FOREIGN DIRECT INVESTMENT AND GROWTH IN MEDITERRANEAN COUNTRIES *

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1. Introduction

The theory of foreign direct investment (FDI) seeks to explain the existence and growth of foreign investments. It also aims to identify the determinants of FDI flows and the effects of such flows on the host and home country economies, as well as on world welfare. It is widely believed that FDI in host countries has a very critical role in boosting the economic growth through the employment effect (creating jobs), technology spillover, etc., especially in the case of developing countries. Compared to indirect investment (short-term loans and portfolio investment), foreign direct investment has the potential of being a much better tool that offers sustainable economic development.

The literature on the relationship between FDI and economic growth is vast. Broadly speaking, FDI to a country can have two main motivations: to take advantage of the factors of production in the host country, *i.e*. vertical FDI; or to supply the domestic and regional markets, *i.e.* horizontal FDI. Therefore, FDI is expected to have impact on trade flows. This impact could be two-fold depending on the motivation. It will have an increasing effect on trade if it is export-oriented or vertical FDI, or a decreasing effect if it aims at the host country market. Therefore, FDI is expected to have direct or indirect impact on growth, through trade. Hence, the relationship between FDI and growth should be analyzed so as to capture both of these effects.

The governments of Euro-Mediterranean basin established the Euro-Mediterranean Partnership (EMP) and adopted the Barcelona Declaration in November 1995. The best-known aspect of the process is the creation of a free trade zone by the year 2010. The countries highlighted the importance of creating an environment to attract FDI, which could lead to the transfer of

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technology and increase production and exports. This, in turn, becomes the main engine of our motivation to investigate FDI-economic growth relationship in the region. With this study, the relationship between FDI and economic growth will be examined for the following Mediterranean countries (MEDA): Algeria, Cyprus, Egypt, Israel, Jordan, Morocco, Syria, Tunisia and Turkey.

After a brief introduction giving the aim of the study, Section 2 surveys both the theoretical and empirical work on the relationship between FDI and economic growth. Section 3 summarizes the characteristics of MEDA countries and the Barcelona Process. After performing unit root and cointegration tests, the Granger causality between these variables are examined in Section 4. Section 5 takes a closer look on FDI, trade and growth in these countries in pre- and post-Barcelona periods. Finally, Section 6 concludes.

2. Literature on FDI and growth

FDI is generally associated with Multinational Corporations (MNCs), which are enterprises owning or controlling value-adding activities in two or more countries. Broadly speaking, there are three agents in the world of FDI. The first one is the home country, which is the source of investment capital. This country may wish to keep its own firms in the country as shifting production abroad may be harmful for the domestic economy (*e.g.*, loss of jobs in the home country). The second agent is the foreign investor. The reasons behind a firm's choice to invest abroad, such as to make use of ownership advantages, have been extensively investigated in the literature[1]. The last agent is the host country, which may promote FDI in order to gain access to advanced technology and management skills, to increase the employment level, to increase competition in the domestic market, to increase tax revenue and/or to boost the economic growth.

Since the early 1960s and especially during 1990s, more and more countries have adopted FDI-specific regulatory frameworks for their investment-related objectives. Most of the regulations were initially intended to control the entry of FDI. However, since 1980s most regulations have been amended, with the design of new frameworks to attract FDI. From 1991 to 1997, 94% of the FDI-specific regulations were directed towards creating a more favourable environment for FDI (see UNCTAD, 1998, p. 67). In particular, especially the developing countries have liberalized their financial

[1]. See, for example, Dunning (1988, 1998, 2000); Ethier (1986); Smith (1987).

markets and encouraged foreign firms (via lower taxes, subsidies for infrastructure, etc.) to invest in their country in order to have better access to technological know-how, increase employment and, in general, all potential positive externalities.

Since the pioneering explanations of Hymer (1976), many scholars have contributed to the literature on international business, in particular on FDI. However, rather than discussing the literature on the determinants and deterrents of FDI, we will limit our survey and focus on the growth impact of FDI[2].

The neoclassical growth literature assumes that long run growth can only be achieved via technological progress and increase in population. The impact of FDI on growth would then be realized only in the short run. Hence, according to this view, FDI will only be growth enhancing if it affects technology permanently and positively.

It has long been argued that capital formation remains an important contributor to economic growth in the developing world. While this arises as a traditional view, in many cases evidence highlights FDI's contribution to growth through technology transfer. As discussed in Lensink and Morrissey (2001), MNCs are presumed to be among the most technologically advanced firms[3], and they not only contribute to imports of more efficient foreign technologies, but also generate technological spillovers for local firms.

Brooks and Hill (2004) highlights that two important features of FDI are its stability and ease of service relative to other sources of (indirect) investment. They attempt to classify the potential benefits of FDI to host economies (to start with increasing output and income), *i)* access to a better technology (Romer, 1993); *ii)* increasing competition; *iii)* increasing domestic investment (see Bosworth and Collins, 1999); *iv)* leading advantages in terms of export market access (Aitken *et al.*, 1997); *v)* saving and/or increasing foreign exchange reserves.

The empirical evidence shows that the spillover effects of FDI on domestic firms are ambiguous. Aitken and Harrison (1999) find a negative effect for Venezuela, whereas in Blomstrom (1986) higher degree of foreign ownership is seen to show faster productivity growth. Some recent studies have argued that the contribution of FDI to growth also depends on the conditions in the host country. Balasubramanyam *et al.* (1996) show that FDI impact on growth is relatively larger when the host countries follow export promotion in preference to encouraging import substitution. Moreover, they find that in the

[2]. For an excellent survey, see De Mello (1997). See also Saggi (2000) for a recent survey on the role of FDI in transferring technology.
[3]. See also Markusen (1995) for more on this.

export promoting countries FDI rather than the domestic investment drives the growth engine. In their later work, Balasubramanyam *et al.* (1999) questioned the same hypothesis again. Instead of using the ratio of imports to GDP (as before) to determine whether a country is export-oriented or import-substituting, they used the residual approach, calculating the deviation between actual and predicted export volumes, to measure trade policy orientation in their 1999 study. However, the new method has not changed the results.

The role of financial markets is searched by Alfaro *et al.* (2003). They show that when the financial markets are developed, FDI positively affects economic growth. Borensztein *et al*. (1998) tested the effect of FDI on economic growth in a cross-country regression framework and suggested that FDI is a crucial tool in transferring the technology, but the effectiveness of FDI depends on the stock of human capital in the host country[4]. They also show that FDI is complementary to domestic investment[5]. By contrast, Blomstrom *et al.* (1992) find no support that human capital is important; however, they find that FDI promotes growth when the host economy is a developed one.

Nair-Reichert and Weinhold (2001), however, claim that the results of such macro studies are flawed due to the homogeneity of assumptions across countries in studies on FDI-growth relationship. They find that the causal relationship between investment (foreign and domestic) and economic growth in developing countries is highly heterogeneous. According to Boyd and Smith (1992), FDI may slow growth by hampering resource allocation in the presence of pre-existing trade, price and other distortions. In a relatively recent work, Carkovic and Levine (2002) claim that previous macroeconomic studies do not fully control for endogeneity, country-specific effects, and the inclusion of lagged dependent variables in the growth regression. They show that after controlling for the statistical problems, their results are inconsistent with the view that FDI exerts a positive impact on growth that is independent of other growth determinants.

The link between FDI and regional integration is also investigated in the literature. Darrat *et al.* (2005) examine the impact of FDI on growth in Central and Eastern Europe (CEE) and the Middle East and North Africa (MENA) regions finding that FDI affects growth positively only in the European Union accession countries of the CEE region.

[4]. See also World Bank (2001), Mody and Wang (1997) and Hermes and Lensink (2003), which find the same result using a different set of countries.

[5]. Agrawal (2000) also finds that there exist complementarity and linkage effects between FDI and domestic investment in the South Asian countries. See also Makki and Somwaru (2004) in which FDI is shown to affect domestic investment positively.

3. Barcelona Process and MEDA countries

Regional integration plays a crucial role as one of the important determinants of FDI. The signature of the Barcelona Declaration by the Mediterranean countries and the establishment of the Euro-Mediterranean Partnership in November 1995, aimed to constitute a regional integration by forming a free trade area by the year 2010 and creating a persuasive investment area by reduction of impediments for FDI.

The Barcelona Declaration emphasizes the importance of free trade and foreign direct investments as the key factors for growth. Especially technology diffusion plays a central role in the process of economic growth. The rate of economic growth of a developing country depends on the extent of adoption and implementation of new technologies that are already in use in developed countries. International trade is also an important instrument for economic growth as facilitating a more efficient production by altering production to the ones that have comparative advantage.

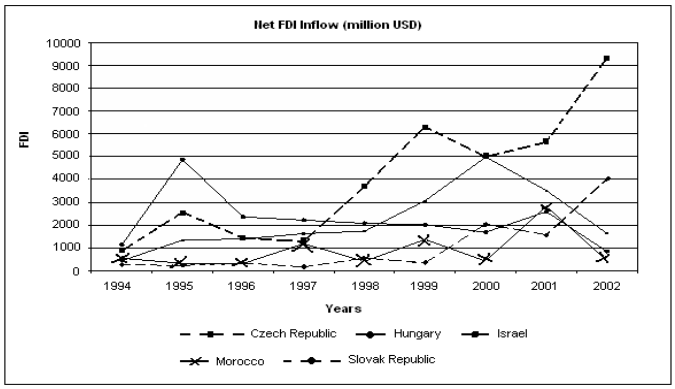
The regulations of the Barcelona Declaration include eliminating progressively tariffs and non-tariff barriers to trade in manufactured products, liberalizing progressively trade in agricultural products and services by taking into account the difference of the partner countries' needs and development stages. Besides the trade liberalization with Europe, the Mediterranean partners also committed to implement free trade among them.

Although almost all MEDA countries have implemented new legislations in the 1990s in order to establish an attractive environment for FDI, the speed of their integration process varies considerably. This is mostly due to the differences in the economic and social structures of these countries, *i.e.* Algeria, Cyprus, Egypt, Israel, Jordan, Morocco, Syria, Tunisia and Turkey.

Although these countries have common features, differences in income generate different development levels. Fig. 1 shows the GDPs per-capita for the 9 countries in the 1975-2003 period. These figures allow us to compare countries that are quite different in size. Israel and Cyprus are the only two countries that have GDP per-capita above 5.000 US Dollars. All the other countries have GDP per-capita less than that level. In addition, these two countries show an increasing trend in terms of GDP per-capita in the period considered. GDP per-capita in Jordan, Syria and Algeria has decreased to levels below 2.000 US Dollars in 1985, 1989 and 1991 respectively and remained so afterwards. However, Tunisia's GDP per-capita remained at

around 2.000 US Dollars. The steep falls in Turkish GDP show the years in which the country had economic crises, *i.e.* 1994 and 2001.

Fig. 1 – Net FDI inflow for some MEDA and CEE countries between 1994-2002



Source: UNCTAD database.

A separate look to the pre- and post-Barcelona periods shows that average GDP growth rate in MEDA countries has been around 4% in the last decade (whereas it was around 3% in the pre-Barcelona period, 1975-1995). In most cases the changes in GDP have been followed by changes in trade. Trade-enhancing FDI may lead to higher GDP relative to market-oriented FDI. Therefore, the causality between all these three variables is examined for MEDA countries.

Exports have been a crucial factor for MEDA because of small domestic markets. Both export and FDI growth rates of the region were slower than other regions of the world. Total exports as a percentage of GDP varies largely from country to country in MEDA. While it is 93.8% in the case of Malta, other countries have disappointing levels, especially for Egypt with 16.3% and Lebanon with 12% between 1991 and 2001. However GDP growth and FDI do not go together in developing countries contrary to developed ones; inward FDI stock levels as a percentage of world total are also low, especially for Algeria, Cyprus and Jordan with a level below 0.10 % on average between 1991 and 2001. Comparison of the FDI potential and performance indexes reveals that almost all MEDA countries, with the exception of Cyprus and Israel, have attracted less FDI than their potential (UNCTAD, 2004).

Algeria, Tunisia, Egypt and Israel have applied incentive programmes in order to attract FDI to certain industries and regions. Despite being the third biggest FDI recipient of Africa, Algeria has not fully benefited from its effects

on job creation and technology transfer. Israel has a specialty among MEDA countries as being strong high-technology performer.

4. Relationship between trade, growth and FDI

This Section aims to examine the pair-wise causalities between FDI, GDP and trade as it is very likely to observe two-way relationships between these variables. A high level of GDP, for example, represents a higher market potential in a country and thus attracts foreign firms. FDI, on the other hand, boosts growth by new investments. Similarly, FDI is attracted to countries with a higher trade potential (both in terms of imports and exports), and also creates new trade opportunities.

Direction of causalities between the variables examined is tested by applying Granger causality test. Possible causality from FDI to GDP would mean that the foreign investment affects GDP. The opposite would indicate that GDP attracts FDI. Here, the GDP could be interpreted as the market size, and such FDI would are more market-oriented. Two-way causality shows both variables affect each other. A similar interpretation applies to trade-FDI and trade-GDP causalities as well.

The sample covers the time period 1970-2003 for all countries, except for Cyprus and Syria[6]. The samples for Cyprus and for Syria belong, respectively, to time periods 1978-2003 and 1975-2003. The logarithms of inward FDI stock, Gross Domestic Product (GDP) and volume of trade are used in the analysis. Volume of trade is calculated by summing a country's exports and imports. Data on inward FDI stock is obtained from UNCTAD database, data on GDP is obtained from World Bank, World Development Indicators Online Database, and data on export and imports are obtained from World Trade Organization Online Database. These indicators measured in current US Dollars are converted into real values by using GDP deflator for the United States[7].

Considering, however, that one of the main issues in time series analysis is the non-stationarity of data, Augmented Dickey-Fuller unit root tests are applied to the mentioned economic variables as a first step. Several series used in the econometric analysis exhibit a non-stationary pattern. Including two or more non-stationary series in one regression might cause a spurious regression problem in which case the *F* and *t* tests would not be reliable.

[6]. Summary statistics for data is given in the Appendix.
[7]. GDP deflator data is obtained from World Bank, World Development Indicators Online Database.

Differentiating the series until they become stationary is one solution to spurious regression problem, but this may cause a loss in determining the long-run relationship between these series (Greene, 2003). The applied unit root test is based on estimating one of the following regressions and testing for the significance of the parameter for y_{t-1}, which is denoted by δ in the representation below[8] (Greene, 2003).

$$\Delta y_t = \delta y_{t-1} + \sum \delta_i \Delta y_{t-i} + \varepsilon_t \quad \text{(no constant)}$$

$$\Delta y_t = \mu + \delta y_{t-1} + \sum \delta_i \Delta y_{t-i} + \varepsilon_t \quad \text{(constant)}$$

$$\Delta y_t = \mu + \beta t + \delta y_{t-1} + \sum \delta_i \Delta y_{t-i} + \varepsilon_t \quad \text{(constant with a time trend)}$$

The series considered is said to have a unit root and, hence, follows a non-stationary pattern if δ is found to be statistically significant. Differencing a non-stationary series d times might make it stationary, in which case the series is said to be integrated of order d (I(d)).

Test statistics are calculated by estimating constant only and constant with a time trend equations given above. Akaike Information Criterion (AIC) is used to select for the lags in the estimated test regressions. Tab. 1 presents Augmented Dickey-Fuller test results for the logarithms of FDI, GDP and volume of trade[9]. In the Table, I(0) denotes that the series examined is level stationary; and I(1) and I(2), respectively denote that the series is first and second difference stationary.

According to these results, FDI inward stock is stationary for Egypt, Jordan and Turkey. Its first difference is stationary for Israel, Morocco, Tunisia, Cyprus and Syria. This series is integrated of order two for Algeria. GDP is also integrated of order two for Algeria. Its first difference is stationary for the rest of the countries, except for Tunisia where it is level stationary. Volume of trade is stationary for Jordan, Tunisia, Turkey and integrated of order one for the rest of the countries.

Tab. 1 – Augmented Dickey-Fuller unit root test results

	FDI	**GDP**	**Trade**
Algeria	I(2)	I(2)	I(1)
Cyprus	I(1)	I(1)	I(1)

[8]. Note that students-*t* distribution is not applicable anymore and Mac Kinnon's critical values are used instead (Harvey, 1993; Enders, 2004).
[9]. The test statistics calculated for the unit root tests are given in the Appendix.

Egypt	I(0)	I(1)	I(1)
Israel	I(1)	I(1)	I(1)
Jordan	I(0)	I(1)	I(0)
Morocco	I(1)	I(1)	I(1)
Syria	I(1)	I(1)	I(1)
Tunisia	I(1)	I(0)	I(0)
Turkey	I(0)	I(1)	I(0)

The problem of spurious regression disappears if a stationary linear combination of these series exists, that is if these series are cointegrated. The series that are integrated of the same order are said to be cointegrated if a stationary linear combination of them exists.

Engle and Granger's cointegration testing approach applies the Augmented Dickey Fuller test explained above to test for cointegration between the variables examined. Only this time stationarity of the error term (u_t) obtained from running the regression below is tested for.

$$y_t = \beta x_t + u_t$$

After performing the unit root tests, Engle and Granger's cointegration test is applied for the countries that have non-stationary FDI, GDP and trade data. The cointegration test results for the variable pairs are reported in Tab. 2[10]. Test statistics are calculated by estimating constant only and constant with a time trend equations and the lag length for each of the test regressions is also determined by minimizing the AIC at this stage. Tab. 2 shows whether or not there is a cointegrating relationship between the paired non-stationary variables[11]. According to these results, GDP and volume of trade tend to move together in the long run in most countries: Algeria, Cyprus, Egypt, Israel and Morocco. The results are similar for FDI and volume of trend: there is a cointegrating relationship between these variables in Algeria, Cyprus, Israel and Morocco. GDP and FDI, on the other hand, do not move together in the long run in all countries tested, except in Morocco.

Tab. 2 – Engle and Granger cointegration test results

	GDP & Trade	**GDP & FDI**	**FDI & Trade**
Algeria	Yes	No	Yes

[10]. The test statistics calculated for the cointegration tests are given in the Appendix.

[11]. Note that that cointegration tests are only performed for the variables which are non-stationary, as there is no spurious regression problem for those, which are level stationary.

Cyprus	Yes	No	Yes
Egypt	Yes	-	-
Israel	Yes	No	Yes
Jordan	-	-	-
Morocco	Yes	Yes	Yes
Syria	No	No	No
Tunisia	-	-	-
Turkey	-	-	-

In the final step of our analysis, Granger causality tests are applied to test for the direction of causalities between the variables. Granger causality test estimates Vector Autoregressive (VAR) or Vector Error Correction (VEC) models for the calculation of the test statistic. The choice between VAR and VEC models depends on the cointegration test results: a VAR model with difference stationary variables is estimated for variables which are not cointegrated and a VEC model is estimated otherwise. The lag length for these test regressions are chosen by using different criterion. Final Prediction Error (FPE) and Akaike Information Criteria (AIC) are used for the lag selection in the VAR models. Wald (Chi-square) statistics are computed for the lag selection in the VEC models.

A VAR representation for a two variable model would be in the following form:

$$y_t = \mu + \sum^{`} \gamma_i y_{t-i} + \sum^{`} \omega_i x_{t-i}$$

$$x_t = \eta + \sum^{`} \delta_i y_{t-i} + \sum^{`} \varphi_i x_{t-i}$$

VEC models add an error-correction term ($\hat{e}_{t-1}$) into both equations in this representation, where this term is obtained from the regression of x_t on y_t ($\hat{e}_t = y_t - \beta x_t$). After estimation of these models, Granger's causality test calculates Chi-square values for the joint significance of the lagged terms.

The results from these pairwise causality tests are reported in Tab. 3[12]. According to these results, the direction of causality between FDI and volume of trade is mainly from FDI to trade. In most countries examined, namely in Algeria, Egypt, Israel, Syria and Turkey, FDI has a significant impact on the volume of trade, whereas trade has no significant effect on the amount of FDI in these countries, except in Turkey. For Turkey, FDI and volume of trade both affect each other simultaneously. In Morocco, on the other hand, volume of trade is found to cause FDI, while FDI has no significant impact on trade.

[12]. The test statistics calculated for the causality tests are given in the Appendix.

There is no Granger causality from FDI to trade or from trade to FDI for Cyprus, Jordan and Tunisia.

The Granger causality test results for the relationship between FDI and GDP are very interesting. The results indicate that there is no significant Granger causality from FDI to GDP or from GDP to FDI. Two exception countries are Syria and Turkey. For Syria, FDI is found to cause changes in GDP and for Turkey, GDP is found to significantly affect FDI.

Turning to the Granger causality test results for GDP and volume of trade, the existence and direction of causality differ in different countries. In Algeria, Morocco and Turkey, neither GDP nor the volume of trade Granger causes the other. In Jordan and Tunisia, the direction of causality is from GDP to trade, and in Syria it is from volume of trade to GDP. GDP and trade simultaneously cause each other in Cyprus and Israel.

Tab. 3 – Granger Causality Test Results

FDI and Trade		
	FDI causes Trade	**Trade causes FDI**
Algeria	Yes	No
Cyprus	No	No
Egypt	Yes	No
Israel	Yes	No
Jordan	No	No
Morocco	No	Yes

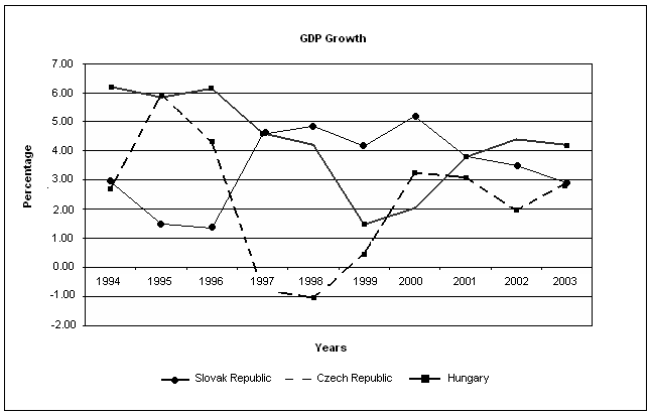
Syria	Yes	No
Tunisia	No	No
Turkey	Yes	Yes
FDI and GDP		
	FDI causes GDP	**GDP causes FDI**
Algeria	No	No
Cyprus	No	No
Egypt	No	No
Israel	No	No
Jordan	No	No
Morocco	No	No
Syria	Yes	No
Tunisia	No	No
Turkey	No	Yes
GDP and Trade		
	GDP causes Trade	**Trade causes GDP**
Algeria	No	No
Cyprus	Yes	Yes
Egypt	No	Yes
Israel	Yes	Yes
Jordan	Yes	No
Morocco	No	No
Syria	No	Yes
Tunisia	Yes	No
Turkey	No	No

5. Responsiveness

Similar to the findings of Darrat *et al*. (2005) showing that «… *FDI inflows stimulate economic growth only in EU accession countries of the CEE region, while the effect of FDI on growth in MENA and in non-EU accession countries is either non-existent or negative*», for the 1979-2000 period the previous Section finds no causality between FDI and GDP for most of the MEDA countries. Testing for causality without differentiating between pre- and post-Barcelona due to data constraints stems out as being the reason for that finding. The post-Barcelona period is short for statistical analysis. Therefore, we need to analyze the effects of Barcelona on MEDA countries by

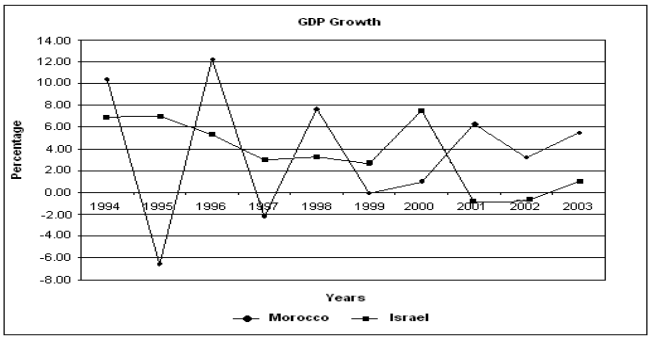
examining the changes in FDI and GDP during the period. It is possible to see the changes in GDP, trade and FDI over the period from Fig. 2.

Fig. 2 – GDP Growth Rates for Some CEE Countries between 1994-2003



Source: UNCTAD database.

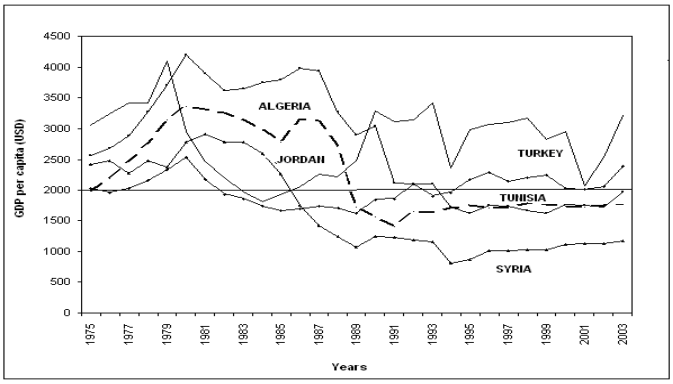
Fig. 3 – GDP Growth Rates for Morocco and Israel between 1994-2003



Source: UNCTAD database.

The relationship between FDI and GDP can be seen from the scatter diagrams drawn for each country with the same scale. These diagrams show that the FDI stock in certain countries is quite large relative to other. Therefore, in order to analyze the impact of FDI on GDP we decided to look at the GDP per FDI stock in each country. This ratio, unlike the standard FDI inflow/GDP used in the literature, allows us to eliminate the effect of large one-shot FDI inflow from dominating the whole analysis.

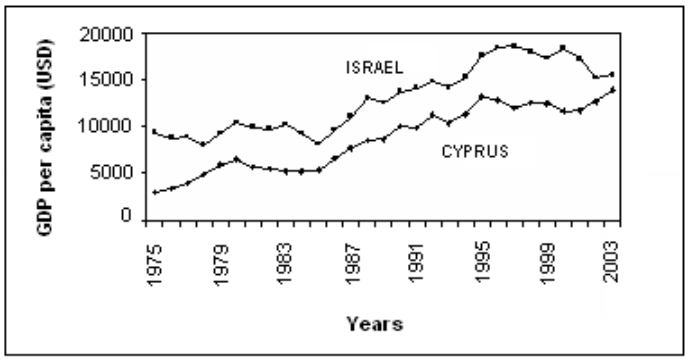
Fig. 4 – GDP per capita in lower income MEDA Countries (1975-2003)



Source: UNCTAD database.

The changes in GDP/FDI over time are given in the diagrams above. Analyzing these diagrams shows that Cyprus, Egypt, Jordan, Morocco and Syria have a decreasing GDP/FDI trend. For Algeria this ratio first manages to increase, but then the GDP per foreign investment starts to decrease in 1987. Despite the ups and downs of the Turkish economic and political life, the country manages to keep an increasing trend somewhat like Israel. FDI to these two countries generates a GDP more than five fold in the pre-Barcelona period. Tunisia stands out as a stable country in this case, as well.

Fig. 5 – GDP per capita in higher income MEDA Countries (1975-2003)



However, in the post-Barcelona period (1996-2003) all MEDA countries but Turkey have a decreasing GDP/FDI ratio, meaning that either the GDP growth has slowed down or the FDI entries have increased. In order to better analyze this pattern, we need to look at the responsiveness of GDP to changes in FDI stock.

In the pre-Barcelona period, the responsiveness of GDP to FDI inward stock has been positive but less than one in Algeria, Cyprus, Egypt, Jordan and Morocco. Israel, Turkey and Tunisia have response ratios greater than 1 but the first two are negative. Syria also has a negative response rate but, unlike Israel and Turkey, it is the decrease in GDP that causes the sign to be negative, whereas it is the decrease in FDI stock for Israel and Turkey. This responsiveness indicates the effect of change in FDI stock on the GDP. A value around 1 means that an increase in FDI stock generates a similar increase in GDP. Tab. 4 below shows these figures for pre- and post-Barcelona periods.

Tab. 4 – Responsiveness of GDP to FDI

Country	**GDP Growth %**	**FDI Growth %**	**% change GDP / % change FDI Growth**
1975-1985			
Algeria	7.3	4.6	1.59
Cyprus	6.6	93.1	0.07
Egypt	5.2	74.5	0.07
Israel	0.6	-4.0	-0.16
Jordan	7.4	22.6	0.33

Morocco	-2.4	21.5	-0.11
Syria	2.7	91.9	0.03
Tunisia	0.6	-0.3	-2.21
Turkey	-2.3	-5.3	0.44
1985-1995			
Algeria	-5.9	-1.4	4.09
Cyprus	10.7	6.9	1.56
Egypt	2.8	6.9	0.40
Israel	10.9	2.1	5.14
Jordan	-0.1	-0.4	0.15
Morocco	6.8	18.0	0.38
Syria	-6.2	33.9	-0.18
Tunisia	4.9	5.4	0.92
Turkey	6.7	2.0	3.25
1994-2003			
Algeria	3.2	15.6	0.21
Cyprus	3.0	16.7	0.18
Egypt	3.4	2.7	1.28
Israel	2.6	23.0	0.11
Jordan	3.4	16.3	0.21
Morocco	2.3	15.5	0.15
Syria	6.8	9.0	0.76
Tunisia	3.5	4.0	0.88
Turkey	5.2	1.1	4.85

Note: Geometric mean has been used to calculate average growth rates of GDP and FDI.

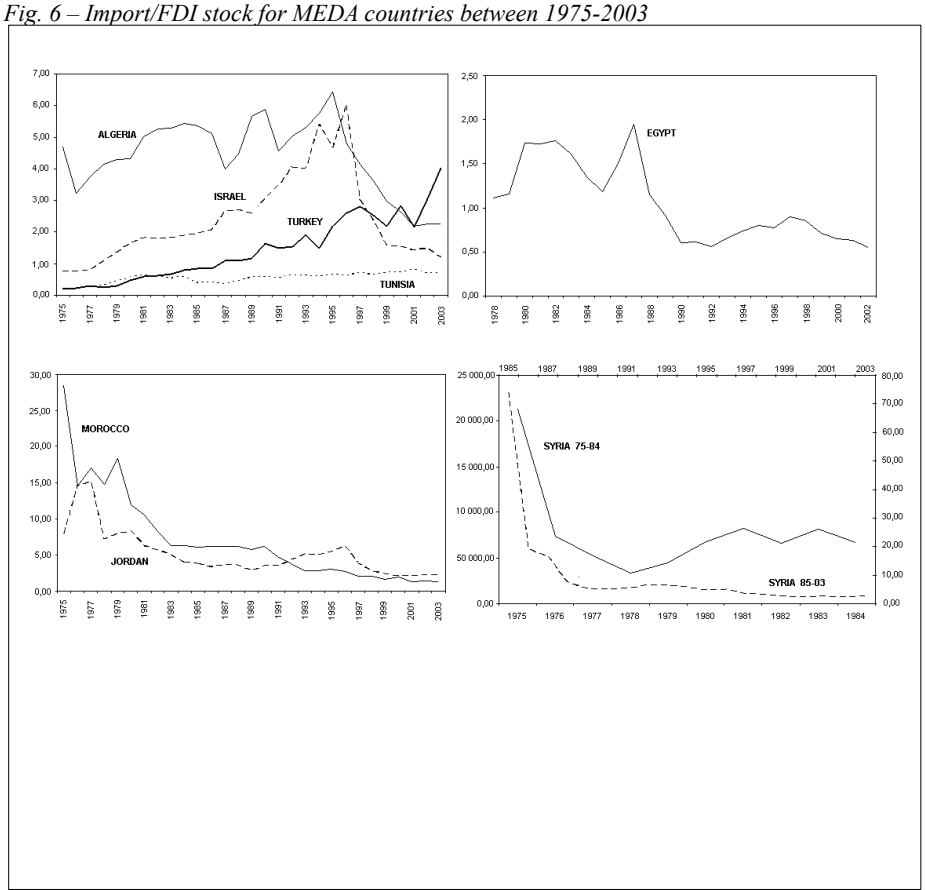
Comparing the pre- and post-columns, we see that the growth rates have decreased for 5 out of 9 MEDA countries, apart from Algeria, Syria, Tunisia and Turkey. The growth in FDI inward stock has increased in Algeria, Israel, Jordan, Tunisia and Turkey. However, the response of GDP to FDI growth has remained below 1 for all MEDA countries, but Egypt and Turkey. It has turned from negative to positive in Israel and Syria but it has not exceeded one.

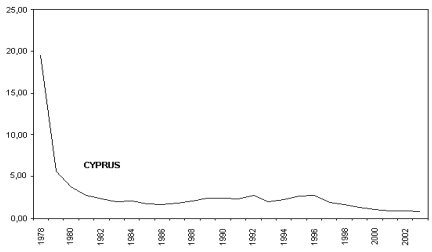
In the last decade the average GDP growth has been around 7% in Syria, 3% in Algeria and Turkey, 3.5% in Egypt, Jordan and Tunisia. The lowest GDP growth is in Israel. The series in Fig. 2 show that in most countries the GDP has been increasing in the post-Barcelona period. Therefore, the changes in FDI need to be examined. The average annual FDI growth in these

countries has been manyfold compared to GDP growth, apart from Egypt and Turkey. The ratio of GDP growth to FDI growth, which can be in a way evaluated as "responsiveness of GDP to FDI changes", is less than one in 8 countries but Turkey. The reason that the response rate varies from one period to the other for each country may indicate a change in the type of FDI. Empirical studies in the literature (*e.g.*, Blomstrom *et al.*, 1992) show that FDI has different effects on growth under export promotion than under import substitution policies. Obviously the type of FDI in the country may affect trade in different ways. On the one hand, FDI can be import substituting, thus reducing imports to the country; alternatively, it can be export enhancing (export-oriented), *i.e.* the foreign firm uses the host country as an export platform to export to third countries and/or home country. The type of FDI has been detected using the import per GDP ratio in the literature. However in this study, instead of that ratio, import per FDI stock has been used to identify whether FDI is import substituting or not.

Changes in import/FDI stock over the period have been varied. The diagrams show that the ratio is decreasing in all countries but Turkey in the post-Barcelona period. A decreasing ratio indicates that the imports per FDI is decreasing; in other words an increase in FDI decreases imports. Hence, interpretation of response rate and import/FDI stock diagrams suggest that if FDI is not import substituting, then growth will respond more to changes in FDI. This finding is somewhat different than Blomstrom *et al.*'s (1992) because in their study they evaluate the effect of the chosen development strategy (*i.e.*, export promotion or import substitution) on the impact of FDI to growth, whereas our findings should be seen as the effect of the type of FDI.

Fig. 6 – Import/FDI stock for MEDA countries between 1975-2003





6. Conclusions

This study examines the relationship between growth, foreign direct investment and trade for some selected MEDA countries: Algeria, Cyprus, Egypt, Israel, Jordan, Morocco, Syria, Tunisia and Turkey. Using data belonging to the 1970-2003 period, the relationship between these variables is investigated. Unit root and cointegration tests are performed before testing for the direction of causality between FDI, GDP and trade using pairwise Granger Causality test. In the long run we observe no significant relationship between these variables for most countries examined. In the short run analyzing the response of growth to changes in FDI stock (*i.e.*, calculated as response rate) and the trade pattern together suggests that FDI into the MEDA region has been mostly import substituting in the post-Barcelona period. Therefore, the integration process of the region to the EU in terms of enhancing FDI to increase growth has not been as expected.

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Appendix

Tab. 1A(a) – Augmented Dickey-Fuller test results for FDI in MEDAC

Country	**Level**		**First difference**		**Second difference**	
Unit root test results with constant only						
	Lag	Test statistic	Lag	Test statistic	Lag	Test statistic
Algeria	1	-0.3261	0	-2.8169*	1	-5.0138***
Cyprus	0	-4.7057***	1	-4.7645***	-	-
Egypt	4	-14.0520***	-	-	-	-

Israel	5	-0.0758	5	1.2274	5	-2.1342
Jordan	4	-3.0813**	-	-	-	-
Morocco	4	0.0373	5	-3.3954**	-	-
Syria	0	-1.6121	0	-4.4681***	-	-
Tunisia	0	0.1833	0	-5.7970***	-	-
Turkey	5	-3.4062**	-		-	-
Unit root test results with constant and a time trend						
	Lag	Test statistic	Lag	Test statistic	Lag	Test statistic
Algeria	0	-0.1953	0	-2.9451	1	-5.6297***
Cyprus	2	-0.7860	0	-13.0235***	-	-
Egypt	5	-6.8767***	-	-	-	-
Israel	4	3.1290	5	-0.6981	4	-6.1531***
Jordan	5	-3.9620**	-	-	-	-
Morocco	5	-3.1192	5	-3.4981*	-	-
Syria	0	-1.4018	0	-4.4511***	-	-
Tunisia	0	-1.8289	0	-6.7384***	-	-
Turkey	5	-3.7345**	-	-	-	-

Note: The sample covers the time period 1970-2003 for all countries, except for Cyprus and Syria. The samples for Cyprus and for Syria belong, respectively, to time periods 1978-2003 and 1975-2003.

(***) Null hypothesis is rejected at %1 significance level.

(**) Null hypothesis is rejected at %5 significance level.

(*) Null hypothesis is rejected at %10 significance level.

Tab. 1A(b) – Augmented Dickey-Fuller test results for GDP in MEDAC

Country	**Level**		**First difference**		**Second difference**	
Unit root test results with constant only						
	Lag	Test statistic	Lag	Test statistic	Lag	Test statistic
Algeria	3	-2.7882*	2	-1.9146	1	-7.3914***
Cyprus	0	-1.5031	0	-3.8153***	-	-
Egypt	0	-0.8720	0	-5.5944***	-	-
Israel	0	-1.3663	0	-4.6942***	-	-
Jordan	4	-2.3146	3	-1.9167	2	-6.2306***
Morocco	0	-1.9364	0	-4.0741***	-	-
Syria	1	-1.8041	0	-4.4862***	-	-

Tunisia	0	-3.0411**	0	-3.9220***	-	-
Turkey	0	-1.7775	0	-5.5770***	-	-
Unit root test results with constant and a time trend						
	Lag	Test statistic	Lag	Test statistic	Lag	Test statistic
Algeria	3	-2.9033	2	-1.5982	1	-7.4344***
Cyprus	0	-1.8135	4	-3.8597**	-	-
Egypt	5	-4.3072**	0	-5.4956***	-	-
Israel	1	-2.9428	0	-4.7977***	-	-
Jordan	4	-2.6025	3	-1.9334	2	-6.1245***
Morocco	2	-3.5232*	0	-4.0046**	-	-
Syria	1	-1.8363	0	-4.2772**	-	-
Tunisia	0	-3.2911*	0	-3.9535**	-	-
Turkey	3	-3.4864*	0	-5.5610***	-	-

Note: The sample covers the time period 1970-2003 for all countries, except for Cyprus and Syria. The samples for Cyprus and for Syria belong, respectively, to time periods 1978-2003 and 1975-2003.

(***) Null hypothesis is rejected at %1 significance level.

(**) Null hypothesis is rejected at %5 significance level.

(*) Null hypothesis is rejected at %10 significance level.

Tab. 1A(c) – Augmented Dickey-Fuller test results for volume of trade in MEDAC

Country	**Level**		**First difference**	
Unit root test results with constant only				
	Lag	Test statistic	Lag	Test statistic
Algeria	5	-2.4677	1	-3.4932**
Cyprus	0	-1.5241	0	-4.8123***
Egypt	1	-2.8510*	1	-4.2537***
Israel	2	-1.8763	1	-3.9869***
Jordan	0	-3.7608***	0	-3.3393**
Morocco	0	-1.8984	0	-4.1398**
Syria	1	-2.4021	0	-5.2099***

Tunisia	1	-2.9741**	0	-3.5912**
Turkey	4	-0.5923	5	-5.7991***
Unit root test results with constant and a time trend				
	Lag	Test statistic	Lag	Test statistic
Algeria	0	-2.2923	1	-3.5123*
Cyprus	0	-2.0880	0	-4.7106***
Egypt	1	-2.4420	1	-4.7556***
Israel	1	-3.3696*	1	-4.1401**
Jordan	5	-3.5240*	0	-3.7618**
Morocco	0	-2.4206	0	-4.1696**
Syria	1	-2.2739	0	-4.9667***
Tunisia	1	-3.9662**	0	-3.7765**
Turkey	3	-6.4567***	5	-5.5730***

Note: The sample covers the time period 1970-2003 for all countries, except for Cyprus and Syria. The samples for Cyprus and for Syria belong, respectively, to time periods 1978-2003 and 1975-2003.

(***) Null hypothesis is rejected at %1 significance level.

(**) Null hypothesis is rejected at %5 significance level.

(*) Null hypothesis is rejected at %10 significance level.

Tab. 2A – Cointegration test results for GDP and Trade

Cointegration test results for GDP and Trade				
	Constant only	Lags	Constant + Trend	Lags
Algeria	-5.5852***	0	-5.3320***	0
Cyprus	-2.7450*	1	-3.7456**	1
Egypt	0.0601	2	-2.7205	2
Israel	-2.9715**	0	-3.0644	0
Morocco	-3.0320**	0	-2.9905	0
Syria	-1.8106	0	-2.0584	0
Cointegration test results for GDP and FDI				
	Constant only	Lags	Constant + Trend	Lags

Algeria	-2.4171	3	-2.9464	3
Cyprus	-1.9860	0	-2.8041	0
Israel	-2.3663	0	-0.5280	0
Morocco	-3.5315**	1	-3.4636*	1
Syria	-1.7542	0	-1.7458	0
Cointegration test results for volume of trade and FDI				
	Constant only	Lags	Constant + Trend	Lags
Algeria	-2.8052*	0	-2.8969	0
Cyprus	-3.1417**	0	-2.8150	0
Israel	-1.0695	5	2.0817***	4
Morocco	-1.8223	0	-4.4553***	1
Syria	-1.7576	0	-2.9850	0

Notes: (***) Null hypothesis is rejected at %1 significance level.
(**) Null hypothesis is rejected at %5 significance level.
(*) Null hypothesis is rejected at %10 significance level.

Tab. 3A – Granger Causality Test Results

Causality between FDI and volume of trade			
	FDI causes Trade	Trade causes FDI	Lags
Algeria	13.6770***	0.9742	3
Cyprus	5.1597	5.8261	4
Egypt	16.0773***	6.9962	5
Israel	10.1884**	6.9618	4
Jordan	4.2829	8.0946	5
Morocco	6.6459	28.9448***	5
Syria	3.4426*	0.6321	1

Tunisia	0.1092	2.2984	1
Turkey	10.7556*	20.2857***	5
Causality between FDI and GDP			
	FDI causes GDP	GDP causes FDI	Lags
Algeria	0.2772	0.6054	2
Cyprus	1.9550	2.2246	2
Egypt	5.5046	6.6302	5
Israel	1.0505	1.6695	3
Jordan	4.0910	6.0353	5
Morocco	2.7854	5.2098	4
Syria	5.5036**	0.3883	1
Tunisia	1.6213	1.3536	1
Turkey	0.5261	5.2016*	2
Causality between GDP and volume of trade			
	GDP causes Trade	***Trade causes GDP***	***Lags***
Algeria	4.0379	0.6746	3
Cyprus	15.487***	12.1259**	5
Egypt	6.1781	9.3900**	3
Israel	17.0810***	10.1470**	3
Jordan	3.5972*	2.5607	1
Morocco	0.0195	1.1289	1
Syria	0.1407	4.3530**	1
Tunisia	4.5108**	0.0075	1
Turkey	0.3092	0.9035	1

Note: The test regressions for the causality between FDI and trade in Israel and Morocco includes a trend variable.

(***) Null hypothesis is rejected at %1 significance level.

(**) Null hypothesis is rejected at %5 significance level.

(*) Null hypothesis is rejected at %10 significance level.

Tab. 4A – Summary statistics for FDI, GDP and volume of trade

FDI				
	Mean	Std.Dev.	Min	Max
Algeria	2004.753	1310.642	0	5985.737
Cyprus	1188.864	1406.925	0	5371.43
Egypt	9464.4	7301.849	2.469	19956.22
Israel	9348.201	6820.993	4665.854	30066.66
Jordan	749.151	712.324	0	2638.051
Morocco	2203.383	2917.135	72.619	10965.97
Syria	506.565	647.112	0	1959.045
Tunisia	8961.816	2565.6	5310.538	15650.68

Turkey	18025.14	4859.128	12971.54	30267.4
GDP				
	Mean	Std.Dev.	Min	Max
Algeria	56796.21	19388.02	17558.69	91198.77
Cyprus	6115.139	2831.423	1834.213	10754.88
Egypt	52389.67	21483.43	25985.32	99427.57
Israel	60325.76	31946.97	19273.62	115452.1
Jordan	6412.632	2110.148	2322.049	9314.746
Morocco	28278.47	7179.466	14365.14	41308.1
Syria	17170.91	5058.028	7771.577	27000.85
Tunisia	14685	4566.195	5225.768	23652.52
Turkey	141915	46138.65	59132.8	227080.7
Volume of trade				
	Mean	Std.Dev.	Min	Max
Algeria	26065.83	9004.241	7205.787	45242.48
Cyprus	3371.183	1371.171	1211.053	5722.198
Egypt	16813.52	6499.517	5621.814	38317.65
Israel	35072.58	17141.24	10377.55	69090
Jordan	4728.419	1923.176	793.127	8337.185
Morocco	12266.28	4557.879	4158.819	21735.43
Syria	7686.395	2559.797	2045.769	12318.17
Tunisia	9588.586	4293.528	1771.892	17889.6
Turkey	39043.66	27141.63	5577.394	110144.3

Notes: (***) Null hypothesis is rejected at %1 significance level
(**) Null hypothesis is rejected at %5 significance level
(*) Null hypothesis is rejected at %10 significance level