. It is as follows:

$$\mathbf{GROWTH}_{i,t} = \beta_0 + \beta_1\, \mathbf{FDI}_{i,t} + \beta_2\, \mathbf{DINV}_{i,t} + \beta_3\, \mathbf{CONTROLS}_{i,t} + \varepsilon_{i,t}$$

where $GROWTH_{i,t}$ is a variable representing the logarithmic of growth in real GDP per capita. $FDI_{i,t}$ represents foreign direct investment measuring the inflows of capital accruing to country *i* in year *t*. $DINV_{i,t}$ is the nationally owned investments defined as gross fixed capital formation. $CONTROLS_{i,t}$ is a vector of control variable of the determinants of FDI and growth; it contains $Topen_{i,t}$ represents the trade openness measured by the sum of imports and exports in percentage of GDP; $FDev_{i,t}$ 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 rate of change

[6] The Chinn-Ito index (*KAOPEN*) measures 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*.

of the Consumer Price Index; $ExRate_{i,t}$ denotes the real exchange rate variable calculated from nominal exchange rates and CPIs; $Kaopen_{i,t}$ variable that measures the extent of openness in capital account transactions. $\mu_{i,t}$ is the error term.

5.4 ESTIMATION RESULTS

5.4.1 STATIONARITY AND COINTEGRATION TEST RESULTS

Before testing the long-run relationship among variables, it is necessary to check whether series are stationary. We employ the ADF test and the PP test. 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. Table 2 provides the results of the ADF and PP tests. The results of the unit root tests conducted on the variables reveal that 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 in the 1st differences. 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)
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% (-3.689, -2.971, -2.625 respectively).***
Values between brackets are probabilities.

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

Table 3. 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	49.013*	28.365*	47.153	31.928*	45.461	28.548*
	(0.0387)	(0.0397)	(0.0581)	(0.0129)	(0.0825)	(0.0375)
At most 1	20.648	12.614	15.224	10.929	16.912	11.219
	(0.3799)	(0.4883)	(0.7654)	(0.6543)	(0.6465)	(0.6254)
At most 2	8.034	6.427	4.924	4.284	5.693	5.688
	(0.4618)	(0.5590)	(0.8783)	(0.8282)	(0.7314)	(0.6534)
At most 3	1.606	1.606	0.010	0.010	0.004	0.004
	(0.2050)	(0.2050)	(0.9186)	(0.9186)	(0.9465)	(0.9465)

**** 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 test as well as the cointegration test results will allow us to better specify the dynamic panel GMM estimator.

The cointegration tests of the four variables for each country give us the results interpreted in the following equations:

Algeria: GROWTH = 0.288 FDI + 9.086 DINV - 0.311 CONTROLS
(0.069) (1.260) (0.084)

Morocco: GROWTH = 0.069 FDI + 1.046 DINV + 0.119 CONTROLS
(0.019) (0.235) (0.026)

Tunisia: GROWTH = 0.381 FDI + 2.402 DINV + 0.163 CONTROLS
(0.051) (0.775) (0.067)

5.4.2 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	1.716 (0.067)	3.017** (0.027)	6.062*** (0.066)
DINV	19.130*** (0.110)	17.457*** (0.103)	11.569*** (0.134)
CONTROLS	0.994 (0.038)	2.782* (0.035)	0.271 (0.077)

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	1.599 (0.111)	1.625 (0.049)	3.375** (0.119)
DINV	6.799*** (0.368)	4.427*** (0.296)	3.241** (0.387)
CONTROLS	- 0.753 (0.136)	2.262 (0.113)	0.635 (0.326)

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	1.031 (0.172)	2.181 (0.038)	3.428** (0.114)
DINV	4.990*** (0.500)	9.833*** (0.158)	6.358*** (0.241)
CONTROLS	- 0.526 (0.191)	2.566 (0.066)	0.260 (0.242)

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 in the studied countries. 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. We can check also the observation that the macroeconomic fundamental such as exchange rate, trade openness, financial system development, capital account transactions…, have, in sum, a positive impact in Moroccan and Tunisian economic growth; whilst, it negatively affects economic growth in Algeria, that may contribute to the explanation as to why Moroccan and Tunisian economies exhibit better macroeconomic stability.

In sum, results show that Foreign Direct Investment (FDI) is an important factor which contributes to increase economic growth of AMU countries. Finally, we can assert that these countries should adopt some economic and financial conditions, such as, adopting a better trade policy reforms[7], restoring international competitiveness, and diversifying the country's exports, to significantly improve their financial and economic situations.

6 CONCLUSION

After reviewing the theoretical and the empirical literature over the link between foreign direct investment and economic growth, this article examines empirically this relationship for the case of three AMU 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.

FDI inflow could bring important benefits to Algeria, Morocco and Tunisia in the form of capital inflows, technology spillovers, human capital formation, international trade integration, job creation, the enhancement of enterprise development, and so forth. However, government policies are needed to enhance benefits and minimize negative effects on the 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, improve economic growth rates in each country, and, thereby, make them less vulnerable to different external shocks.

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APPENDIX

Table A. 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
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.
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).

Table B. Overview of studies on the impact of FDI on economic 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.