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FDI and macroeconomic volatility: A close-up on the source countries

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IDE et volatilité macroéconomique: Un focus sur les pays sources

Résumé

Les déterminants des IDE sont peu étudiés du point de vue du pays source, la priorité étant donnée aux caractéristiques du pays hôte. Dans un modèle gravitaire, nous montrons que la volatilité du PIB du pays source a un effet significatif négatif sur les flux d'IDE à destination des pays en développement. Cet effet peut aller jusqu'à annuler l'effet positif qu'ont les cycles macroéconomiques du pays d'accueil sur les entrées d'investissement étranger. Nous trouvons également que les effets positifs des réformes structurelles, telles que l'ouverture et l'intégration commerciale, sur les entrées d'IDE peuvent être réduits par la volatilité du PIB dans le pays hôte, et que les IDE provenant des sources non traditionnelles sont moins sensibles à la volatilité et au risque macroéconomique que ceux qui proviennent des sources plus traditionnelles.

Mots-clés : volatilité du PIB, inflation, IDE, modèle gravitaire, pays sources, Union Européenne, Moyen Orient et Afrique du Nord

FDI and macroeconomic volatility: A close-up on the source countries

Abstract

Macroeconomic determinants of FDI are seldom analyzed from the perspective of source countries, priority being given to host country characteristics. In a gravity set-up, we show that output volatility of source country has a significant adverse impact on FDI flowing to developing economies that can offset the positive effect of domestic cycles. We also find that the standard positive FDI-effect of structural reforms such as trade openness is reduced by higher output volatility levels in host countries, and that FDI coming from non-traditional sources is less reactive to output instability and macroeconomic risk than FDI coming from traditional sources.

Keywords: Output volatility, Inflation, FDI, gravity model, source countries, European Union, Middle East and North Africa

JEL: C23, C24, F15, F21, F31

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1. INTRODUCTION

Whereas the domestic determinants of foreign direct investment (FDI) attraction 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 policy-makers are abruptly reminded of just how volatile financial flows can be. Loayza, Rancière, Servén and Ventura (2007) have expressed that need, stressing that the role of trade and FDI flows as shock absorbers or amplifiers 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. Consequently, FDI sensitivity to macroeconomic outcomes is of vital concern for all those economies that, as they are highly dependent on sources of foreign investment, may therefore be most vulnerable to economic fluctuations in source countries (Koren and Tenreyro, 2007). This is particularly true for developing countries which, with their very high domestic macroeconomic imbalances, commonly suffer most from capital flights in time of external turmoil.

There are several reasons why assessing the impact of macroeconomic instability on FDI flowing to Middle East and North African (MENA) countries is particularly relevant. First, MENA economies have high age dependency ratios which force them to rely heavily on external sources of savings. Second, as in many other parts of the world, MENA countries have progressively reformed their institutions and opened their economies up to foreign trade and investment throughout the last two decades (Mina, 2012). However, although those countries have enjoyed a steep increase in FDI inflows from the mid-1990s onwards, they have failed to reap the benefits of their efforts in terms of their share of world FDI; they have, equally, suffered from the marked instability of those incoming flows of investment during the last decade (UNCTAD, 2009). Third, MENA economies have been more closely associated, since the mid-1990s, 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[2]. Table 1 shows that, since 1995, FDI instability has been significantly higher for South and Eastern Mediterranean countries than it has been for other developing regions in the world. The MENA countries have become much more subject to external sources of instability coming from Europe, without benefitting from structural transfers flows like those that sustained Central and East European economies during their accession to the European Union. Fourth, GDP and price volatilities are traditionally strong in MENA economies, and both dimensions of volatility significantly reduce domestic investment (Aysan, Pang and Veganzonès-Varoudakis, 2009)[3].

Notes

[1] See Bloningen (2005) for an overview of that literature.

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

[3] Aysan, Pang and Veganzonès-Varoudakis (2009) also find a significant adverse effect of external instability, as measured by the debt burden, on private capital formation in the region. They estimate that a more stable external environment would have increased investment decisions on average by 8.4% in Morocco, by 10% in Egypt in the 1980s, by 3.9% in Morocco and by 2.6% in Tunisia in the

Table 1: FDI flows and dispersion: before and after 1995

FDI inflows (US millions dollars)	1987-1995		1996-2009	
Countries	Annual average levels	Coefficient of variation	Annual average levels	Coefficient of variation
Egypt	863,221	0,425	3689,557	1,112
Morocco	287,908	1,602	1540,046	2,663
Tunisia	301,774	0,085	1086,767	1,102
Turkey	622,111	0,020	6666,500	0,211
Lebanon	10,452	9,530	2281,927	0,728
Southern and Eastern Mediterranean Countries	2613,595	0,316	25062,096	0,857
Asia	36913,603	0,670	196046,140	0,545
Latin America and Caribbean	14889,762	0,589	102751,060	0,455

In this paper, we analyze the structural and macroeconomic determinants of FDI flows to developing economies, and more specifically to a set of MENA economies, with a close-up on source countries macroeconomic conditions. We argue that FDI sensitivity to macroeconomic volatility is likely to be complex, since it may vary according to degree of macroeconomic risk in host countries, but also in relation to the nature of external conditions and of source countries macroeconomic characteristics. From what precedes, it could be extremely fruitful to take the external determinants of FDI into account at a sufficiently disaggregated level, especially in what concerns source countries. Since they generally explain FDI inflows to developing economies without considering their origin, the bulk of the studies that are typically found in the literature are constrained by their framework to use one average measurement of external conditions, thereby failing to address source-related determinants of FDI. A couple of recent papers have used a gravity set-up in order to identify the specific effects on bilateral FDI flows of various sources of macroeconomic volatility in both the source and the host country (Levy-Yayeti, Panizza and Stein, 2007; Cavallari and D'Addona, 2012), but they do not really isolate the respective role of the structural and macroeconomic determinants of FDI flowing from developed source economies to less developed host countries. Cavallari and D'Addona (2012) examine the role of host and source country nominal and real volatility, but their study is limited to the bilateral FDI flows among 24 OECD economies. Levy-Yayeti, Panizza and Stein (2007) are closer to our concern since they question more explicitly North-South FDI. Since they question the impact of business cycles on the arbitrage between the local investment and the FDI outflows of US, European and Japanese firms, their focus is, however, on the source level, and they do not explicitly address the host country determinants of the corresponding FDI inflows that are received by developing economies. Their argument is that the pull factors, especially those concerning output volatility in host countries, are pretty hard to interpret because of the high output volatility exhibited by most developing economies.

Source-related macroeconomic determinants of FDI have, so far, not been studied properly or explicitly in the literature interested in the determinants of FDI inflows to developing economies. The present paper tests the sensitivity of FDI levels to a specific dimension of macroeconomic instability, real output volatility, and to various combinations of real output volatility with other key determinants, structural and macroeconomic, of FDI flows. Our framework allows the FDI effect of host countries characteristics to be differentiated according to the degree of instability or the level of

1990s. Chan and Gemayel (2004) have also found that the instability of ICRG scores for political, financial and economic risks has an adverse effect on the FDI entering MENA economies, but they do not explicitly address macroeconomic instability.

development of the source country. In addition, our particular gravity set-up allows for a series of distance-related FDI factors to be controlled for.

The remainder of the 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 develops a series of robustness checks, and Section 6 concludes.

2. Fdi and macroeconomic instability: An Overview

When a transnational corporation decides to settle abroad – in particular in a developing country – it considers a variety of structural "objective" factors to reduce the direct or indirect costs incurred in such operations. Among the domestic determinants involved, what Algacil, Cuadros and Orst (2011) refer to as local factors, we find such elements as low labour costs (Bevan and Estrin, 2004), a high level of human capital and labour skill (Lucas, 1990 ; Zhang and Markussen, 1999, Noorbakhsh, Paloni and Youssef, 2001), low taxes (Bénassy-Quéré, Fontagné and Lahrèche-Révil, 2005; Klemm and Van Parys, 2009), strong property rights regimes (Petri, 2012), institutional proximity (Bénassy-Quéré, Coupet and Mayer, 2007), good governance (Morrissey and Udomkerdmongkol, 2012), political stability[4] (Busse and Hefecker, 2007, Alfaro *et al.*, 2008, Asiedu, Jin and Nandwa, 2009), natural resource availability (Asiedu, 2006), and prices or nominal exchange rate decreases (Lederman, 2011, Takagi and Shi, 2011). FDI is also attracted to developing economies by other sorts of "objective" factors that enhance opportunities for trading, such as a large host-market (Asiedu, 2006), a free trade zone (Medvedev, 2011), access to a global value chain (Lefilleur and Maurel, 2010) or bilateral investment treaties (Busse, Königer and Nunnenkamp, 2010)[5].

Once all those structural factors of risk and opportunity have been considered, a transnational corporation tends to prefer the least risky host economy in terms of its macroeconomic stability (Aizenman, 2003; Chakrabarti 2001), and of the likelihood of that being maintained in the future. The empirical literature dealing with FDI attraction has investigated such various sources of macroeconomic instability as nominal, real and institutional. Though the nominal sources of volatility, essentially price and exchange rate fluctuations, have been frequently analyzed since the early nineties, real output volatility, both external and domestic, has been, until recently, somewhat downplayed by empirical studies.

The inflation rate and the real exchange rate are two nominal variables that have been commonly used to characterize host country macroeconomic conditions. It might be expected that more inflation would reduce FDI attraction because it increases both production and transaction costs for transnational corporations. However, evidence supporting the assumption of an adverse effect is, surprisingly, mixed. More inflation does not appear to be a significant determinant of FDI inflows for Frenkel, Funke and Stadtmann (2004), whereas it does significantly reduce incoming investment for Apergis and Katrakilidis (1998), who use a sample of developing economies, or Garibaldi *et al.* (2001) for a panel of 25 transition economies over the period 1990-1999. Exchange

[4] Here, good governance pertains to all sources of increase in transaction costs due to the presence of corruption or predatory groups; likewise, political stability is related to the promise that foreign firms will not be expropriated by predatory individuals or groups, and that property rights will be enforced by the state.

[5] Furthermore, some of those determinants are highly complementary, as shown by Gastanaga, Nugent and Pashamova (1998), meaning that their effect on FDI is higher when they are combined.

rate volatility is another symptom of macroeconomic instability, especially in developing economies. Following Froot and Stein's (1991) first attempt at analyzing the effects of exchange rate volatility on FDI in a context of imperfect capital markets, empirical studies have found that domestic firms tend to reduce their investment abroad in case of a depreciation of their domestic currency. By contrast, FDI inflows of foreign firms tend to increase, mainly as a response to the price opportunities generated by the depreciation. Hence, when exchange rate volatility is limited, FDI may be stimulated by an upward shift of the real exchange rate that may lead to a decrease of the domestic assets price. When an external shock triggers a balance of payments crisis, however, the brutal adjustment in the nominal exchange rate, or in foreign currency reserves, may increase uncertainty as to the domestic assets value and production costs, thereby decreasing FDI inflows. As it is generally assumed that foreign investors look for steady exchange rates when they choose where to host their investment, especially in what concerns vertical FDI, which involves large flows of intra-firm trade of productive assets (Levy-Yeyati and Sturzenegger, 2001), highly volatile exchange rates, especially in the sense of the appreciation of the domestic currency, should decrease FDI inflows[6].

The present paper introduces the inflation rate and the real exchange rate level as two indicators of the nominal macroeconomic situation of host countries, but its focus is made on the impact of real volatility on FDI flows. In what concerns real macroeconomic volatility, the theoretical effect of output volatility on FDI is far from being straightforward.

First, output volatility in source country may have an adverse income effect on FDI outflows, since domestic corporations tend to reduce their international investments when macroeconomic instability increases their financial cost or provokes a slowdown in sales (Wang and Wong, 2007). Accordingly, it has been found that an increase in output volatility in the source country significantly reduces FDI outflows (Wang and Wong, 2007, Cavallari and D'Addona, 2012). Moreover, FDI flows to developing economies tend to be reduced in times of global slowing of capital mobility, when, as it was the case during the 2008-2009 financial crisis, the bulk of world economies are affected by a symmetric economic crisis. Bad external macroeconomic conditions can even outweigh the domestic institutional or structural factors of FDI attraction or repulsion (Méon and Sekkat, 2012). Nevertheless, there is a possibility that FDI's patterns of reaction to economic risk may be related to the source country's macroeconomic characteristics. FDI flows tend to react 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. Interestingly, Andrès, Busse and Nunnenkamp (2012) have found that non-traditional sources of FDI are less risk-adverse than traditional ones. Levy Yeyati, Panizza and Stein (2007) had also found that FDI flows tend to be countercyclical when they are sourced in Europe and US, and more pro-cyclical when they are sourced in Japan.

Second, host country economic conditions, and more specifically their articulation to external or source patterns of volatility, have to be considered. When business cycles in the source and host country are coordinated, transnational corporations may react to the anticipated fall in their profits and to rising financing costs by holding back on investment projects, and by disinvesting abroad. If, however, business cycles in the source and host countries are not synchronized, the foreign country undergoing a bust while the domestic country is benefiting from a boom, substituting foreign

[6] The empirical literature remains inconclusive as regards the effect of exchange rate instability on FDI inflows: the latter are adversely influenced by exchange rate volatility in Bénassy-Quéré, Fontagné and Lahrèche-Révil (2001), Bechri (1999), Loewendahl and Ertugal-Loewendahl (2000), Kiyota and Urata (2004), and Calderón and Didier (2009), but are left unaffected by the existence of a fixed exchange rate regime in Frenkel, Funke and Stadtmann (2004). Takagi and Shin (2011, 267) have remarked that the Asian financial crisis left Japanese FDI to Asian emerging economies unaffected, and that Japanese investment was even positively impacted by exchange rate volatility over 1987-2008. Equally, Aizenman and Marion (2004) have evidenced that horizontal FDI, in which similar activities are undertaken in different locations, may be triggered, to some extent, by exchange rate volatility.

investments for domestic investment may become more attractive for the firms undergoing high volatility on their origin market. In that case, a positive substitution effect explains that more volatility on the source country will increase FDI flows to other countries. In such circumstances, source country firms may tend to direct their FDI to the dynamic economies where high levels of GDP growth and output variation are driven by productivity-increasing technological shocks (Cavallari, 2010; Corsetti, Martin and Pesenti, 2007; Ghironi and Melitz, 2005). Furthermore, such a positive effect of external conditions on FDI inflows may be amplified by waves of opportunity-led FDI to be observed when the marked depreciation of the exchange rate, or a fall in the value of stocks in a host economy, increases mergers by those foreign firms that have sufficient funds to weather the storm (Krugman 2000; Aguiar and Gopinath 2005)[7]. Accordingly, Cavalleri and D'Addona (2012) find, in a gravity model of foreign investment between OECD countries, that FDI tends to increase when host country has higher output volatility, in sharp contrast with the adverse FDI effect of source volatility. They argue that such asymmetry in the behavior of investments in host and source countries is consistent with the view that investors choose between investment options at home and abroad, in relation to the differential of volatility between economies. Likewise, Levy Yeyati Panniza and Stein (2007) (2007) have found on a gravity model of North-South FDI that local and foreign investments tend to move in opposite directions relative to the cycle in the source country.

Third, FDI sensibility to host country macroeconomic risk may also vary according to the scope and origin of the macroeconomic imbalance. Large output fluctuations in host country may, undoubtedly, increase the entry costs associated with investing abroad, thereby leading to a FDI reduction. This is particularly true when the recorded high levels of real instability indicate host country's excessive macroeconomic vulnerability to domestic or external shocks. Uctum and Uctum (2011) have shown for example, in the case of Turkey, that FDI reacts significantly and adversely to the occurrence of domestic crises. In that case, FDI volatility may channel real macroeconomic instability from the source region to the host country, with potential adverse effects on economic growth for the latter. the effect of an external shock on FDI inflows might well become worse because of the existence of bad internal macroeconomic outcomes in the host country (Eichengreen 2000, Kose, Prasad, Rogoff and Wei, 2009). If growth turns out to be less stable, and if inflation is triggered by external shocks, it is likely that the exchange rate instability[8] will produce even greater negative effects on FDI attraction (Kaminsky, Lizondo and Reinhart 1998). Accordingly, there are only very few chances of a country's recovering its FDI flows when an external shock is combined with bad domestic macroeconomic outcomes (Ishii *et al.* 2002)[9]. In developing economies, a high degree of macroeconomic risk, characterized by high degrees of both GDP and price volatility, has also been related to a low institutional quality or to unconstrained predatory government policies (Tornell and Lane, 1999; Acemoglu, Johnson, Robinson and Thaicharoen, 2003). Such institutional or political factors of instability tend to have adverse effects on FDI inflows for developing economies (Alfaro, Kalemli-Ozcan and Volosovych, 2008; Papaioannou, 2008; Bénassy-Quéré, Coupet and Mayer, 2007; Ali, Fiess and MacDonald, 2010; Mina, 2012). Likewise, for Demekas, Horváth, Ribakova and Wu (2007), a policy environment promoting macroeconomic stability strengthens the rule of law and the enforcement of contracts, minimizes distortions, supports competitiveness and ultimately encourages foreign investment. In periods of high FDI activity, however, such dimensions of political

[7] A recent illustration can be provided by the waves of sector-based consolidations that were reported in the oil and gas sectors, in mining, in the automobile industries or in financial services (UNCTAD 2009), in years of sharp decrease in global FDI flows in 2008 (-15 %) and 2009 (-30%).

[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 to obtain long-term profits from the selected localization (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 macroeconomic conditions. That last assumption has received empirical support in Fernandez-Arias and Hausman (2001), Levchenko and Mauro (2007) and Levy-Yeyati, Panizza and Stein (2007).

and economic risk appear to be less helpful in explaining FDI levels than external real volatility, as has been shown by Méon and Sekkat (2012).

This overview of the literature has shown that the net effect of domestic and external sources of instability on FDI inflows generally results from a combination of sometimes contradictory, probably non-linear or cumulative effects. Consequently, the direction of those effects may be less intuitive or straightforward than is generally expected. Real macroeconomic instability in source country may have both a negative and a positive effect on FDI flows to developing economies. The net effect of source country output volatility depends on the relative magnitude of those income and substitution effects (Cavallari and D'Addona, 2012). It seems, moreover, that this effect is not linear, since it may well vary according to the way external and domestic macroeconomic conditions, including structural and institutional conditions, articulate. In the next section, we focus our attention on the specific effect of the real output instability, as measured at the level of host and source countries, and on its interaction with other sources of FDI attraction, both macroeconomic (inflation) and structural (trade openness and integration, institutional quality).

3. MODEL, VARIABLES AND METHODS

In order to identify the sensitivity of FDI inflows to the various elements of instability described in the preceding section, we use a gravity model that links thirty-two source countries of investments to the five largest receiver countries of the MENA region (Egypt, Lebanon, Morocco, Tunisia and Turkey), during the period 1987-2009[10]. Our sample is comprised of 3,220 observations. The gravity model is generally seen as a relevant approach to explaining bilateral trade flows (Evenett and Keller 2002; de Mello-Sampayo 2009), and the model has also been used recently to explain bilateral flows of FDI (Frenkel, Funke and Stadtmann, 2004; Bevan and Estrin, 2004; Desbordes and Vicard, 2009; Busse, Königer and Nunnenkamp, 2010; Busse, Nunnenkamp and Spatareanu, 2011). Unlike standard models of FDI attraction, the gravity model is of particular interest since it allows information on both origin and host countries to be used. The intensity of FDI flows between any two countries is positively linked to the product of their GDP, and adversely impacted by the distance that separates them. The standard expression of the gravity model adapted to bilateral flows of FDI can be written as:

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

where FDI_{ij} is the annual flow of FDI from source country i in host country j, Y_i and Y_j are the annual GDP levels of 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 gives the following equation:

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

where FDI_{ijt} represents the value in dollars of the inflows of FDI from a country i (country of origin) entering the country j (host country) at time t. Whereas Busse, Königer and Nunnenkamp (2010) introduce country-year fixed effects in their model so as 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

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

resistance appear to move only slowly, and country-pair fixed effects reduce the omitted variable bias associated with unobserved time-invariant pair-specific heterogeneity. As the dependent variable is censored, the model has been estimated by using the Tobit method, which includes temporal random effects, in order to circumvent the problem of zeros corresponding to null FDI flows without excluding them[11]. Random effects enable time-invariant factors such as distance or common border to be controlled for. Time dimension is accounted for by random effects because it enables all kinds of dyadic events, not specified in equation (2), such as trade or investment bilateral treaties, to be controlled for.

If we now consider the right-hand side of the equation (2), $Ln(GDP_{it})$ and $Ln(GDP_{jt})$ respectively stand for the natural logarithm of GDP levels of the source and origin countries, and β_1 and β_2 take a positive sign if there is a "mass" effect at work 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) between the two countries is used as a proxy for the differences in factor endowments or in the level of economic and technological development of each country. The coefficient takes a positive sign if FDI is pulled 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 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 lower, the greater the distance is between the two countries involved. When, however, the host country shares a common border, language, or a former colonial link with the origin country, it is generally considered that FDI is higher. *Adjacency* and *Common language* take the value 1 if the origin and host countries respectively share a common border or have a common language; they take the value 0 in the contrary case[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 regarding either source country *i* or host country *j*, including source and host country characteristics in terms of output volatility (respectively *Instability source* and *Instability host*), and indicators of the price and exchange rate instability in host countries. The first indicator focuses on output volatility since foreign investment tends to be reduced when the long-run growth potential of the host economy is afflicted by instability. The point is particularly true of market-led FDI, but is also the case for other categories of foreign investment, every time investors seek out a stable macroeconomic environment. On the contrary, 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 with the extent of 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

[11] When there is a significant proportion of zeros for the bilateral FDI flows, using Ordinary Least Squares would result in highly biased estimates and a non-linear model like the Tobit is most appropriate (Eaton and Tamura, 1994; Wei, 2000; Head and Ries, 2008). This is especially so when the model does not suffer from heteroskedasticity (Santos Silva and Tenreyro, 2006), which, because of the extensive size of our sample, is our case.

[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] Former colonization links**,** as they have influenced the institutional, linguistic or cultural proximities that ease the building of international network ties, are considered by Bénassy-Quéré, Coupet and Mayer (2007) and Abderrezak (2008) to be key determinants 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).

positive effect seems to be plausible for MENA economies, given the nature of the foreign investments they tend to attract.

As foreign firms' investments are conditioned by the extent of their revenue in their origin markets, we also assume that source country GDP growth instability can influence FDI levels. More volatility on European source-markets may well reduce FDI outflows, thereby depressing growth prospect for periphery economies relying on external sources of finance. In that case, foreign investment can possibly act as a transmission channel for growth instability, and source-country higher volatility may reduce FDI inflows to MENA economies. For each time period, a pseudo-coefficient of variation has been calculated, 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 GDP growth rate's standard deviation for the country *i* at the period *t,* and $\mathrm{Mean}_{\mathrm{GDP}jt}$ is the average rate of growth of the GDP for country *i* over the same period *t*. Standard deviation and average values at time *t* have been computed as a three-year moving average over *t-2*, *t-1* and *t*. In order to avoid a null average value, we have chosen to compute it in terms of absolute value and to express it in logarithmic form[15]. In order to test our hypotheses, this variable has been computed for both source and host countries.

Two indicators of nominal instability, *Inflation*, which measures the volatility of domestic prices in the host country and *Real exchange rate* are also included in our estimations as additional controls of macroeconomic domestic conditions[16].

Assuming that source and host GDPs are expressed in current USD, higher inflation in the host country could deter inward FDI if the nominal exchange rate is fixed. Since price instability increases uncertainty about the future value of liabilities and assets acquired by the TNC[17], it should adversely influence FDI inflows. Moreover, as economic activity tends to focus on short-term horizons, investments with long-term higher returns are generally not implemented (Krueger, 1992). In the present paper, we have adopted the generally accepted annual standard inflation rate in our estimations. In spite of a generalized disinflationary trend, inflationary peaks persisted throughout the time period for all our five host economies.

The second indicator of nominal instability insists more on external sources of macroeconomic disturbance such as speculative attacks on domestic currency or reversals of capital flows. Any appreciation of the annual average level of real exchange rate is expected to have a negative impact on FDI because it increases the price of domestic assets or the sunk costs associated with greenfield investments. Appreciation of the real exchange rate is measured in our study by a reduction in the real exchange rate, so that the sign of the coefficient is expected to be negative for all kinds of FDI, especially for vertical FDI since exports become more expensive in terms of foreign currency. An alternative measure of exchange rate instability can be found in Schmidt and Broll (2009) who focus their attention on the unpredictable part of the exchange rate variations. Our measurement of

[15] Note that the huge fall in GDP growth rate for Lebanon due to the war has been controlled in estimations by the introduction of a dummy variable taking the value 1 for the war years (1987 to 1991), and 0 from 1992 onwards. A post-war dummy, taking 1 for the years 1992 to 1995 has also been introduced to control for the ambiguous trends in FDI associated with reconstruction at the end of the war.

[16] So as to account for the lagged impact of an exchange rate crisis on FDI localization and to deal with possible endogeneity problems, *Real exchange rate* **has been i**ntroduced in regressions with a **one-year** lag.

[17] It also increases uncertainty about future tax levels.

exchange rate level, however, does not need to be adjusted in such a way, since the predictable components of exchange rate volatility (border, distance) are already controlled for in the gravity equation.

$Controls_{jt}$ is a vector of additional determinants of bilateral FDI flows. As it is expected that trade openness will alternatively tend to increase inflows of efficiency-led FDI by lowering export costs for TNCs, and tend to decrease market-led FDI motivated by tariff-jumping, we control for the degree of trade openness ($Openness_{jt}$), measured by the ratio of exports to GDP at time *t* for the host country *j*. Dummies for membership in 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 in 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 FDI flows of export processing by TNCs. Equally, since the investment decisions of transnational corporations 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[18]. 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, profits repatriation and payment delays[19]. A dummy variable, *War,* has been added to control for the effect of the Lebanese war on the FDI inflows received by Lebanon. Equally, a dummy variable post-war was introduced to account for the possible specific effect of post-war reconstruction on FDI inflows to Lebanon.

4. RESULTS AND DISCUSSION

Results of the regressions for FDI levels have been reported in Table 2. The baseline regression (Column 2.1.) is in accordance with the results of the existing literature. *GDP source*, *GDP host* have the expected positive influence on the FDI levels of our five host countries. Of the estimated coefficients for the variables which represent standard proxies for the transaction and transport costs, only one, that of *Common language*, has the expected signs and is significant. *Adjacency* and *Distance*, and *Past colonial links*, on the contrary, are not significant, suggesting that geographical distance does not explain the FDI localization concerning the five MENA economies in our sample. *Difference in GDP* positively explains FDI for our five MENA host countries, meaning that the greater the technological distance, the greater the investment flow. Trade openness also increases FDI levels to MENA economies, with that positive effect of trade being reinforced by regional integration, since *MED* and *AMU* both show a positive and significant coefficient. The significant effect of the Euro-Med dummy (*MED*), moreover, confirms that the reduction in institutional distance increases FDI flows, for European firms, irrespective of the particular colonial history of the origin and destination countries. The positive and significant impact of the quality of institutions (*InvestProfil*) in host countries confirms that minimizing transaction costs is an objective of European firms when they invest in the Mediterranean periphery. It should be noted, however, that participation in regional

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

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

trade agreements is not always a factor of attraction for FDI: whereas *MED* and *AMU* significantly increase FDI, *GAFTA* has a negative effect. This means that trade economic integration of MENA economies with the European Union (*MED*), or the economic integration between Tunisia and Morocco (*AMU*) has contributed significantly to the increase in FDI that each of those countries receives from the others.

Table 2: FDI levels baseline regressions

	2.1	2.2	2.3	2.4	2.5
Openness	6.434 (10.21)***	6.680 (10.39)***	6.473 (10.25)***	6.231 (9.84)***	6.455 (10.17)***
MED	1.981 (5.04)***	1.855 (4.66)***	2.034 (5.18)***	1.878 (4.76)***	1.983 (5.03)***
AMU	6.135 (9.08)***	5.974 (8.83)***	6.062 (9.01)***	6.072 (9.00)***	6.130 (9.07)***
GAFTA	0.290 (0.47)	0.229 (0.37)	0.319 (0.52)	0.245 (0.40)	0.304 (0.49)
InvestProfil	3.036 (4.95)***	2.202 (3.18)***	2.932 (4.79)***	3.163 (5.14)***	2.995 (4.66)***
War	-6.810 (-4.28)***	-7.086 (-4.44)***	-6.721 (-4.27)***	-8.200 (-4.86)***	-6.797 (-4.22)***
Post War	-3.996 (-3.54)***	-3.624 (-3.17)***	-4.229 (-3.73)***	-4.712 (-4.05)***	-4.021 (-3.55)***
Inflation	-	-0.419 (-2.36)**	-	-	-
Instability source	-	-	-0.841 (-3.94)***	-	-
Instability host	-	-	-	0.870 (2.62)***	-
Real exchange rate	-	-	-	-	0.053 (0.08)
GDP source	3.520 (25.44)***	3.518 (25.56)***	3.378 (24.08)***	3.521 (25.38)***	3.519 (25.42)***
GDP host	1.801 (9.29)***	2.143 (8.86)***	1.803 (9.30)***	1.750 (9.02)***	1.804 (9.29)***
Difference	0.739 (4.27)***	0.733 (4.24)***	0.644 (3.71)***	0.734 (4.25)***	0.740 (4.27)***
GDP/capita	-0.240 (-0.94)	-0.276 (-1.08)	-0.186 (-0.73)	-0.230 (-0.90)	-0.238 (-0.93)
Distance	0.296 (0.91)	0.289 (0.89)	0.344 (1.06)	0.301 (0.93)	0.296 (0.91)
Adjacency	-1.044 (-1.55)	-1.046 (-1.56)	-0.882 (-1.31)	-1.068 (-1.59)	-1.037 (-1.54)
Past colonial links	3.525 (8.77)***	3.515 (8.78)***	3.450 (8.60)***	3.525 (8.77)***	3.521 (8.75)***
Common language	-132.244 (-18.98)***	-136.01 (-18.69)***	-135.016 (-19.1)***	-125.36 (-17.13)***	-132.325 (-17.79)***
Constant					
Log likelihood	-5040.3203	-5041.5479	-5034.3057	-5037.8804	-5041.8735
	Wald $\chi^2(14)$ = 1434.66 Prob > χ^2 = 0.0000	Wald $\chi^2(15)$=1444.3 Prob > χ^2 = 0.000	Wald $\chi^2(15)$=1450.0 Prob > χ^2 = 0.0000	Wald $\chi^2(15)$=1423.4 Prob > χ^2 = 0.0000	Wald χ^2 (15)= 1426.4 Prob > χ^2 = 0.0000

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

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 four specific variables that focus on macroeconomic instability: host country inflation rate, host country output instability, host country nominal exchange rate levels and source country output instability. Table 2 shows that inflation has the expected adverse impact on FDI levels, with a higher rate of inflation in host countries acting as an impediment for investors, since it reduces the competitiveness of exports towards foreign markets (Column 2.2.). Column 2.4 shows that host countries undergoing more GDP instability attract significantly higher FDI levels. When all the other determinants of localization are equal, output volatility is not an obstacle to FDI attraction. On the contrary, FDI flows to those economies whose GDP is the most unstable, signalling that those investments are probably more export-oriented than market-led in the case of MENA economies. In what concerns GDP instability in source countries, we find that it significantly reduces FDI flows to our sample of MENA economies (Column 2.3). This result suggests that an increase in output volatility in source country reduces the resources available to potential investors. The estimated coefficient suggests that a 1% increase in source country volatility reduces the average amount of FDI outflows by 0.84%, whereas it the same

increase in host country volatility tends to increase the average amount of FDI inflows by 0.87%. Given the values of the coefficients that are reported above, the net FDI effect of an increase in *Source volatility* and *Host volatility* can be considered to be null, and we could conclude that bad macroeconomic outcomes in source countries can offset and eliminate the positive FDI effect of macroeconomic cycles for developing host economies.

Asymmetry in the behavior of FDI in relation to the combination of output volatility in host and source countries suggests, moreover, that investors may arbitrage between investment options at home and abroad, thereby supporting the substitution view as in Levy-Yayeti, Panizza and Stein (2007) or Cavallari and D'Addona (2012). As our indicator of output instability does not allow differentiating booms and busts, FDI cannot be considered as being strictly counter-cyclical, relative to the source country, and pro-cyclical, relative to the host country. These results can be explained by the nature of FDI in the zone, but also by the fact that European firms have been engaged in long-term North-African localization. Table 2 also shows that real exchange rate levels have no effect on the FDI levels received by our five MENA economies (Column 2.5), suggesting that fire-sales, or Mergers & Acquisitions driven by price-opportunities, are not the dominant form of foreign investment in the countries of our sample. This result is consistent with the significantly higher share of greenfield investment in total FDI, which differentiates MENA economies from those in other developing regions[20]. It is likely that the benefits reaped from the proximity of those countries to the European Union tend to counterbalance the standard adverse effects of episodes of instability in host country.

At this point, it might be objected that the estimation of the coefficient for source country instability could be driven by a selection bias. Firms from more stable countries might invest more in MENA because they are more internationalized than those from more unstable economies. One reason for this could be that those more unstable economies are less developed, which means that their firms are further from the technological frontier than those from more stable and developed economies, which limits their capacity to invest at an international level. The negative coefficient of *Instability source* might then 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 *Stable*, is exclusively composed of developed Western European economies[21]. The second group, labelled *Unstable*, includes less developed and more unstable countries Eastern and Central European, Mediterranean and MENA countries[22]. The average GDP coefficient of variation, computed over the whole period for the *Stable* group, is about twice as low (.001435) as that of the *Unstable* group (.002887). Two dummies, *Stable* and *Unstable,* have been generated, with *Stable* taking the value 1 for the countries belonging to the Stable group, and 0 otherwise, and *Unstable* taking the value 1 for the countries belonging to the *Unstable* group, and 0 otherwise. Then, *Stable* (or alternatively *Unstable*) is successively interacted with *Instability source* and *Instability host*, with those interactive variables being introduced into estimated models of FDI levels. In accordance with Lensink and Morissey (2006) and Choong and Liew (2009) who have both pointed out that FDI instability has consistent adverse effects on GDP per capita increase, whereas the alleged positive effect of FDI levels is far less robust, we have also tested our gravity equation with standard deviations of FDI

[20] In North Africa, the ratio of the number of greenfield operations over 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)].
[21] Those of the European Union before Eastern and Central European members' accession, plus Switzerland and Norway.
[22] Eastern and Central European (Hungary), Mediterranean (Malta) and MENA countries (Egypt, Morocco, Tunisia, Turkey, Lebanon, Syrian Arab Republic, Jordan, Mauritania).

inflows as the dependent variable, computed by a three-year moving average. Results are reported in Table 4.

Table 3 shows, first, that the coefficient for *Instability source* does not lose its statistical significance, and also keeps its negative sign. Second, the adverse effect of *Instability source* on FDI levels is magnified when limited to the more stable group, which is composed of European economies (Column 3.1). That adverse effect is, however, smoothed when restricted to the more unstable group of less developed Eastern European and MENA source countries. Column 3.2 shows, moreover, that the *Instability source* significantly reduces volatility when it is restricted to the more stable European economies. Thus, FDI flows from more stable Western European economies are more likely to be reduced when volatility increases in host-countries, and their volatility is more likely to increase in that case. Conversely, FDI from more unstable source economies increases in response to host country output volatility. It should also be noted that FDI instability is higher for those MENA host economies that are more open to trade, and for those which are involved in regional trade agreements with Europe (*Med*) or with other MENA economies (*AMU*, *GAFTA*). Those countries which have the most attractive institutional environment for foreign investments are also those that experience more FDI instability.

Table 3: FDI levels & volatility and alternative FDI sources

	3.1 FDI levels	3.2 FDI volatility	3.3 FDI levels	3.4 FDI volatility
Openness	6.851 (10.50)***	0.755 (9.60)***	6.669 (10.11)***	0.737 (9.30)***
MED	2.423 (5.36)***	0.264 (4.87)***	2.347 (5.08)***	0.253 (4.67)***
AMU	6.039 (9.01)***	0.225 (2.80)***	6.033 (8.96)***	0.217 (2.69)***
GAFTA	0.831 (1.29)	0.336 (4.58)***	0.803 (1.24)	0.327 (4.46)***
InvestProfil	3.374 (4.86)***	0.195 (2.31)**	3.539 (5.02)***	0.202 (2.40)**
War	-6.235 (-3.88)***	-0.851 (-4.90)***	-7.769 (4.49)***	-0.980 (-5.18)***
Post War	-4.297 (-3.72)***	-0.791 (-5.54)***	-4.855 (-4.08)***	-0.842 (-5.76)***
Instability source	-0.625 (-2.64)***	0.007 (0.27)	-	-
Instabilité host	-	-	1.119 (3.13)***	0.108 (2.51)**
Stable*Instab source	-0.285 (2.48)**	-0.050 (-3.68)***	-	-
Stable*Instab host	-	-	-0.251 (-2.01)**	-0.046 (-3.14)***
GDP source	3.207 (20.47)***	0.102 (7.71)***	3.382 (21.94)***	0.110 (6.31)***
GDP host	1.925 (9.63)***	0.051 (2.12)**	1.884 (9.34)***	0.047 (1.92)*
Difference in GDP per capita	0.298 (1.30)	-0.041 (-1.59)	0.451 (1.93)*	-0.031 (-1.20)
Distance	-0.204 (-0.80)	0.178 (5.80)***	-0.244 (-0.95)	0.177 (5.76)***
Adjacency	0.425 (1.31)	-0.043 (-1.09)	0.382 (1.17)	-0.045 (-1.13)
Past colonial links	-0.419 (-0.61)	0.195 (2.29)**	-0.658 (-0.96)	0.178 (2.10)**
Common language	3.307 (8.21)***	0.056 (1.14)	3.397 (8.43)***	0.063 (1.30)
Constant	-136.751 (-18.46)***	-8.074 (-9.27)***	-127.834 (-16.36)***	-7.457 (-8.04)***
Log likelihood	-4992.2179	-2547.9097	-4996.7649	-2548.6831
	Wald χ^2 (16)=1383.31 Prob > χ^2 = 0.0000	Wald χ^2 (16)= 477.21 Prob > χ^2 = 0.0000	Wald χ^2 (16)=1362.83 Wald χ^2= 0.0000	Wald χ^2 (16)= 479.33 Prob > χ^2 = 0.0000

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

In short, we can conclude that Western European investment to MENA is less likely to trigger volatility than FDI from countries further removed from the technological frontier. Hence, our results, like those of Andrès, Busse and Nunnenkamp (2012), confirm that that FDI from traditional sources (developed economies) exhibits different sensitivity to host country conditions than FDI from non-traditional sources.

Having first identified the isolated effects of the various sources of macroeconomic instability, we now turn to the issue of their likely complementary effects on FDI inflows. Estimations of their determinants, including interactive terms between macroeconomic factors, are reported in Table 4. First, we test the assumption that external and domestic forms of instability could exercise a cumulative detrimental effect on FDI inflows. Inflation, when combined with source or host country output instability, proves to have a net adverse effect on those inflows (4.1 and 4.2). Column 4.3 shows that the effect of source and host country real output volatility is not cumulative which, since they each have a contradictory pattern of influence on FDI levels, is not very surprising.

Second, we went on to test whether those macroeconomic sources of FDI instability are magnified or reduced by structural or policy outcomes such as the degree of trade openness or regional integration. When interacted with trade openness or MED, all the sources of macroeconomic instability show the same significantly adverse effect on FDI levels (Columns 4.4 and 4.5), thereby suggesting that those countries that have the lowest price or output volatility levels reap more benefit from trade openness or regional integration. Column 4.6, however, shows that trade openness tends to aggravate the adverse effect of inflation on FDI levels. Results reported in columns 4.4 to 4.6 can also be interpreted as if macroeconomic imbalances such as high inflation or output volatility could mitigate the positive effects of such standard structural determinants of FDI attraction as trade openness and integration or institutional reforms.

Table 4: FDI levels and interactive terms

	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8
Openness	6.726 (10.43)***	6.524 (10.10)***	6.277 (9.89)***	6.713 (10.17)***	-6.898 (-1.15)	9.778 (9.90)***	2.997 (1.21)	6.515 (10.22)***
MED	1.949 (4.91)***	1.793 (4.49)***	1.938 (4.92)***	-6.376 (-1.55)***	2.433 (5.25)***	2.288 (4.94)***	1.918 (4.85)***	4.012 (1.49)
AMU	5.683 (8.44)***	5.900 (8.73)***	5.998 (0.42)***	5.976 (8.86)***	6.023 (8.93)***	5.822 (8.59)***	6.076 (8.98)***	6.084 (8.97)***
GAFTA	-0.027 (-0.04)	0.261 (0.42)	0.260 (0.42)	0.720 (1.11)	0.795 (1.23)	0.578 (0.89)	0.239 (0.39)	0.276 (0.45)
InvestProfil	2.130 (3.08)***	2.149 (3.07)***	3.051 (4.96)***	3.447 (4.89)***	3.279 (4.65)***	1.857 (2.36)**	-4.638 (-0.87)	3.311 (4.54)***
War	-6.920 (-4.40)***	-7.576 (-4.45)***	-8.106 (-4.84)***	-9.339 (-4.96)***	-6.551 (-3.69)***	-6.511 (-4.03)***	-5.900 (-3.50)***	-6.514 (-3.98)***
Post War	-4.137 (-3.58)***	-3.868 (-3.25)***	-4.864 (-4.16)***	-5.516 (-4.48)***	-4.903 (-4.11)***	-3.543 (-3.03)***	-4.037 (-3.57)***	-3.929 (-3.45)***
Inflation	-4.102(-3.99)***	-3.286(-2.54)***	-	-	-	5.366(3.24)***	-	-
Instability source	0.194 (0.55)	-	0.522 (0.21)	-	-	-	-	-
Instability host	-	1.746(3.36)***	2.331(0.86)	1.669 (3.41)***	10.230(2.49)**	-	-	-
Instab source*Inflation	-0.555 (-3.64)***	-	-	-	-	-	-	-
Instab. host*Inflation	-	-0.476(-2.25)**	-	-	-	-	-	-
Instab source * Inst host	-	-	0.225(0.55)	-	-	-	-	-
Med*Instab host	-	-	-	-1.440(-2.14)**	-	-	-	-
Openness* Instab host	-	-	-	-	-2.263(-2.27)**	-	-	-
Openness*Inflation	-	-	-	-	-	-1.499(-3.59)***	-	-
Openness*InvestProfil	-	-	-	-	-	-	1.853 (1.44)	-
MED* InvestProfil	-	-	-	-	-	-	-	-1.023 (-0.76)
GDP source	3.389 (24.29)***	3.519 (25.44)***	3.379 (24.05)***	3.389 (25.47)***	3.522 (25.44)***	3.505 (25.40)***	3.516 (25.41)***	3.524 (25.44)***
GDP host	2.131 (8.81)***	2.068 (8.55)***	1.752 (9.04)***	1.850 (9.15)***	1.876 (9.31)***	2.261 (8.78)***	1.823 (9.39)***	1.792 (9.20)***
Diff. in GDP per capita	0.640 (3.70)***	0.733 (4.26)***	0.641 (3.70)***	0.764 (4.41)***	0.773 (4.47)***	0.759 (4.39)***	0.734 (4.24)***	0.736 (4.25)***
Distance	-0.315 (-1.24)	-0. 50 (-0.98)	-0.175 (-0.69)	-0.201 (-0.79)	-0.219 (-0.86)	-0.199 (-0.84)	-0.215 (-0.84)	-0.231 (-0.91)
Adjacency	0.329 (1.02)	0.298 (0.92)	0.354 (1.10)	0.300 (0.93)	0.293 (0.91)	0.304 (0.94)	0.301 (0.93)	0.299 (0.92)
Past colonial links	-0.981 (-1.47)	-1.051 (-1.57)	-0.912 (-1.36)	-0.951 (-1.42)	-0.940 (-1.40)	-0.848 (-1.27)	-1.028 (-1.53)	-1.054 (-1.57)
Common language	3.582 (8.93)***	3.502 (8.76)***	3.461 (8.63)***	3.446 (8.57)***	3.437 (8.55)***	3.436 (8.55)***	3.525 (8.76)***	3.524 (8.76)***
Constant	-131.378 (-17.25)***	-123.321 (-15.34)***	-119.363 (-6.73)***	-126.628 (-15.99)***	-75.200 (-2.92)***	-152.026 (-19.43)***	-118.350 (-10.11)***	-132.855 (-18.85)***
Log likelihood	-5028.0376 ***	-5036.7305***	-5031.5024***	-4996.4957***	-4996.2262***	-4991.8899***	-5040.5376***	-5041.4448***
	Wald $\chi^2(17)=1438.45$ Prob > χ^2 = 0.0000	Wald χ^2 (17=1442.92 Prob > χ^2 = 0.0000	Wald $\chi^2(17)1433.46$ Prob > χ^2 = 0.0000	Wald$\chi^2(16)=1362.12$ Prob > χ^2 = 0.0000	Wald χ^2 (16)1366.69 Prob > χ^2= 0.0000	Wald$\chi^2(16)$= 1374.66 Prob > χ^2 =0.0000	Waldchi2(15)=1432.04 Prob > χ^2 = 0.0000	Waldchi2(15)=1426.35 Prob > χ^2 = 0.0000

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

Number of observations: 3220; Number of years: 23; Number of country-pairs: 28*5=140

Mina (2012) has recently shown that MENA economies, by coordinating institutional reform, a first best policy, with investment treaties, and a second best policy, have succeeded in attracting more FDI. Our results show that institutional reforms and investment treaties do

not, however, exercise a cumulative effect on FDI levels. First, Column 4.7 shows that the effect of a higher degree of contract and property rights protection on FDI inflows is not reinforced by the degree of trade openness at standard levels of risk. Second, Column 4.8, reporting the estimated coefficient of the interactive term MED*InvestProfil, shows that the positive effect of institutional reforms on FDI levels is not affected by the fact that the source and host countries are involved in a Euro-Med agreement.

5. Robustness checks And ADDITIONAL comments

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

A first issue is that focusing on a country-level indicator of macroeconomic instability such as the GDP's coefficient of variation could entail a mispecification 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 FDI increase can outweigh the most prominent domestic determinants of FDI attraction. In our initial model, global FDI waves were not controlled for. However, as that might lead to overestimating the impact of source country macroeconomic characteristics, an indicator of global waves of FDI, similar to that of Méon and Sekkat (2012) was subsequently introduced, leaving the coefficients for source country and host country instability unchanged (Table 5).

Table 5: FDI levels and FDI waves

	5.1	5.2	5.3	5.4
Openness	6.645 (10.38)***	6.447 (10.08)***	6.763 (10.50)***	6.561 (10.22)***
MED	2.568 (6.06)***	2.507 (5.88)***	2.672 (6.22)***	2.602 (6.02)***
AMU	6.085 (9.03)***	6.095 (9.02)***	6.085 (9.02)***	6.095 (9.00)***
GAFTA	0.818 (1.29)	0.822 (1.29)	0.883 (1.39)	0.877 (1.37)
InvestProfil	4.106 (5.76)***	4.491 (6.30)***	4.269 (4.92)***	4.655 (6.44)***
War	-5.756 (-3.62)***	-7.019 (-4.16)***	-5.661 (-3.57)***	-6.986 (-4.14)***
Post War	-3.804 (-3.34)***	-4.233 (-3.63)***	-3.639 (-3.18)***	-4.075 (-3.48)***
Europe FDI wave	-0.982(-3.40)***	-1.133(-3.97)***	-	-
World FDI wave	-	-	-1.198(-3.73)***	-1.345 (-4.20)***
Instability source	-0.708(-3.25)***	-	-0.726 (-3.36)***	-
Instability host	-	0.849(2.56)**	-	0.880 (2.65)***
GDP source	3.393 (24.28)***	3.514 (25.57)***	3.390 (24.29)***	3.514 (25.60)***
GDP host	1.909 (9.62)***	1.876 (9.46)***	1.952 (9.73)***	1.918 (9.58)***
Difference in GDP per capita	0.696 (3.98)***	0.777 (4.47)***	0.697 (3.98)***	0.779 (4.48)***
Distance	-0.173 (-0.68)	-0.205 (-0.80)	-0.166 (-0.65)	-0.199 (-0.78)
Adjacency	0.331 (1.02)	0.294 (0.91)	0.332 (1.03)	0.294 (0.91)
Past colonial links	-0.758 (-1.13)	-0.899 (-1.34)	-0.735 (-1.10)	0.882 (-1.32)
Common language	3.525 (8.77)***	3.423 (8.52)***	3.364 (8.40)***	3.420 (8.52)***
Constant	-132.244 (-18.98)***	-109.353 (-13.20)***	-117.183 (-13.90)***	-105.854 (-12.40)***
og likelihood	-5029.8667	-5031.7349	-5029.1201	-5030.7939
	Wald χ^2 (16)= 1467.78 Prob > χ^2 = 0.0000	Wald χ^2 (16)= 1451.71 Prob > χ^2 = 0.0000	Wald χ^2 (16)= 1470.98 Wald χ^2= 0.0000	Wald χ^2 (16)= 1455.21 Prob > χ^2 = 0.0000

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

A second issue concerns the choice of our estimation procedure. 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). An alternative method, the one most commonly used in the literature, circumvents the problem of the zero for the dependent variables by using a simple transformation of the form *ln*(1+FDI), which enables the coefficient to be interpreted as an elasticity when the value of *ln*(1+FDI) is approximately equal to the *ln*(FDI), which is accepted as a reasonable assumption (Eichengreen and Irwin, 1998)[23].

Table 6: FDI levels, Eichengreen's correction and RE estimator

	6.1	6.2	6.3	6.4
Openness	2.287 (9.04)***	2.370 (9.30)***	2.315 (9.18)***	2.183 (8.52)***
MED	1.209 (7.03)***	1.138 (6.53)***	1.231 (7.18)***	1.155 (6.67)***
AMU	2.212 (7.68)***	2.149 (7.44)***	2.143 (7.46)***	2.171 (7.53)***
GAFTA	-1.102 (-4.57)***	-1.135 (-4.71)***	-1.100 (-4.58)***	-1.117 (-4.63)***
InvestProfil	1.369 (5.92)***	1.056 (4.04)***	1.331 (5.78)***	1.468 (6.26)***
War	-0.110 (-0.27)	-0.138 (-0.33)	-0.121 (-0.29)	-0.618 (-1.33)
Post War	-0.134(-0.39)	0.096 (0.27)	-0.190(-0.56)	-0.415 (-1.15)
Inflation	-	-0.191 (-2.54)**	-	-
Instability source	-	-	-0.470 (-5.12)***	-
Instability host	-	-	-	0.342 (2.46)**
GDP source	1.348 (27.62)***	1.347 (27.61)***	1.279 (25.34)***	1.347 (27.63)***
GDP host	0.928 (11.25)***	1.083 (10.56)***	0.932 (11.34)***	0.901 (10.82)***
Difference in GDP per capita	0.350 (5.12)***	0.349 (5.11)***	0.307 (4.48)***	0.351 (5.14)***
Distance	-0.322 (-3.68)***	-0.336 (-3.82)***	-0.338 (-3.87)***	-0.325 (-3.71)***
Adjacency	0.284 (2.03)**	0.284 (2.03)**	0.325 (2.32)**	0.287 (2.05)**
Past colonial links	0.103 (0.33)	0.106 (0.34)	0.172 (0.54)	0.101 (0.32)
Common language	2.076 (12.47)***	2.063 (12.39)***	2.062 (12.43)***	2.073 (12.46)***
Constant	-49.648 (-19.12)***	-51.636 (-19.06)***	-51.311 (-19.69)***	-46.785 (-16.46)***
R^2 within	0.405	0.406	0.410	0.406
R^2 Between	0.950	0.948	0.949	0.950
R^2 Total	0.451	0.453	0.456	0.452
Fisher Test : MCO vs individual FE	F(139, 3070) = 18.00	F(139, 3069) = 17.92	F(139, 3069) = 17.72	F(139, 3069) = 17.92
Fisher Test : MCO vs temporal FE	F(22, 3183) = 1.47	F(22, 3182) = 1.74	F(22, 3182) = 1.50	F(22, 3182) = 1.50
Breush Pagan $\chi^2_{(1)}$ test : MCO vs individual RE	5519.73***	5515.46***	5365.55***	5494.57***

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

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 since it. Consequently, if applying fixed effects estimator to FDI flows corrected *à la* Eichengreen and Irwin (1998) does not change our results, then we can consider that they are robust and not overvalued by the use of a Tobit estimator explicitly accounting for the zero flows. A first round of estimations was made on Equation 2, with time fixed effects to control for temporal heterogeneity. Then, Equation 2 was estimated with random effects, since unobserved heterogeneity could affect the variance-covariance matrix and, consequently, bias estimations. The χ^2 statistic indicates that the fixed effects model should be preferred to the random effects model at 1%.

[23] See Stein and Daude (2007: 100-101) for a discussion.

Because of the presence of country dummies among explaining variables, however, the RE was preferred to the FE. The results reported in Table 6 show that our main findings are robust to a change of estimator. A third 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. Table 7 shows that when an alternative computation of GDP instability (five year-moving average-based variation coefficients) is used, the results reported in Table 2 are not changed. The coefficients estimated for *source instability* and *host instability* are, thus, robust to a change in the measurement of output volatility.

Table 7: FDI levels and 5 year-moving averages

	7.1	7.2	7.3	7.4
Openness	7.122 (10.61)***	7.443 (10.96)***	7.123 (10.58)***	6.847 (9.98)***
MED	1.572 (3.96)***	1.462 (3.64)***	1.627 (4.11)***	1.477 (3.70)***
AMU	6.151 (9.16)***	5.949 (8.86)***	6.020 (8.98)***	6.122 (9.14)***
GAFTA	0.357 (0.58)	0. 289 (0.47)	0.458 (0.74)	0.272 (0.44)
InvestProfil	4.070 (7.46)***	3.033 (4.72)***	3.966 (7.31)***	4.437 (7.67)***
Post_War	-3.183(-2.87)***	-2.690 (-2.40)**	-3.453 (-3.11)***	-3.936 (-3.35)***
Inflation	-	-0.540 (-2.98)***	-	-
Instability source	-	-	-1.072(-3.93)***	-
Instability host	-	-	-	0.838(1.89)*
GDP source	3.447 (24.72)***	3.444 (24.81)***	3.267 (24.74)***	3.448 (24.75)***
GDP host	2.139 (10.73)***	2.574 (10.51)***	2.129 (10.68)***	2.131 (10.70)***
Difference in GDP per capita	0.737 (4.23)***	0.728 (4.20)***	0.648 (3.71)***	0.728 (4.19)***
Distance	0.022 (0.09)	-0.024 (-0.09)	0.073 (0.28)	0.019 (0.07)
Adjacency	0.301 (0.92)	0.292 (0.90)	0.334 (1.02)	0.302 (0.92)
Past colonial links	-0.665 (-0.98)	-0.666 (-0.98)	-0.478 (-0.70)	-0.705 (-1.03)
Common language	3.328 (8.11)***	3.318 (8.13)***	3.235 (7.90)***	3.339 (8.16)***
Constant	-142.413 (-19.43)***	-147.351 (-19.49)***	-145.205 (-19.53)***	-136.957 (-17.58)***
Log likelihood	-4803.6099	-4799.835	-4796.5649	-4801.5986
	Wald χ^2 (13)= 1374.54 Prob > χ^2 = 0.0000	Wald χ^2(14)=1399.40 Prob > χ^2 = 0.0000	Wald χ^2(14)=1392.43 Prob > χ^2 = 0.0000	Wald χ^2(14)=1377.61 Prob > χ^2 = 0.0000

Notes: *, **, *** significant at 10%, 5% and 1% risk.
Number of observations: 2940; Number of years: 21; Number of country-pairs: 28*5=140

A fourth source of bias in estimation could result from the likelihood of Lebanon being an outlier because of the war and post-war periods. The war period itself necessarily exacerbated GDP instability in Lebanon, while FDI nose-dived, thereby possibly producing an adverse relation between host GDP volatility and FDI inflows. As for post-war reconstruction from 1991 onwards, with its context of high GDP growth variation springing from growth and FDI recovery that may have induced a positive relation 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, we introduced 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. The introduction of the two dummies did not change the coefficient estimated for GDP host volatility, which remained positive and significant in explaining FDI levels. We also checked whether our estimations are robust to change in the sample composition. Estimations of Table 2 were run without incorporating Lebanon, as that country is the most unstable of the five host countries of our sample. As the result regarding

source country volatility remained unchanged, this suggests that the estimation based on the whole sample was not driven by the presence of a highly unstable outlier.

A fifth issue is whether our findings are driven by a specific sub-period. Chow tests found a structural break for 1995 in the empirical model used to explain FDI levels. That particular year 1995 corresponds to the Barcelona agreement between European Union and the MENA countries. The results reported in Table 8 show that our main results are driven by the post-1995 period, and not by the pre-1995 period, which includes both the Lebanese war and post-war reconstruction periods. Equally, our results show that prior to 1995, FDI volatility was driven by source country economic conditions, and more specifically by the investment climate ad measured by the quality of economic governance. After that structural break, exchange rate crises become highly significant in explaining FDI volatility, as well as source and host country GDP volatility. After the Barcelona agreement, economic governance became less significant, whereas trade openness and regional trade agreements simultaneously became more significant in explaining FDI levels and volatility.

Table 8: FDI levels and Chow test

	8.1	8.2	8.3	8.4	8.5	8.6
N=3220	First group 1987-1995	Second group 1996-2009	First group Core/Stable	Second group Peripheral/Instable	First group Core/Stable	Second group Peripheral/Instable
Openness	0.742 (2.16)**	3.069 (7.62)***	1.886 (4.88)***	2.105 (6.92)***	1.896 (5.13)***	2.299 (8.65)***
MED	1.126 (1.87)*	0.875 (3.96)***	0.609 (2.37)**	1.458 (7.14)***	0.799 (3.15)***	0.985 (5.44)***
AMU	0.809 (2.09)**	2.448 (7.42)***	-	1.997 (7.84)**	-	1.986 (7.81)***
GAFTA	-	-0.076 (-0.24)	-	-0.363 (-1.74)*	-	0.130 (0.64)
InvestProfil	1.835 (6.46)***	1.224 (2.21)**	1.614 (4.84)***	1.102 (4.63)***	1.189 (3.49)***	0.599 (2.77)***
War	-1.127 (-2.60)***	-	-0.365 (-0.62)	-0.389 (-0.88)	0.592 (1.20)	-0.139(-0.52)
Post War	-1.701 (-4.33)***	-0.446 (-0.74)	-0.261 (-0.62)	-0.170 (-0.50))	0.626 (1.51)	0.299 (1.27)
Inflation	0.375(3.54)***	-0.437(-4.35)***	-	-	-0.274(-2.77)***	-0.057(-0.80)
Instability source	-0.138 (-1.15)	-0.874 (-6.57)***	-0.084 (-0.65)	-0.214 (-1.98)**	-	-
Instability host	0.104 (0.51)	0.323 (1.76)*	0.500 (2.57)***	0.152 (1.00)	-	-
GDP source	1.117 (14.29)***	1.337 (20.12)***	2.615 (26.82)***	0.709 (14.59)***	2.635 (27.79)***	0.401 (7.82)***
GDP host	-0.077 (-0.44)	1.532 (10.71)***	1.428 (10.55)**	0.233 (2.24)**	1.663 (10.67)***	0.197 (1.83)*
D Difference in GDP pc	0.284 (3.51)***	0.474 (4.77)***	-0.103 (-0.36)	0.587 (8.53)***	0.284 (1.02)	0.167 (2.30)**
Distance	-0.428 (-4.95)***	-0.187 (-1.89)*	-2.575 (-11.00)***	0.220 (3.56)***	-2.882 (-13.13)***	0.251 (4.66)***
Adjacency	0.313 (1.58)	0.215 (1.17)	-1.153 (-4.55)***	-0.644 (-4.30)***	-1.326 (-5.28)***	-0.000 (-0.00)
Past colonial links	0.012 (0.03)	0.834 (2.16)**	2.022 (3.81)***	-0.094 (-0.23)	1.929 (3.99)***	0.653 (1.51)
Common language	1.867 (9.03)***	1.828 (7.36)***	0.264 (0.76)	1.132 (6.29)***	0.231 (0.80)	0.793 (4.94)***
Constant	-22.014 (-4.93)***	-67.543 (-16.04)***	-60.417 (-12.06)***	-28.645 (-8.69)***	-65.001 (-13.61)***	-22.482 (-8.19)***
SCR	38998,016		39082,948		39398,979	
SCR1	11276,456		18933,795		22587,391	
SCR2	26322,756		13275,260		7846,902	
Fisher	6,581		39,996		55,203	
Fisher $F_{0.05}$	1,60		1,60		1,60	

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

Number of observations: 3220; Number of years: 23; Number of country-pairs: 28*5=140

FDI inflows proved to be increasingly attracted by price-opportunities, which were probably related to nominal or real volatility in the five MENA economies. Institutional distance started to fall as a consequence of the Euro-Med agreement, while short-tem macroeconomic factors of attraction started to outweigh the structural factors that had predominated before 1995. Although regional integration increases FDI levels to developing economies via the reduction of microeconomic transaction costs, it also tends to raise the macroeconomic costs associated with volatility. Trade intensification with Europe has opened new channels of volatility transmission for MENA economies, with FDI being one of those channels.

6. CONCLUSION

Although several recent empirical studies have confirmed that FDI volatility has a negative effect on both GDP growth and macroeconomic stability, far fewer have addressed the effects of GDP volatility on FDI levels and volatility. In the present paper, we analyze the impact of various combinations of macroeconomic instabilities on FDI localization in Middle East 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 on FDI inflows of macroeconomic sources of risks and cost to be differentiated from the other sources of risks and costs. As a gravity model also allows the impact of various determinants concerning FDI flow origins to be assessed, this enables our paper to accord special attention to source countries and to pinpoint the specific influence of their macroeconomic characteristics on FDI flows.

We consider four indicators of macroeconomic instability: output volatility in both source and host countries, annual inflation rate and annual average real exchange rate, and find evidence of contradictory impact on FDI flows for the first two variables. When controlling for bilateral and host country characteristics such as economic and political risk, trade openness and distance, we find that macroeconomic instability is a major determinant for European firms' location decisions in MENA economies. We show that, among our various sources of instability, inflation remains a critical determinant of FDI levels, whereas the real exchange rate has no impact in our sample. When controlling for GDP levels, countries with a higher level of output instability tend to host higher levels of FDI, and also experience higher FDI volatility.

Host country instability is not the only determinant of investment decision since source country output volatility has an adverse impact on FDI to MENA countries. We find that FDI levels and volatility decrease with the extent of output instability in the origin country. Hence, the results we obtain for MENA economies confirm recent evidence by Méon and Sekkhat (2012) that FDI varies as much because of what happens in the world economy (waves) as it does because of the of host country risk characteristics. Moreover, we find that countries with the lowest output volatility, which are also those with the highest income levels, tend, on average, to invest more in MENA countries. When host country output volatility is higher, however, those more developed countries tend to invest less than more peripheral and middle-income economies, which are less sensitive to macroeconomic factors of risk.

Though source and host country volatility have opposite effects on FDI flows, they do not, however, have cumulative effects on those flows. This means that countries with the highest real volatility tend to attract FDI from countries exhibiting the lowest volatility, with such a relation being even stronger for peripheral non-traditional sources of FDI. FDI from those peripheral non-traditional sources tends to be less reactive to economic fluctuation in the source country than FDI from core traditional sources. Hence, FDI tends to be less pro-cyclical when it comes from non-traditional

sources and, conversely, tends to be more responsive to any source of volatility when it comes from more traditional developed sources.

In short, we show in this paper that source country macroeconomic instability appears to be a significant determinant of FDI flows to MENA economies, making FDI a possible vector of macroeconomic volatility transmission, especially when source countries are more developed, and more at the core of the world economy. This result challenges the now common idea that, because FDI is less pro-cyclical than the other forms of financial inflows, it is a stable source of external financing for developing economies (Fernandez-Arias and Hausmann, 2001; Calderón and Didier, 2009). It also suggests that there is a possible trade-off, for developing economies, between technology and skill-intensive but unstable FDI sourced from more developed economies, and stable but less technology-intensive investments sourced from middle-income peripheral countries. Further analyses of the relative costs-benefits of those alternative sources of FDI need to be undertaken in order to improve the economic and social efficiency of FDI attraction policies that are financially costly for developing economies.

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APPENDIX A

TABLE A1

Data sources and definitions

Variables	*Description of Variables*	*Data Source*
FDI_{ij}	The value in thousands of US dollars of flows of foreign direct investment (FDI) from a country *i* (country of origin) 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 origin country *i* and destination country *j*	Population data used to measure per capita GDP **is** collected from IMF International Financial statistics
Distance	Distance in **kilometers** between origin and destination 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 county *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, profits 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)
Real Exchange rate	Real exchange rate annual average	CEPII CHELEM database
Instability host and Instability source	Volatility of GDP growth for host or source country *j* reflecting the coefficient of variation of growth	Authors' calculations CEPII CHELEM database
War	Dummy variable takes the value 1 for Lebanon **war's** years (1987-1991) and 0 from 1992 onwards	Authors' calculations
Post_War	Dummy variable takes the value 1 for post-Lebanon war's years (1992-1996) and 0 for other years	Authors' calculations
VagIDE_World	World levels of FDI flows in value	UNCTAD
VagIDE_UE	European Union (UE25) levels of FDI flows in value	UNCTAD

Stable	Dummy variable takes the value 1 if the country belongs to the European core (UE15) in 2009, and takes null otherwise.	Authors' calculations
Unstable	Dummy variable takes the value 1 if the country does not belong to the European core (UE15) in 2009, and null otherwise.	Authors' calculations

APPENDIX B

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

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