OUTPUT VOLATILITY AND FDI TO MIDDLE EAST AND NORTH AFRICAN COUNTRIES: A CLOSE-UP ON THE SOURCE COUNTRIES

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Abstract *- Macroeconomic determinants of FDI are seldom analysed from the perspective of source countries, priority generally being given to host country characteristics. Using a gravity model, we analyse FDI flows from a sample of European and non-European countries to MENA economies. We find that European investment to our chosen MENA host countries is higher the higher the source country output volatility, thus lending support to the existence of a substitution effect for European transnational corporations. We also find that the 1995 Barcelona agreement has reinforced MENA countries' vulnerability to European short- and medium-term macroeconomic cycles. Regional integration of MENA economies and the emergence of new sources of FDI for MENA economies is not necessarily a positive development since investment to MENA countries coming from the Mediterranean periphery of Europe is affected by a revenue effect, with FDI flows being reduced when macroeconomic volatility increases in the zone. Our results are robust with respect to various changes in estimator, sample composition and measurement of instability.*

Key words **-** INFLATION, FDI, GRAVITY MODEL, EUROPEAN UNION, MENA

JEL classification - F21, F43, F44

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1. INTRODUCTION

Whereas the domestic determinants of what attracts foreign direct investment (FDI) have been extensively studied[1], the empirical literature has, until very recently, tended to disregard external macroeconomic conditions. Those conditions need, however, to be considered as crucial determinants of FDI inflows since, every time there is a global financial crisis, economists and policymakers are abruptly reminded of just how volatile financial flows can be. Loayza, Rancière, Servén and Ventura (2007) have expressed that need, stressing the fact that the role of trade and FDI flows as absorbers or amplifiers of shocks has not yet been fully established.

Undoubtedly, external shocks tend to trigger Gross Domestic Product (GDP) volatility for developing economies (Martin and Rey, 2006), the impact of those shocks on activity and employment being channelled, *inter alia*, by huge variations in foreign investment flows (Lensink and Morrissey, 2007). As an illustration, global FDI flows dropped severely in 2009 when western economies and firms were hit by the 2008 financial crisis and the ensuing drastic credit restriction (UNCTAD, 2009). Even though global crises are important in explaining brutal swings in FDI inflows to developing economies, we claim in this paper that it would be also fruitful to take external instability into account at the more disaggregated source country level. Source-related macroeconomic determinants of FDI have, so far, not been studied properly or explicitly in the literature on the determinants of FDI inflows to developing economies. Since they generally explain FDI inflows to developing economies without considering their origin, the majority of the studies that are found in the literature are constrained by their framework to use a single average measurement of external conditions, thereby failing to address source-related determinants of FDI[2].

In sharp contrast to this literature, the present paper tests the sensitivity of FDI levels to source country GDP instability in a gravity model. The gravity model is generally seen as a relevant approach to explaining bilateral trade flows (Evenett and Keller 2002; de Mello-Sampayo 2009), and this model has also been used recently to explain bilateral flows of FDI (Frenkel et al. 2004; Bevan and Estrin, 2004; Desbordes and Vicard, 2009; Busse et al. 2010). This framework allows the FDI effect of host countries' characteristics to be differentiated according to the degree of instability of the source country, while controlling for a series of distance-related factors. A couple of recent papers have used this gravity model in order to identify the specific effects on bilateral FDI flows of various sources of macroeconomic volatility. Cavallari and D'Addona (2012) have examined the role of host and source country nominal and real volatility, but their study is limited to bilateral FDI flows among 24 OECD economies. Levy-Yayeti et al. (2007) are closer to our concerns since they address North-South FDI more explicitly. They focus, however, on the source level, and they do not explicitly address the host country determinants of the

[1] See Bloningen (2005) for an overview of that literature.
[2] A recent illustration is Méon and Sekkat (2012) who proxy external macroeconomic volatility using an aggregate ratio of world FDI to world GDP.

corresponding FDI inflows that are received by developing economies because of their high level of output volatility.

Our paper focuses on North-South investment and aims at identifying the simultaneous effect on FDI of both source and host country output instability by studying the impact of European countries' macroeconomic instability on FDI flowing to the Mediterranean economies of the Middle East and North Africa (MENA)[3]. There are several reasons why this model has been chosen. First, as in many other parts of the world, Mediterranean MENA countries have progressively reformed their institutions and opened up their economies to foreign trade and investment over the last two decades (Mina, 2012). However, although MENA countries have enjoyed a steep increase in FDI inflows since the mid-1990s, they have failed to reap the benefits of their efforts in terms of their share of world FDI. They have also suffered from the marked instability of those incoming investment flows during the last decade (UNCTAD, 2009). Second, the sensitivity of FDI to macroeconomic performance is of vital concern for all those highly age-dependent, labour-exporting MENA economies that are particularly dependent on sources of foreign investment. As such, they tend to be extremely vulnerable to economic fluctuations in source countries, with dramatic consequences on their own output volatility (Koren and Tenreyro, 2007). Third, since the mid-1990s, Mediterranean MENA economies have been more closely associated with the European Union via the bilateral Euro-Med trade and exchange agreements, which has made their economies more exposed to external sources of instability[4].

Table 1 shows that, since 1995, FDI instability has been significantly higher for Southern and Eastern Mediterranean countries than for other developing regions in the world. The Mediterranean MENA countries have become much more subject to instability coming from Europe, without benefitting from structural transfer flows like those that sustained Central and Eastern European economies during their accession to the European Union. Fourth, GDP volatility is traditionally strong in MENA economies, which has significantly reduced domestic investment (Aysan, Pang and Veganzonès-Varoudakis, 2009)[5].

[3] The Mediterranean MENA countries considered are Morocco, Algeria, Tunisia, Libya, Egypt, Jordan, Lebanon, Syria and Turkey. In the econometric part of our work, we have focused on the five biggest recipients of FDI as our host country sample: Morocco, Tunisia, Egypt, Lebanon and Turkey. Algeria is not included in our host country sample since inward FDI is highly concentrated on oil. MENA Gulf countries are considered neither as host nor as source countries in our analysis, because they are not as closely associated with European trade and investment as the Mediterranean ones.

[4] They have also increased regional integration by adopting various free trade agreements (UMA, GAFTA).

[5] Aysan et al. (2009) also report a significant adverse effect of external instability, as measured by the debt burden, on the formation of private capital in the region. They estimate that a more stable external environment would have increased the number of decisions to invest on average by 8.4% in Morocco and 10% in Egypt in the 1980s and by 3.9% in Morocco and 2.6% in Tunisia in the 1990s. Chan and Gemayel (2004) also found that the instability of ICRG scores for political, financial and economic risks has an adverse effect on the quantity of FDI entering MENA economies, but they do not explicitly address macroeconomic instability.

Table 1: FDI level and variability: Before and after 1995

FDI inflows (M $ US)	1987-1995		1996-2009	
Countries	Annual average levels	Coefficient of variation	Annual average levels	Coefficient of variation
Egypt	863.221	0.425	3,689.557	1.112
Morocco	287.908	1.602	1,540.046	2.663
Tunisia	301.774	0.085	1,086.767	1.102
Turkey	622.111	0.020	6,666.500	0.211
Lebanon	10.452	9.530	2,281.927	0.728
Southern and Eastern Mediterranean Countries	2,613.595	0.316	25,062.096	0.857
Asia	36,913.603	0.670	196,046.140	0.545
Latin America and Caribbean	14,889.762	0.589	102,751.060	0.455

Source: UNCTAD - Author's calculations.

In line with Cavallari and D'Addona (2012) and Levy-Yayeti, Panizza and Stein (2007) which recently found that investors tend to substitute foreign investment for domestic investment when domestic macroeconomic conditions worsen, we find that FDI to Mediterranean MENA economies is marked by a substitution effect, i.e. transnational corporations (TNCs) tend to increase their foreign investment when macroeconomic instability increases in their domestic market. This effect is especially strong for the TNCs originating in the most developed core European countries. On the contrary, FDI coming from the periphery of Europe exhibit revenue effects since it is the lowest for the most volatile source country. As a consequence, Mediterranean MENA economies are not equally vulnerable to macroeconomic fluctuations in source countries through their impact on FDI.

The remainder of this paper is organized in four sections. Section 2 discusses the effects of several kinds of macroeconomic instability (internal/external) on FDI inflows. Section 3 presents the indicators of macroeconomic stability (internal/external) retained in the empirical study, as well as the model and the estimation strategy. In Section 4, we first present and then discuss the results of our gravitational model panel data estimation, paying specific attention to source countries and the possibility of cumulative effects. Section 5 shows the results of our estimation when source countries are differentiated according to their level of development. Section 6 develops a series of robustness checks, and Section 7 concludes.

2. FDI AND MACROECONOMIC VOLATILITY: OVERVIEW OF THE LITERATURE

Though the nominal sources of volatility, essentially price and exchange rate fluctuations, have been frequently analysed since the early 1990s, real output volatility, especially external, has been somewhat downplayed by empirical

studies of macroeconomic stability[6]. The theoretical effect of output volatility on the flow of FDI to developing countries is far from straightforward, especially when one considers both host and source macroeconomic instability.

As for host country volatility, it undoubtedly increases the entry costs associated with investing abroad, thereby leading to a reduction in FDI. This is particularly true when high levels of real instability indicate a host country's excessive vulnerability to domestic or external macroeconomic shocks. Uctum and Uctum (2011) show, for example, that in the case of Turkey, FDI reacts significantly and adversely to crises in the host country, whereas portfolio investment is most strongly affected by source country instability. But FDI may also be attracted towards highly volatile economies insofar as they also tend to grow rapidly. In this case, foreign investment is driven towards highly volatile countries by market opportunities. A marked depreciation of the exchange rate, or a fall in the value of stocks in host economies may equally increase investment by those foreign firms that are looking for merger opportunities (Krugman 2000; Aguiar and Gopinath 2005). A recent illustration can be provided by the waves of sector-based consolidations that have been reported in the oil and gas, mining, and automobile industries or in financial services (UNCTAD 2009), in years of sharp decrease in global FDI flows: 2008 (-15 %) and 2009 (-30%). Hence, host country volatility may theoretically have either a negative or positive effect on FDI inflows. In the case of European investment in MENA economies, we may reasonably expect that the positive effects will be prevalent, insofar as vertical, green field forms of FDI - less sensitive to output volatility than to exchange rate instability - tend be dominant[7].

Source country output instability may also have either a negative or a positive effect on FDI flows. When business cycles in the source and host countries are synchronised, TNCs may react to the anticipated fall in their profits and to rising financial costs by holding back on investment projects, and by disinvesting abroad (Aizenman, 2003; Wang and Wong, 2007). Hence, source country volatility may reduce FDI outflow because firms are subject to an adverse revenue effect. Conversely, when business cycles in the source and host countries are not synchronized, with, for example, the host country undergoing a bust while the source country benefiting from a boom, substituting FDI for domestic investment may become attractive for firms subject to high volatility in their original market. In that case, a positive substitution effect may well be identified, with higher levels of volatility in the source country increasing FDI flows

[6] Frenkel, Funke and Stadtmann (2004), Apergis and Katrakilidis (1998) or Garibaldi *et al.* (2001) have studied the effects of domestic inflation on FDI inflows. As for exchange rate volatility effects on FDI inflows, see Froot and Stein (1991), Bénassy-Quéré, Fontagné and Lahrèche-Révil (2001), Bechri (1999), Kiyota and Urata (2004), Frenkel, Funke and Stadtmann (2004), Schmidt anjd Broll (2009), Calderón and Didier (2009), Lederman (2011) and Takagi and Shi (2011).

[7] In non-oil MENA countries, the ratio of the number of Greenfield operations to the number of M&A is four to five times higher than the world average, and three times higher than that of developing economies [Authors' calculations based on UNCTAD (2009)].

to other countries. This is the case in Cavalleri and D'Addona (2012) who find FDI between OECD countries to increase when the source country has higher output volatility. They argue that such behaviour of investors with respect to host and source country volatility is consistent with the view that investors choose between investment options at home and abroad on the basis of the volatility differential between the source and host economies. By estimating a gravity model of North-South FDI, Levy-Yeyati, Panniza and Stein (2007) found a similar substitution effect, with FDI flows tending to be countercyclical with respect to output cycles in the US and Europe, thereby reflecting investors' arbitrage among different investment opportunities. They concluded by arguing that, contrary to what is usually claimed, recessions in industrial countries are likely to increase FDI flows to developing countries, particularly to those with close ties with the U.S. and Europe. This is the substitution effect. Thus, output volatility in source countries may have both a negative and a positive effect on FDI flows to developing economies, with this effect being highly conditional to the relative magnitude of those income and substitution effects.

Of course, the effect of source instability on FDI flows to developing countries might well be amplified by bad internal macroeconomic performance in the host country (Eichengreen 2000; Kose, Prasad, Rogoff and Wei, 2009). If host country's output growth or exchange rate[8] turns out to be less stable, it is likely that the source country's volatility positive effects on FDI will be weaker (Kaminsky, Lizondo and Reinhart 1998). Thus there is less chance of a country attracting higher FDI flows when an external shock is combined with bad domestic macroeconomic performance (Ishii *et al.* 2002)[9]. Méon and Sekkat (2012) found that FDI flows to developing economies tend to be reduced in times of global symmetrical economic crisis, with generalized bad external macroeconomic conditions tending to outweigh the domestic institutional or structural factors that might attract or repel FDI. FDI flows tend, however, to react quite differently to increased macroeconomic risks depending on whether those investments are sourced in countries whose firms traditionally invest abroad or in economies where foreign investment is less common. Andrès, Busse and Nunnenkamp (2012) have, for example, recently found that non-traditional sources of FDI are less risk-averse than traditional ones.

The next section explains the method used in order to identify which one of these two effects dominates in the case of Euro-Mediterranean FDI flows.

[8] For a recent study of the contrasted effects of exchange rate instability on FDI inflows, see Schmidt and Broll (2009).

[9] As the decision to set up a subsidiary abroad is generally justified by the intention of obtaining long-term profits from the selected location (Caves, 1996), the odds are, however, that the corresponding sunk costs (especially for greenfield projects) will make the FDI less reactive than other forms of capital to a transitory deterioration of source or host countries' macroeconomic conditions. This assumption has received empirical support in Fernandez-Arias and Hausman (2001), Levchenko and Mauro (2007) for host country volatility, and in Levy-Yeyati, Panizza and Stein (2007) for source country volatility.

3. MODEL, VARIABLES AND METHODS

In order to identify the sensitivity of FDI inflows to the host and source country's instability, we use a gravity model that links thirty-two countries that were sources of investment to the five largest recipient countries in the MENA region (Egypt, Lebanon, Morocco, Tunisia and Turkey), during the period 1987-2009[10]. The standard expression of the gravity model adapted to bilateral flows of FDI can be written as:

$$FDI_{ij} = A\frac{Y_i^{\beta_1} Y_j^{\beta_2}}{D_{ij}^{\beta_3}} \quad (1)$$

where FDI_{ij} is the annual flow of FDI from source country i to host country j, Y_i and Y_j are the annual GDP levels of the source and host countries, D_{ij} is an indicator of the distance between the two countries, and A, β_1, β_2 and β_3 are the parameters to be estimated. When Equation (1) is log-linearized, it becomes:

$$Ln(FDI_{ijt}) = \alpha + \beta_1 Ln(GDP_{it}) + \beta_2 Ln(GDP_{jt}) - \beta_3 Ln(D_{ijt}) + \beta_4 Macro_{ijt} + \beta_5 Controls_{jt} + u_{ij} + v_t + \varepsilon_{ijt} \quad (2)$$

where, FDI_{ijt} represents the value in dollars of the inflows of FDI from a country i (source country) entering country j (host country) at time t. In order to control for the multilateral resistance terms identified by Anderson and Wincoop (2003), we have chosen to introduce bilateral country-pair fixed effects u_{ij} since, as stressed by Bergstrand and Egger (2007), sources of multilateral resistance appear to move only slowly, and country-pair fixed effects reduce the omitted variable bias associated with unobserved time-invariant pair-specific heterogeneity[11].

If we now consider the right-hand side of equation (2), $Ln(GDP_{it})$ and $Ln(GDP_{jt})$ stand for the natural logarithm of GDP levels of the source and host countries respectively, and β_1 and β_2 take a positive sign if there is a "mass" effect operating in determining bilateral direct investment flows. By extension, higher host country GDP is generally considered to increase horizontal FDI, as the size of the local market is worth being served by a multinational firm's production subsidiary. The *Difference in GDP* per capita (in log form) between the two countries is used as a proxy for the differences in factor endowments or in the level of economic and technological development in each country. The coefficient takes a positive sign if FDI is attracted by low labour costs, and a negative sign if the FDI-related labour requirements are more skill-intensive. D_{ijt} is the vector of the various concepts of distance controlling for the most typical

[10] The country list is given in the Appendix. Algeria is excluded because of the size of the FDI related to energy. Turkey is also treated as a source country for FDI because of its proximity to the European Union.

[11] Random effects enable time-invariant factors such as distance or common border to be controlled for. The time dimension is accounted for by random effects because it enables all kinds of dyadic events, not specified in equation (2), such as bilateral trade or investment treaties, to be controlled for.

sources of transaction and transport costs involved in an investment moving from one country to another. The physical bilateral distance (*Distance*) corresponds to the distance between the countries' capitals[12]; FDI is generally taken as being inversely proportional to the distance between the two countries involved. However, when the host country shares a common border, language, or a former colonial link with the source country, it is generally considered that FDI will be higher. *Adjacency* and *Common language* take the value 1 if the source and host countries respectively share a common border or have a common language; they take the value 0 otherwise[13]. The variable *Past colonial links* takes value 1 if the source country had colonized the host country, and 0 otherwise[14].

$Macro_{ijt}$ is a vector of macroeconomic determinants of FDI inflows concerning either source country *i* or host country *j*, including source and host country characteristics in terms of output volatility (respectively *Volatility source* and *Volatility host*). The expected sign of the *Volatility source* coefficient has been discussed in the previous section. It may be positive or negative, conditional on the dominance of substitution or income effect. As for *Volatility host* coefficient, its sign may also be a priori undetermined. On the one hand, FDI inflows tend to be reduced when the short- and medium-term growth potential of the host economy is afflicted by instability. This point is particularly true in relation to market-led FDI, but is also the case for other categories of foreign investment: investors always seek out a stable macroeconomic environment. On the other hand, financial difficulties imposed on host country domestic firms by a high degree of growth instability can favour opportunity-led investments of a fire-sale type. In that case, FDI inflows should increase in proportion to the host country's growth volatility. From what precedes, we can anticipate that the coefficient for *Instability host* can be either negative or positive, but the opportunity-driven positive effect seems to be plausible for MENA economies, given the nature of the foreign investments they tend to attract.

For each time period, the standard deviation of GDP growth has been calculated for both host and source country. Mean and standard deviation values at time *t* have been computed as a three-year moving average over *t-2*, *t-1* and *t*. We have supposed that investors observe short-term past volatility and compare it for different potential destinations. In order to avoid a null average value, we

[12] Stein and Daude (2007) have also recently shown that differences in time zones have an adverse effect on the location of investment because time distance increases the transaction costs associated with activities necessitating real-time communication and interaction. Given the concentration of our sample on a limited array of time zones, that aspect has not been included in our model.

[13] The influence of former colonial links on the institutional, linguistic and cultural proximities that facilitate the creation of international networks is considered by Bénassy-Quéré, Coupet and Mayer (2007) and Abderrezak (2008) to be a determinant in explaining trade or FDI flows.

[14] It should be noted that *Past colonial links* is a good proxy for legal origin, which appears to be significant in explaining bilateral portfolio investment flows (Lane and Milesi-Ferretti 2008) as well as bilateral FDI flows (Stein and Daude 2007).

have chosen to compute absolute values of standard deviations, and, then, to express them in logarithmic form[15].

$Controls_{jt}$ is a vector of additional determinants of bilateral FDI flows. As it is expected that openness to trade will either tend to increase inflows of efficiency-led FDI by lowering export costs for TNCs, or tend to decrease market-led FDI motivated by tariff-jumping, we control for the degree of openness to trade ($Openness_{jt}$), measured by the ratio of exports to GDP at time *t* for the host country *j*. Dummies for membership of a common regional trade agreement are also included, since integration spurs FDI (Daude, Levy-Yeyati and Stein, 2003), especially that of a North-South nature (Stein and Daude, 2007). As our study uses a sample of both MENA and European countries, we explicitly introduce controls for membership of three regional trade agreements (*GAFTA*, *UMA* and Euro-Med, noted as *MED*). Medvedev (2012) has provided evidence that there is a positive correlation between the size of any two economies bound by a Free Trade Agreement and their mutual FDI flows. Similarly, it has also been found that bilateral investment treaties have positive effects on FDI inflows to developing economies in general (Desbordes and Vicard, 2009), and to MENA economies in particular (Mina, 2012). Here, we focus exclusively on bilateral trade agreements, as they are often associated with increased export processing FDI. Equally, since investment decisions made by TNCs generally use a global evaluation of host country property rights (Ali, Fiess and MacDonald, 2012), any empirical assessment of FDI flows requires the introduction of a variable to control for institutional quality[16]. The comprehensive indicator that is used here, *Investprofil*, is particularly suitable for capturing the impact of business regulation and property rights enforcement on FDI, since it combines ratings of contract viability, risks of expropriation, repatriation of profits and delays in payments[17]. It is also worth remarking that the VIF test reported in Annex1, table A3 does not reject the assumption of no multi-collinearity between our variables.

4. FDI AND SOURCE COUNTRY VOLATILITY: BASELINE ESTIMATIONS

Insofar as our model takes a logarithmic form, it is necessary to deal with the issue of zero value FDI flows. Several alternatives are used in the panel gravity

[15] Although *volatility source* is not likely to be endogenous to FDI levels, volatility host may theoretically be affected by the contemporary level of incoming FDI. To limit this risk, *volatility host* is computed as a three-year moving average including the year t-1 and t-2. Out the three measurements of GDP growth included in the standard deviation computation, one only (that in time t) may be affected by contemporaneous FDI levels. Moreover, FDI to MENA are modest relative to MENA GDP. Furthermore, we have tested our model with *host country* lagged one-year (computed over time t-3, t-2 and t-1) with respect to FDI inflows in time t, with no significant change on the estimated coefficients.

[16] Anderson and Marcouiller (2002) have previously shown that omitting indexes of institutional quality biases typical gravity model estimates of trade.

[17] The definition, source and descriptive statistics of the variables are reported in the Appendix.

model literature. The Eichengreen correction, coupled with Random Effect estimation, is the most commonly used approach in order to circumvent the problem of the zero for dependent variables. It consists of using a simple transformation of the form *ln*(1+FDI), which enables the coefficient to be interpreted as elasticity when the value of *ln*(1+FDI) is approximately equal to *ln*(FDI), which is accepted as a reasonable assumption (Eichengreen and Irwin, 1998). Since the dependent variable is censored, however, the model may also be estimated by using the Tobit method, which presents the advantage of dealing with the problem of zeros, corresponding to null FDI flows, without excluding them. Explicitly accounting for zero FDI flows increases the variation of the dependent variable, thereby producing higher values and significance for the estimated coefficients of the various determinants of FDI. The Tobit Random Effect model, based on maximum likelihood estimation, is considered as a robust approach when dealing with censored data concerning the dependent variable (Eaton and Tamura, 1994; Wei, 2000; Head and Ries, 2008). Our baseline model Random Effect estimations, with the Eichengreen correction, and by the Random Effect Tobit estimator are reported in Table A4.

When the model does suffer from heteroscedasticity, however, the gravity model Poisson estimation is to be preferred, as shown by Santos Silva and Tenreyro (2006). The tests reported in the lower panel of columns A4.1 and A42 (Table A4) show that we cannot reject the hypothesis of heteroscedasticity in our case. Our preferred estimator is thus the Poisson Pseudo-Maximum Likelihood, with estimation results being reported in the first two columns of Table 2.

The baseline regression (Column 2.1) is in accordance with the results of the existing literature. *GDP source* has the expected positive influence on FDI flows. If *GDP host* is not significant *per se*, the difference between it and *GDP source* significantly increases FDI flows, meaning that the greater the technological distance, the greater the investment flow. This confirms that FDI to MENA countries may be more vertical than horizontal. The two variables controlling for cultural distance have contrasted impacts on FDI flows. Whereas a common language seems to slightly increase FDI flows between two countries, signalling a reduction in transaction costs, the existence of past colonial links has no effect. This result is confirmed by the positive and significant impact of the quality of institutions (*InvestProfil*) in host countries, which confirms that minimizing transaction costs is an objective of European firms when they invest in the Mediterranean periphery.

As for the two variables assessing transport costs, *Adjacency* and *Distance*, they are not significant, suggesting that geographical distance does not explain the location of FDI as far as the five MENA economies in our sample are concerned. Although this result would be surprising if obtained on the basis of a worldwide sample, it is more understandable in the context of our sample. Since all source countries are geographically close to the five receivers, there is very low observable heterogeneity in the geographical distances. Although trade openness has no effect on FDI levels to MENA economies, regional integration has a positive influence, since *GAFTA* and *AMU* both show a positive and significant coefficient. The significant effect of the Euro-Med dummy (*MED*),

moreover, confirms that the reduction of both the institutional distance and trade barriers increases FDI flows for European firms, irrespective of the particular colonial history of the source and host countries.

Having first examined the standard determinants invoked in the empirical analyses of bilateral FDI flows, we can now proceed to consider the simultaneous effects of our specific variables that focus on macroeconomic instability: host and source country output instability.

Table 2: FDI levels: Baseline Poisson estimation, with GDP instability and war (Student *t*)

	2.1	2.2	2.3
Openness	-.180 (-3.28)***	-.101 (-1.77)*	-.0874 (-1.51)
MED	.166 (5.26)***	.173 (5.43)***	.183 (5.70)***
AMU	.947 (4.94)***	.593 (2.67)***	.605 (2.72)***
GAFTA	.317(4.83)***	.275 (3.81)***	.290 (3.99)***
InvestProfil	.090 (12.27)***	.091 (11.66)***	.090 (11.57)***
GDP source	.481 (11.96)***	.373 (8.71)***	.374 (8.72)***
GDP host	.032 (0.92)	.050 (1.38)	.229 (0.59)
Difference in GDP per capita	.170 (6.42)***	.163 (6.06)***	.160 (5.96)***
Distance	-.293 (-1.31)	-.229 (-1.00)	-.216 (-0.94)
Adjacency	-.264 (-1.01)	-.253 (-0.97)	-.257 (0.99)
Past colonial links	.096 (0.17)	.253 (0.47)	.255 (0.45)
Common language	.492 (1.77)*	.351 (1.25)	.327 (1.17)
Volatility source	-	.035 (5.38)***	.035 (5.36)***
Volatility host	-	-.309 (-2.03)**	-.080 (-0.44)
War	-	-	-.490 (-2.68)***
Post War	-	-	-.002 (-0.02)
Constant	-6.866 (-3.89)***	5.863 (-3.20)***	-5.572 (-3.84)***
Log likelihood	6832.770	6394.726	6390.425
LRTest	χ^2 = 4451.83***	χ^2 =4259.38 ***	χ^2= 4219.55***
Wald χ^2	2321.92***	1799.86***	1800.14***
AIC	13693.54	12821.45	12817.12
BIC	13779.28	12985.93	12925.85

*Notes: *, **, *** significant at 10%, 5% and 1% risk.*
*Number of observations: 3375; Number of years: 23; Number of country-pairs: 27*5=135.*

The negative sign of Volatility host in column 2.2 shows that host countries exhibiting more GDP instability attract significantly lower FDI. This result seems somewhat contradictory with the fact that MENA economies attract vertical rather that horizontal FDI. The hypothesis cannot be rejected, however, that this result could be driven by the particularities of Lebanon during both wartime and post-war periods. The wartime period necessarily exacerbated GDP instability in Lebanon, while FDI nose-dived, thereby possibly producing an adverse relationship between host GDP volatility and FDI inflows. As for the post-war reconstruction period, from 1991 onwards, with its context of high GDP growth variation springing from growth and FDI recovery, it may have induced a positive relationship between GDP host and FDI inflows. As the net effect of the Lebanese war on the estimated impact of GDP volatility on FDI

might be contradictory, a war dummy, taking the value 1 for the Lebanon between 1987 and 1991 and 0 otherwise, and a post-war dummy taking value 1 for the Lebanon from 1992 to 1995, and 0 otherwise were simultaneously introduced into Equation 2. Column 2.3 shows that the coefficient for host GDP growth volatility is no more significant when the two dummies are introduced as additional controls[18]. When the particular characteristics of the Lebanese wartime and post-war periods are controlled for, FDI is no longer dependent on macroeconomic conditions in MENA countries, which is more consistent with the type of investment that traditionally flows to this region. As mentioned above, FDI to our five MENA economies is generally resource-based and vertical, with little likelihood of sensitivity to macroeconomic conditions in host countries (Sadik and Bolbol, 2001; Nicet-Chenaf and Rougier, 2011).

As far as output volatility in source countries is concerned, we find that it significantly increases FDI towards our sample of MENA economies (Columns 2.2 and 2.3). This result suggests that, in response to source country output volatility, the investors in our sample may well arbitrate between investment options at home and abroad, thereby lending support to the substitution view put forward by Levy-Yayeti, Panizza and Stein (2007) or Cavallari and D'Addona (2012). As our indicator of output instability does not allow us to differentiate between boom and bust cycles, FDI cannot be considered as being strictly counter-cyclical relative to the source country and pro-cyclical relative to the host country.

5. VOLATILITY, TRADITIONAL AND NON-TRADITIONAL SOURCES OF FDI

Focusing on source country macroeconomic characteristics, it could be argued that the estimated positive effect of GDP instability on FDI levels is driven by a selection bias. Firms from more stable countries might invest more in MENA countries because they are more internationalised than those from more unstable economies. One reason for this could be that less stable economies, those located at the periphery of Europe in our sample, are less developed. This means that their firms are further from the technological frontier than those from more stable and developed economies and this distance limits their capacity to invest at an international level. The positive coefficient of *Volatility source* might thus simply reflect the fact that more developed economies are also more stable, and that their firms invest more in less developed countries than is the case for firms from less stable economies.

In order to test this hypothesis, the set of source countries has been separated into two subsets in terms of average GDP level. The first subset, labelled *Central*, is composed of the most developed Western European economies which are also the traditional sources of investment to MENA economies[19]. The sec-

[18] Since *Post war* has never entered significantly into the explanation of FDI levels, it has been withdrawn from subsequent estimations. We checked that our main findings remain unchanged when *Post war* is removed (Column 3.1 in Table 3).

[19] This subset includes members of the European Union before the accession of Eastern and Central European countries, plus Switzerland and Norway.

ond group, labelled *Peripheral*, includes less developed and stable economies located in the periphery of Europe[20]. They are non-traditional sources of FDI to MENA economies in the sense that their firms have only started investing abroad very recently. The standard deviation of GDP growth, computed over the whole period for the *Central* group, is about half (.001435) that of the *Peripheral* group (.002887): these mean values are statistically different. Hence, the *Central* group of source countries is significantly less volatile than the peripheral one. Two separated estimations of Equation 2 were carried out, one for each subset (*Central* and *Peripheral),* and a Chow test was performed to check the hypothesis that FDI behaviour might be differentiated according to the type of source country. The results of these estimations are reported in columns 3.1 and 3.2 of Table 3.

Column 3.1 of Table 3 shows a positive and significant FDI effect of *Volatility source* for the *Central* subgroup of source countries. In addition, the positive sign of the *Volatility host* coefficient suggests that FDI from traditional Western European sources tends to be lower when volatility is higher in our MENA host countries. Conversely, column 3.2 shows that, although FDI from more unstable *Peripheral* economies increases in response to host country output volatility, it tends to be reduced when domestic output volatility is higher since the coefficient of *Volatility source* is negative. The Chow test reported in the lower panel of Columns 3.1 and 3.2 confirms that the two estimations have significantly different coefficients.

Thus, our results for the whole sample may be driven by the behaviour of the core European firms, with those of the European periphery having adopted very different behaviour with respect to host country instability. This finding suggests that the substitution effect found for the whole sample was essentially due to the more developed core European economies. TNCs from the less stable *Peripheral* economies tend, on the contrary, to reduce their investment abroad in times of higher domestic instability, thereby being subject to a revenue effect. FDI is therefore reactive to volatility in the host country, with different patterns of reaction being observed for traditional and non-traditional sources. Since the estimated coefficients for *Volatility host* are different across the two subgroups, our findings also highlight the fact that FDI sensitivity to host country volatility is significantly different according to the country of origin of TNCs. Although firms from the core European market tend to invest less in the more volatile MENA host economies, those from the periphery of Europe tend to be more attracted by those volatile economies. Hence, not only do our results confirm the finding published recently by Andrès, Busse and Nunnenkamp (2012) that FDI from traditional sources (developed economies) exhibits different sensitivity to host country conditions than FDI from non-traditional sources, but our results also generalize this differentiation in the sensitivity to the volatility of the source country.

[20] Eastern and Central European (Hungary), Mediterranean (Malta) and MENA countries (Egypt, Morocco, Tunisia, Turkey, Lebanon, Syrian Arab Republic, Jordan, Mauritania).

Table 3: Estimations of FDI levels: Chow tests (Student *t*)

	3.1	3.2	3.3	3.4
N=3375	First group *Central*	Second group *Peripheral*	First group 1987-1995	Second group 1996-2009
Openness	-.251 (-4.02)***	.739 (3.87)***	.092 (0.70)	-.160 (-1.98)**
MED	.212 (6.24)***	.281 (1.66)*	-	.384 (7.33)***
AMU	-	.278 (1.14)	.632 (2.66)**	1.075 (1.79)*
GAFTA	-	.052 (0.54)	-	.300 (1.91)**
InvestProfil	.080 (9.62)***	.153 (6.10)***	.119 (6.44)***	.079 (8.29)***
War	-.362 (-2.11)**	-22.521 (-0.01)	-.297 (-1.32)	-
Volatility source	.059 (7.60)***	-1.211 (-3.06)***	.0189 (0.05)	.028 (2.55)**
Volatility host	-.316 (-1.74)*	2.061 (3.26)***	-.589 (-1.69)*	.202 (0.91)
GDP source	.560 (8.47)***	.069 (0.82)	.757 (7.26)***	.226 (4.32)***
GDP host	-.056 (1.21)	.421 (3.32)***	-.043 (-0.37)	.093 (2.06)**
Difference in GDP p.c.	.064 (2.07)**	.227 (4.70)***	.159 (2.00)**	.129 (4.59)***
Distance	-.776 (-2.59)***	.086 (0.21)	-.332 (-1.07)	-.040 (-0.13)
Adjacency	-.308 (-1.13)	-.555 (-0.84)	-.536 (-1.54)	-.196 (-0.71)
Past colonial links	.2161 (0.13)	1.747 (1.28)	.232 (0.30)	.608 (1.00)
Common language	-.079 (-0.23)	1.304 (2.01)**	1.480 (3.65)***	.026 (0.06)
Constant	2.370 (0.96)	-11.727 (-3.50)***	-11.370 (3.75)***	-4.954 (2.42)**
Log likelihood LR test	-4664.617 χ^2)= 2153.89 Prob>χ^2=0.0000	-1628.036 χ^2)= 1112.85 Prob>χ^2=0.0000	-1787.328 χ^2)= 4366.37 Prob>χ^2=0.0000	-4011.767 χ^2)= 3607.37 Prob>χ^2=0.0000
Wald χ^2 test	Waldχ^2(14)=230Prob>χ^2=0.0000	Waldχ^2(16)=547 Prob > χ^2 = 0.0000	Waldχ^2(15)=284.3 Prob > χ^2 = 0.0000	Waldχ^2(14)=470 Prob>χ^2=0.0000
Instability source Instability host		χ^2(2)=13.21 Prob > χ^2 = 0.0001		χ^2(2)=44.07 Prob > χ^2 = 0.000
Group		χ^2(3)=29.68 Prob > χ^2 = 0.0001		χ^2(3)=18.22 Prob > χ^2 = 0.00010
GDP source GDP host		χ^2(2)=74.06 Prob > χ^2 = 0.0000		χ^2(2)=24.06 Prob > χ^2 = 0.0000
Group		χ^2(3)=74.40 Prob > χ^2 = 0.000		χ^2(3)=45.27 Prob > χ^2 = 0.0000

*Notes: *, **, *** significant at 10%, 5% and 1% risk.*

A related issue is whether our results are driven by a specific sub-period. It is likely that the determinants of European FDI flows to MENA countries changed after the 1995 Barcelona agreement. We test this assumption by estimating Equation 2 for the two periods before and after 1995, and perform a Chow test. As assumed, our estimations, reported in columns 3.3 and 3.4 (and in the lower panel for the Chow test), show a structural break for 1995 in the empirical model used to explain FDI levels to MENA economies. That particular year corresponds to the Barcelona agreement that eased trade and investment between European Union and MENA countries. Columns 3.3 and 3.4 show that our main results are driven more by the post-1995 period, opening with the Barcelona agreement, than by the pre-1995 period, which, moreover, includes

both the Lebanese war and post-war reconstruction. Equally, column 3.3 shows that, prior to 1995, host country instability and the existence of a common language were critical factors for attracting FDI to our MENA countries. The results reported in column 3.4 show that it is only after 1995 that source country output volatility became so significant in explaining FDI levels. In a sense, the 1995 Barcelona agreement reinforced MENA countries' vulnerability to European short- and medium-term macroeconomic cycles. By the same token, after the Barcelona agreement, economic governance and cultural proximity became less significant, whereas MENA-European Union trade agreements became more significant in explaining both FDI levels.

6. ROBUSTNESS CHECKS

In this section, we address several issues related to the robustness of our results.

The first issue is that focusing on such country-level indicators of macroeconomic instability as standard deviation of GDP growth could entail a misspecification bias arising from the fact that the real volatility that reduces FDI flows to MENA economies may be global instead of being related to source country characteristics. Méon and Sekkat (2012) have recently provided convincing evidence that global waves of increase in FDI can outweigh the most prominent domestic determinants of attractiveness to FDI. In our initial model, waves of FDI were not controlled for. However, as that might have led to an overestimation of the impact of source country macroeconomic characteristics, an indicator of global FDI waves, similar to that of Méon and Sekkat (2012) was subsequently introduced[21], leaving the coefficients for source country and host country instability unchanged (Table 4). Insofar as FDI instability tends to be as important as FDI levels to explain economic development (Lensink and Morissey, 2006; Choong and Liew, 2009), we also tested our gravity equation with three-year moving average standard deviations of FDI inflows as the dependent variable[22]. The estimation results, reported in columns 4.2 and 4.4 of Table 4, show that although MENA countries do not attract more foreign investment when world FDI increases, FDI waves tend to reduce FDI volatility, with likely positive effects on future economic growth.

The second issue is that focusing on three-year moving averages might lead to overestimating the coefficients used to measure the effect of host and source country GDP volatility on FDI. Column 5.2 of Table 5 shows that when an alternative computation of GDP instability (five year-moving standard deviation) is used, our main findings remain unchanged. The coefficients estimated for *Volatility source* and *Volatility host* are, thus, robust to a change in the measurement of output volatility.

[21] The World FDI wave indicator consists of the annual value of world FDI outflows; similarly, the European FDI wave is computed as the annual value of European FDI outflows.

[22] So as to limit any reciprocity bias, GDP volatility is lagged by one year in these two estimations.

Table 4: FDI levels and FDI waves (Student *t*)

	4.1 FDI Levels	4.2 FDI volatility	4.3 FDI Levels	4.4 FDI volatility
Openness	-.083 (-1.44)	.382 (3.98)***	-.082 (-1.42)	.386 (4.01)***
MED	.1915 (5.65)***	.074 (1.22)	.191 (5.55)***	.070 (1.12)
AMU	.605 (2.72)***	-.009 (-0.04)	.603 (2.71)***	-.007 (-0.03)
GAFTA	.299 (4.07)***	-.053 (-0.54)	.300 (4.05)***	-.057 (-0.57)
InvestProfil	.093 (10.74)***	.021 (1.32)	.093 (10.74)***	.0142 (0.89)
War	-.475 (-2.68)***	.684 (2;97)***	-.474 (-2.66)***	.701 (2;98)***
Europe FDI wave	-.016 (-0.75)	-.167 (-4.30)***	-	-
World FDI wave	-	-	-.0178 (-0.64)	-.100 (3.87)***
Volatility source	.036 (5.41)***	.0001 (0.01)	.036 (5.39)***	.001 (1.69)*
Volatility host	-.086 (-0.50)	-1.540 (-5.12)***	-.091 (-0.52)	-1.598 (-5.29)***
GDP source	.378 (8.70)***	.351 (6.14)***	.378 (8.76)***	.353 (6.12)***
GDP host	.034 (0.84)	.832 (12.43)***	.037 (0.87)	.866 (11.62)***
Diff. in GDP p.c.	.162 (6.01)***	-.054 (-1.75)*	.162 (5.99)***	-.057 (-1.84)**
Distance	-.220 (-0.97)	-.269 (-1.14)	-.222 (-0.97)	-.280 (-1.17)
Adjacency	-.255 (-0.98)	-.287 (-1.03)	-.255 (-0.98)	-.289 (-1.03)
Past colonial links	.255 (0.45)	.123 (0.22)	.255 (0.45)	.121 (0.22)
Common language	.341 (1.21)	.728 (2.46)*	.343 (1.22)	.737 (2.46)*
Constant	-5.421 (-2.95)***	-16.209 (-7.97)***	-5.418 (-2.94)***	-16.375 (-7.93)***
Log likelihood	-6390.275	-4287.048	-6390.350	-4290.267
LR test	χ^2 = 4067.55 Prob>χ^2=0.0000	χ^2 = 1336.71 Prob>χ^2=0.0000	χ^2 = 4004.60 Prob > χ^2 = 0.0000	χ^2 = 1341.60 Prob>χ^2=0.0000
Wald χ^2 test	Wald χ^2 (16)= 1791.28 Prob>χ^2=0.0000	Wald χ^2 (16)= 815.85 Prob>χ^2=0.0000	Wald χ^2 (16)= 1791.35 Wald χ^2= 0.0000	Wald χ^2 (16)= 802.61 Prob>χ^2=0.0000
AIC	12816.55	8610.097	12816.7	8616.535
BIC	12925.28	8718.83	12925.44	8725.269

*Notes: *, **, *** significant at 10%, 5% and 1% risk.*
Number of observations: 3375; Number of years: 25; Number of country-pairs: 140.

The third issue concerns the indicator of volatility. The value of a distribution's standard deviation is proportional to the value of its arithmetic mean. It might thus be argued that, because they operate in more dynamic domestic markets, firms from more volatile source countries tend to invest more abroad because their revenues are higher. The positive coefficient estimated for source country volatility would therefore reflect revenue rather than a substitution effect.

In order to test the robustness of our results with respect to the indicator of volatility, while checking the assumption of a revenue effect, we computed a coefficient of variation using the following formula:

$$\mathrm{Cv}_{jt} = \frac{\sigma_{\mathrm{GDP}_{jt}}}{\mathrm{Mean}_{\mathrm{GDP}_{jt}}} \qquad (3)$$

where, $\sigma_{\mathrm{GDP}jt}$ is the standard deviation of the GDP growth rate for country *j* at period *t*, and $\mathrm{Mean}_{\mathrm{GDP}jt}$ is the average rate of growth of the GDP for country *j* over the same period *t*. The standard deviation is thus corrected for the GDP growth size effect. The results of the regressions of FDI levels on three-year and five-year moving coefficients of variation are reported in Table 5.

Table 5: Regressions of FDI levels: 5 year-moving standard deviations, 5 year-moving and 3 year-moving coefficients of variation (Student *t*)

	5.1 5-year moving standard deviations	5.2 5-year moving standard deviations	5.3 3-year coefficients of variation	5.3 5-year coefficients of variation
Openness	-.156 (-2.82)***	-.077 (-1.08)	-.091 (-1.16)	-.077 (-1.20)
MED	.170 (5.39)***	.167 (4.63)***	.175 (5.47)***	.162 (4.55)***
AMU	.957 (4.99)***	1.050 (1.83)*	.619 (2.79)***	1.049 (1.83)**
GAFTA	.325 (4.54)***	.279 (3.77)***	.311 (4.31)***	.276 (3.74)***
InvestProfil	.087 (11.71)***	.078 (9.14)***	.089 (11.48)***	.077 (9.03)***
War	-.450 (2.84)***	-.134 (-0.75)	-.476 (-2.63)***	-.135 (-0.75)
GDP source	.487 (12.11)***	.386 (8.86)***	.426 (10.15)***	.389 (8.94)***
GDP host	.017 (0.49)	.087 (1.76)*	.008 (0.23)	.089 (1.89)**
Diff. in GDP p.c.	.171 (6.45)***	.135 (5.08)***	.151 (5.67)***	.136 (4.11)***
Distance	-.285 (-1.28)	-.171 (0.73)	-.251 (-1.12)	-.175 (-0.75)
Adjacency	-.267 (-1.02)	-.254 (-0.98)	-.252 (-0.97)	-.253 (-0.98)
Past colonial links	.086 (0.15)	.292 (0.2)	.144 (0.26)	.287 (0.51)
Common language	.487 (1.75)*	.251 (0.83)	.397 (1.42)	.260 (0.86)
Volatility source	-	.045 (3.53)***	.510 (3.65)***	.714 (3.53)***
Volatility host	-	-.331 (-1.81)*	-1.79 (-0.58)	-6.764 (-2.14)**
Constant	-6.848 (-3.90)***	-7.122 (-3.73)***	-5.992 (-3.33)***	-7.165 (-3.78)***
Log likelihood	-6828.250	-5929.180	-6397.902	-5928.500
LR test	χ^2= 4366.37 Prob>χ^2=0.0000	χ^2= 4036.30 Prob>χ^2=0.0000	χ^2= 4217.74 Prob>χ^2=0.0000	χ^2= 4032.34 Prob>χ^2=0.0000
Wald χ^2 test	Wald χ^2 (13)= 2315.20 Prob>χ^2=0.0000	Waldχ^2(14)= 1341.26 Prob>χ^2=0.0000	Wald χ^2(14)= 1765.64 Prob > χ^2 = 0.0000	Wald χ^2(14)= 1342.26 Prob>χ^2=0.0000
AIC	13686.51	13676.62	12829.81	11891
BIC	13778.37	13758.28	12932.5	11992.1

*Notes: *, **, *** significant at 10%, 5% and 1% risk.*
*Number of observations: 3775; Number of years: 21; Number of country-pairs: 28*5=140.*

Columns 5.3 and 5.4 show that the coefficient of *Volatility source* keeps its positive sign when measured by a coefficient of variation (instead of a standard deviation) and remains significant. This is especially the case when instability is measured by 3-year moving coefficients of variation. It should also be noted that when computed as 5-year moving coefficients of variation, the adverse effect of *Volatility host* becomes significant, even when the effect of the Lebanese war on FDI is controlled for. Since the coefficient of *Volatility source* remains positive even after controlling for the size effect, the positive impact of the standard deviation of GDP growth is not driven by the fact that the most volatile countries are also those where the growth rates of aggregate income and corporate revenues are the highest. Thus rejecting the revenue effect reinforces the conclusion that there is a substitution effect.

The fourth and final issue concerns the influence of host country nominal instability on our core results. Although our paper focuses on the impact of real volatility on FDI flows to MENA countries, nominal sources of instability, notably affecting domestic prices or exchange rates, may also be relevant to explaining the attraction of FDI. We tested the impact of price instability and ex-

change rate fluctuations on FDI to MENA countries and checked whether or not it changed our basic results with respect to real volatility. We first tested the impact of host country inflation on FDI. Whereas inflation may reduce FDI inflows, it could also explain the impact of host country GDP volatility on FDI flows in the case where GDP volatility is mainly provoked by price variations. Column 6.1 of Table 6 shows that although inflation reduces FDI inflows, it does not change the estimated value and significance of our core GDP volatility variables.

The assumption that exchange rate volatility may increase fire-sale FDI in developing MENA economies has also been tested. According to Kaminsky, Lizondo and Reinhart (1998), an exchange rate crisis is typically a situation in which a speculative attack leads to a sharp depreciation of the local currency and to considerable losses in exchange reserves, especially in the case of fixed or pegged regimes. Although exchange rate crises are expected to have a negative impact on FDI, especially vertical FDI, they may foster fire sale investments attracted by low-price Merger & Acquisition opportunities in times of high frequency exchange rate crises (Krugman 2000; Aguiar and Gopinath 2005). Our indicator of exchange rate volatility takes the value 1 if the country has experienced a large variation in the value of the real exchange rate or of its foreign currency reserves, and 0 otherwise. The algebra of the indicator is reported in Annex 2.

Table 6: FDI levels and nominal instability (Student *t*)

	6.1	6.2
Openness	-.087 (-1.52)	-.075 (-1.31)
MED	.174 (5.43)***	.173 (5.41)***
AMU	.622 (2.80)***	.6393 (2.88)***
GAFTA	.310 (4.29)***	.309 (4.27)***
InvestProfil	.089 (11.38)***	.083 (10.03)***
GDP source	.429 (10.19)***	.441 (10.44)***
GDP host	.007 (0.19)	-.020 (0.51)
Difference in GDP p.c.	.148 (5.55)***	.1535 (5.73)***
Distance	-.253 (-1.12)	-.242 (-1.09)
Adjacency	-.254 (-0.98)	-.261 (-1.01)
Past colonial links	.137 (0.24)	.107 (0.19)
Common language	.396 (1.42)	.373 (1.34)
Volatility source	.0384 (3.60)***	.038 (3.64)***
Volatility host	-.1438 (-0.78)	-.048 (-0.28)
War	-.456 (-2.55)***	-.528 (-2.99)***
Exchange rate crisis	-.029 (-1.36)	-
Inflation	-	-.037 (-2.62)***.
Constant	-6.000 (-3.34)***	-5.772 (-3.21)***
AIC	12830.13	1771.60
BIC	12938.86	12933.87
Log Likelihood	-6397.062	-6394.566
Likelihood ratio test	χ^2 = 4205.90 ***	χ^2 = 4227.83 ***
	Wald χ2= 1767.44***	Wald χ2= 1771.60***

*Notes: *, **, *** significant at 10%, 5%, 1% risk. N. of observations: 3220; N. of years: 23; N. of country-pairs: 28*5=140.*

Our estimations, reported in column 6.2 of Table 6 show that real exchange rate crises have no effect on the FDI levels received by our five MENA economies, suggesting that fire sales, or Mergers & Acquisitions driven by price opportunities, are not the dominant form of foreign investment in the countries in our sample. It does not modify the estimated value of our core GDP instability variable coefficients. This result is consistent with the significantly higher proportion of green-field investment in total FDI, which differentiates MENA economies from those in other developing regions.

7. CONCLUSION AND POLICY ISSUES

In the present paper, we analyse the impact of output volatility on FDI location in Middle Eastern and North African countries within the framework of a gravity model. As such a model allows the reduction of risks and costs associated with distance (geographical, linguistic and legal) to be controlled for, this enables the impact of macroeconomic sources of risks and costs on FDI to be differentiated from other sources of risks and costs. Additionally, since the gravity model allows the effect on FDI of various determinants concerning source countries to be assessed, our paper has been able to pay special attention to the impact of source country output volatility on FDI. We could therefore consider output volatility in both source and host countries, and find evidence of opposing impacts on FDI flows for these two variables, when controlling for bilateral and host country characteristics such as economic and political risk, trade openness and distance.

More specifically, we first show that FDI to MENA countries increases with the level of output volatility in the source country, therefore supporting the assumption of a substitution effect between domestic and foreign investment for our sample source countries. Second, we find that MENA countries with a higher level of output instability tend to attract less FDI, but this result is sensible to the control for Lebanon war. We also found that after the introduction of the Euro-Med agreement, institutional or cultural distances started to fall, with short-term macroeconomic factors of attraction also becoming less important in explaining European investment in MENA economies. Third, we show that FDI from non-traditional sources (in our sample essentially least-developed non-European Mediterranean countries) tends to have adopted radically different patterns of reaction to economic fluctuations in both the source and host countries than FDI originating from traditional sources (the most highly-developed Western European countries). Although FDI coming from central European countries is higher when volatility is higher in source and lower in host MENA countries, FDI sourced from countries located at the Europe periphery (mostly non-European Mediterranean countries) is lower when volatility is higher in source and lower in host MENA countries. Hence, our results confirm recent finding that FDI from traditional and non-traditional sources exhibits different sensitivity to host country conditions (Andrès, Busse and Nunnenkamp 2012), by focusing on macroeconomic volatility rather than on institutional quality. Furthermore, our findings extend this differentiation to the FDI sensitivity to home country volatility.

As for the policy issues raised by our findings, there are two of them. First, although regional integration increases levels of FDI to developing economies via the reduction of microeconomic transaction costs, it also tends to raise the macroeconomic costs associated with volatility. When business cycles are synchronised in the different peripheral economies of our sample, FDI coming from non-traditional sources (other MENA economies and countries of the European periphery, such as Malta or Hungary) is more prone to be pro-cyclical and transmit source country instability than FDI coming from more traditional (Western Europe) sources. Thus, deepening integration to central European economies, via association agreements, would be more beneficial to MENA economies than increasing purely regional integration since it could reduce the risks related by pro-cyclical FDI behaviour. Second, our results challenge the currently widely-held idea that, because FDI is less pro-cyclical than the other forms of financial inflow, it is a more stable source of external finance for developing economies (Fernandez-Arias and Hausmann 2001; Calderón and Didier 2009). Developing economies, like those of MENA countries, that are dependent on foreign investment, can finally suffer from external sources of macroeconomic instability that are not global but, instead, related to the countries whence the FDI comes.

Consequently, although diversifying FDI sources towards non-traditional investors is necessary for MENA countries, especially by increasing regional trade and value chain integration, MENA countries should find new partners outside the MENA region. Trying to increase their attractiveness to Asian investors could be a very positive development for the countries of the region. A good policy would be to diversify the portfolio of FDI sources so that pro-cyclical and counter-cyclical effects could compensate, with limited effect on the level of FDI flowing to MENA economies.

REFERENCES

Abderrezak, A. 2008. "Foreign direct investment in the MENA region: Is there a colonisation memory effect?". *The Journal of North African Studies* 13, no. 2: 219-226.

Aguiar, M., and G. Gopinath. 2005. "Fire-sale foreign direct investment and liquidity crises". *The Review of Economics and Statistics* 87, no. 3: 439-452.

Ahluwalia, P. 2000. "*Discriminating contagion: An alternative explanation of contagious currency crises in emerging markets"*. IMF working paper WP/00/14, The International Monetary Fund, Washington D.C.

Aizenman, J. 2003. "Volatility, employment and the patterns of FDI in emerging markets". *Journal of Development Economics* 72, no. 2: 585-601

Ali, F.A., N. Fiess, and R. MacDonald. 2010. "Do institutions matter for Foreign Direct Investment?". *Open Economies Review* 21, no. 1: 201-219.

Anderson, J.E., and D. Marcouiller. 2002. "Insecurity and the pattern of trade: An empirical investigation". *The Review of Economics and Statistics* 84, no. 2: 342-352.

Anderson, J. E., and E. van Wincoop. 2003. "Gravity with gravitas: A solution to the border puzzle". *American Economic Review* 93, no. 1: 170-192.

Andrés M. S., P. Nunnenkamp, and M. Busse. 2012. "*What drives FDI from non-traditional sources ? A comparative analysis of the determinants of bilateral flows"*. Kiel Institute for the World Economy Working Papers No. 1755. Kiel Institute for the World Economy, Kiel, Germany.

Apergis, N., C. Katrakilidis. 1998. "Does inflation uncertainty matter in foreign direct investment decisions? An empirical investigation for Portugal, Spain and Greece". *Rivista internazionale di Scienze economiche e commerciali* 45, no. 4: 729-744.

Aysan, A., G. Pang, and M.-C. Véganzonès-Varoudakis. 2009. "Uncertainty, economic reforms and private investment in the Middle East and North Africa". *Applied Economics* 41, no. 11: 1379-1395.

Bechri, M. 1999. "*Institutional obstacles, reform uncertainty and Tunisia's integration with the European Union"*. ERF/OECD/World Bank: The Dynamics of New Regionalism in MENA: Integration, Euro-Med Partnership Agreements & After, Cairo, February 6th and 7th of 1999.

Bénassy-Quéré, A., L. Fontagné, and A. Lahrèche-Révil. 2001. "Exchange-rate strategies in the competition for attracting foreign direct investment". *Journal of the Japanese and International Economies* 15, no. 1: 178-198.

Bénassy-Quéré, A., M. Coupet, and T. Mayer. 2007. "Institutional Determinants of Foreign Direct Investment". *The World Economy* 30, no. 5: 764-782.

Bergstrand, J. H., and P. Egger. 2007. "A knowledge-and-physical-capital model of international trade flows, foreign direct investment, and multinational enterprises". *Journal of International Economics* 73, no. 2: 278–308.

Bevan, A.A., and S. Estrin. 2004. "The determinants of foreign direct investment into European transition economies". *Journal of Comparative Economics* 32, no. 4: 775-787.

Bloningen, B. 2005. "A review of the empirical literature on FDI determinants." NBER *Working Paper No. 11299*. National Bureau of Economic Research, Cambridge, MA.

Busse, M., J. Königer, P. Nunnenkamp. 2010. "FDI promotion through bilateral investment treaties: more than a bit?".*Review of World Economics* 146:147-177.

Calderón, C. and T. Didier. 2009. "Will FDI be Resilient in this Crisis?" *Mimeo.* The World Bank, Washington D.C.

Cavallari L. 2010. "Exports and FDI in an endogenous-entry model with nominal and real uncertainty". *Journal of Macroeconomics* 32, no. 2: 300-313.

Cavallari, L., S. D'Addona. 2012. *"Nominal and real volatility as determinants of FDI." Mimeo.* University of Roma 3.

Chan, K. K., and E. R. Gemayel. 2004. "Risk instability and the pattern of FDI in the MENA region". IMF *Working Papers WP/04/139*. Washington D.C.

Choong, C.-K., and V. K.-S. Liew. 2009. "Impact of foreign direct investment volatility on economic growth of ASEAN-5 countries". *Economics Bulletin* 29, no. 3: 1829-1841.

Daude, C., E. Levy-Yeyati, and E. Stein. 2003. “Regional Integration and the Location of FDI”. *Working Paper 492*. Inter-American Development Bank.

Demekas, D,G, B. Horváth, E. Ribakova, and Y. Wu. 2007. "Foreign direct investment in European transition economies: The role of policies". *Journal of Comparative Economics* 35, no. 2: 369-386.

De Mello-Sampayo, F. 2009. “Competing-destinations gravity model: an application to the geographic distribution of FDI”. *Applied Economics* 41, no. 17: 2237-2253.

Desbordes, R., and V. Vicard. 2009. “Foreign Direct Investment and bilateral investment treaties: An international political perspective”. *Journal of Comparative Economics* 37, no. 3: 372-386.

Head, K., and J. Ries. 2008. “FDI as an outcome of the market for corporate control: Theory and evidence”. *Journal of International Economics* 74, no. 1: 2-20.

Eichengreen, B. J. 2000. “Taming capital flows”. *World Development* 28, no. 6: 1105-1116.

Eichengreen, B. J., and D.A. Irwin. 1998. “The role of history in bilateral trade flows”. In *The Regionalization of the World Economy*, ed. J. A. Frankel. Cambridge, Mass: National Bureau of Economic Research.

Evenett, S.J., and W. Keller. 2002. “On theories explaining the success of the gravity equation”. *Journal of Political Economy* 110, no. 2: 281-316

Fernandez-Arias, E., and R. Hausmann. 2001. “Is Foreign direct investment a safer form of financing?”. *Emerging Markets Review* 2, no. 1: 34-49

Frenkel, M., K. Funke, and G. Stadtmann. 2004. “A panel analysis of bilateral FDI flows to emerging economies”. *Economic Systems* 28, no. 3: 281-300.

Ishii, S., K. Habermeier, B. Laurens, J. Leimone, J. Vadasz, and J.I. Canales-Kriljenko. 2002. “Capital account liberalization and financial sector stability”. IMF Occasional Paper 211. Washington D.C.: The International Monetary Fund.

Kaminsky, G., S. Lizondo, and C. Reinhart. 1998. “Leading indicators of currency crises”. *IMF Staff Papers* 5, no. 1: 1-48.

Kiyota, K., and S. Urata. 2004. “Exchange rate, exchange rate volatility and foreign direct investment”. *The World Economy* 27, no. 10: 1501-1536.

Koren, M., and S. Tenreyro. 2007. “Volatility and development”. *The Quarterly Journal of Economics* 122, no. 1: 243-287.

Kose, M. A., E. Prasad, K.S. Rogoff, and S.-J. Wei. 2009. “Financial Development: A reappraisal”. *IMF Staff Papers* 56, no. 1: 8-62.

Krugman, P. 2000. Fire-sale FDI. “In *Capital Flows and the Emerging Economies: Theory, Evidence, and Controversies”*, ed. S. Edwards. Chicago, Ill.: The University of Chicago Press for the NBER.

Lane, P., and G. M. Milesi-Ferretti. 2008. “International Investment Patterns”. *Review of Economics and Statistics* 90, no. 3: 538-549.

Lederman, D. 2011. Large devaluations, foreign direct investment and exports: A speculative note. *Policy Research Working Paper 5619*, Washington D.C., The World Bank.

Lefilleur, J., M. Maurel. 2010. "Inter- and intra-industry linkages as a determinant of FDI in Central and Eastern Europe". *Economic Systems* 34, no. 3: 309-330.

Lensink, R., O. Morrissey. 2006. "Foreign Direct Investment: Flows, volatility and the impact on growth". *Review of International Economics* 14, no. 3: 478-493.

Levchenko, A., P. Mauro. 2007. "Do some forms of financial flows help protect against "sudden stops"?" *The World Bank Economic Review* 21, no. 3: 389-411.

Levy-Yeyati, E., and F. Sturzenegger. 2001. "Exchange rate regimes and economic performance". *IMF Staff Papers* 47, no. 1: 62-98.

Levy Yeyati, E., U. Panizza, and E. Stein. 2007. "The cyclical nature of north-south FDI flows". *Journal of International Money and Finance* 26, no. 1: 104-130.

Loayza, N.V., R. Rancière, L. Servén, and J. Ventura. 2007. "Macroeconomic volatility and welfare in developing countries: An introduction". *The World Bank Economic Review* 21, no. 3: 343-357.

Medvedev, D. 2012. "Beyond trade: The impact of Preferential Trade Agreements on FDI inflows". *World Development* 40, no. 1: 49-61.

Méon, P.-G., and K. Sekkat. 2012. "FDI Waves, waves of neglect of political risk". *World Development* 40, no. 11: 2194-2205.

Mina, W. M. (2012). "The institutional reforms debate and FDI inflows to the MENA region: The "best" ensemble". *World Development* 40, no. 9: 1798-1809

Nicet-Chenaf, D., and E. Rougier. 2011. "New exports matter: FDI, export discoveries and growth in MENA countries". *Journal of International Trade and Economic Development* 20, no. 4: 507-533.

Petri, P.A. 2012. "The determinants of bilateral FDI: Is Asia different?". *Journal of Asian Economie*s 23, no. 3: 201-209.

Sadik, A., and A. Bolbol. 2001. "Capital flows, FDI and technology spillovers: Evidence from Arab countries". *World Development* 29, no. 12: 2111-2125.

Santos Silva, J., S. Tenreyro. 2006. "The log of gravity". *The Review of Economics and Statistics* 88, no. 4: 641-658.

Stein, E., C. Daude. 2007." Longitude matters: time zones and the location of foreign direct investment". *Journal of International Economics* 71, no. 1: 96-112.

Takagi, S., and Z. Shi. 2011. "Exchange rate movements and foreign direct investment: Japanese investment in Asia, 1987-2008". *Japan and the World Economy* 23, no. 4: 265-272.

Uctum, M., and R. Uctum. 2011. "Crises, portfolio flows, and foreign direct investment: A application to Turkey". *Economic Systems* 35, no. 4: 462-480.

UNCTAD. 2009. *World Investment Report 2009*. Geneva: United Nations Conference on Trade and Development.

Wang M., and S. Wong S. 2007. "Foreign direct investment outflows and business-cycle fluctuations". *Review of International Economics* 15, no. 1: 146-163.

Wei, S.-J. 2000. "How taxing is corruption on international investors?". *Review of Economics and Statistics* 82, no. 1: 1-11.

ANNEX 1.

Table A1: Data sources and definitions

Variables	*Description*	*Data Source*
FDI_{ij}	The value in thousands of US dollars of flows of foreign direct investment (FDI) from a country *i* (source country) towards the country *j* (host country) at time *t*	OECD, UNCTAD FDI/TNC database Balance of payments of Morocco, Central Bank of Tunisia
GDP host	GDP in thousands of US dollars	CEPII, CHELEM database
GDP source	GDP in thousands of US dollars	
Difference in GDP per capita	Difference in GDP per capita (thousands of US dollars) between source country *i* and host country *j*	Population data used to measure per capita GDP is collected from IMF International Financial statistics
Distance	Distance in kilometers between source and host capitals	CEPII, Geo dataset
Adjacency	Common Border between country *i* and *j* (takes the value 1 if the two countries share a common border, and 0 otherwise)	CEPII, Geo dataset
Common language	Common official language for country *i* and *j* (takes the value 1 if the two countries share a common language, and 0 otherwise)	CEPII, Geo dataset
Common colonial power	Common colonizer for country *i* and *j* (takes the value 1 if the two countries had a common colonizer, and 0 otherwise)	CEPII, Geo dataset
Past colonial links	Country *j* is colonized by county *i* (takes the value 1 if the country *j* was colonized by country *i*, and 0 otherwise)	CEPII, Geo dataset
Investprof	Score of the risk to FDI not covered by other political, economic and financial risk components. It includes ratings of contract viability, risks of expropriation, profit repatriation and payment delays. Highest score equates X very low risk.	ICRG database
Openness	Ratio of trade openness of country *j*	Export and import data collected from IMF
Inflation	Inflation rate of country *j*	World development indicators (WDI)
Exchange rate crisis	Index of crisis exchange of host country (takes the value 1 if the country has experienced a large variation in the value of its real exchange rate or foreign currencies reserves, and 0 otherwise)	Authors' calculations on the basis of IMF data
Volatility host and Volatility source	Volatility of GDP growth for host or source country *j* reflecting the coefficient of variation of growth	Authors' calculations CHELEM database

War	Dummy variable takes the value 1 for Lebanese war years (1987-1991) and 0 from 1992 onwards	Authors' calculations
Post_War	Dummy variable takes the value 1 for Lebanese post-war years (1992-1996) and 0 for other years	Authors' calculations
World FDI wave	World levels of FDI flows in value	UNCTAD
Europe FDI wave	European Union (UE25) levels of FDI flows in US Dollar	UNCTAD
Central	Dummy variable takes the value 1 if the country belongs to the European core (UE15) in 2009, and takes null otherwise.	Authors' calculations
Peripheral	Dummy variable takes the value 1 if the country does not belong to the European core (UE15) in 2009, and null otherwise.	Authors' calculations

TABLE A2: List of countries in the sample

Algeria	Germany	Libya	Romania
Austria	Great Britain	Malta	Spain
Belgium-Luxembourg	Greece	Mauritania	Sweden
Czech Republic	Hungary	**Morocco**	Switzerland
Denmark	Ireland	Netherlands	Syria
Egypt	Italy	Norway	**Tunisia**
Finland	Jordan	Poland	**Turkey**
France	**Lebanon**	Portugal	Ukraine

Note: the five main MENA host countries are reported in bold.

TABLE A3: Multicolinearity VIF tests

	VIF	1/VIF
Openness	1.69	0.592556
AMU	1.28	0.780349
GAFTA	1.69	0.590143
InvestProfil	2.03	0.491424
GDP source	1.85	0.541074
GDP host	187	0.536023
Difference in GDP p.c.	2.28	0.439394
Distance	1.25	0.801524
Adjacency	1.44	0.695449
Past colonial links	1.19	0.839594
Common language	1.65	0.606727
Volatility source	1.33	.0.749694
Volatility host	1.29	0.777782
Mean VIF	**1.63**	-

Table A4: FDI levels: Eichengreen correction and Tobit RE estimations (Student *t*)

Estimator	Eichengreen's correction RE estimator		Tobit RE estimator	
	2.1	2.2	2.3	2.4
Openness	.7566 (3.55)***	.489 (2.16)***	.753 (3.54)***	.481 (2.13)***
MED	1.433 (9.00)***	1.316 (8.16)***	1.437 (9.05)***	1.324 (8.24)***
AMU	2.206 (4.54)***	1.944 (3.29)***	2.191 (4.47)***	1.882 (3.11)***
GAFTA	-.424 (-1.85)*	-.4182 (-1.79)*	-.413 (-1.81)*	-.392 (-1.66)*
InvestProfil	.145 (4.31)***	.233 (6.23)***	.145 (4.32)***	.236 (6.30)***
GDP source	1.261 (11.8)***	1.153 (10.08)***	1.256 (11.39)***	1.118 (9.07)***
GDP host	.489 (4.26)***	.445 (3.54)***	.485 (4.14)***	.441 (3.40)***
Diff. in GDP pc	.014 (0.17)	.038 (0.42)	.014 (0.17)	.041 (0.44)
Distance	-.631 (-2.03)**	-.655 (-1.99)**	-.6294 (-1.93)**	-.648 (-1.42)*
Adjacency	-.2851 (-0.63)	-.3842 (-0.87)	-.2890 (-0.66)	-.403 (-0.85)
Past col. links	.653 (0.74)	1.056 (1.13)	.667 (0.72)	1.141 (1.12)
Common lang.	1.188 (2.78)***	1.103 (2.41)	1.178 (2.64)***	1.063 (2.15)**
Volatil. source	-	.0430 (1.23)	-	.0457 (1.31)
Volatil. host	-	2.588 (5.29)***		2.646 (5.41)***
Constant	-28.40 (-8.43)***	-25.2041 (-6.88)***	-28.220 (-8.14)***	-24.539 (-6.34)***
R^2 within	0.24	0.22		
R^2 Between	0.61	0.60		
R^2 Total	0.45	0.44		
Tests	Fisher Test : MCO vs individual FE F(134,3233)=21.32 Pr>F=0.000	Fisher Test : MCO vs individual FE F(134,3233) =22.16 Pr>F=0.000	AIC = 16771.74 BIC = 16863.6 Loglikhd=8370.867	AIC = 15401.82 BIC = 15504.51
	Hausman test χ^2 = 83.03 Pr>χ^2 =0.000 Waldχ^2=1293.53***	Hausman test χ^2 = 1036 Pr>χ^2 =0.000 Waldχ^2=1073.11***	Waldχ^2=1270.80***	Waldχ2=1035.11***
Breush Pagan $\chi^2_{(1)}$ test	χ^2 = 179.00 Pr>χ^2 =0.000	χ^2 = 130.34 Pr>χ^2 =0.000		

*Notes: *, **, *** significant at 10%, 5% and 1% risk. Number of observations: 3375; Number of years: 23; Number of country-pairs: 27*5=135).*

ANNEX. 2

Exchange rate crisis indicator

In line with Ahluwalia (2000), we implement for each host country an ex-post identification of the periods during which they were affected by such a crisis. To this end, an index combining variations of nominal exchange rates and variations in foreign exchange reserves has been computed. Equation (3) shows that the indicator consists of a weighted average of the variations of nominal exchange rate and exchange reserves.

$$IND = \left(\frac{\frac{1}{\sigma^2_{TCN}}}{\left(\frac{1}{\sigma^2_{TCN}} + \frac{1}{\sigma^2_{RES}} \right)} \right) * \Delta TCN + \left(\frac{\frac{1}{\sigma^2_{RES}}}{\left(\frac{1}{\sigma^2_{TCN}} + \frac{1}{\sigma^2_{RES}} \right)} \right) * (-1) * \Delta RES \qquad (3)$$

These two variables, computed as quarterly variations on the basis of monthly average levels, are respectively named ΔTCN and ΔRES. The weights respectively measure

the shares of the variance of the exchange rate and of the foreign exchange reserves in the sum of these variances.

This index, designed to reflect the intensity of the pressures that a national currency undergoes during an episode of balance of payments crisis, enables the severity of those periods of external instability to be measured. It should be noted that the negative sign allotted to the average monthly variation of the foreign exchange reserves makes it possible to obtain the highest level of the index when the crisis is imminent (Ahluwalia, 2000). In order to identify whether a country *j* is affected by a crisis at date *t*, we need to establish a threshold above which the value of IND can be considered as a crisis peak. This threshold is defined on a country-by-country basis and not for the whole sample. It is obtained by considering both the average level ($Mean_{IND}$) and the standard deviation (σ_{IND}) of IND. A crisis is detected when IND is superior or equal to $Mean_{IND} + \sigma_{IND}$. That definition of the crisis threshold corresponds to the minimal bound found in the literature. A higher threshold ($1{,}5*\beta_{IND} + \sigma_{IND}$) would have resulted in an insufficient variation in the variable. Subsequently, the effect on FDI is taken into account by introducing into the econometric estimates a binary variable *Crisis* of the type: Crisis = 1 if IND $\geq Mean_{IND} + \sigma_{IND}$ and 0 otherwise. In order to transpose these quarterly crises data into annual impacts, we made the commonly admitted assumption that any episode of crisis lasting for more than three months will have effects on the current year, which means that the crisis could be regarded as annual. In order to avoid reverse causality with FDI inflows, a crisis in year *t* has been imputed in estimation as a determinant of FDI inflows in *t+1*.

STABILITÉ DE LA CROISSANCE DES PAYS INVESTISSEURS ET FLUX D'IDE DANS LES PAYS D'AFRIQUE DU NORD ET DU MOYEN-ORIENT

Résumé *- Si les déterminants macroéconomiques des flux d'IDE ont beaucoup été analysés du point de vue du pays hôte et de ses caractéristiques, ils l'ont plus rarement été du point de vue du pays source. A l'aide d'un modèle gravitaire nous analysons les déterminants des IDE entrants des pays MENA en focalisant notre attention sur la stabilité macroéconomique d'un ensemble de pays investisseurs (européens et non européens). Notre analyse en panel montre que les investissements européens dans les pays MENA sont d'autant plus élevés que la stabilité macroéconomique des pays source est faible ce qui confirmerait pour les firmes transnationales européennes, l'existence d'un « effet de substitution ». Nous trouvons également que les accords de Barcelone de 1995 ont renforcé la vulnérabilité des pays MENA aux cycles européens tant à court qu'à moyen terme. Nous montrons également que l'intégration régionale des pays MENA et l'émergence de nouvelles sources d'IDE en provenance de pays méditerranéens à la périphérie de l'UE n'ont pas nécessairement eu des effets positifs sur les flux d'IDE à destination des MENA. Nous pouvons en effet observer un « effet revenu » par lequel les flux d'IDE en provenance des pays périphériques à l'Europe diminuent lorsque leur croissance est plus instable. Nos résultats sont robustes lorsque nous testons notre modèle avec différents estimateurs, différents échantillons et différentes mesures de l'instabilité.*

Mots-clés - IDE, MODÈLE DE GRAVITÉ, UNION EUROPÉENNE, MENA, INFLATION