FDI, Diversification and Growth: An Empirical Assessment for MENA Countries

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Abstract

Export diversification has become a priority goal for the development strategies of the MENA countries. FDI can act as a complementary factor in the discovery process. In this paper, we aim at measuring the effects of exports' diversification on growth in MENA countries. Within the framework of an endogenous growth model estimated by the GMM system method, we provide robust evidence that FDI do not necessarily have the same effect on growth according to the diversification level. We also show that while FDI have a positive and significant effect on the MENA countries' growth, it is most probably rather linked to the direct effect on value added and employment than to the spillover effects of technological transfer.

Keywords: Export diversification, FDI, Growth, MENA, GMM system

JEL classification codes: F1, O11

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1. Introduction

After many years of a relative closing on foreign investments, most of the Mediterranean economies (Middle East and North Africa : MENA countries) moved towards some active strategies of foreign establishments as early as the end of the eighties. These strategies were reaffirmed during the nineties when an increasing number of empirical analyses started to demonstrate that FDI could have beneficial effects on the growth of developing countries. Today, the FDI effects are well documented although there are very few points of consensus in such literature due to the scarcity of theoretical models and the important methodological problems linked to the measurement of the FDI-Growth relation. FDI are supposed to be more productive than domestic investments because of their superior technological content. Furthermore, they circulate these technologies directly into the local firms that receive equipment assets transferred by foreign firms, and indirectly through the transfer effects of the upstream-downstream links between foreign subsidiaries and local partners. FDI also have a part in the indirect increase of the local firms' productivity through labour's training that is particularly beneficial to local firms with staff turnover, and also through competitive pressures that lead to the elimination of the less productive local firms and force the remaining ones to improve their productive efficiency.

However, the empirical relationship that exists between economic growth and foreign direct investment is not entirely devoid of ambiguity. Although there seems to be a consensus – at least at theoretical level – on the positive effect of FDI on economic growth, the tempered results of empirical verifications underlie the idea that the FDI effect is not automatic and depends closely on the characteristics of each host country's and on the nature of each FDI. The FDI impact can be non-significant, negative or positive according to the economical, institutional and technological conditions of the receiving country. The sector analysis thus show that the effects of technological and productive efforts do exist and are conditioned by factors such as the density of the links between subsidiaries of foreign firms and local firms, be them partners or competitors, the degree of training and qualification of the local labour, or the technological and organizational capacities of the local firms. Analysis on aggregate data show that FDI can have aggregate effects on the growth of a developing economy, but their results are fragile and remain weak and contradictory since they are very sensitive to the adopted specifications. UNCTAD (1999) and Ram and Zhang (2002) thus detect a positive relationship between FDI and growth, but it disappears over some specifications[1] or for certain variables used to measure the FDI flow. Beyond these limits, the transversal analysis still helped to identify the factors that can act as a catalyst for the effects of technological and productive transfer at a disaggregated sector level on a regular basis in a large number of host countries. They thus showed that some higher absorption capacities in a host country, measured by the education level [Borensztein et al (1998), Lipsey (2000)] or by the technological gap with the FDI country of origin [Lipsey (2000), Xu (2000), Görg and Greenaway (2004), Li and Liu (2004)], a higher level of financial development [Hermes and Lensink (2003) or Alfaro et al (2004)], a more open economy oriented towards exportations Balasubramanyam et al (1996), Bende et al. (2000) and OECD (2002)], a better macro-economical stability [Jallal et al. (2005), Prüfer and Tondl (2007)] and some local infrastructures and institutions of higher quality [Olofsdotter (1998), Bénassy-Quéré et al. (2005), Busse and Groizard (2006), Prüfer and Tondl (2007)] increase the FDI capacity to stimulate the growth of the GDP and the global productivity of the factors.

[1] Among the variables used in specifications, we find the GDP level per capita, the education level, the domestic investment ratio, the political instability, the exchange terms, the black market premium and the financial development level (UNCTAD : 1999).

Our contribution must be seen from the angle of a triple observation. First, among this extensive literature, few works have been dedicated to the MENA countries. The opening to FDI is indeed quite recent; the FDI inflows are there very uneven and the temporal hindsight too weak to allow solid statistical assessments. However, the question of FDI and opening of these economies to the global value chains and re-exportation industries is at the very centre of the strategies of the special zones that start appearing in all theses countries [Nicet-Chenaf and Rougier (2007)].

Secondly, few cross-section analysis have tried to establish the link between the conditions to realize technological transfers' effects and the most recent works on the links between diversification and development, or on the technological and innovating capacities of the developing countries. Yet, these dimensions that are the subject of significant works placed in an aggregate approach happen to be the necessary conditions to the appearance of transfer effects in the analysis at the sector level. The density and integration of productive networks, the diversification of the local productive system, as well as the intensity of the links between firms or the technological capacities of the local firms have poorly been introduced in the aggregate analysis. But for the last few years these dimensions of a structural change have been the subject of new analysis [Imbs and Warcziag (2003), Klinger and Lederman (2004, 2006a, 2006b), Koren and Tenreyro (2003, 2007)] that closely associate the productive mutations constitutive of development process and the conditions for international integration. Furthermore, these structural change dimensions are nowadays rather well measured thanks to some direct indicators and proxies that enable to integrate them into transversal specifications and test their importance for a large number of countries.

Lastly, the estimation of the FDI effects on growth is often biased by some endogeneity problems of explanatory variables, of which FDI can be considered as a major one. Rodrik (1999) thus underlines the possibility that a bias of inverse causality between received FDI and growth (since the most dynamic economies attract the most investors) explains the positive relation sometimes measured by certain empirical analysis. A small number of surveys have taken these difficulties into account and proposed to analyse these relations within the framework of a simultaneous equation modelling [Bende et al. (2000), Li and Liu (2004)] or through procedures of Bayesian means [Prüfer and Tondl (2007)]. Yet, up to now, very few works have used some econometric techniques adapted to the dynamic models that are tested (they include a delayed value of the explained variable), such as GMM. In the same line as a growing number of recent works, we also propose to correct this endogeneity bias by estimating a dynamic model through the general method of moments [Arellano and Bond (1991), Arellano and Bover (1995) et Blundell and Bond (1998)] that uses the explanatory variables by delaying them. Lastly, like Borzenstein et al (1998), we use the technique of interactive variables in order to highlight the FDI effects on growth that go through diversification.

After having presented the links between FDI, growth and diversification in MENA countries (section 2), we will precise the stakes of diversification in the development and international integration process (section 3). The model, the estimation methods as well as the data will be presented in section 4, and the results, comments and sensitivity analysis in section 5.

2. FDI, diversification and growth in MENA countries

2.1. FDI and growth: failed expectations

At the end of the nineties, the MENA's under-performance in terms of FDI attraction started to be highlighted. Petri (1998) underlines the deficiency of FDI attraction performances by comparing it with the higher performances of countries with similar « fundamentals ». During the nineties, the FDI represented an average of 0,9% of the GDP in MENA countries, against 2,5% in African countries, 3,8% in Eastern Asia and 4,5% in Latin America [Sekkat, 2004]. A few years later, and despite a fast increase of the FDI flow received in certain countries of the area (Tunisia, Morocco, Egypt), such weakness in attraction capacities was again underlined by Dupuch, Mouhoub and Talahite (2004), Iqbal and Nabli (2004), Chan and Gemayel (2004), Sekkat (2004) or Daniele and Marani (2006). Moreover, Noland and Pack (2007) or Iqbal and Nabli (2004) also show that the degree of integration to the global production chains is very limited in spite of the closeness to the European market and MNC. Yet, several surveys described and assessed the role of FDI (especially the vertical ones) in the process of productivity and GDP increase for a developing economy. De Gregorio (1992) and Blomstrom et al (1992) thus show that FDI are three times more « efficient » than local investments, notably because of their ability to stimulate internal investments (crowding-in) and the externalities that are related to a superior content in terms of organization and technologies (spill-over).

Most of the analysis devoted to the MENA countries concur to explain the weak attraction performances by a limited international and regional integration in this area, as well as the slowness and inefficiency of the structural reforms (privatizations, improvement of the regulations, opening and convertibility) that make them unable to create favourable conditions for the local establishment of foreign firms. Sekkat (2004) puts forward the opening and convertibility efforts into which the countries of this area entered at various degrees against the necessity to further improve complementary reforms in the field of infrastructures and socio-institutional and political environments. But the econometric analysis is made on a sample of developing countries and not only on MENA countries. Bouklia-Hassane et Zatla (2001) show that opening and infrastructures have a positive influence on incoming FDI in MENA countries, while other factors that are traditionally important and significant, such as the size of the market, the productivity levels or the labour costs, are less important in MENA countries than in other developing countries. As for Onyeiwu (2003), he shows that only the opening and the bureaucratic rules can explain positively and negatively the incoming flows of FDI, the variables of infrastructure, macro-economic stability and investments yields being non significant. The legal and administrative environments of the MENA countries' attractiveness were particularly scrutinized in several surveys [Alessandrini (2000), Daniele and Marani (2006), Chan and Gemayel (2004), Benassy-Quéré et al (2005), Femise (2004)].

On the other hand, there are few empirical surveys on the micro-economic transfer effects of FDI in MENA countries. Haddad and Harrison (1993) then Harrison (1996) find very few empirical proofs of the existence of such technological transfers towards local firms, even though the joint-ventures in Morocco display some productivity performances that are higher than the local firm's. Harrison (1996) even suggests that in Morocco, the FDI effect on productivity might have been negative in the short term because of the consequences of the loss of local market shares for domestic firms in terms of production scale. Bouoiyour and Akhawayn (2005) shows on a panel of Moroccan industries that FDI had significant transfer

effects on the work's productivity, and that they are proportional to the technological gap between foreign subsidiaries and local firms and increase together with the opening of the sector towards exportations. Sadik and Bolbol (2001) show that within the framework of an accounting exercise, FDI have more effects on growth via capital accumulation than via productivity gains[2]. FDI received by Egypt, Jordan and Tunisia have an effect on sectors with limited effects on technological transfers (sectors like energy and textile for Tunisia, energy and services for Jordan, and sectors that are highly protected against competition in Egypt). But the efficiency progress that was recorded in Tunisia during the eighties are rather linked to the intensification of competition due to the presence of foreign firms than to real transfers of an advanced technology [Sadik and Bolbol (2001)]. Therefore, the fiscal policies linked to attractiveness can still be justified in such case, as they can be for activities whereby the foreign firms present a significant technological gap compared to the local firms.

The limited capacities of absorption of MENA countries compared to other developing countries are often put forward to explain the weak effects of FDI on growth [Sekkat (2004), Elmawazini (2007)]. Bouklia-Hassane and Zatla (2001) analyse the effects of FDI on growth and the convergence on a panel of MENA countries and they cannot conclude unequivocally on a positive and significant relation. They also explain such weak significance of FDI through the growth of threshold effects in terms of FDI and human capital stocks as well as through the effects of crowding-out in domestic investments. Jallal et al. (2007) shows that the macroeconomic stability is also a variable that conditions the effects of FDI on growth in MENA countries, while the commercial opening and the initial development are not significant.

2.2. Discovering new exports as a "new challenge" for the MENA region

There is today a double questioning about MENA countries that refers to their ability to attract FDI that may accelerate their growth and the nature of their productive structures. The evolution and the diversification of their specializing structure is put forward in several reports from international bodies and often relayed by some ambitious national programmes. A recent unpublished survey from the World Bank has thus over-viewed the question of diversification for five MENA countries: Egypt, Lebanon, Jordan, Morocco and Tunisia. Statistical analysis shows that these five countries – except Jordan – have had very few progress towards the diversification of their productive and exporting structures. Moreover, the exportations of these countries are generally characterized by a high sector-based integration since the four biggest export sectors represent 75% of the exportations in Egypt, Tunisia, Jordan and Morocco, against 57% in South-East Asia and 49% in Eastern Europe countries. Furthermore, the measurement of these countries' specialization reveals that not only are the main export sectors very dependent on natural resources –agriculture and food (Morocco, Jordan), oil and gas (Tunisia, Morocco, Jordan), fertilizers (Jordan, Morocco) or low skilled works such as textile (Tunisia, Morocco, Jordan)-, but also the part of their medium or high technology exports remains very modest (21.2% on average in the five countries against 55% for the new European countries and South-East Asia).

It is also interesting to note that the World Bank has published an important survey on the growth and international integration of Morocco (World Bank, 2006). This economic memorandum has had a considerable influence on the choices made in the Moroccan economic policy. The survey is entirely built from the method of growth diagnosis proposed

[2] FDI do not give a significant explanation to the growth in Morocco, Oman and Saudi Arabia. Sadik and Botbol (2001) explain this result by internal factors that are not controlled in regressions (for Morocco, influence of the bad harvests, for Oman and Saudi Arabia, influence of the oil prices).

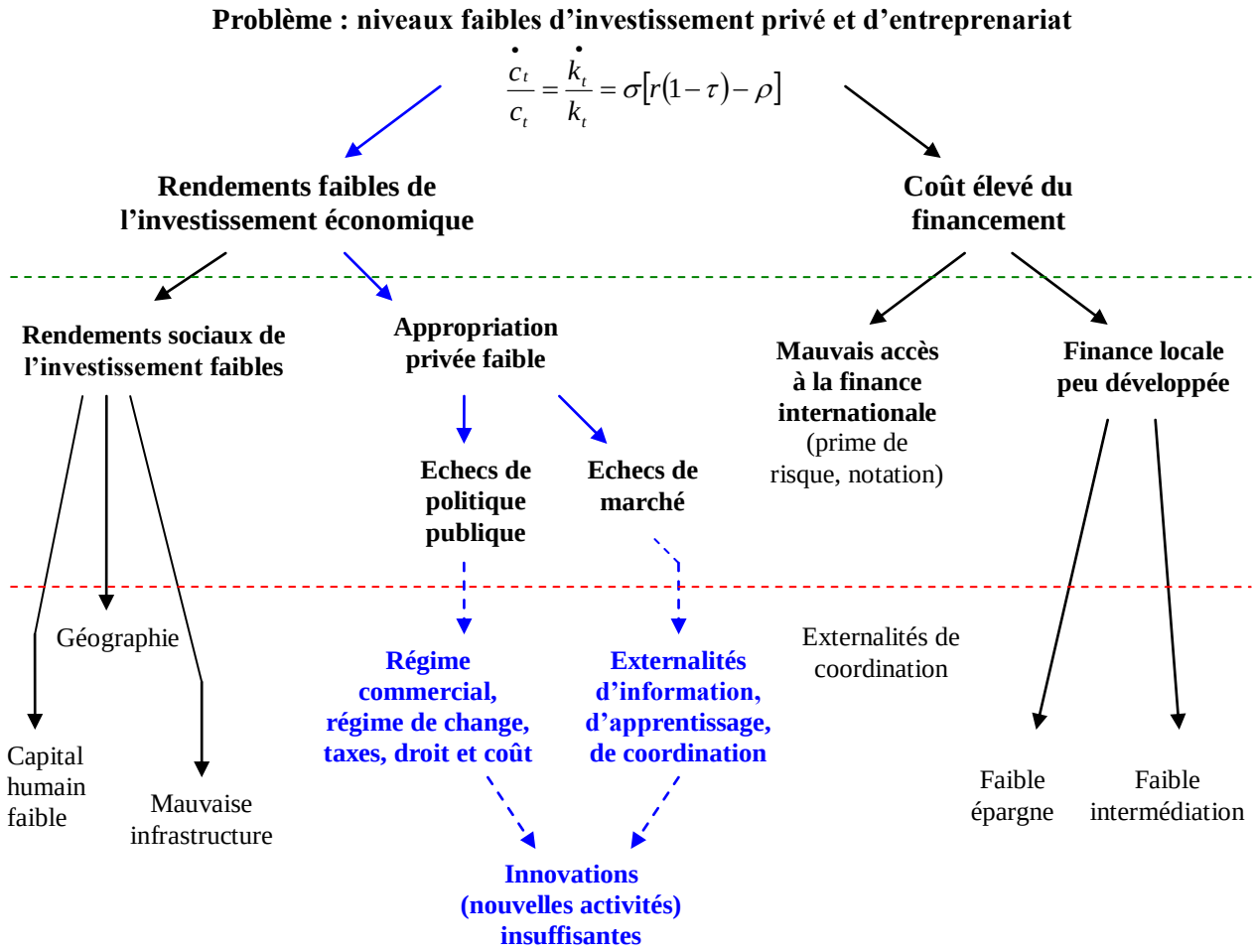
by Hausmann et al. (2005), and one of its major assumptions is that the restraint of Moroccan growth is due to insufficient private capitals. The distortions diagnosis (figure 1) then concludes that the growth's acceleration must be drawn by exportations and their diversification, and that the whole economic policy of Morocco must be oriented towards the incitement to discover new exportable products (Imbs and Warcziag, 2003).

This survey leans on the method of growth diagnosis from Hausmann et al (2005) and completes it with a dimension that did not appear in the tree proposed by the authors, that is, the diversification and competitiveness of exportations – that are assessed as being too weak, and thus restricting for the growth. These deficiencies are explained by the combination of several weaknesses in the public and market policies that restrain the incitement to innovate and self-discover for the firms and entrepreneurs of Morocco. Hausmann and Rodrik (2003) proposed the notion of "discovery" relayed by Klinger and Lederman (2004) in an empirical analysis of the links between economic development and export diversification. Following Hausmann and Rodrik (2003), Klinger and Lederman (2004) start from the assumption according to which the market's weaknesses (such as insufficient barriers to the entry on a new market) can disrupt the positive relation between productive diversification and economic development. They thus demonstrate that the relation between discovery[3] and economic development is positive up to the low levels of average incomes (income per capita between 4.200 and 5.500 USD), and that it then becomes negative.

They also show that it is not the consequence of modifications in factorial provisions, but that it depends mostly on the growth of exportations, population and development level. Lastly, they show that imitation and free-rider behaviours may inhibit the emergence of new export products in developing countries. The Country Economic Memorandum thus shows that the Morocco's discovery levels are below those related to the same level of income per capita, and also below the levels of his competitors (China, Romania, Turkey) (World Bank, 2006, p26).

The authors deduct from this that *"the weak competitiveness and productive diversification are at the source of the slowness in the structural transformation of the economy, and Morocco's main challenge in the forthcoming years will be to develop new products for export"* (WB, 2006, p26). Moreover, this "slowness of structural transformation towards productive diversification" is explained by the combination of failures in both economic and market policies. The first ones refer to the stiffness of the work regulations and its high cost, a too heavy taxation that burdens the firms' profits and the income of skilled workers, and the non-adaptability of both the commercial system (anti-export bias joint to a very high level of protection against importations) and the exchange rate system (fixed rate and risk of over-valuation).

[3] They define « discoveries » as products whose export value progressed from less than 10.000 USD in 1993 to over 1 million USD between 2000 and 2002.



Therefore, the CME highlights the necessity for Morocco to enter into a strategy of exports diversification beyond the traditional manufacture products (textiles and leather, agribusiness and automotive parts gather 86% of the manufacture exports and 43% of the total exports), towards services and new dynamic activities. The ability to go over from primary exportations to exportations with a higher added value, ability that was at the very heart of the strategies of export incentives applied to the Asian economies, is presented as a key for economic growth (CME, p63). Examples like Taiwan, South Korea and Chile are even invoked to underline the strategic importance of « fundamentals » : a stable macroeconomic environment, some pro-market policies, an active industrial policy for the sector-based incitement of exportations and the mobilization of savings and investments towards these sectors.

3. How do diversification and FDI affect growth ?

3.1. Diversification, structural change and development

Chenery (1979) or Syrquin's (1989) pioneering works showed that the production's structural changes were at the root of the development process. Since the international integration is one of the requisite for the development to happen, such structural changes also concern the exchanges between developing countries. At an early stage, Prebish (1950) and Singer (1950) have thus underlined the risks of an excessive concentration of the primary

products exports towards growth and stability. But the diversification issue cannot be restricted to the move from an agricultural production to an industrial production that helps to limit the effects of the deterioration of exchange terms on the trade-generated incomes. Today, it is perceived as a mean to stabilize the export revenues on the long term in front of high elasticity demands and very volatile market prices [Bertinelli et al. (2006), Levchenko and di Giovanni, (2008)][4]. Yet, since it enables to plan the investments, safeguard an import capacity and prompt to create new exportable activities, the stabilization of exports revenues contributes inevitably to growth in the long term.

But the new production techniques linked to exports diversification also help to generate some technological transfer effects that might lead to dynamics of endogenous growth. Indeed, the knowledge and an increasing number of export products are non-rival assets that can thus be spread without limitation in the productive system and feed the productivity gains [De Pineres and Ferrantino (2000), Feenstra and Kee (2004)]. Exporting firms generally have higher productivity levels because they use technologies that are more advanced and they use their resources in a more efficient way. They also have lower costs because they take advantage of the economies of scale generated by the size of the global market. A larger number of export sectors can thus increase the productivity level of the whole production system because of the upstream and downstream connections through which the effects of technological transfer are transiting. But these upstream and downstream connections also generate some strong incentives to create new complementary activities that allow the diversification of the production system, and even lead to new exports in the long run.

As for the models of activities portfolio [Acemoglu and Zibilotti (1997), Kalemli-Ozcan et al. (2003)] the exports diversification is explained by an endogenous process whose driving force is the decision taken by producing agents to invest in diversified activities in order to stand on the optimal border. Diversification then looks like a strategy open to countries that have a capital to invest and enough opportunities to invest this capital [Koren and Tenreyro (2007)]. On the opposite, the poorest countries should specialize in a small number of low-risk sectors in order to stand in the optimum. FDI should thus favour diversification by increasing at the same time the quantity of capital available for investments – as long as the diversion effects on domestic investments remain limited. But they may also increase the investment opportunities through the upstream and downstream links and via the imitation likely to come together with foreign establishments. Furthermore, Hausmann, Hwang and Rodrik (2007), Hausmann and Klinger (2006) or An and Iyigun (2004) show that the diversification towards much more complex assets can stimulate the growth. And this diversification can also facilitate the structural change, especially by increasing the density of the productive system. The thickening of the « production tree » [Hausmann and Klinger (2006)] increases the number of opportunities for discoveries or changes of specialization by moving from one branch to another one, i.e. by moving the production towards products that are new, but close to the ones that are already produced by the economy. Such increase of concentration also helps to reduce the cost of discoveries for exportation since the close assets need some similar combinations of private and public capital that are available in the economy [Hausmann and Klinger (2006)]. Based on these theoretical foundations, the relation between development and diversification was recently the subject of empirical analysis. Imbs and Warcziag (2003) showed that the development level measured by the income per capita has a robust non-linear effect on the diversification measured from the population's structure and the labour's

[4] This volatility in export prices and volumes has been reinforced by the entry of China in the world markets, causing both a new competition in terms of volumes on the textile markets and some very important price movements on the market of raw materials, creating many instabilities for the trade-generated incomes and the growth of several developing countries (Kaplinsky [2006]).

utilization. Diversification increases together with the level of income per capita up to a development threshold (9.000 USD) from which the integration starts to increase again. Klinger and Lederman (2005), Hausmann et al (2006) and Carrère et al. (2007) further showed that these results could also be observed at the level of exports' structures. Carrere et al. (2007) argue that these results are in accordance with the standard analysis of international trade that explains diversification as a shifting through the diversification cones as the capital gets accumulated [Schott (2004), Xiang (2007)]. However, this theory does not give an endogenous explanation on the shifting process that results from an exogenous accumulation of capital comparable to development.

The effects of diversification on growth have also been analysed by a few recent works. De Pineres and Ferrantino (2000), Al- Marhubi (2000), De Ferranti et al. (2002), Lederman and Mahoney (2007) or Hesse (2007) show that generally speaking, the exports' diversification has a robust positive effect on the increase of GDP per capita[5]. However, Hesse (2007) brings out a development threshold below which a diversification's increase accelerates the growth and beyond which an increase in export concentration stimulates the growth.

We carry on with this multi-variable regression approach though a model of dynamic growth estimated by the GMM, but we look at the role of FDI and diversification –as well as their interactions- towards the growth.

3.2. Diversification, FDI and growth

While some of the variables related to the absorption capacities of FDI are now well documented, as earlier demonstrated, other were left aside although they certainly condition the expected gains from received FDI. Thus, a superior degree of diversification in the production and exportations will ease the effects of technological and economical transfers between the sectors and between the firms engaged in the same activities. Imbs and Warcziag (2003) and Klinger and Lederman (2006) highlight the relation between the level of economic development and the diversification of the exports' structure for the first ones and the diversification of the production's structure for the latter. Hausmann and Rodrik (2003a et 2003b) establish the link between Imbs and Warcsziag's (2003) notion of diversification and the notion of "discovery". Starting from the criteria of appearance and increase of the exportations in terms of value, Klinger and Lederman (2006) show that the frequency of exportable "discoveries" increases along with the yields of export's activities (approximated by the exports' growth on the given period), while the extent of discoveries increases with the entry barriers that protect against innovators and imitators. FDI probably play a role in these relations between diversification, growth and development[6]. Simultaneously, Hausmann, Hwang and Rodrik (2006a) underline the role of specialization, and especially of exports' structure in the growth. They propose to use an indicator for the level of export income. Once again, FDI may be the transmission channel for these effects. In a similar way, the effects of the accumulation's thresholds (critical size of the trans-national capital) have seldom been tested in the empirical literature[7].

Like Borzenstein et al (1998) and Hermes and Lensink (2003), we start from the Barro and Sala-I-Martin (1995: chap 6) 's formalization of a model of endogenous growth of Romer

[5] Herzer et al. (2006) reach the same result for the Chile case.

[6] Hausmann and Klinger's (2006) recent analysis underlines the importance of the density of the productive network in the ability to innovate, diversify and develop the production and exportations' structure.

[7] They can probably be connected to the previous characteristics through a non-linear model.

type (1990) in which the new types of semi-finished goods introduced in FDI increase the growth on condition that the human capital and the technological gap [for Borzenstein et al. (1998)] or the financial development [for Hermes and Lensink (2003)] are important enough to reduce the introduction costs of new technologies and increase the yields of new semi-finished goods.

On our side, we assume that a diversified economy offers a larger variety of complementary factors [Hausmann and Rodrik (2003a), Hausmann and Klinger (2007)] that enable to lower the introduction costs of new technologies involved in the semi-finished goods linked to FDI as well as increase the productivity of these semi-finished goods. Moreover, Hausmann and Rodrik (2003) show that the key for structural change in a developing economy is the creation of incentives to « disclose » the production costs of new activities so that this knowledge can give rise to private investments in these fields. The increase of the number of discoveries publicizes the information about the production costs of a larger variety of products and prompts to make private investments that go in the direction of larger diversification of the production and exportations. As for the human capital or the level of financial development[8], the diversification has an effect on growth via the term that expresses the technological level and its indirect effects on the investments' profitability. But it also generates some direct investments that need to be done to get information on « what the country is good at producing »[9]. Furthermore, the knowledge of private costs for a new activity generates some externalities that are profitable for other entrepreneurs and are a potential source of increasing yields, as long as the public incentives let the entrepreneurs have a part of the social profit of their discovery. Lastly, rather than a formalized technology, FDI and semi-finished goods involve above all a tacite technology that must be adapted by the receiving environment [Nelson, 2000; Evenson and Westphal, 1995; Lall, 2000]. The discovery processes can then be the unexpected result of this adaptation of imported technologies to local conditions.

We thus carry on with the empirical model of Borzenstein et al (1998) or Hermes and Lensink (2003), whereby the GDP growth per capita is explained by the stock of human capital, the initial level of income per capita, the direct foreign investment and all other variables that usually influence the growth[10]. In Borzenstein et al (1998)'s analysis, an interactive term between FDI and education helps to measure the way the impact of foreign investments on growth is influenced by the level of human capital in the economy. Using the same type of interactive variables, Hermes and Lensink (2003) on the same model, and Alfaro et al (2004) on the basis of a simpler theoretical model that leads to an equivalent econometric specification, try to assess the effects of financial liberalization on the relation between FDI and growth. The problem is that neither Borzenstein et al (1998), nor Hermes and Lensink (2003), nor Alfaro et al (2004), take into account the dynamic nature of the theoretical model and the necessity to assess it with methods allowing to deal with the endogeneity problems and obtain some more efficient estimators. We start from a similar specification, but integrate some new variables that were up to now seldom used in the aggregate analysis, such as the diversification's degree or the sector's concentration of exports and the appearance of « discoveries », that is to say new imported products. This variable enables to capture the way FDI affect the growth according to the degree of diversification in the economy. Moreover,

[8] For justifications, see Borzenstein et al (1998) about human capital and Hermes and Lensink (2003) regarding financial development.

[9] Hausmann and Rodrik (2003: 606).

[10] Public expenses, incentive on the black market on exchange rate, political instability, political rights, financial development, inflation rate, quality of the institutions. See Barro et Sala-I-Martin (1995 : Chap 12).

we propose to estimate this specification on the basis of the GMM and the Blundell-Bond's estimator (Blundell and Bond, 1998).

4. Model, data and estimators

To wonder about the determinants of the growth's dynamics takes you first to the convergence models that were originally represented by the Solow's (1956) model. This model leads to two interpretations of the convergence. The first one assumes on the long term a convergence of the poor countries towards the rich countries. There, we are in a logic of reduction of the inequalities between countries, that rather translates into the notion of σ-convergence [Barro and Sala-i-Martin (1992)]. According to the second interpretation, the capital's productivity per worker decreases with the countries' capital accumulation, and in the long run this leads each economy towards its own stationary condition for the production's growth per capita. This is a convergence approach that can be analysed in terms of β-convergence [Barro and Sala-i-Martin (1992) or Mankiw et al (1992)], that only takes into account the convergence speed of the nation (towards its balance path) or of a block of nations (towards an average balance path). Within the framework of our problematics, we will retain this second approach since it is more a matter of finding out the determinants of the growth dynamics than wondering about the notion of convergence. However, in order to study the growth dynamics of the MENA countries, we are in line with the endogenous growth models [Romer (1986)] and therefore with the conditional convergence models. As for the works of Durlauf, Johnson and Temple (2004), we will thus distinguish three families of control variables that could explain the divergences (convergences) of the growth rhythms. First, we have the variables linked to the initial conditions of the countries (noted X) and included in Solow model. These variables usually concern the work force and the physical capital and they allow to test « Solow growth models ». Then there are some more specific variables linked to the models of endogenous growth (noted Y), such as infrastructures, public expenses, R&D expenses, commercial opening, etc. Lastly, we have the delayed endogenous variable, usually the GDP per capita delayed by one period. This growth equation is written under a logarithmic form [Barro et Sala-i-Martin (1992); Mankiw et al. (1992); Durlauf, Johnson et Temple (2004)]:

$$(1) \qquad \text{Log}\,(Y_{it:}/Y_{it-1}) = \alpha\,\text{Log}(Y_{it-1}) + \Psi\,X_{it} + \Pi\,Z_{it} + f_i + \varepsilon_{it}$$

with Y_{it} the GDP per capita PPP of the country i at the t moment and X_{jt} and Z_{jt} the set of control variables at the period t for the country i. f_i represent the possible fixed effects specific to each country and ε_{it} the specification error.

For the X type variables, we took into account the accumulation of physical capital through a variable of « investment rate » (*FBCF* variable). We used as indicator of human capital the high school registration rate (noted human capital)[11]. The active population is also taken into account (variable noted Force). In this type of endogenous growth, the control variables of the Y type are linked to the synergies of accumulation of private capital (Romer, 1986), the favourable effect of public infrastructures on private capital (Barro, 1990 : Aghion and Howitt, 1992), the research and development expenses[12] (Romer, 1990 or the accumulation of human capital (Lucas, 1988).

[11] Some more pertinent indicators of scholarship, such as the number of years at high school given by Barro and Lee (2000), are not available on an annual basis or are incomplete for several countries.

[12] Unfortunately, the research & development expenses were not available and could not be taken into account.

In line with Romer's works (1986), a certain number of models consider that the firms, having constant scale yields within their structure, can still via capital accumulation and the free circulation of information, get advantage of an accumulation of know-how (learning spillover). The increasing yields of the industrial sector then become the very base of growth. The technological externalities can come from the complementarity of firms and activities, as well as some mechanisms of knowledge's spreading. From this perspective, anything allowing a better circulation of the information (such as the infrastructures' state) and technological transfers (such as the commercial opening of the economies and the foreign direct investments) can be considered as deciding factors for a dynamic growth. In this account, we introduce a FDI variable that encompass the net FDI entries in percentage of the GDP.

Public spending can also be a growth factor through public infrastructures since they help to improve the productivity of private entreprises (Barro, 1990). For Barro (1990), the public expense is optimal when the externalities exerted on the productivity of private investments are compensated by the negative effects on taxation. The weight of public expenses (in % of GDP) (public expenses variable) can thus have an uncertain sign, depending on which of these two models prevails. In this model, we also take into account some variables that may improve the incentives to invest and the spreading of innovations and discoveries. We thus introduce some variables of infrastructures (infrastructure variable) and communication quality (communication variable)[13] or the presence of a developed banking system. The level of financial development is approximated by the ratio of domestic credit supplied by the bank sector on GDP (bank credit variable) and by the ratio M2/GDP (GDP variable) (Aghion et al., 2003). We also introduced the annual inflation rate as a financial repression measure (inflation).

Commercial opening can also be a factor of growth and adjustment, under certain conditions only, like the initial quality of the specialization (Rodrik 1999, Fontagné and Guérin, 1997, Bensidoun et al., 2001). Notably through the decrease of customs duties or the incorporation into a zone of commercial and political integration, the commercial opening can revive the competition between firms of various countries, avoid redundancy in R&D expenses, limit the imitation activities, lead to range savings, allow technological transfers, give rise to economic growth and in the end enable convergence. For Aghion and Howitt (1992), competition is also an innovation factor. We used the imports and exports of assets and services as a measurement of the commercial opening (export and import variable). We also used the importations of semi-finished goods in several countries (semi-finished goods variable)[14]. These importations indicate at the same time the potential integration of the country in a decline of the productive processes, and the fact that the countries import some semi-finished goods in a logic of modernization of the productive processes as well as a need of economical adjustment. The importation sof semi-finished goods can also be perceived as a technological transfer. Lastly, we took into account the flow of public international aid (aid variable)[15.]

Lastly, in direct relation with our issues, we successively introduced three variables supposed to be representative of the changes in the productive structures : the number of discoveries, the diversification index and the concentration index (CNUCED database). The

[13] The infrastructure indicator is measured by the size of the roads network (measured by the number of tarred roads in percentage of the total) and the quality of the electricity network (given by the losses on the electrical network). The more the indicator's value is close to 1, the more the infrastructures are developed. The communication indicator is measured by the number of telephones per 1.000 inhabitants, the number of personal computers per 1.000 inhabitants and the number of persons equipped with Internet. Data from the World Bank.

[14] We used Chelem's data base for all international trade data.

[15] All previous data are issued from the World Bank database on the World Development Indicators, except for the imports and exports of assets and services, that come from Chelem's database, and the FDI flows that come from CNUCED

number of discoveries is measured by the number of exported products (in absolute value) at the level of the CTCI-3 group of three digits position. However, only the products having a value higher that 100.000 USD or counting for more than 0.3% of the country's total exports are included (discovery variable). The diversification index is a variant of Finger-Kreinin's indicator on the similarity of the trade structure (appendix 1), whose value is between 0 and 1. This index indicates whether a country's structure of exportations per products differs a little or a lot from the worldwide structure of exportations per products. The closer to 1 the index is, the stronger the divergence is. The concentration index is measured by the Herfindahl-Hirschmann's Index whose value is between 0 and 1 (see appendix). It indicates the degree of concentration of a country's exports according to its exported products. The closer to 1 the index is, the stronger the integration is. According to the earlier mentioned works, we introduced in the estimation some interactive variables, defined by the FDI amount multiplied by either the discovery variable (noted decoFDI) or the integration variable (noted con.FDI) or the diversification variable (noted diverFDI).

The equation (1) can be re-written under the form of an AR(1) as follows :

$$\text{Log}\,(Y_{it}) = \theta\,\text{Log}(Y_{it-1}) + \Psi\,X_{it} + \Pi\,Z_{it} + f_i + \varepsilon_{it} \qquad (1')$$

With $\theta = (1- \alpha)$ and where α[16] must be negative to have a convergence between countries.

Testing the equation (1') in dynamic panel with the presence of specific individual effects creates the problem of the correlation between the delayed endogenous and the specification error, as well as some heterogeneity problems [Hanssen (1982), Holtz, Eakin, Newey and Rosen (1988), Arellano et Bond (1991)]. The first solution is to use the method of instrumental variable as well as the General Method of Moments (GMM) in order to control the endogeneity and obtain some convergent estimators. According to the technique developed by Arellano and Bond (1991), it first consists in getting a first-order difference equation (3') in order to eliminate the fixed effect :

$$\Delta\text{Log}\,(Y_{it}) = \theta\Delta\text{Log}(Y_{it-1}) + \Psi\,\Delta X_{it} + \Pi\,\Delta Z_{it} + \Delta\varepsilon_{it} \qquad (1'')$$

By construction, the $(\varepsilon_{it} - \varepsilon_{it-1})$ error term is then correlated with $(Y_{it-1} - Y_{it-2})$. In a second stage, we thus have to use the techniques of instrumental variables (for $T \geq 2$). In generalizing the GMM, Arellano and Bond (1991) suggest to use for one's end $(Y_{it-1} - Y_{it-2})$ through all available delays on the delayed endogenous variable at level, as well as $(X_{it-1} - X_{it-2})$ and $(Z_{it-1} - Z_{it-2})$ through their value at level delayed by one moment or more. The Sargan test then enables to test the validity of the instruments. However, according to Blundell and Bond (1998), when the dependent variable and the explanatory variable are continuous, the delayed levels of the variables are not reliable instruments for the first-order difference equation (3''). It is then necessary to develop a second method, the GMM method, consisting in piling up the first-order difference model with the level model. From then on, we add up the instruments for level regressions that are the delayed differences of the related variables. We thus use the exogenous variables of the $(y_{it-2}, y_{it-3},\ldots,y_{it-n})$, $(x_{it-1}, x_{it-2},\ldots, x_{it-n})$ and $(_{it-1}, Z_{it-}$

[16] Generally speaking, the convergence is studied from the following type of equation : $\text{Log}(Y_{it}/Y_{it-1}) = a + (e^{-\beta} - 1)\,\text{Log}(Y_{it-1}) + \varepsilon it$, with Y_{it} representing the GDP per capita of the country i at the moment t; Y_{it-1} representing the GDP per capita of the country i at the moment t-1; β then representing the speed of the convergence towards a stationary state. To have a convergence, the β coefficient must be positive. The estimated coefficient $\alpha = (e^{-\beta} - 1)$ must be negative and significantly different from zero to have a β -convergence.

$_{2}$,…, Z_{it-n}) types as the instruments for first-order difference equations while the difference variables Δy_{it-1} , Δx_{it-1} and ΔZ_{it-2} are the instruments of the level equations[17].

5. Results, comments and sensitivity analysis

The significance of the various variables earlier presented was tested through these methodologies for all countries subject to the survey over the period 1995-2004 (Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Tunisia, Turkey). Our sample proposes four successive estimations. A level estimation with the introduction of specific individual effects (fixed effects) will control the heterogeneity of the sample and the neglected variables. A Fisher test will precise the significance of the fixed effects. A level estimation with selected random (random effects). A Hausman test will then help to conclude about the fixed nature of the specific individual effects and choose between fixed or random specification. A difference GMM (FE/RE) and a system GMM estimation will control the endogeneity bias.

Since the results are only significant in the model introducing the number of discoveries[18], they are the only ones presented in Table 1.

For a start, with FE models, we note that the Fisher test (F(6, 38) = 12.39) indicates that the specific individual effects are significant, while the Hausman test allowing the comparison between the FE model and the RE one (chi2(9) =37.38) indicates that the fixed effects model could be preferred to the random effects model. However, the FE model does not save us from the endogeneity bias and the potential correlation between regressors and specific individual models. From then on, it is necessary to use in the model's interpretation the GMM difference and the GMM system's estimations. For the latter, the variables that are systematically instrumented are the GDP per capita (delayed endogenous) as well as the FDI, FBCF and country's exports[19].

Two statistics should be retained concerning the validity of the GMM difference and the GMM system. First, the instruments validity is confirmed in both cases by the Sargan / Hansen test since the $\chi 2(40)=19.35$ et $\chi 2(70)=43.67$ statistic is in both models inferior to the fractile of the Khi Two law at 40ddl and 70ddl. We can thus always accept the H0 hypothesis on instruments validity. Then, the Arellano and Bond's test (1992) indicates[20] for both models the rate-2 non self-correlation of ε_{it} since the z statistic calculated is inferior to the 1.64 threshold. Therefore, the models give satisfying results from an econometric point of view.

As for the econometric and economic analysis of these models, we note that a global convergence can be observed in all four estimations. In the FE model, if the θ coefficient of y_{it-1} (0.1320487) is non significant to conclude on a global convergence of the countries, it is then necessary to calculate (θ-1)= -0.86794 as well as the Sudent's t joint to this coefficient (t_θ = (θ -1)/(θ standard deviation)) = -10.32. We then observe that the coefficient is negative and significant, confirming the countries' convergence within our sample. We observe the same

[17] These instruments are only valid under the assumption of a non correlation between exogenous variables and non observed individual effects $E(x_{it},f_i) = 0$.
Instruments for differenced equation : L(2/.).gdp L(2/.).fbcf L(2/.).fdi L(2/.).export___
Standard: D.human_capital_ D.infrastructure D.product_number D.decofdi D.export___ D.communication D.fdi D.fbcf D.high_technology-export D.import___ D.aid D.cpi D.credit D.gouv D.labor D.m2
Instruments for level equation: LD.gdp LD.fbcf LD.fdi LD.export___Standard: _cons

[18] The diversification and concentration variables never are significant in the tested models.

[19] The variables were chosen through endogenous tests. That way, each variable (FDI, FBCF then exportation) is regressed against all the other explanatory variables. You then retrieve the residues of the 3 regressions and regress the growth equation by adding the estimated residues variables. If the residues are significant, then the variables are considered as endogenous.

[20] The z statistic follows in an asymptotical way a normal reduced centred law. If this statistic is superior to 1,64 in absolute value, we then refuse H0. Otherwise, we accept the hypothesis of a rate-2 non self-correlation.

global convergence in the RE model since (θ -1) is there equal to -0.4653 and the Student's t joint to this coefficient (t_θ = (θ -1)/(θ standard deviation)) is equal to -7.75. As for the GMM difference and GMM system models, the new calculations respectively give the -0.8929 and -0.4809 coefficients and some joint Student's t of -10.47 and -10.30, indicating that the models supply some stable and coherent results on the convergence issue.

In the models, the variables' coefficients for Solow increased model, i.e. the FBCF and the labour force (except in the estimation of the GMM system) are significant and positive while the coefficient of the human capital's variable is not significant in any of the four models. As a general rule, the econometric surveys conclude that this variable is non significant when it is measured by the high school's registration rate. It is however difficult to obtain better data on a yearly basis.

There are two sets of variables that are also significant in all four models: the international variables (FDI, exportations and discoveries) indicating a positive connection between the growth and international integration of these countries, and the diversification of foreign trade. In the latter case, since the coefficient is significant and positive, it is possible to interpret these results by the fact that the foreign trade's diversification enhances the MENA countries. The effect of the diversification on growth can go through some growth paths and a stabilization of the export revenues, but it can also stem from an increase of the productive levels of the production system or from the effects of a technological transfer due to the increasing number of export sectors. The positive sign of the FDI joint coefficient can be considered as the measurement of the FDI contribution to the growth, apart from the drive effects of domestic investments.

We must also note that the « decofdi » variable always has a significant and negative coefficient (with various levels of significance)[21]. This means that the higher the number of discoveries is, the less the growth is responsive to FDI. In the case of MENA countries, this can have two explanations. First, the FDI received by these countries do not carry a lot of transfer effects because they are either isolated from the potential productive network, as it is the case for the raw materials investments, or oriented towards the domestic market with a weak integration in the global value chains, as it is the case for the mergers and acquisition operations due to privatizations. For another, the most diversified economies are also the ones whose growth is the less sensitive to the direct effects of FDI entries on the national GDP, because they have a more diversified demand and productive network.

The second set of variables refers to monetary variables linked to inflation, money supply and banking system, approximated by the credits issued from the banking system. As for the macro-economic stability, the inflation (and the monetary expansion grasped by M2) does have a negative influence on growth process (RE model) in so far as it hampers the foreign competitiveness of these countries that, as earlier mentioned, can draw their growth from international integration. As for the development of the banking system, it has a positive influence in so far as it enables a larger financing of the investment projects. This way, we meet up with the results of the surveys indicating that the development of the banking and financing system plays a significant role in the growth process.

[21] When the model is only estimated with the FDI and discovery variables, the FDI coefficient happen to be significant but negative, indicating a negative role of FDI in the growth process. As soon as the FDI variable is combined with the interactive variable (decofdi), the FDI coefficient becomes positive again while the coefficient of the interactive variables is negative.

Table 1 : Dependent variable: annual GDP growth for 1995-2004

Nombre d'observations : 80 / Nombre de groupes : 7	FE F(16, 46) = 129.99 Prob>F=0.0000	RE Wald chi2(17) = 857.31 Prob > chi2 = 0.000	GMM – différence Wald chi2(17) = 1587.3 Prob > chi2 = 0.000	GMM – système[22] Wald chi2(17) = 37324. Prob > chi2 = 0.000
y_{it-1}	**.1320487** **(1.57)**	**.5346475*** **(8.91)**	**.1070672** **(1.26)**	**0.5190*** **(11.12)**
Constante	-3.56e+09 (-0.71)	**-3.89e+10*** **(-4.51)**	4.76e+08 (1.01)	**-2.91e-10*** **(-4.64)**
Capital humain	-383.5828 (-0,98)	-978.1201 (-0.95)	-574.6974 (-1.55)	-473.03 (-1.15)
FBFC	**1.241852*** **(4.99)**	**1.059899*** **(3.36)**	**1.117066*** **(3.16)**	**1.220*** **(4.80)**
Force	**2719.002*** **(5.5)**	**2862.853*** **(4.33)**	**1820.593***** **(2.41)**	735.94 (2.28)
Gouv	3.30e+07 (0.10)	-1.19e+08 (-0.27)	1.63e+08 (-0.47)	-3.16e+08 (-1.27)
Inflation	4.64e+07 (1.18)	**-1.89e+08*** **(-3.29)**	2.38e+07 (0.65)	60344 (0.21)
Crédit	**1.75e+08*** **(3.39)***	**1.40e+08*** **(2.14)**	1.25e+08 (2.29)	**1.82e+08*** **(3.46)**
Exportations	**.8625617*** **(4.46)**	**2.298182*** **(5.85)**	**1.041728 *** **(4.74)**	**1.1063*** **(4.97)**
Infrastructure	-1.95e+09 (-0.38)	**1.15e+10*** **(1.98)**	4.97e+09 (0.66)	**1.06e+10*** **(1.95)**
FDI	**8.7798*** **(2.85)**	**10.3186*** **(2.92)**	**7.444187***** **(2.27)**	**14.61*** **(4.81)**
Découvertes	**5.94e+07** **(2.49)***	**1.23e+08*** **(3.58)**	**5.84e+07 ***** **(2.52)**	**8.93e+10*** **(4.63)**
DecoFDI	**-.0471*** **(-3.26)**	**-.0551879*** **(-3.21)**	**-.0412431*** **(-2.72)**	**-0.07594*** **(-5.34)**
Importations	-.1249791 (-0.70)	.2866888 (0.92)	-.1560689 (0.64)	-0.15195 (-0.93)
Biens intermédiaires	-1.47e+08 (-1.32)	-2.82e+08 (-0.95)	-1.80e+08 (-1.42)	-8.60e+07 (-0.63)
Aide	-6628925 (-1.15)	**4.23e+07*** **(.2.79)**	-1.10e+07 (-1.32)	**1.60e+07*** **(2.01)**
Communication	4.27e+09 (0,93)	-1.29e+10 (-1.10)	-5.83e+09 (-0.79)	-5.45e+10 (-0.86)
M2	-6.97e+07 (-1.14)	**-6.57e+07 **** **(-1.70)**	**-1.30e+08 ***** **(-1.70)**	**-1.01e+08*** **(-2.09)**
Test de Fisher Test d'Hausman	F(6, 38) = 12.39 Prob > F = 0.0000	 chi2(9) =37.38 Prob>chi2 = 0.0000		
Test de Sargan			chi2(38) = 19.35	**chi2(70) =43.67**
Test AR(2)			Z=0.43	Z=0.85545

(*) risque de 1ère espèce à moins de 5% : (**) risque de 1ère espèce à moins de 8%

The countries of our sample do not seem to have problems of foreign constraints since the import coefficients are never significant. The same happens for the importations of semi-finished goods that do not play any role in the growth phenomenon of MENA countries. This latter result confirms the weak integration of MENA countries in the global value chains [World Bank (2007), Noland and Pack (2007), Iqbal and Nabli (2004)] as well as the fact that the received FDI do not generate a lot of transfer effects.

Lastly, while the public expenses or the importance of the information networks do not have any notable influence on growth, the public aid to development as well as the development of infrastructures seem to play some significant and positive roles in the growth process within the framework of the GMM system model. As done by Harding and Javorcik (2007) the bilateral or multilateral public aid can be interpreted like a proxy of the setting up of agencies for the promotion of exportations and investments. Indeed, the Developing Countries generally benefit from some aid flows aiming at co-funding the setting up of promotion agencies and supporting their actions. These latter results thus confirm the importance of public and private investments for the supply of information about the conditions of foreign investment and transport infrastructures to attract the investments and make them more efficient in terms of production.

Table 1 gives the results of the most complete models. The change from one estimator to another one does not create any significant instability in the value of the estimated coefficients. But some complementary sensitivity analysis was carried out since the control variables (aid, communication, importation, M2) were introduced step by step without either modifying significantly the estimations.

6. Conclusion

Export diversification has become a priority goal for the development strategies of the MENA countries that want to go beyond some excessively strong specializations on raw materials and finished goods for which prices and demand are rather unstable. Diversification must favour at the same time the domestic and foreign investment and induce some endogenous structural changes creating development. In this paper, we aimed at measuring the effects of exports' diversification on growth in MENA countries. The issue was also to test the hypothesis along which FDI do not necessarily have the same effect on growth according to the diversification level. Within the framework of an endogenous growth model estimated by the GMM system method, we showed that while FDI and diversification favour the MENA countries' growth, some higher levels of the latter decrease the effects of FDI on growth. We also demonstrated that while FDI have a positive and significant effect on the MENA countries' growth, it is most probably rather linked to the direct effect on value added and employment than to the effects of technological transfer. However, this is still a mere hypothesis that will need to be further confirmed.

ANNEX

Indice de diversification

L'indice de diversification, dont la valeur est comprise entre 0 et 1, indique si la structure par produits des exportations d'un pays diverge peu ou beaucoup de la structure par produits des exportations totales dans le monde. Plus l'indice est proche de 1, plus la divergence est forte (les produits exportés par le pays sont très différents des produits exportés dans l'ensemble du monde).

Déviation absolue de la structure du pays par produits par rapport à la structure mondiale comme ci-dessous :

$$S_j = \frac{\sum_{i=1}^{n} | hij - hi |}{2}$$

où h_{ij} = part du produit *i* dans le total des exportations (ou importations) du pays *j*

h_i = part de produit *i* dans le total des exportations (ou importations) mondiales.

Cet indice est une variante de l'indicateur de Finger-Kreinin sur la similarité de la structure du commerce. Pour plus d'information, on peut consulter l'article de Finger, J. M. et M. E. Kreinin (1979), A measure of 'export similarity' and its possible uses, *Economic Journal*, 89: 905-12.

Indice de concentration

L'indice de concentration, dont la valeur est comprise entre 0 et 1, indique le degré de concentration des exportations d'un pays par rapport aux produits qu'il exporte. Plus l'indice est proche de 1, plus la concentration est forte (un nombre réduit de produits représente une large part du total des exportations du pays).

Indice de Herfindahl-Hirschmann normalisé pour obtenir des valeurs comprises entre 0 et 1 (concentration maximale) d'après la formule suivante

$$Hj = \frac{\sqrt{\sum_{i=1} (xi/X)^2} - \sqrt{(1/n)}}{1 - \sqrt{(1/n)}}$$

où H_j = indice du pays

x_i = valeur des exportations du produit *i*

$$X = \sum_{i=1}^{n} x_i$$

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