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Exchange Rates, Trade and FDI Flows and The Euro-Mediterranean Partnership

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Simon Neaime, Institute of Financial Economics,
American University of Beirut, Lebanon

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Exchange Rates, Trade and FDI Flows and The Euro-Mediterranean Partnership*

Research Director

Simon Neaime
(sn01@aub.edu.lb)

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Institute of Financial Economics, American University of Beirut- Beirut, Lebanon.
P.O.Box: 11-0236. Fax (9611) 744484-Tel (9611)744485-

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ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criterion
CPI	Consumer Price Index
DM	German Mark
ECB	European Central Bank
EP	Egyptian Pound
EU	European Union
EMMU	Euro Mediterranean Monetary Union
FD	First Difference
FF	French Frank
FTA	Free Trade Area
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
HP	Hodrick-Prescott
IMF	International Monetray Fund
JD	Jordanian Dinar
LP	Lebanese Pound
M	Imports
MED	Mediterranean
MD	Moroccan Dinar
MPCs	Mediterranean Partner Countries
NAFTA	North American Free Trade Agreement
NAMU	North American Monetary Union
OCA	Optimum Currency Area
PP	Phillips-Perron
PPP	Purchasing Power Parity
PPI	Producer Price Index
RIA	Regional Integration Agreement
SP	Syrian Pound
SUR	Seemingly Unrelated Regression
TD	Tunisian Dinar
TT	Terms of Trade
USD	United States Dollar
VAR	Vector Autoregression
VECM	Vector Error Correction Model
X	Exports

EXECUTIVE SUMMARY

Over the past two decades, Mediterranean Partner Countries (MPCs) have taken several steps to integrate into the world economy. Among other steps taken was the negotiation and signing of bilateral trade agreements with the European Union (EU). These agreements were primarily aimed at enhancing the access of Mediterranean (MED) exports to the EU markets. With the Barcelona declaration of 1995, the EU-MED region moved to a new era of trade and economic cooperation. In fact, the Barcelona conference aims at creating a Euro-Mediterranean Free Trade Area (FTA) by the year 2010 that will promote trade and Foreign Direct Investment (FDI) flows in the region.

Since the Euro-MED Trade Agreements are expected to generate trade patterns that can amplify the consequences of real exchange rate misalignments, this research project studies the implications of MED exchange rate policies on EU-MED trade, FDI and foreign debt. It also analyses problems that may arise from real exchange rate misalignments within the context of the Euro-MED trade agreements.

It is shown that exchange rate misalignments within the Euro-MED trade agreements are in fact leading to a reduction in trade, and a relocation of foreign direct investment. This may have negative consequences on the stability of the Euro-MED trade agreements in the future, and may lead to macroeconomic instability throughout the region. With the prevailing MED exchange rates arrangements, these misalignments have been amplified within the Euro-MED region right after the ratification of Barcelona. In addition, a US dollar peg coupled with the depreciation of the Euro currency against the US dollar since its introduction in 1999 have been the main cause for a steady appreciation of the region's average real exchange rates with a direct negative impact on trade, FDI, and foreign debt in the region.

Since MPCs are not pursuing an independent monetary policy, the costs of greater fixity to the euro are relatively low. A monetary policy that pegs the various MED currencies to the euro, or to a basket of currencies where the euro is given the highest weight in the medium run can turn out to be instrumental in borrowing monetary credibility from the European Central Bank (ECB). It can also reduce the impact of exchange rate misalignments on Euro-MED trade and the flow of FDI. One extreme scenario would be a Euro-MED currency union whereby the MPCs simply adopt the euro.

The empirical results show that the impact of real exchange rate misalignments on EU-MED exports and FDI is likely to be amplified as more countries join the Agreements, and as trade is intensified between the Euro-MED Regional Integration Agreements (RIA) Member Countries. In addition, volatility in the real bilateral exchange rate has a much stronger impact among MPCs that are already members of the Euro-MED RIA. In fact, a depreciation of the real bilateral exchange rate increases relative FDI. This is coupled with the existence of tariff-jumping FDI, which are more likely to relocate in case of exchange rate disagreements among MPCs.

The study shows that MED foreign debt is highly dollar denominated. These high proportions of debt levels denominated in USD-when these countries have either joined the Euro-MED partnership or will soon be joining- are expected to amplify the balance sheet effects of exchange rate movements, once EU-MED trade is intensified in the coming few years.

Finally, the study shows that that total exports, imports, and total trade have all increased uniformly between the EU and MPCs that have already ratified the Barcelona Declaration. This evidence provides a strong support to the claim that for those MPCs that have ratified the Barcelona Agreements, greater trade integration is gradually leading to greater economic integration with the EU. This scenario is, however, quite different when the MED region is considered. The empirical results show no convergence in MED monetary and fiscal policies. Thus, more efforts need to be devoted to enhance South-South economic and financial integration.

I. Introduction

The recent events in Argentina and Brazil made it clear that serious problems may arise when countries have trade agreements with exchange rate disagreements. In particular, it has been shown that trade agreements can generate trade patterns that can amplify the consequences of real exchange rate misalignment (Fernandez-Arias, Panizza, Stein, 2002). This is a serious issue for the Euro-Mediterranean partnership. In fact, while this agreement is bound to increase trade between Europe and its Mediterranean Partners Countries[1], some countries in the latter group (e.g. Egypt, Jordan, Lebanon, and Syria) peg their currency to the US dollar. Given the divergent paths of the Euro and US dollar[2] and the existence of exchange rate misalignments, this has led to a large real appreciation of some Middle Eastern currencies, and there are good reasons to believe that this misalignment is likely to become even more important after the completion of the Euro-MED partnership. This study aims at analyzing problems that may arise from real exchange rate misalignments within the context of the Euro-MED trade agreements.

Since the early 1970s, MED countries have taken several steps to integrate into the world economy. Among other steps taken was the negotiation and signing of bilateral trade agreements with the European Union. These agreements were aimed at enhancing the access of MED exports to the EU market; promote transparency, standardization of procedures and regulations, and government revenues.

With the Barcelona declaration of 1995, the EU-MED region moved to a new era of trade and economic cooperation. In fact, the Barcelona conference aims at creating a Euro-Mediterranean Free Trade Area[3] by the year 2010 that will promote trade flows in the region, as countries will lift obstacles to trade and perceive trade as a source of growth.[4] Another feature of the agreement is to establish an integrated Euro-Mediterranean region of mutual economic co-operation. The establishment of the FTA requires, however, trade liberalization within the MED region. It also requires that MED

[1] The Mediterranean Partner Countries are: Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Malta, Morocco, Syria, Tunisia, and Turkey. In this study, we focus on MED countries that have ratified or will ratify soon the Barcelona agreements. We exclude those countries that might join the EU like Cyprus, Malta and Turkey, and in some sections Israel due to on going political tensions rendering intra-MED trade with Israel totally absent, and lack of data.

[2] See Neaime and Paschakis (2002), for an extensive discussion of the future Euro-US Dollar exchange rate.

[3] The FTA will be established gradually. Tariff barriers to trade in manufactured products will be gradually eliminated according to specific timetables to be negotiated between partners. Under the agreement, partners are committed to liberalizing the current payments connected with the movements of goods, services, persons, and capital, achieving the complete liberalization of capital movements as soon as conditions are met. Besides the bilateral vertical trade liberalization with the EU, MPCs are committed to implement free trade among themselves (Horizontal or South-South integration).

[4] The Barcelona Declaration signed in 1995 by the EU, and the 12 eligible Non EU Mediterranean Partners (Algeria, Morocco, Tunisia, Turkey, Egypt, Lebanon, Syria, Jordan, Israel, Palestinian authority, Cyprus and Malta) established the adoption of the "Euro-Mediterranean Partnership" consisting of mainly economic and financial partnership, to promote regional integration. From among 12 MPCs, Cyprus and Malta are expected to obtain full membership with the EU in 2004, while Turkey hopes to join in 2004. The joining of these 3 countries the EU means a negating of the already signed bilateral agreements.

exchange rates arrangements be in line with trade policies and not be a hindering factor in the promotion of integration and Euro-MED trade flows.

While MPCs have been successful in the signing of bilateral agreements with the EU, much still need to be done at the regional level to achieve the 2010 target of a Euro-MED FTA. Already ratified agreements are with Tunisia (1995), Israel (1995), Morocco (1996), and Jordan (1997), and an interim agreement with the Palestinian Authority was signed in 1997. With the exception of Syria with which negotiations are still under way, Algeria (2002), Egypt (2001), and Lebanon (2002) have now signed but their agreements are awaiting ratification. These agreements have reinforced the importance of Europe to the Mediterranean region, especially in terms of trade and capital flows.[5]

The purpose of this research is both positive and normative. On the positive side, the research aims at evaluating the strain that real exchange rate misalignments can put on the Euro-MED partnership. On the normative side, the research aims at providing policy recommendation for the exchange rate, FDI, trade, and debt management policies of countries within the Euro-MED partnership. Particular focus will be put on: (1) Individuating policy responses that may help alleviate problems arising from trade agreements and exchange rate disagreements; (2) The implications of reducing MPCs' real exchange rate volatility on trade policy management;[6] (3) The relationships that might arise with the Euro; (4) The relocation of foreign direct investment; And (5) the structure of foreign debt in relation with exchange rate policies (balance sheet effects).

It is important to ask why being members of a trade agreement may make real exchange rate misalignments particularly damaging. There are three reasons why trade agreements amplify the costs of real exchange rate misalignment: (1) The impact on trade due to the presence of regional goods; (2) The relocation of foreign direct investment; And (3) the amplification of balance sheet effects due to exchange rate movements. Exchange rate misalignments within trade agreements that lead to a reduction in trade, relocation of foreign direct investment, and balance sheet effects may have negative consequences on the stability of the trade agreement, and may lead to macroeconomic instability through its impact on the debt structure and foreign exchange reserves, and consequently may culminate into a currency crisis (Fernandez-Arias, Panizza, and Stein, 2002).

The rest of the study is divided as follows. Section II overviews exchange rate policies in the MED region over the last four decades. It then identifies the presence of exchange rate misalignments within MED countries that follow divergent exchange rate policies (South-South misalignments), and between the Euro-MED countries (North-South misalignments), using the Hodrick-Prescott framework and the Purchasing Power Parity (PPP) model. In fact, the existence of exchange rates misalignments within the MED region has had a direct negative impact on intra MED trade for the past two decades. With the prevailing MED exchange rate arrangements, these misalignments

[5] Barcelona is intended to increase market access for both MPCs and EU countries by providing gradual liberalization of European agricultural markets and reciprocal trade liberalization by the MPCs for European manufactured goods. It also provides financial and technical support for the MPCs undergoing the transition from protected markets to free trade with the EU.

[6] This issue became a priority for the Lebanese government after it initialed its partnership agreement with the EU in February of 2002. The rest of MPCs will also have to deal with this issue.

might be amplified within the Euro-MED region right after the ratification of Barcelona, and even before the establishment of the FTA in 2010 with a direct negative impact on the Euro-MED Partnership. This section will also look at the benefits and costs of reducing exchange rates volatility in the Euro-MED region. Within the same context, Sections III and IV identify how the Euro-MED partnership may amplify the problems related to real exchange rate misalignments. Particular emphasis will be put on the impact of exchange rates misalignments on the Euro-MED trade flows and foreign direct investment within the Euro-MED Regional Integration Agreement. Section V looks at debt management policies and their relationship with exchange rate misalignments. Since misalignments are expected to exist either within the MED region or the Euro-MED region, the impact on FDI and trade flows on one hand, and on the balance sheet of MPCs on the other, might be very damaging for the Euro-MED partnership. Section VI considers, therefore, closely the prospects for an Optimum Currency Area (OCA) and a Euro Mediterranean Monetary Union (EMMU), as potential solutions to the problems arising from exchange rate misalignments. Section VII concludes the study with some policy implications.

II. Real Exchange Rate Misalignments In The Euro-MED Region

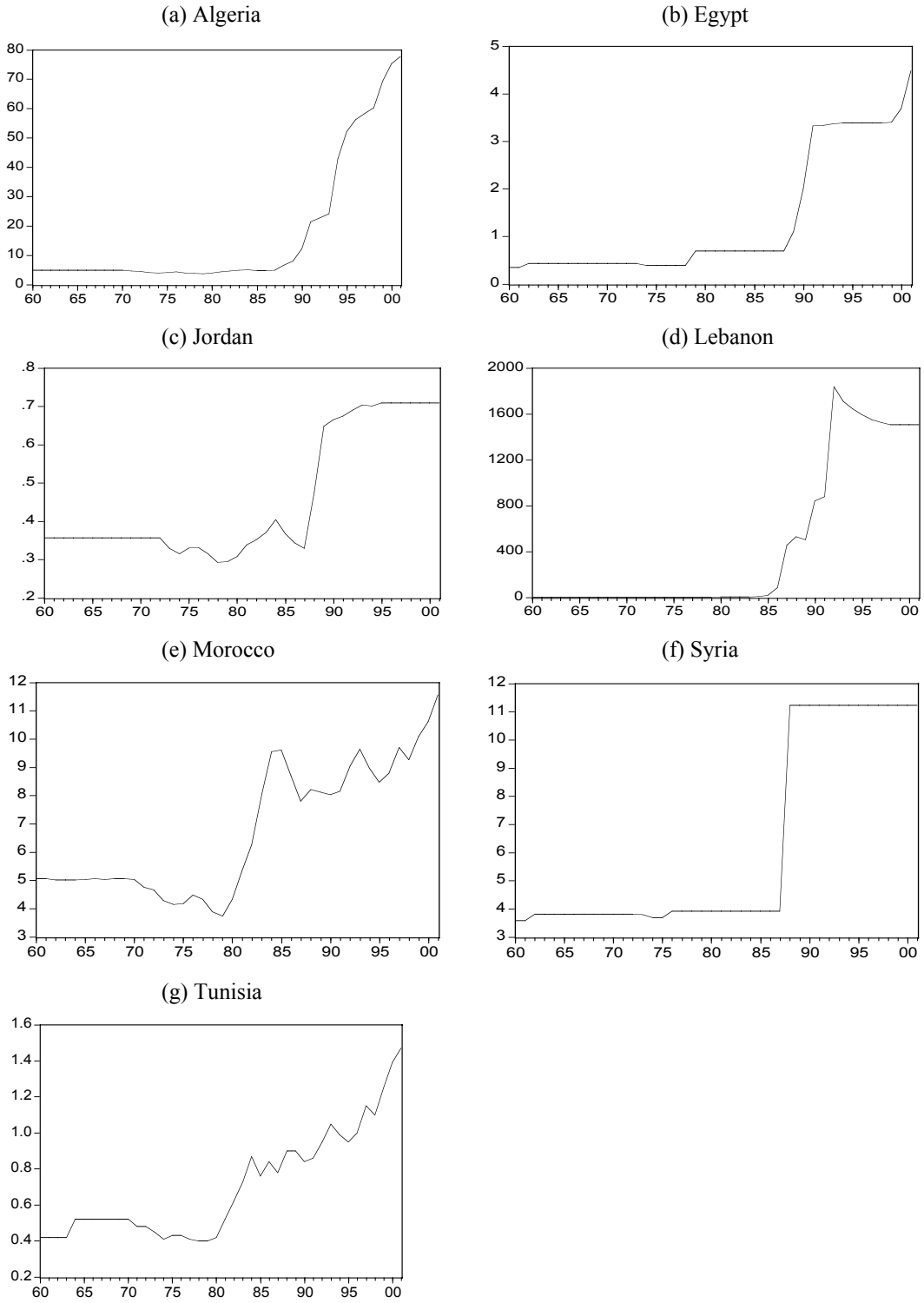
1. Exchange Rate Policies In The Mediterranean Region

Over the last two decades a non-stable macroeconomic environment has characterized the MED region. While exchange rates in Algeria, Morocco and Tunisia cannot be classified as fixed, those of Egypt, Jordan, Lebanon, and Syria have been in general pegged to the US dollar. However, the success of the policy of pegged regimes to the US dollar has not been homogenous across these countries. Although, these countries adopt a fixed exchange rate regime, domestic inflation has experienced episodes of high rates coupled with sporadic and high nominal exchange rate volatilities. In addition, a US dollar peg coupled with the depreciation of the Euro currency against the US dollar since its introduction in 1999 have been the main cause for a steady appreciation of the region's average real exchange rates. Therefore, the potential for real exchange rates to have been misaligned cannot be ruled out.

Macroeconomic instability in Egypt, Jordan, and Lebanon has led to several episodes of devaluations against the dollar. After a period of exchange rate stability, Egypt was pressured recently to float its exchange rate. This was due to macroeconomic imbalances, and the mismanagement of fiscal and monetary policies. The Jordanian Dinar (JD) and the Egyptian Pound (EP) were both devalued in 1988, after years of poor macroeconomic conditions in both countries. In Egypt, the depreciation of the pound reached about 300 percent, edging up against the dollar from about parity to the dollar in 1988 to about 4 pounds per USD in 1991. Similarly, Jordan's currency also experienced a 200 percent devaluation during the same period, edging up against the dollar from 0.35 in 1988 to about 0.75 per dollar in 1991. The Dinar was stabilized since then, but the Egyptian Pound was devalued again in 2000 and 2001 (See Figure 1).

After a decade of market-determined exchange rates in the 1980s, Lebanon has entered since the mid 1990s a period of exchange rate stability with the adoption of a fixed exchange rate regime to the US dollar. From about LP 2 per USD in 1985, the Lebanese Pound (LP) depreciated tremendously to about LP1832 per USD during the 1989-1992 period. Recently, the exchange rate was allowed to oscillate but within very

FIGURE 1: The Dynamics of Selected MPCs Nominal Exchange Rates (Per One USD): 1960-2001



Source: International Monetary Fund (IMF), IFS.

narrow exchange rates bands around a central parity of LP 1505 per USD. The Lebanese

pound depreciated substantially in the late 1980s and early 1990s after the end of the civil war, and subsequently appreciated slightly before being stabilized in mid 1990 at the currently still prevailing level of LP 1500 per USD (see Figure 1).

Syria is following a multiple exchange rate regime, an official exchange rate and more than one rate in the black market. While the adoption of an officially determined exchange rate may protect the economy from a currency crisis, this policy may sometime lead to the creation of a black market coupled with incentives for capital outflows. Syria has had a multi-tier exchange rate system since the early 1980s, in addition to a well-developed black market for foreign exchange since the 1970s. The value of the Syrian Pound (SP) depreciated significantly in 1988, following the patterns of the Jordanian and Egyptian currencies, and has continued to fluctuate since then in the black market. The pound depreciated from about SP3.5 per USD to SP12 per USD by the end of 1988. Extensive price controls, rationing of subsidized products and extensive black market prevalence in many subsidized products has contributed to limiting invisible macroeconomic instability in Syria.

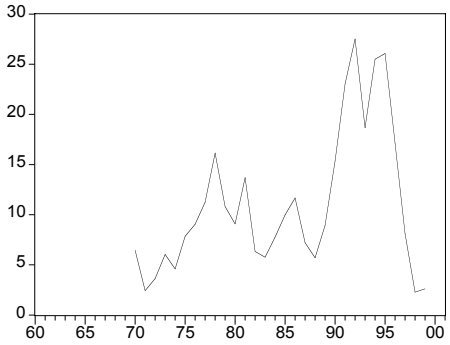
Unlike the above MED countries, Tunisia and Morocco have adopted and to varying degrees a flexible exchange rate system since the early 1980s. Since then, both countries have also experienced various episodes of devaluation. In Morocco the Dirham is determined to some extent on the foreign exchange market through the forces of supply and demand since the early 1980s. However, The central bank intervenes occasionally in the market to maintain the exchange rate within some specified exchange rate bands, floating around a central parity. This central parity is linked to a weighted basket of currencies reflecting Morocco's trade patterns. With the exception of the early and mid 1980s, where the Moroccan Dirham (MD) experienced some significant devaluation, (from about 4.33 to the USD in 1980 to about MD 9.62 to the USD in 1985) the central bank has been successful in avoiding large swings in the nominal exchange rate (Figure1).

The exchange rate in Tunisia is closer to a crawling peg arrangement whereby the value of the Dinar is determined in the interbank market. Occasionally, the Tunisian central bank intervenes on the foreign exchange market trying to influence the rate at which the Tunisian Dinar (TD) is traded. The Tunisian nominal exchange rate has been stable since the early 1960s with no major swings against the USD until the mid 1980s. As in Morocco, the exchange rate has since been depreciating at a constant rate from TD 0.8 in 1985 to a current rate of TD 1.4 per USD. Algeria is in a very similar situation, where the depreciation of the local currency started in the mid 1980s. The deprecation was about 8 folds against the USD.

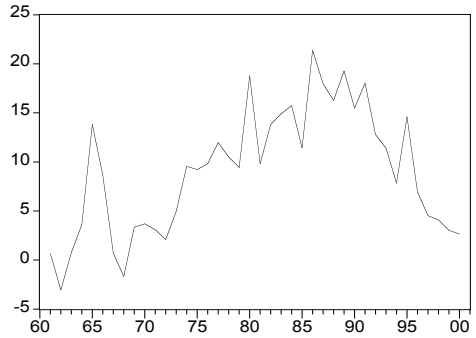
Similar dynamics for inflation rates are observed across MPCs. The periods of currency devaluations were coupled with rising inflationary pressures. In Egypt and Jordan inflation rates were at about 20 percent during the mid 1980s. In Lebanon however, the rates reached the three digits level during the same period, while in Algeria they were at about 25 percent. Inflationary pressures appear to be dying down in mid 1990s. In Tunisia, Morocco and Algeria inflation rates have been somehow contained although rising steadily over the same period (see Figure 2).

FIGURE 2: The Dynamics of Inflation Rates In Selected MPCs: 1960-2001

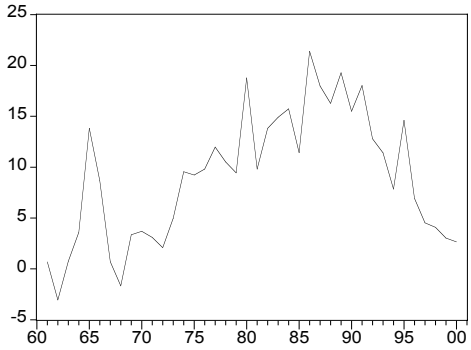
(a) Algeria



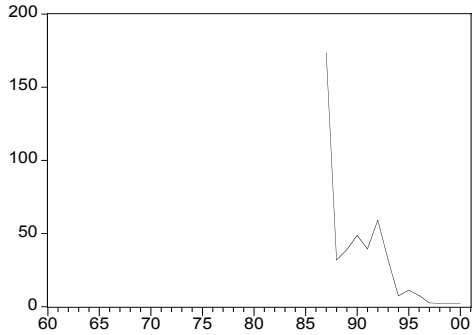
(b) Egypt



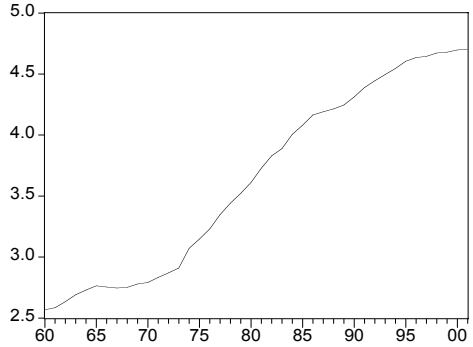
(c) Jordan



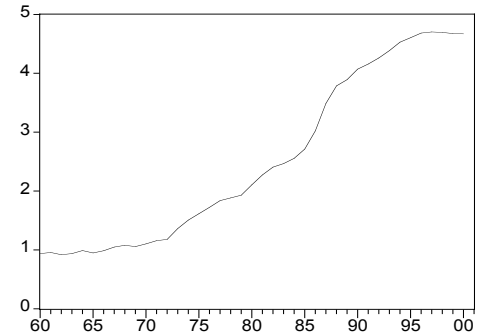
(d) Lebanon



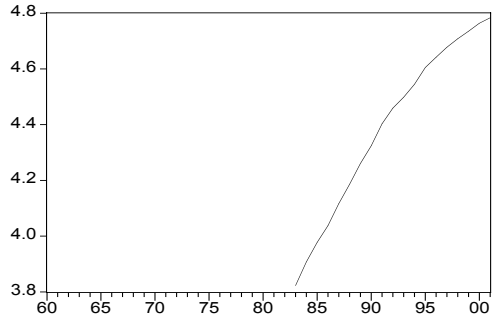
(e) Morocco



(f) Syria



(g) Tunisia

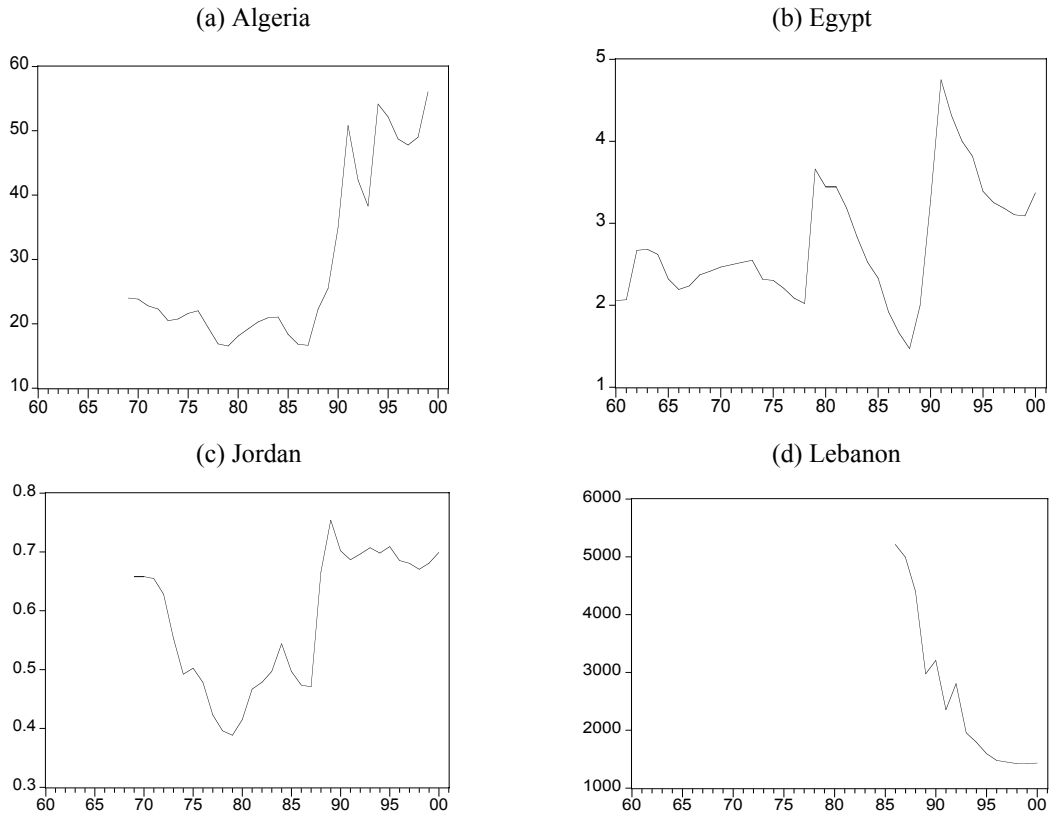


Source: International Monetary Fund (IMF), IFS.

A highly volatile exchange rate and high inflationary pressures have led to a constant real exchange rate appreciation. With the exception of Tunisia and to some extent Algeria where the real exchange rate has been depreciating over the last decade, Egypt, Jordan, Morocco, Syria and Lebanon have been experiencing a real appreciation of their exchange rate (Figure 3). This real exchange rate appreciation has put significant strains on these countries patterns of trade, reducing these countries competitiveness within the MED region and in world markets. This was coupled with a constant fall of the euro since its introduction in 1999 against the USD, putting even more strains on these countries competitiveness and trade flows with the EU.

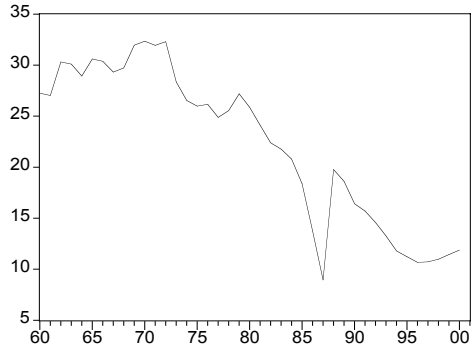
It is thus clear that heterogeneity do exist in the MED exchange rate arrangements, and it is bound to lead to more intra and inter regional real exchange rates misalignments after the ratification of the EU-MED bilateral trade agreements. Monetary and exchange policies in the MED region have long ignored the issue of exchange rate misalignments and its impact on trade flows. In light of increased trade integration with the EU, the problem of intra MED and EU-MED misalignments should be resolved before the establishment of an FTA in 2010. While fluctuations in real exchange rates are in no doubt the main source of misalignments, divergence in inflation rates can also lead to misalignments. After stabilizing the nominal exchange rate, MED monetary authorities should try to adopt a policy with as main goal price stability.

FIGURE 3: Real Exchange Rates In Selected MPCs: 1960-2001

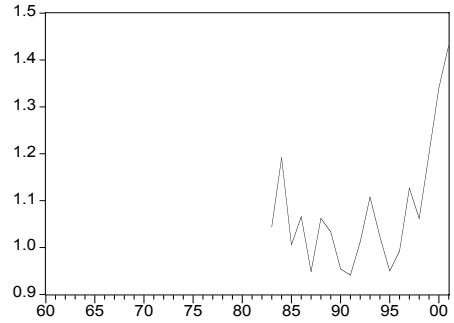


(e) Morocco

(f) Syria



(g) Tunisia



Source: International Monetary Fund (IMF), IFS.

2. South-South And North-South Misalignments

This section identifies real exchange rate misalignments within the MED region on one hand, and in the EU-MED region, on the other. Real exchange rate misalignments are not easy to define and even harder to measure. In the next two sections we use the Hodrick Prescott and the Purchasing Power Parity (PPP) frameworks to identify EU-MED exchange rate misalignments.

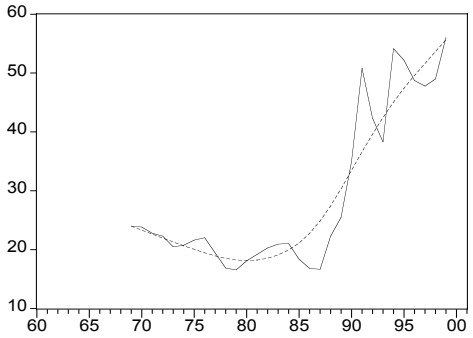
2.1 Hodrick Prescott Framework For Exchange Rate Misalignment

We start by estimating exchange rate misalignments within the MED and the Euro-MED regions using the Hodrick-Prescott (HP) framework (1997). This is a smoothing method that is widely used among macroeconomists to obtain a smooth estimate of the long-term trend component of a series. This long-term component is the long-run equilibrium exchange rate. Deviations from this trend constitute an accurate measure of exchange rate misalignments. This framework was first used in a working paper (circulated in the early 1980's and published in 1997) by Hodrick and Prescott to analyze postwar U.S. business cycles, and the deviations of actual from potential Gross Domestic Product (GDP). Specifically, the Hodrick-Prescott filter is a two-sided linear filter that computes the smoothed series X of Z by minimizing the variance of Z around X, subject to a penalty that constrains the second difference of X. That is, the HP filter chooses X to minimize

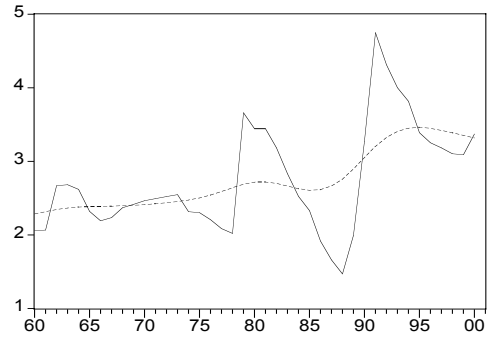
$$\sum_{t=1}^{T}(Z_t - X_t)^2 + \lambda\sum_{t=2}^{T-1}((X_{t+1} - X_t) - (X_t - X_{t-1}))^2. \qquad (1)$$

Figure 4: Hodrick-Prescott Real Exchange Rate Misalignments

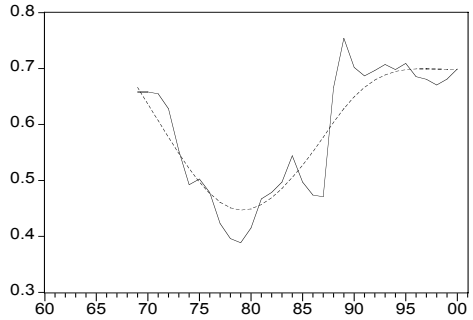
(a) Algeria



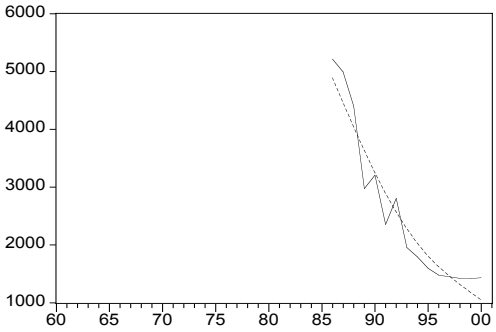
(b) Egypt



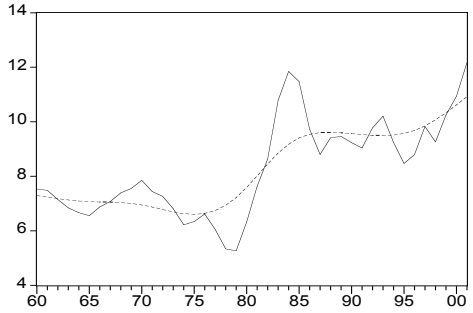
(c) Jordan



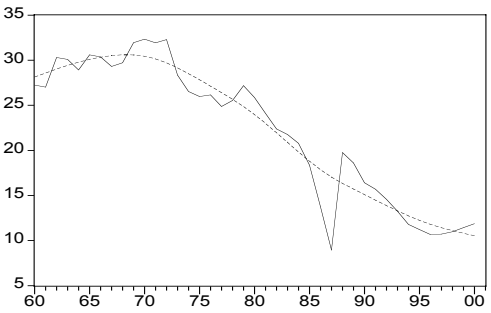
(d) Lebanon



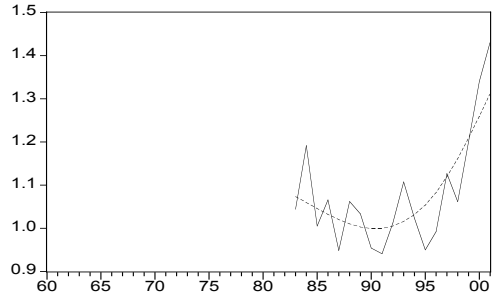
(e) Morocco



(f) Syria



(g) Tunisia



Source: Authors' Estimations.

The penalty parameter λ controls the smoothness of the series X_t. The larger the λ, the smoother the X_t. As $\lambda \to \infty, X_t$ approaches a linear trend. For our purpose we assume $\lambda \to 100$. Figure 4 presents real exchange rate misalignments for 7 MPCs with respect to the USD. It is clear that current real exchange rates have been misaligned since the 1960s over relatively long periods of time, and they do not seem to revert back to their equilibrium level even after 4-5 years. In Egypt, Jordan, and Morocco prior to 1990, it is taking 4-5 years for the real exchange rate to revert back to its long-run equilibrium value. However, In Lebanon, Algeria, Tunisia, and Syria the observed periods of misalignments are between 2-3 years.

2.2 PPP And Exchange Rate Misalignments

On a more rigorous level, we use the concept of real exchange rate and its relationship with the Purchasing Power Parity framework to estimate misalignments. The empirical literature on exchange rates proposes several ways of defining and estimating the equilibrium real exchange rate, and has used the PPP based equilibrium exchange rate framework considerably. PPP is based on the law of one price and asserts that given two identical baskets of consumer goods in two different countries, the nominal exchange rate between the two countries should be such that the average price of the two baskets is equal when quoted in the same currency.

A more realistic version of PPP states roughly that over time, the relationship between the nominal exchange rate and the overall price differential between two countries should be one to one, and that this long run relationship is an estimate of the equilibrium real exchange rate. If this long run PPP implied equilibrium real exchange rate is estimated, it can be used to calculate the misalignment of a currency over time.[7] A third way of measuring misalignment is an approach somewhat similar to the PPP approach. The PPP value of the currency is estimated as the average value of the real exchange rate over a given period. The degree of misalignment is then calculated as the divergence of the real exchange rate from this equilibrium real exchange. Other attempts have been undertaken to estimate PPP like for example in Mark and Sul (1999) and Kao (1999). They use panel cointegration tests and panel dynamic ordinary least squares after establishing that all series contain unit roots using the Augmented Dickey Fuller tests (see also Peseran and Shin (1999)).

In this study, we rely on the relationship between the real exchange rate and PPP to evaluate EU-MED exchange rate misalignments. PPP assumes that the bilateral real exchange rate is exogenously determined. The real exchange rate q_t is given by

$$q_t = \frac{e_t P_t^*}{P_t}, \tag{2}$$

where e_t is the nominal bilateral exchange rate at time t, P_t^* and P_t are the foreign and domestic Consumer Price Indices (CPI) at time t respectively. If we assume that the real

[7] Long-run mean levels of the real exchange rate given by PPP have been estimated for many countries and regions of the world, and often with the conclusion that the real exchange rate did not exhibit such "mean reverting" behavior, thus not supporting the presence of a PPP relationship. But for some countries, "mean reverting" behavior of the real exchange rate has been found, and has been used to evaluate misalignment.

exchange rate is exogenous, then we can rewrite (2) as the ratio of the respective price indices as follows

$$e_t = \frac{P_t}{P_t^*}. \tag{3}$$

Rewriting (3) for time zero (assumed to be the base year) we get

$$e_0 = \frac{P_0}{P_0^*}. \tag{4}$$

Equations (3) and (4) imply that

$$e_t = e_0 \frac{P_t / P_0}{P_t^* / P_0^*}. \tag{5}$$

Equation (5) is saying that the equilibrium exchange rate can be obtained by adjusting the nominal exchange rate in the base year 0 by a factor that reflects the inflation differential.

Similarly, we can define the real exchange rate in equation (2) for a given base year 0. After rearranging and using equation (5), we get the following expression for the real exchange rate

$$q_t = e_0 \left[\frac{P_t / P_0}{P_t^* / P_0^*} \right] \left[\frac{P_t^*}{P_t} \right] = e_0 \left(\frac{P_o^*}{P_0} \right) = q_0. \tag{6}$$

Equation (6) implies that the real exchange rate is exogenous or constant over time and thus PPP holds. In this framework, deviation of the nominal exchange rate from the one implied by PPP is used next to measure the extent of exchange rate misalignments. If the spot nominal exchange rate is above (below) the level given by PPP, then the domestic currency of the respective MPC is said to be undervalued (overvalued).

In what follows, the misalignment index (M) will be measured by the percentage deviation of the spot rate from the one implied by PPP

$$M_t = 100 \left[\frac{e_t}{\bar{e}_t} - 1 \right], \tag{7}$$

where $\bar{e}_t$ is given by (5).

The misalignment index in equation (7) will be computed for the 7 MED countries and the European Union. The price level for each country is proxied by the Consumer Price Index, while the bilateral exchange rate for each country pair will be computed as cross rates (from the respective country exchange rate with the USD) according to

$$e(Z_i / Z_j) = \frac{e(Z_i / USD)}{e(Z_j / USD)}, \quad (8)$$

where i = 1,2,…8, j = 1,2,…,8, such that $i \quad j$, and Z represents the currencies of the 7 MED countries and the EU [8] respectively. If, for instance i = 1, j = 2, such that 1 refers to Lebanon and 2 refers to Jordan, then the bilateral exchange rate between Lebanon and Jordan is simply obtained by dividing the exchange of the LP/USD to that of the JD/USD. Thus, in this case $e(Z_1 / Z_2)$ gives the price of one JD in Lebanese Pounds, and Lebanon is the domestic economy while Jordan is the foreign country.

Table 1. Misalignments Measured by Average Percentage Deviations From PPP Rates in (%)

	Algeria	Morocco	Tunisia	Egypt	Jordan	Lebanon	Syria	EU
Algeria	0	24.60	33.96	9.25	47.78	97.92	86.70	36.15
Morocco	-66.85	0	8.25	21.40	13.78	-99.54	-54.71	8.96
Tunisia	-96.51	-89.12	0	-61.24	69.25	-99.94	-92.17	16.12
Egypt	-89.14	65.47	18.70	0	40.00	-99.84	-85.00	23.90
Jordan	-97.77	-92.97	-39.10	-78.28	0	-99.96	-96.51	-33.6
Lebanon	96.01	27.18	24.91	10.67	41.54	0	19.55	30.02
Syria	-11.02	19.60	12.78	78.20	36.03	99.39	0	16.24
EU	-96.25	-89.53	-11.21	-65.86	-68.54	-99.95	-67.02	0

Source: Authors' Estimations.

Table 1 presents the average deviations[9] from PPP rates over the 1960-2002 sample period. We list on the row side foreign economies while on the column side domestic economies. In all cases negative deviations imply that the foreign currency is undervalued, while positive figures imply that the foreign currency is overvalued. It is clear that the Euro, and the Jordanian Dinar (Rows 5 and 8), are undervalued with respect to all other MED currencies. The currencies of Algeria and Lebanon, are overvalued vis-a vis all MED currencies including the Euro. While the Moroccan Dinar is undervalued against the Algerian, Syrian and Lebanese currencies, it is overvalued against the remaining currencies. The Egyptian Pound is overvalued against the currencies of Morocco, Tunisia, Jordan and the EU, and is undervalued against those of Algeria, Lebanon and Syria. Syria's currency is overvalued against all currencies except Algeria's currency. It should be noted that figures in Table 1 are averages over the 1960-2002 sample period. Thus, in each year the respective figure could be much larger and may have a different sign. What is important is that the presence of exchange rate misalignments whether within the MED region or between the Euro-MED region cannot be ruled out.

When one considers actual exchange rate data, it is clear that the real exchange rate is time variant since PPP does hold at each point in time. However, if PPP holds as a long-run equilibrium condition, then the real exchange rate will tend to revert to its equilibrium level over time, and the speed of adjustment can be measured using a Vector Error Correction model. The vector error correction model (VECM) was first introduced

[8] The European Union's currency is taken as the value of the ECU rate per USD prior to 1999, and the euro after 1999.

[9] The deviation figures presented in Table 1 are averages over the 1960-2002. Thus, in any given year these can be much larger or smaller and could have different signs.

by Sargan (1984) and later popularized by Engel and Granger (1987). Their two–step method is used to estimate first the following cointegrating regression representing PPP in logarithm

$$P_t = \alpha_0 + \alpha_1(e_t + P_t^*) + \varepsilon_t . \quad (9)$$

In the second stage we estimate the following error correction model corresponding to equation (9) with one lag[10]

$$\Delta P_t = \lambda_0 + \lambda_1 \hat{\varepsilon}_{t-1} + \lambda_2 \Delta(e_{t-1} + P_{t-1}^*) + \lambda_3 \Delta P_{t-1} + \upsilon_t , \quad (10)$$

where Δ denotes first differences, υ_t is the error term with the usual properties, and $\hat{\varepsilon}_{t-1}$ is the estimated lagged residual from equation (9). In equation (10), $\Delta(e_{t-1} + P_{t-1}^*)$ and ΔP_{t-1} capture the short-run disturbances in P_t whereas the error correction term $\hat{\varepsilon}_{t-1}$ captures the adjustment toward the long-run equilibrium. If λ_1 is statistically significant, it tells us what proportion of the disequilibrium in P_t in one period is corrected in the next period. When using yearly data, if $\lambda_1 = -0.3$, then this means that 30 percent of the deviation from the long-run equilibrium in the previous year is corrected in the current year.

Table 2. Results of Cointegration Tests

	Algeria	Morocco	Tunisia	Egypt	Jordan	Lebanon	Syria	EU
Algeria	--	0.005	0.15	0.02	-0.04	0.05	0.01	0.09*
		(0.402)	(1.98)	(0.64)	(-0.96)	(0.68)	(0.31)	(2.02)
Morocco	-0.02*	--	-0.04	0.007	-0.04	-0.07**	0.09*	-0.05*
	(-2.19)		(-0.37)	(0.38)	(-1.29)	(-5.74)	(2.05)	(-2.63)
Tunisia	-0.07**	0.04	--	-0.06**	-0.02**	0.01	0.01	-0.05
	(-4.29)	(1.75)		(-3.20)	(-3.04)	(0.07)	(1.45)	(-1.21)
Egypt	-0.02	0.01	-0.05**	--	0.007	-0.33**	0.03	0.05*
	(-0.99)	(0.63)	(-3.18)		(0.28)	(-3.04)	(0.56)	(2.71)
Jordan	-0.003	-0.05*	0.0001	-0.06*	--	-0.21**	-0.07	-0.31*
	(-1.27)	(-2.71)	(0.10)	(-2.17)		(-3.25)	(-1.78)	(-2.57)
Lebanon	-0.06	-0.05**	-0.05**	-0.07**	-0.32	--	0.08*	-0.05**
	(-0.55)	(-2.85)	(-3.39)	(-5.63)	(-1.09)		(2.17)	(-3.14)
Syria	-0.01	0.02	-0.07**	-0.005	0.01	-0.24	--	0.003
	(-0.71)	(0.78)	(-3.63)	(-0.14)	(0.06)	(-0.97)		(0.04)
EU	-0.05**	-0.02	0.02**	-0.02	-0.04**	-0.001	-0.03	--
	(-3.30)	(-1.53)	(4.02)	(-1.59)	(-4.57)	(-0.01)	(-1.72)	

Notes: A ** indicates significance at the 1 percent level, while a * indicates significance at the 5 percent level. Rows represent foreign countries, while columns represent domestic countries.
Source: Authors' Estimates

[10] Granger's Representation Theorem postulates that cointegration implies and is implied by the existence of a valid error correction representation. It is, thus, possible to test for cointegration indirectly by estimating an error correction and testing its validity. The significance of the coefficient λ_1 in equation (10) can then be used as a test for cointegration.

The cointegration results are presented in Table 2 for all possible currency combinations. The table reports the estimated value of λ_1 (the coefficient on the error correction term) and its respective t statistic. This coefficient states in the instance of misalignment the speed with which it can be eliminated. The 5 and 1 percent critical values are –2.02 and –2.80 respectively (Kremers et al., 1992, Table 1, p. 338). When Algeria is the foreign country (first row), the null hypothesis of no cointegration is only rejected with the EU at the 5 percent level of significance. In Syria's case, the null hypothesis is rejected only for the case with Tunisia at the 1 percent level of significance, and the same is true for Egypt with the exception of Egypt and Tunisia, Lebanon and the EU. The rest of the MED countries exhibit mixed results. When the EU is taken as the foreign economy, the null hypothesis of no cointegration is rejected in all cases at the 1 percent level of significance except with Morocco, Egypt, Lebanon, and Syria. The most striking result is that in 32 of the cases, exchange rate misalignments whether within the MED region or between the Euro-MED regions are not eliminated even in the long-run. In other cases, when such a tendency exists, the adjustment is rather slow. The largest coefficient (in absolute value) is –0.33 between Egypt and Lebanon. This means that about 33 percent of the deviation of the spot bilateral exchange rate from that implied by PPP is corrected every year. Hence, it takes about 3 years for the whole deviation to be corrected in the absence of other types of shocks. The coefficients for the remaining countries are much lower. For instance, the largest coefficient for Morocco is –0.09 with Syria. Thus, it takes about 10 years for the whole deviation to be corrected in the absence of other types of shocks. The largest coefficient for Jordan is –0.31 with the EU. Again, it takes about 3.5 years for the whole deviation to be corrected in the absence of other types of shocks. For the EU, the largest coefficient is 5 percent, which means that it takes about 20 years for the whole deviation to be corrected in the absence of other types of shocks. We can, therefore, conclude that while misalignments within the MED region are significant with an average correction period between 3-6 years, the misalignments between the EU and the MPCs appear to be more significant and do not tend to be eliminated even after 10 years.

3. Costs And Benefits of Fixing MPCs' Exchange Rates To The Euro

In the previous section, it was shown that MED bilateral exchange rates have not only been volatile but also misaligned whether internally or regionally. Inter and Intra-MED exchange rate misalignments can be attributed to: (1) The differences in exchange rate arrangements adopted by individual countries; (2) Domestic macroeconomic pressures; And (3) the recent depreciation of the currency of MPCs major trading partner the EU. While macroeconomic and inflationary pressures appear to have been contained in the MED region since the early 1990s, it remains for the MPCs to first harmonize their exchange rate policies, on one hand, and take into consideration the fact that most of their trade is with the EU, and now the euro has emerged to be a major challenger to the US dollar in world financial markets. The euro has not only proved to be a store of value, but qualifies as a unit of account and a medium of exchange. The exchange rate peg to the US dollar may have been justified before the introduction of the euro in 1999, and the ratification of the Barcelona Declaration in 1995. However, the euro is now presenting the MED region with an alternative exchange rate arrangement. With the Barcelona Declaration, the enhancement of the Euro-MED Partnership and the establishment of the

FTA in 2010, MPCs are now presented with a unique opportunity to effectively adopt proper exchange rate arrangements. Among others, a fixed exchange rate to the euro, or a flexible anchoring to the euro, or anchoring with a band to the euro might prove to be the pareto optimal arrangement for the MED region as a way to eliminate exchange rate misalignments. Next, we look at whether greater fixity with the euro can be costly to MPCs.

The main costs of reducing real exchange rate volatility consist in the fact that, with an open capital account, reducing exchange rate volatility implies the loss of monetary independence. This section, therefore, evaluates the costs associated with the loss of monetary independence. These costs are usually analyzed using the Optimal Currency Area approach (Mundell (1961), and McKinnon, (1963)). However, as the OCA approach assumes that countries have credible central banks that can conduct independent monetary policies, we will also evaluate whether MED countries are able to reap the benefits of an independent monetary policy.

In order to evaluate the costs in terms of loss of monetary independence that could be associated with greater exchange rate coordination or simply the adoption of the Euro, this section starts by testing the degree of asymmetry of economic shocks and cycles among partners. This allows making some important policy recommendations about the enhancement of South-South and North-South integration and its impact on the development of MPCs exchange rate regimes (fixed to the euro, flexible anchoring to the euro, anchoring with a band to the euro). This section also provides an evaluation of the effectiveness of monetary policies in Mediterranean countries.

The following indicator considers the asymmetry of the business cycle by focusing on the standard deviation of changes in the log of relative GDP between Euro-MED economies

$$\text{A}= \sigma\left(\log\left(\frac{GDP_i^t}{GDP_{EUROPE}^t} \right) - \log\left(\frac{GDP_i^{t-1}}{GDP_{EUROPE}^{t-1}} \right) \right). \tag{11}$$

If the cyclical component of output is exactly equal in the two countries, this indicator will be equal to 0, even if growth trends are different across countries. The indicator increases in direct proportion with the asymmetry between the cycles.

In addition, the following two indices are estimated. The first looks at the relative volatility of depreciation and interest rate (RVEI)

$$\text{RVEI} = \frac{\sigma(DEP)}{\sigma(i)}. \tag{12}$$

MPCs with limited interest rate interventions will have a relatively low volatility of the domestic interest rate and a higher volatility of their exchange rate; the opposite is true for countries that actively try to manage their exchange rate. The data for the above exercises are obtained form the IMF's International Financial Statistics (IFS).

The second index (RVER) looks at the relative volatility of exchange rates over reserves using the following indicator

$$\text{RVER} = \frac{\sigma(DEP)}{\sigma\left(RES/M2\right)}, \tag{13}$$

where DEP measures exchange rate depreciation, and RES/M2 international reserves over money supply (Proxied by M2). Under a perfectly flexible exchange rate system, the volatility of international reserves would be low (approaching zero), and therefore, the relative volatility of exchange rate and international reserves (RVER) would be high. In the opposite case of a fixed exchange rate or a constant crawl, the numerator of equation (13) would be zero (or close to zero), yielding a low RVER.

Table 3. MPCs Monetary Policy Independence

	Algeria	Egypt	Jordan	Lebanon	Morocco	Syria	Tunisia
A	0.25	0.29	0.14	0.36	0.18	0.17	0.20
RVEI	4.83	0.34	0.12	80.01	1.33	--	0.12
RVER	78.91	4.55	0.50	3147.27	2.01	5.77	1.67

Source: Authors' Estimates.

According to Table 3 Index A, the cyclical components of GDP between MED countries and the EU have very similar variability, indicating that shocks to the EU's GDP tend to be transmitted to the MED region. While this index is the lowest for Jordan at 0.14, Lebanon's index is the highest at 0.36. In Syria, Morocco, Algeria and Egypt the range is between 0.17 and 0.29. There is, thus, certain symmetry between the EU-MED business cycles. The second index (RVEI) indicates that Algeria, Morocco, Lebanon and to a lesser extent Egypt appear to have relatively limited monetary policy intervention via interest rates to counter fluctuations in the exchange rate. This not the case in Jordan and Tunisia, where monetary policy appears to be using more the rate of interest as a policy instrument to dampen the impact of exchange rates volatility on the domestic economy. Finally, the RVER index is relatively high for Lebanon; this may be reflecting the fact that until relatively recently, Lebanon had a floating exchange rate regime. But prior to 1995 a fixed regime to the USD dollar was adopted. This ratio is also high for Algeria, which experienced a significant devaluation similar to that experienced in Lebanon in the late 1980s and early 1990s. This index is somehow presenting mixed results for Tunisia, Egypt, Jordan, Morocco and Syria.

To check whether MED monetary policy has been independent over the last three decades, the following three models are estimated. The first equation tests the capacity to protect against external interest rate fluctuations by regressing the domestic short-term interest rate (i) over the short-term international interest rate (i*) in euro or dollar according to the following equation (see Frankel, 1999)

$$i_t = a + bi_t^* + u_t. \tag{14}$$

If b is close to1, the country under analysis does not have monetary independence to start with, and therefore, it would not loose much by fixing its exchange rate.

Table 4. Regression Results: Equation (14)

	Algeria	Egypt	Jordan	Lebanon	Morocco	Syria	Tunisia
b, on EU Interest Rate	-1.001	0.84	-0.03	0.17	0.41	0.00	0.65
t- statistics	-2.77**	2.77**	-0.27	0.28	3.89**	5.84**	3.94**
b, on US Interest Rate	-0.98	0.007	-0.17	-0.30	0.18	-0.00	0.06
t- statistics	-3.57**	0.02	-1.90	-0.53	1.71	-5.90**	0.36

Notes: A * indicates significance at the 5 percent level, while a ** indicates significance at the 1 percent level. Source: Authors' Estimates.

According to Table 4, when the EU rate of interest is the independent variable, the b coefficient in Algeria, Egypt, Tunisia and Morocco is very close to 1, and is statistically significant at the 1 percent level. This indicates that for those countries, monetary policy appears not to be independent, and the adoption of a fixed exchange rate to the euro would not entail high costs in terms of monetary independence. Syria does not have an interest rate policy, as domestic interest rates have not changed over the last three decades and have been at about 5 percent. Lebanon and Jordan's coefficients are not significant. When the US interest rate is considered, similar results are obtained for Algeria, and Syria. However, now Egypt is not significant, and so are Tunisia, Egypt and Lebanon. Therefore, and in almost all MED countries, the empirical results are all pointing towards little costs in terms of monetary independence, and for greater fixity of the exchange rate.

Next, the behavior of interest rates over the business cycle is considered. In a MED country with a flexible regime, the central bank should be able to smooth the business cycle by lowering the interest rate during recessions, and increasing the interest rate during expansions. To check whether MPCs used this option, the reaction of interest rates to the cyclical component of GDP, measured as the difference between current GDP and its trend component is considered.[11] Formally, we test

$$i_t = a + bGAP_t + u_t, \tag{15}$$

where GAP is the output GAP, and if countries make use of counter cyclical policies we should find b<0. If not, we could conclude that countries make limited use of independent monetary policy.

Table 5. Regression Results: Equation (15)

	Algeria	Egypt	Jordan	Lebanon	Morocco	Syria	Tunisia
b coefficient	-0.42	-0.09	-0.33	1.21	-0.23	0.00	-0.24
t- statistics	-2.57**	-1.15	-0.82	0.79	-1.37	--	-0.38

Notes: A * indicates significance at the 5 percent level, while a ** indicates significance at the 1 percent level. Source: Authors' Estimates

In Table 5, all the coefficients on the GAP variable have the correct sign in all 7 MPCs. However, the t-statistic is only significant for Algeria at the 1 percent level, and is not significant for the remaining MPCs. Thus, with the exception of Algeria, which appears to be using the rate of interest as a tool to counteract fluctuations in GDP, none of

[11] The trend component of GDP is derived using the Hodrick-Prescott framework (1997).

the remaining MPCs are using the rate of interest in particular or monetary policy in general as an anti cyclical monetary tool.

We also evaluate exchange rate flexibility and the capacity to use monetary policy as an anti-cyclical tool by testing whether flexible interest rates make it possible to protect economic growth from terms of trade shocks. For this purpose, we run a model in which the dependent variable is annual changes in GDP and the explanatory variables are: (1) Terms of trade shocks (TT)[12] measured as the change in terms of trade multiplied by openness;[13] (2) A dummy variable (TF) taking a value of 1 when the exchange regime is "truly fixed;" And (3) a variable $(TF_{i,t} * \Delta TT_{i,t})$ which represents the interaction between TF and terms of trade shocks. Formally, the following empirical model is tested

$$\log(y_{i,t}) - \log(y_{i,t-1}) = \alpha + \beta \Delta TT_{i,t} + \gamma TF_{i,t} + \theta(TF_{i,t} * \Delta TT_{i,t}) + \varepsilon_{i,t} . \quad (16)$$

Table 6. Regression Results: Equation (16)

	Egypt	Jordan	Morocco	Syria	Tunisia
_ coefficient	-3.40	-2.15**	1.56	-0.46	-2.88
t- statistics	(-0.27)	(-2.40)	(0.64)	(-0.32)	(-1.28)
_ coefficient	0.07	0.02	0.04	0.004	0.03
t- statistics	(0.31)	(0.40)	(0.85)	(0.06)	(0.50)
_ coefficient	2.63	3.24	-1.68	-0.99	3.02
t- statistics	(0.21)	(1.48)	(-0.67)	(-0.63)	(1.01)

Notes: A * indicates significance at the 5 percent level, while a ** indicates significance at the 1 percent level. Algeria and Lebanon are excluded due to lack of data on their terms of trade, mainly data related to their PPI.
Source: Authors' Estimates.

With the exception of Jordan where the _ coefficient appears to be significant at the 1 percent level, none of the remaining coefficients is statistically significant. This indicates that in 5 MPCs, monetary policy is not being used to account for the impact of terms of trade type shocks on the growth rate of GDP (see Table 6).

Overall, this section has shown that in almost all cases there is weak empirical evidence to suggest that MPCs have adopted an independent monetary policy. Therefore, one can safely conclude that the costs associated with a loss of monetary independence, as a result of greater exchange rate fixity, appear to be very low.

[12] Terms of trade for a given country i are measured as the ratio of country i's Producers Price Index (PPI) to proxy the price of exports, and the Consumer Price Index (CPI) to proxy the price of imports.
[13] The measure of openness used is defined as the ratio of total exports plus imports divided by GDP.

III. The Euro-MED RIA And Trade Flows

1. Overview And Related Literature

Since its introduction in 1999 for a nominal value of USD1.15, the euro depreciated by about 30 percent to reach 0.83 against the USD by the end of 2002. The MPCs have been pegging their currencies to the USD, and as a result have during the last three years experienced a constant appreciation of their real exchange rates. Fluctuations in real exchange rates were not entirely due to domestic factors but were mainly driven by the appreciation of the US dollar against the currency of these countries major trading partner: The euro. Whenever the anchor currency is appreciating with respect to the currency of MPCs major trading partner, the domestic MPC's currency will appreciate in real terms. This appeared to have had detrimental negative impacts on the economies of MPCs, and has led to significant losses in competitiveness. Consequently, the choice of a future anchor currency for MPCs will be an important factor in the stabilization of their macroeconomic policies.

While it is well known that a real exchange rate appreciation negatively affects exports, it is necessary to ask why would the impact be any different for countries that belong to a trade agreement? The answer is based on the idea that a trade agreement may affect the degree to which exports can be relocated in the event of an exchange rate appreciation vis-à-vis other members of the trade agreement. This is because by virtue of the preferential access to partners' markets granted by the trade agreement, it is possible for a country to export goods in which it is not internationally competitive (this is Viner's trade diversion). If suddenly these exports are curtailed due to a depreciation by trade agreement partners, it may be impossible to find alternative markets for these goods. Bevilaqua Catena, and Talvi (2001) label exports that cannot easily be relocated as "regional goods."[14] These authors show that "regional goods" amplify the transmission of the business cycle in one country to other countries that belong to the same trade agreement. While regional goods may also exist in the absence of regional integration agreements (for instance goods with high transportation costs), trade agreements are likely to increase the importance of regional goods. This is because preferential access may create a demand for goods that are not internationally competitive and because trade agreements may lead to the adoption of common standards and regulations. Either of these factors would make relocation of exports more costly, and thus increase the degree of "regionality" of trade.

While there is ample literature that describes the benefits of reducing real exchange rate volatility (see for instance Frankel and Wei, (1997), or the survey in Edison and Melvin, (1990)), the literature on how the presence of a trade agreement may amplify the negative consequences of a real exchange rate misalignment is extremely new and still very limited. Eichengreen (1993) pointed out that in some instances trade

[14] Consider the case of automobile trade in Mercosur. Argentine car exports to (and from) Brazil are made possible by the preferential access, and by a special regime that translates into high protection on car imports from the rest of the world. It would be hard to argue that Argentina is internationally competitive in cars. If for whatever reason (say, a depreciation) Brazil stops demanding Argentine cars, it will be difficult for Argentine producers to find alternative markets. Consider instead a commodity such as oil, another one of Argentina's main exports to Brazil, and a product in which Argentina is internationally competitive. If for whatever reason Brazil's demand for oil declines, oil producers in Argentina will be able to relocate these exports at limited cost (Fernandez-Arias, Panizza, and Stein, 2002).

agreements should be paired with exchange rate coordination. Obstfeld (1997) makes a similar point, and suggests that closer trade links may require higher monetary coordination. Bevilaqua, Catena, and Talvi (2001), however, introduce the concept of regional goods and show that their presence could amplify the transmission of macroeconomic shocks among countries that are members of the same trade agreement. More recently, Fernandez-Arias, Panizza, and Stein (2002) show that real exchange rate misalignments are much more damaging for exports among countries that belong to the same trade agreement. They also show that real exchange rate misalignment lead to a large relocation of investment among countries that belong to the same trade agreements. Finally, they provide an informal discussion based on case studies of how exchange rate misalignments can, by building pressure for the introduction of protectionist measures, be damaging for a trade agreement, and formally show that the presence of a trade agreement amplifies the well-established relationship between real exchange rate appreciation and currency crisis (Goldfajn and Valdés 1997).

2. Empirical Model And Results

Most of the literature on links between exchange rates and trade has focused on the negative impact of exchange rate misalignments and volatility on the level of exports. It is shown that while exchange rate volatility has negative effects on trade-although the impact is quite small and declining over time- the impact of exchange rate misalignments is rather significant and persistent over time.[15] Rather than focusing on the effects of volatility, in this section we focus on the effects of Euro-MED exchange rate misalignments on EU-MED exports.

The concerns with regard to exchange rate disagreements on the part of the country that "suffers" the disagreement is generally embedded in the effect of exchange rate swings on their capacity to export. The empirical evidence suggests that exports from the country that loses competitiveness fall quite substantially.[16] However, if a country that suffers from exchange rate misalignment with a trading partner is able, at a reasonable cost, to shift its exports to other markets, then the consequences for exporters should not be as serious. If, on the contrary, exports to the partner cannot easily be relocated to other markets, exporters will suffer. This suggests that what is crucial is the evolution of total exports, not just bilateral exports, around these episodes of exchange rate misalignments. It is to this matter that we turn next.

Our general focus will be on the impact of real exchange rate misalignments on exports. In particular, we are interested in testing whether a MPC's misalignment vis-a-vis its RIA partners has a larger impact, other things being equal, than a similar misalignment vis-à-vis nonmembers. In other words, we want to study whether Euro-MED exchange rate disagreements will be potentially more harmful among the Euro-MED countries with regional integration agreements.

Why would the impact be any different? Our main hypothesis is that regional integration agreements, depending on their nature, can affect the degree to which exports can be relocated in the event of an exchange rate disagreement. By virtue of the

[15] See for example Frankel and Wei (1997).

[16] Exports from the depreciating country may fall due to valuation effects (if prices are set in domestic currency, prices in dollars will fall), to protectionist measures by the partner, or to the recessionary effects of the depreciation on the county's partners.

preferential access with its RIA partners, it is possible for a country to export goods in which it is not internationally competitive. If suddenly these exports are curtailed due to a depreciation in the RIA partner, it may be very difficult to find alternative markets for these goods. Following Bevilaqua et al (2001), we label these exports that cannot easily be relocated "regional goods." Bevilaqua et al. (2001) show that "regional goods" amplify the transmission of the business cycle in one country to other countries that belong to the same RIA. In particular, they show that the presence of regional goods amplified the impact on Mercosur's exchange rate and output volatility.

Consider the case of trade in agricultural products from the MED region to the European Union. MPCs export agricultural products to the EU, and this is made possible by the preferential access, and by a special regime that translates into high protection on agricultural imports from the rest of the world. It would be hard to argue that MPCs are internationally competitive in agriculture. If, for whatever reason, (say, a depreciation) the EU stops demanding MED agricultural products, it will be tough for MED producers to find alternative markets. Consider instead a commodity such as oil, another one of MPCs main exports to the EU, and a product in which MPCs are internationally competitive. If the EU's demand for oil declines, MED oil producers will be able to relocate these exports somewhere else, even if this relocation is not costless.

It should be pointed out that regional goods may also exist in the absence of regional integration agreements. Some goods, such as fresh milk, may only be tradable regionally. In these cases, the regional character of the goods is due not to preferential access, but to geographical proximity. However, regional integration agreements are likely to increase the importance of regional goods for several reasons. First and foremost, preferential access may create a demand for goods that are not internationally competitive, either through trade creation or trade diversion. In addition, the regional integration agreement may lead to the adoption of common standards and regulations, or –through its effect on trade – to more taste uniformity among member countries. Either of these factors would make relocation of exports more costly, and thus increase the degree of "regionality" of trade.

If regional integration agreements increase the importance of regional goods, we would expect the elasticity of total exports with respect to exchange rate misalignments to be higher when the source of the misalignment lies within the RIA. To test this hypothesis, we start from a basic model in which a country's level of total exports depends on the misalignment of its real exchange rate and its GDP. Our data consists of annual observations on 8 MPCs and the EU between 1980 and 2002. The data was obtained from the IMF's Direction of Trade Statistics and International Financial Statistics. Because our data contains information on cross sectional units observed over time, a panel data estimation technique is adopted. This allows us to perform statistical analysis and apply inference techniques in either the time series or the cross−section dimension.

The model takes the form

$$\ln(X_{i,t}) = \alpha_i + \beta q_{i,t} + \theta \ln(GDP_{i,t}) + u_{i,t}, \tag{17}$$

where i = 1,2,…N cross sections, and periods t =1,2,…T, with N=9 countries and T=22 years. The dependent variable X_{it} represents total exports within the RIA, the independent

variables $q_{i,t}$, and $GDP_{i,t}$ are the regional multilateral real effective exchange rate misalignment, and total GDP for country *i* at time *t* (exports and GDP are measured in current dollars). The intercept α_i is a country fixed effect that controls for country specific factors that do not vary over time. White heteroskedasticity–consistent standard errors and covariances are computed. We compute real exchange rate misalignments as the percentage difference between the actual real exchange rate and the trend exchange rate, using a Hodrick-Prescott decomposition.[18] The independent variables have been selected on the basis of their potential relevance to this model, and because of their importance in depicting the impact on EU-MED trade. The residual covariance matrix for this set of equations is given by

$$\Omega = E(uu') = \sigma^2 I_N \otimes I_T . \tag{18}$$

Equation (17) implicitly assumes that the elasticity of exports with respect to real exchange rate misalignments is independent of the source of the misalignment (within or outside the regional integration agreement). As we are interested in testing whether these elasticities differ, we decompose the multilateral real effective exchange rate misalignment into a within-RIA (or regional) component and an outside-RIA (or non-regional) component as follows

$$q_{i,t} = w_i RIAq_{i,t} + (1 - w_i) NRIAq_{i,t}, \tag{19}$$

where w_i is the share of RIA partners in total trade of country *i,* and $RIAq_{i,t}$ and $NRIAq_{i,t}$ are the exchange rate misalignments of country *i* with respect to regional and non-regional trading partners respectively.[19] Next, we define $RMIS_{i,t} = w_i RIAq_{i,t}$ and $NORMIS_{i,t} = (1 - w_i) NRIAq_{i,t}$. By weighting the regional and non-regional misalignments by their respective shares in total trade, we can interpret $RMIS_{i,t}$ as the contribution of the regional misalignment to the multilateral misalignment, and

[18] In particular, $q_{i,t} = (q_{i,t} - \overline{q}_{i,t}) / \overline{q}_{i,t}$, where $q_{i,t}$ is the real exchange rate in country *i* at time *t* and $\overline{q}_{i,t}$ is the equilibrium level (as predicted by the trend in a Hodrick-Prescott decomposition) of the real exchange rate for country *i* at time *t* (this methodology is identical to that used by Goldfajn and Valdés, 1999).

[19] $RIAq_{i,t}$ and $NRIAq_{i,t}$ are weighted averages of bilateral exchange rate misalignment, with $\sum_i \omega_{ria,i} = 1$ and $\sum_i \omega_{noria,i} = 1$, where $\omega_{ria,i}$ and $\omega_{noria,i}$ are weights within and outside the RIA respectively.

$NORMIS_{i,t}$ as the contribution of the non-regional misalignment to the multilateral misalignment of country *i* at time *t*. We then estimate the following model

$$\ln(X_{i,t}) = \alpha_i + \beta RMIS_{i,t} + \gamma NORMIS_{i,t} + \theta \ln(GDP_{i,t}) + u_{i,t}, \qquad (20)$$

and test whether $\beta \succ \gamma$. In other words, we test whether the impact of an overall misalignment originated within the Euro-MED regional integration agreement (β) is larger than that of a similar overall misalignment originated outside the region (γ).

We estimate equations (17) and (20) using annual data for the 1980-2002 period for the 8 MPCs[20] and the EU. MPCs are split into two groups: those who have already ratified the Barcelona Treaty and those who did not. It is assumed that MPCs that belong to EU-MED regional integration agreement are Jordan, Israel, Morocco and Tunisia, while the remaining countries (Algeria, Egypt, Lebanon and Syria) are assumed to be outside of the RIA, although some countries have recently signed those agreements.

The empirical results are reported in Table 7. The first column of the table reports the results obtained by estimating equation (17), and confirm that real exchange rate misalignments are a statistically significant and quantitatively important determinant of exports within the Euro-MED region. In particular, the results indicate that a 1 percent real exchange rate appreciation is associated with a 2.3 percent decrease in exports. Column 2 reports the results obtained by estimating equation (20) and confirms that there are large and significant differences in the effect of regional and non-regional misalignments over exports. Column 2 shows that a one-percentage point contribution of the regional real exchange rate to multilateral appreciation is associated with a significant decrease in exports of approximately 3.48 percent. It also shows that a one-percentage point contribution of the non-regional real exchange rate to multilateral appreciation is associated with a significantly lower decrease in exports of approximately 0.4 percent. Thus, the impact of an overall misalignment originated within the Euro-MED regional integration agreement ($\beta = 3.48$) is significantly and statistically larger than that of a similar overall misalignment originated outside the region ($\gamma = 0.4$). The empirical results have shown that the impact of real exchange rate misalignments on EU-MED exports is likely to be amplified as more countries join the Agreements, and as trade is intensified between the Euro-MED RIA member countries.

[20] The eight MPCs are Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Tunisia, and Syria.

Table 7. EU-MED Exports and Real Exchange Rate Misalignments

Dependent Variable log(Exports)	All MPCs and the EU (1)	RIA and EU; and NORIA (2)
Log(GDP)	0.49**	0.66**
t-stats	(17.7)	(20.74)
Total Misalignment (RMIS)	-2.3**	
t-stats	(-2.36)	
Regional Misalignment (RMIS)		-3.48**
t-stats		(2.65)
Non-Regional Misalignment (NORMIS)		-0.40**
t-stats		(2.01)
R-Squared	0.96	0.95
Total Panel (Unbalanced) Observations	132	132

Notes: A * indicates significance at the 5 percent level, while a ** indicates significance at the 1 percent level. The RIA countries are the EU, Israel, Morocco, Tunisia and Jordan; while the non-RIA countries are Algeria, Egypt, Lebanon and Syria. The panel estimation is carried out using the Seemingly Unrelated Regression (SUR) Method.
Source: Authors' Estimates.

IV. The Euro-MED RIA And The Relocation of Foreign Direct Investment

1. Overview And Related Literature

There are a number of reasons why it is imperative for MPCs to move swiftly to liberalize intra-regional trade and FDI flows, and enhance south-south financial and monetary integration. The bilateral association agreements might lead to a hub-and-spoke trading system (Wonacott 1996). Under a hub-and-spoke trading system, the hub country (the EU) liberalizes trade with each of the spoke countries (the MPCs), however, the spokes only liberalize trade with one country, the EU hub. Producers in the EU hub can obtain least cost inputs from any of the Mediterranean spokes, while competing producers in the spoke countries only experience falling costs on imports from the hub. Therefore, producers in the EU hub will gain a competitive advantage over producers in each of the MPCs spokes upon implementation of the bilateral association agreements. Producers in the EU hub face lower barriers for selling their products in each of the Mediterranean markets than MPCs' producers, who gain improved access to the EU market but not relative to one another. The result of the hub-and-spoke trading system of the EU-Mediterranean Association Agreements is that international investors will divert some foreign direct investment into the EU hub, to take advantage of its exclusive access to all MPCs' markets, in preference to investment in MPCs. Once new industrial clusters are established in the EU, economic forces will hinder their relocation to the spokes when the bilateral agreements are expanded into the proposed Euro-Mediterranean FTA. These economic forces include economies of scale, location of input supplying industries, labor pooling, and information pooling. Unfortunately, many MPCs have limited resources for negotiating and implementing multiple trade agreements. This has resulted in

Mediterranean governments concentrating resources on implementing the new generation of association agreements with the EU, while devoting fewer of their limited resources towards intra-regional integration. It is imperative that Mediterranean partner governments rapidly implement trade liberalization and standardization between their regional neighbors, to prevent the artificial diversion of FDI from Mediterranean partners to the EU industrial clusters. Only a full Euro-Mediterranean FTA will insure maximum economic gains and equal access to markets and FDI for all partners.

Another factor that may influence Euro-MED FDI flows is real exchange rate misalignments. There exists ample empirical evidence suggesting that exchange rate movements do affect FDI flows (see Froot and Stein (1991), Blonigen, (1997), and Klein and Rosengreen, (1994)). Froot and Stein (1991) relate the flows of FDI to the existence of imperfections in capital markets. In particular, informational asymmetries regarding the value of an investment will limit the leverage of firms, making it costly or impossible to fully finance the investment through borrowing. Changes in real exchange rate affect wealth, and thus borrowing constraints. If foreigners tend to hold relatively more non-dollar assets, a depreciation of the dollar increases their relative wealth, and relaxes their borrowing constraints. This, in turn, will allow them to acquire more investments abroad.

Blonigen (1997) proposes an alternative channel for exchange rates to matter. He notes that the acquisition of a firm allows knowledge transfers from the parent company to the subsidiary, and also from the subsidiary to the parent company. This knowledge may take the form of a product or process development. If this technology can be applied by the parent company in its own market, this would lead to a stream of profits in the home market, in domestic currency. If this is so, a depreciation in the target host country will decrease the cost of this stream of revenues.

This last channel seems like a plausible scenario for FDI between EU countries. However, it does not relate well to EU-MED FDI. EU Firms have rarely acquired a MED firm hoping to obtain a new technology to apply in the home country. They have usually engaged in Mediterranean production activity for one of two reasons: either to take advantage of the difference in relative factor endowments and comparative advantage, in order to reduce overall costs of production (as in the vertical models of FDI), or to serve a protected market that would be too expensive to serve through trade (as in the horizontal models of FDI). In the case of vertical FDI, firms that produce for the world market locate different stages of production in different countries in order to reduce costs. A depreciation of the exchange rate will attract FDI in projects which are labor and land intensive, since the cost of land and labor is now relatively lower.

In the case of horizontal tariff-jumping FDI, firms have multiple production facilities producing the same good, with each facility supplying the domestic market. Whether a firm engages in FDI in a particular country will depend on the relative cost of serving this market via trade, or via domestic production. An exchange rate depreciation in the host country will reduce the cost of producing the good through local production, relative to serving this market through trade.

So far, we have discussed a number of channels through which exchange rate depreciation might increase incoming FDI. These channels suggest that movements in the bilateral exchange rate between two countries will affect the relative amounts of FDI these two countries receive. But a key question this section will address: Are all "exchange rate disagreements" the same, or are their effects particularly important among

EU-MED countries with trade agreements? Will a country like Morocco suffer more from a depreciation in Tunisia, compared to a depreciation in Israel?

In the case of vertical FDI, in which a firm produces for the world market, a depreciation may favor location in the depreciating country at the expense of all other potential hosts. A depreciation in Tunisia or Israel, will make Morocco relatively less attractive as a location of FDI. In the purest case of horizontal FDI, in which each production plant produces for the domestic market, in principle a depreciation should increase FDI inflows, but this would not necessarily come at the expense of other potential hosts. To the extent that production plants produce only for the domestic market, Israel or Tunisia would receive more FDI if their currency depreciates, but Morocco should in principle not be affected.

The problem with this last argument is that it does not take into account the existence of the Euro-MED regional integration agreement, which will create an enlarged market protected from the outside world. Provided there are economies of scale, the elimination of trade barriers implicit in the regional integration agreement will induce firms to produce in just one location within the bloc, and serve the extended market from this location.[21] The Euro-MED regional trade arrangements may thus create a space of intense competition for the location of investment. Under these conditions, swings in the bilateral real exchange rates among countries in the Euro-MED bloc, which affect relative costs of production, may have important consequences for the location of new FDI, and in many cases may shift the location of existing investments as well. This argument suggests that swings in the real bilateral exchange rate of Morocco vis-a-vis Tunisia should have a larger effect on investment in Morocco than similar swings in the exchange rate vis-à-vis a country outside the Euro-MED RIA. In other words, we expect the elasticity of relative FDI to relative exchange rates to be higher in the case of countries belonging to the Euro-MED RIA.

Foreign direct investment constitutes the single largest source of capital inflows for developing countries in general,[22] accounting for about two-thirds of capital flows to LDCs in 1999 and 2000 and about 85 percent of capital flows to Latin America (Williamson 2001). It should be noted that the impact of exchange rate volatility on investment decisions by international firms is largely ignored in the debate over optimum currency regimes. Although empirical and partial-equilibrium analyses suggest that exchange rate uncertainty may be important in a firm's decision to engage in production activity overseas, the literature incorporating international firms into models of the global economy has remained largely separate from studies of exchange rate policy. One exception, however, is the work of Devereux and Engel (2000), which considers the welfare impact of fixed and floating exchange rate regimes in the presence of a stylized form of FDI. They argue that exchange rate uncertainty emanating from a floating regime represents two potential risks for a foreign firm investing in the home country plant. First, it faces the direct risk that a depreciation of the home currency will cause a net loss if the fixed cost is paid before the exchange rate shock occurs. Second, an appreciation of the exchange rate might cause a negative shock to sales in the home market, also causing a net loss.

[21] For a study of the relationship between RIAs and locations of FDIs see Levy Yeyati, Stein and Daude (2001).

[22] Although this has not been the case for most of the MED countries.

To evaluate how exchange rate disagreements may determine relocation of FDI among EU-MED countries, this section highlights the implications of the Association Agreements on FDI. The purpose of this section is to study whether the presence of the Euro-MED Regional Integration Agreement affects the location of FDI. While there is ample evidence that real exchange rate misalignments are associated with FDI flows (Froot and Stein, 1991, Blonigen, 1997, and Klein and Rosengreen, 1994), the work on the impact of trade agreement on FDI location is much more limited (see Levy Yeyati, Stein and Daude. 2001). As in the case of trade, we are interested in whether the effect of Euro-MED exchange rate misalignments on foreign direct investment is amplified by the presence of a Euro-MED Trade Agreement. Consider the case of horizontal FDI, in which each production plant produces for the domestic market. If the key reason for producing in local markets is tariff-jumping, a trade agreement that creates an enlarged market protected from the outside world will induce firms to produce in just one location within the bloc and serve the extended market from this location. This may create a space of intense competition for the location of investment in which real exchange misalignments may have important consequences for the location of foreign direct investment. This is also true for vertical FDI where a depreciation of the exchange rate of the host country may attract FDI at the expense of all the remaining EU-MED countries.

With the above in mind, if MPCs continue with their dollar peg, and the US dollar appreciates against the euro as it did in between 1999-2002, and which meant a real appreciation of MPCs' currencies of about 30 percent against the euro, then FDI will certainly relocate to the EU countries. Upon the establishment of the euro-MED FTA and to prevent this scenario from repeating itself in the future, a peg to the euro should replace MPCs' peg to the dollar. Such peg would eliminate any artificial appreciation of MPCs' currencies against their major trading partner: The EU, due to the appreciation of the US dollar. Once a large market is created within the Euro-MED region, exchange rate polices should be altered to take into account any future negative impacts of real exchange rate appreciations. One way to get around this problem is greater fixity to the euro, or even better a Euro-Mediterranean currency union with the euro as its sole currency.

2. Empirical Model And Results

The purpose of this section is to study whether the presence of a Euro-MED regional integration agreement affects the location of FDI, using a sample that includes both EU countries and their MPCs.[23] Thus, we can examine whether the common membership in the Euro-MED regional integration agreement will have significant consequences on the relocation of FDI.

To look at how swings in the real bilateral exchange rate affect the location of Euro-MED FDI, and examine the specific role-played by the EU-MED regional integration agreements, we estimate the following empirical model

$$\log\left(\frac{FDI_{i,t}}{FDI_{j,t}}\right) = \alpha + \beta \log\left(\frac{GDP_{i,t}}{GDP_{j,t}}\right) + \theta\left(OP_{i,t} - OP_{j,t}\right) + \gamma\left(NSRIA_{ij}\right)\left(q_{ij,t}\right) + \delta\left(SRIA_{ij}\right)\left(q_{ij,t}\right) + u_{ij} + \varepsilon_{ij,t} \tag{21}$$

[23] For an extensive survey of the empirical relationship between the presence of a Regional Integration Agreement and the location of FDI see Levy, Stein and Daude 2001.

where $FDI_{i,t}$ and $FDI_{j,t}$ are foreign direct investment flows to country i and j at time t; $GDP_{i,t}$ and $GDP_{j,t}$ are the countries' levels of GDP; $OP_{i,t}$ and $OP_{j,t}$ are measures of trade openness for countries i and j; $q_{ij,t}$ is the bilateral real exchange rate between countries i and j; $NSRIA_{ij}$ and $SRIA_{ij}$ are dummy variables that take values 0 and 1 depending on whether countries i and j belong to the same regional integration area; u_{ij} is a country-pair specific fixed effect, and $\varepsilon_{ij,t}$ is an error term.

The relative GDPs and the difference in openness are included to control for their effects on relative FDI. We expect the coefficient β to be positive, since larger countries should receive more FDI than smaller ones. The sign of θ is ambiguous: in the case of vertical FDI, we would expect FDI to increase with openness, since production in the subsidiary may require imported inputs, which may be produced by the same firm in other locations. In contrast, in the case of tariff-jumping horizontal FDI, more protection would result in higher FDI. The coefficients we are most interested in, however, are γ and δ. We expect both to be positive, indicating that a higher (more depreciated) bilateral real exchange rate should lead to higher relative inflows of FDI (from all sources). Furthermore, if changes in the bilateral real exchange rate have, as we argued above, a bigger effect for countries that belong to the same RIA, we also expect to find $\delta > \gamma$.

To test these hypotheses, we use annual data on FDI and GDP for the 1988-2002 period. Bilateral real exchange rates will be calculated using nominal exchange rates and the consumer price index. These variables are obtained from the World Bank's Global Development Finance and the IMF's International Financial Statistics. Openness is defined as exports plus imports over GDP.

Table 8. EU-MED FDI and Real Exchange Rate Misalignments

Dependent Variable log ($FDI_{i,t}$ / $FDI_{j,t}$)	All MPCs and the EU
$Log(GDP_{i,t} / GDP_{j,t})$	0.74**
t-stats	(4.67)
$(OP_{i,t}-OP_{j,t})$	-0.12**
t-stats	(2.45)
(NSRIA*$q_{ij,t}$)	0.016
t-stats	(0.03)
(SRIA* $q_{ij,t}$)	2.5**
t-stats	(2.25)
R-Squared	0.65
Total Panel (Unbalanced) Observations	984

Notes: A * indicates significance at the 5 percent level, while a ** indicates significance at the 1 percent level. The RIA Countries are the EU, Israel, Morocco, Tunisia and Jordan; while the non-RIA countries are Algeria, Egypt, Lebanon and Syria. The panel estimation is carried out using the Seemingly Unrelated Regression (SUR) Method.
Source: Authors' Estimates.

Table 8 reports the results of model (21). The empirical results support the hypothesis laid down in the previous discussion. Specifically, movements in the real

bilateral exchange rate have a much stronger impact among EU-MED countries that are already members of the Euro-MED RIA. In this case, a one-percent depreciation of the real bilateral exchange rate increases relative FDI by 2.5 percent. In contrast, among the remaining MPCs that are not yet members of the Euro-MED RIA, the impact of bilateral exchange rates is not statistically significant. In addition, the fact that $\delta > \gamma$ means that EU-MED FDI are tariff-jumping horizontal FDI, which are more likely to relocate in case of exchange rate disagreements among MPCs. Tariff-jumping horizontal FDI are usually much more prevalent among developing countries. The β coefficient is positive and significant as expected, specifying that larger MPCs attract more FDI than smaller countries. Finally, the θ coefficient is negative and significant. This supports again our earlier finding that Euro-MED FDI are tariff-jumping horizontal FDI, and more protection would result in higher FDI inflows.

V. The Euro-MED RIA And Debt Management Policies

1. Overview And Related Literature

The Euro-MED Trade agreements are likely to increase trade flows with EU countries, and this is likely to increase the balance sheet effect of exchange rate misalignment. Specifically, consider the case of a firm that is located in a MPC that pegs to the dollar, given the structure of the current financial system, the USD constitutes the major portion of the firm, as well as the MPC's debt denomination, while revenues will be increasingly linked to the euro. If the euro depreciates vis-à-vis the dollar, the firm will experience deterioration in its balance sheet that may reduce its investment, and in the aggregate negatively affect the MPC's economic activity, and possibly generate a chain of defaults. The same is true for a MPC that has a debt denominated in USD and exports in euros. It is, therefore, expected that the Euro-MED agreements will amplify the risk of balance sheet effects linked to exchange rate movements.

This section evaluates the balance-sheet effects of exchange misalignments. The theoretical literature (see Aghion, Bacchetta, and Banerjee 2001) on how currency mismatches affect firms' balance sheets, and the overall level of economic activity makes the point that a real devaluation increases the domestic currency value of foreign debt, and weakens therefore a country's debt position. By weakening countries and firms' balance sheets, any real devaluation prevents domestic firms from increasing production or investment. If this is the case, the expansionary effect of devaluation that is generated within the standard Mundell-Fleming models is either attenuated or completely eliminated, yielding to a situation in which a devaluation is contractionary. While some authors show that the standard Mundell-Fleming result holds even in the presence of currency mismatches, others (Aghion et al., 2001) point out that if the balance–sheet effect is large enough, devaluation can be contractionary. This is a serious issue in the Euro-MED agreement in which firms may end up borrowing in one currency (the US dollar) and exporting to the Euro area in another (the euro), the proceeds of which being in euros.

In fact, in 1994, the government of Mexico undertook a devaluation that had been recommended to it by the IMF, in part to correct a real exchange rate overvaluation that appeared to be stifling growth in the country. A similar correction of the exchange rate had, in fact resulted in an acceleration of economic growth a few years before in the

United Kingdom and Italy, when these countries opted out of the ERM (exchange rate mechanism of the European Monetary System) and allowed their exchange rate to depreciate. Surprisingly, in Mexico, the devaluation was followed not by an acceleration of growth, but by a debt crisis (a refusal of creditors to roll over existing debt or extend new loans) that resulted in a sharp contraction of economic activity.

While the cases of Mexico and Argentina have received a substantial amount of attention, there is substantial evidence that debt and exchange rate policies are strongly linked in emerging economies more generally. Reinhart (2002), for example, finds that 84 percent of all default episodes in her 59-country sample over the period 1970-99 were followed within 24 months by currency crises, while 66 percent of all currency crises in her developing-country subgroup were followed within 24 months by debt defaults.

Two separate strands of literature address this issue peripherally. One such strand is the literature on sovereign debt. Following the debt crises in the early 1980s, several authors focused on how a no-default debt equilibrium could be explained for sovereign borrowers (see Eichengreen, 1991 for a review) using models based on reputation or sanctions (Bulow and Rogoff, 1989). Some early empirical work associated with this literature (for example, Edwards (1984)) attempted to link sovereign default to exchange rate policy by considering how the exchange rate regime prevailing prior to a debt crisis would influence the occurrence of such a crisis. The central idea was that the willingness to use the exchange rate as a mean of adjustment could have the effect of reducing the likelihood of a crisis. However, this literature produced neither formal models nor empirical evidence supporting such views. A second strand is the second-generation variant of the currency crisis literature, which examines the factors that influence an optimizing government's choice to alter (or not) an existing exchange rate peg. But this literature does not typically consider such a choice as part of a wider menu of policies that also includes a fiscal instrument and a debt default option.

As a result of the exchange rate peg to the US dollar and the fact that a major portion of MPCs external debt is denominated in USD, a typical balance sheet of a MPC or a firm operating in the MED region is characterized in general by similar features i.e., a dollar debt on the liability side, while revenues are being increasingly denominated in euros. The major portion of debt at the firm and country levels is in US dollar. This situation could prove to be particularly damaging after the establishment of the Euro-MED FTA in 2010. For the past decades, interest rates and exchange rates volatilities have had negative impacts on firms operating in MPCs, on one hand, and on the fiscal position of nearly all MPCs on the other. MPCs with dollar liabilities have suffered considerably due to exchange rates and interest rates volatilities. For instance, the average composition of a typical balance sheet of a Moroccan, Egyptian or Israeli firm is 80-90 per cent dollar dominated, and most of its liabilities originate from creditors in the US. The story is quite similar for Jordanian firms where one sees that the liability structure is highly dollaryzed. Similar liability and average leverage ratios are observed in Lebanon, Algeria, Tunisia and Syria.

In addition, and after the establishment of the FTA in 2010, the share of tradables in the production structures of MPCs' firms is expected to increase considerably. This will amplify even further the balance sheet effect of exchange rate volatility. Subsequently, the negative impact will be on the firm in terms of investment, production and employment.

2. Empirical Model And Results

We use data compiled from the World Bank's Global Development Finance and the IMF's International Financial Statistics for the period 1989-2001, for Algeria, Egypt, Jordan, Lebanon, Syria, Tunisia, and Morocco to study the interaction between the structure of MED foreign debt, exchange and interest policies and the level of economic activity in the MED region. We exclude Israel from the sample due to lack of data.

Table 9 reports the currency composition of long-term debt in some selected MPCs. With the exception of Jordan and Morocco where the proportion of debt denominated in USD was 30 and 39 percent respectively in 2001, it is clear that the USD dominates the currency composition of MPCs' foreign debt. In Algeria, the proportion of debt denominated in USD is 46.6 percent in 2001. In Egypt, it is a little less at 43.6 percent. The highest proportion of debt denominated in USD is observed in Lebanon and Syria. In Lebanon it is about 80 percent, while in Syria it is even higher at 87 percent. These observed high proportions of debt levels denominated in USD-when these countries have either joined the Euro-MED partnership or will soon be joining-may amplify the balance sheets effects of exchange rate movements once EU-MED trade is intensified in the coming few years.

Table 9. Composition of MPCs Long-Term Debt in Major World Currencies (%)

Algeria											
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
DM	10.1	8.3	6.6	6.3	7.2	7	6.6	6.7	5.9	5.5	--
FF	15.8	13.1	12	13.9	16.2	16.9	15.5	15.1	13.2	12.5	--
Euro	25.9	21.4	18.6	20.2	23.4	23.9	22.1	21.8	19.1	18	29.8
Yen	15.8	15.4	16	15.2	13.4	12.2	11.8	12.1	15.1	14.5	12.6
USD	34	39.8	42.9	40.8	38.2	38.8	41.5	44.8	44.5	44.7	46.6
Egypt											
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
DM	10.6	10.5	9.8	10.5	11.2	11.1	10.5	10.9	9.9	9.9	--
FF	19.1	19.5	18.5	19.2	20.2	19.7	18.2	18.2	16.3	15.6	--
Euro	29.7	30	28.3	29.7	31.4	30.8	28.7	29.1	26.2	25.5	29.1
Yen	11	11.6	13.1	14	13.1	12.2	11.6	12.5	14.8	13.8	11.3
USD	38	38	37.9	35	34	35.6	39.1	37.2	38.2	39.7	43.6
Jordan											
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
DM	7.6	8.3	7.2	7.7	7.6	6.9	6	6.3	5.5	5.7	--
FF	3.5	7.9	7.5	8.7	9.9	9.1	8.5	9.3	7.9	7.6	--
Euro	11.1	16.2	14.7	16.4	17.5	16	14.5	15.6	13.4	13.3	17.6
Yen	12.2	15.7	18.3	21.6	24.1	23.5	21.7	23.2	25.6	27.4	21.6
USD	42.6	39.7	40.4	35	28.8	28.6	30.5	30.5	31.1	28.7	30.3
Lebanon											
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
DM	4.6	3.9	2.6	1.2	1.1	2.7	8.3	5.2	3.1	2.4	--
FF	35.2	64.1	62	23.5	8.2	6.2	4.6	2.9	28.4	1.4	--
Euro	39.8	68	64.6	24.7	9.3	8.9	12.9	8.1	31.5	3.8	12.9
Yen	0.4	0.3	0.2	0.1	0	0	0	0	0.5	0.1	0.1
USD	41.5	17.5	13.8	57.5	69.2	65	61.9	74.1	53.9	71.3	79.1

Table 9. (Cont'd) Composition of MPCs Long-Term Debt in Major World Currencies (%)

Morocco											
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
DM	6.6	7	7.6	8	7.8	7.1	6.8	6.7	6	5.7	--
FF	22.8	21.2	19.5	19.5	18.2	18	18.4	19.6	17.6	17.4	--
Euro	29.4	28.2	27.1	27.5	26	25.1	25.2	26.3	23.6	23.1	32.7
Yen	3.1	3.8	4.2	4.4	3.8	3.5	2.5	2.7	3.4	3.7	3.9
USD	33.2	33.4	32.8	30.5	31.9	31.9	32.9	40.8	40.8	39.9	38.7
Syria											
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
DM	2.2	2.2	2.1	2.3	2.4	2.2	2	2.1	1.8	1.7	--
FF	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.6	0.6	--
Euro	2.9	2.9	2.8	3	3.2	2.9	2.7	2.8	2.4	2.3	2.2
Yen	2.8	2.9	3.5	3.8	3.5	3.1	2.8	3.1	3.5	3.1	2.7
USD	86.4	86.8	85.1	83.5	82.4	82.7	84.8	84.4	85	86.1	86.7
Tunisia											
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
DM	10.3	9.7	8.5	8	7.5	6.5	6.1	6.2	6.2	5.6	--
FF	14.2	13.5	13.2	14.7	14.7	13.2	9.9	10.2	10.9	10.7	--
Euro	24.5	23.2	21.7	22.7	22.2	19.7	16	16.4	17.1	16.3	25
Yen	8.5	7.8	8.2	9.4	14	14.3	13.9	15.1	20.6	21.6	23.9
USD	18.9	20.8	19.2	16.3	12.9	16.3	28.6	41	31.8	30.4	27.6

Notes: DM is the German Mark, and FF is the French Frank. The DM plus the FF represent the euro before 1999. Source: Global Development Finance, Various Issues.

The interaction between a MPC's debt and GDP, and movements in interest and exchange rates is studied empirically. In particular, we test whether MPCs with dollar debt experience a reduction in GDP and investment after a devaluation of the domestic currency. In particular, we will estimate a model of the type

$$Y_{i,t} = \alpha_i + \lambda\left(FD_{i,t-1} * \Delta e_t\right) + \delta\left(FD_{i,t-1} * \Delta i_t\right) + u_{i,t}, \qquad (22)$$

where $Y_{i,t}$ is a measure of country i's GDP in period t; $\left(FD_{i,t-1} * \Delta e_t\right)$ is total foreign debt multiplied by changes in the exchange rate weighted by the currency denomination of debt; and $\left(FD_{i,t-1} * \Delta i_t\right)$ is total foreign debt multiplied by changes in the domestic interest rate. α_i and $u_{i,t}$ represent the MPC's fixed effects, and an error term respectively; λ measures the effect of foreign currency debt during exchange rate movements, and δ measures the effect of debt during interest rate defenses that require movements of the interest rate. Notice that since MPCs' foreign currency debt is a composite of different foreign currencies (USD, Yen, Euro), we use a weighted average of movements in the exchange rate of these different currencies.

Table 10. Balance Sheet Effects of Selected MPCs

Dependent Variable is GDP	All MPCs
$\left(FD_{i,t-1} * \Delta e_t\right)$	-1.58**
t-stats	(2.31)
$\left(FD_{i,t-1} * \Delta i_t\right)$	-0.62
t-stats	(1.15)
R-Squared	0.77
Total Panel (Unbalanced) Observations	67

Notes: A * indicates significance at the 5 percent level, while a ** indicates significance at the 1 percent level. The panel estimation is carried out using Seemingly Unrelated Regression (SUR) Method.
Source: Authors' Estimates.

Table 10 indicates that MPCs' economic activity is significantly affected by fluctuations in the exchange rate. In Particular, a one percent devaluation in the debt weighted exchange rate leads to a 1.5 percent reduction in GDP, while a one percent increase in the debt weighted interest rate decreases GDP by about 0.67 percent, but the result is not significant. These results can be explained by the fact that most MPCs' debt is in USD, thus any devaluation against the USD means a higher debt level and debt service in the future. Thus, a devaluation means basically a deterioration in a MPC's balance sheet, a higher debt and debt service and little or no improvement in economic activity, while at the same it means a higher bill for the MPCs imports. Balance–sheet effects appear to be large enough in the MED region such that a devaluation is causing a contraction in economic activity as measured by GDP.

The establishment of a euro-MED FTA in 2010 is likely to increase trade with EU countries, and this is likely to amplify even further MPCs' balance sheet effects of exchange and interest rates fluctuations. MPCs that will continue to peg their respective exchange rate to the USD-given the current structure of their foreign debt being mainly in USD -while their export revenues will be increasingly linked to the euro, are expected to experience fiscal and macroeconomic imbalances that may lead to currency crisis and perhaps a default on foreign debt. If the euro depreciates further vis-à-vis the dollar, as it did since its introduction until the end of 2001, MPCs will experience deteriorations in their balance sheets that may reduce investment, and in the aggregate negatively affect MPCs' GDP and possibly generate a chain of defaults. It is, therefore, expected that the Euro-MED agreements will amplify the risk of balance sheet effects linked to exchange rate movements. MED countries will not be able to keep on borrowing in USD, at a time when their foreign currency revenues from exports will be increasingly linked to the euro.

VI. Euro-MED Exchange Rates And The Prospects For An OCA/EMMU

1. Overview And Related Literature

As the project is aimed at evaluating the relationship between exchange rate misalignments and trade agreements, and since one way to eliminate exchange rate misalignments may be achieved through establishing an Optimum Currency Area or a Euro-Mediterranean Monetary Union, this section evaluates the prospects of reducing exchange rate misalignments through either establishing an OCA or a EMMU.

So far this research project has proven the existence of exchange rate misalignments whether within the Mediterranean or the EU-MED regions. These exchange rate misalignments have been extremely damaging to trade and financial flows, and are expected to become even more damaging in the future with greater trade and financial integration between the two regions. This section, therefore, explores the prospects of establishing a Euro-MED OCA, and may be in the future a monetary union, with the full adoption of the euro by MPCs. Since MPCs appear not to be adopting an independent monetary policy, the establishment of an OCA or a EMMU may constitute a plausible solution to the misalignment problems in the region.

Following the Barcelona Conference, and the ratification of several bilateral trade agreements with MPCs on one hand, and the successful introduction of the euro currency on the other,[24] the debate about economic and monetary integration within the Mediterranean and in the Euro-Mediterranean regions gained considerable momentum.[25] With the ratification of the Barcelona agreements, closer Euro-MED trade links imply greater economic links among the MED countries and those of the EU, and greater prospects for monetary unification in the future among these countries. The debate has centered on monetary arrangements within the MED region, and the advantages and disadvantages of fixed versus flexible exchange rates (see Mansoorian and Neaime 2002, 2003, and Neaime 2000).

Subsequent to Mundell's (1961) classic contribution on the theory of optimum currency areas, interest on this topic intensified in the 1990's with a lag of almost 30 years. Mundell demonstrated that fixed exchange rates is the optimal monetary arrangement among a group of countries or regions that are subject to similar and symmetric economic shocks. On the other hand, if shocks are asymmetric or idiosyncratic, factor mobility among the regions, wage-price flexibility and fiscal transfers are required to sustain fixed exchange rates. McKinnon (1963) extended the theory by suggesting openness of an economy as a criterion for choosing an OCA. Kenen (1969) added the criterion of economic diversification, in the sense that diversified economies are more likely to have correlated economic shocks, and thus, require a common policy response.

No doubt, interest in the theory of OCAs was renewed with developments in Europe for economic and monetary unification, the ratification of the Barcelona agreements and the establishment of a Euro-MED FTA, and the enhancement of trade

[24] For a detailed discussion of the introduction of the euro currency and the future euro-dollar exchange rate see Neaime and Paschakis (2002).

[25] For a detailed discussion of the implications of the euro currency on Arab countries see Neaime (2001), (2002) and Colton and Neaime (2003).

and monetary integration in North America, following the signing of the North American Free Trade Agreement (NAFTA) among the US, Canada and Mexico in 1994. This theory has provided the main framework for the introduction of the euro in the European Union (EU), and the literature on the prospective monetary and exchange rate arrangements within NAFTA could constitute a very useful framework to study the prospects for greater economic and monetary integration in the Euro-MED region following the Barcelona Declaration of 1995.

Since early 1990s, the literature on OCAs has been large and growing. Primarily, applied researchers have studied the conditions under which certain groups of countries or regions are OCAs. Among others, Eichengreen (1992) examined the question of whether the EU is an OCA, by computing the volatility of bilateral real exchange rates and comparing it to the volatility of relative prices within different regions of the US. The basic idea is that regions with more highly correlated shocks will have less volatile real exchange rates. He found that EU real exchange rates were more volatile than the relative prices of the US regions. The implication of this finding is that the EU was further away than the US from being an OCA. Decressin and Fatas (1995) examined regional labor dynamics in Europe and compared their findings to those obtained by Blanchard and Katz (1992) for the US. They found that shocks to labor markets in Europe are 80 percent region specific. Also, in Europe labour market shocks are absorbed in changes in the participation rates, while in the US they induce labor migration. Based on Mundell's OCA criteria these results suggested that the EU would form a less suitable monetary union than the US.

Bayoumi and Eichengreen (1997) relate movements in actual European exchange rates to variables suggested by the OCA theory: asymmetric output disturbances, trade links and country size.[26] They reported empirical support for the theory of OCAs. Frankel and Rose (1997) pointed out that both international trade patterns and business cycle correlations are endogenous, in the sense that countries that trade more tend to have more highly correlated business cycles. Thus, greater trade integration may help a country to satisfy the conditions for entry into a currency union. Particularly, and after Barcelona and the creation of the FTA in 2010, greater trade integration with the EU should be used by MPCs to help them satisfy the condition for entry into an OCA or even a currency union with the EU through the full adoption of the euro. This section, therefore, adds to the limited existing literature by examining empirically, the prospects of an OCA/EMMU within the Euro-MED region.

The exchange rate literature stipulates that the benefits of monetary unification, by adopting a common currency, are in the form of elimination of the costs associated with exchange rate misalignments and currency conversion. The recent Euro-MED trade agreements do not immediately provide for labor mobility within the region or for fiscal cross-border transfers in order to smooth out economic and financial shocks. Further, it

[26] Bayoumi and Eichengreen (1994) have given a comprehensive empirical assessment of monetary and exchange rate arrangements for NAFTA. Using data of variance time spans from 1963 to 1989 and the Blanchard and Quah (1989) methodology of computing demand and supply shocks, they studied the nature and transmission of economic shocks in Eastern and Western Canada, eight BEA regions of the US and Mexico. They found that economic shocks are more asymmetrically distributed within NAFTA than in the EU, and consequently the costs of giving up the exchange rate and forming a North American Monetary Union (NAMU) are likely to be larger.

was shown earlier that various MED central banks do not possess a good track record of maintaining price stability, and a flexible exchange rate, to allow them to pursue their own independent monetary policy. Therefore, a policy that ties various MED currencies closely to the euro can turn out to be instrumental in borrowing monetary credibility from the European Central Bank, and thus, may reduce the MED region inflation and interest rates.

If there is a desire for monetary independence, then a flexible exchange rate regime is better for MED countries in the presence of structural differences between the two regions. However, Lebanon, Egypt, Morocco and Tunisia's experience with flexible rates has been disappointing, given the high volatility of their real exchange rates, and the prolonged misalignment of their respective currencies from its equilibrium value. A weak domestic currency contributes to the low productivity of domestic firms competing in the foreign sector. Since these countries are moving toward greater trade links with the EU, greater exchange rate fixity vis-à-vis the euro might be favored.

Similar arguments were made pointing out that flexible exchange rates have not delivered the expected results in the MED region. Unemployment rates in Morocco and Tunisia have remained high and labor market flexibility has been lower because of flexible rates. Also, the high volatility of their exchange rates has increased the exchange rate risk premium and resulted in higher interest rates. A common currency, would improve the two countries financial and monetary position within the MED region by eliminating exchange rate misalignments and currency convergence costs and exchange rate risk premia, and by reducing interest rates and general price variability.

The following section examines empirically the prospects of a Euro-MED OCA/Monetary Union. Recent data is used depending on data availability from 1980 to 2002. To guide the empirical analysis we make a useful distinction between the conditions that characterize an OCA and the conditions that are necessary for a successful monetary union. We consider the OCA conditions empirically as in Bayoumi and Eichengreen (1994) by analyzing trade data and correlations of real GDP growth rates in 7 MED countries, and the EU. Next, the prospects of a European Union/Mediterranean Monetary Union are evaluated using co-integration analysis on variables inspired by the Maastricht treaty criteria for nominal convergence within the EMU.

2. Empirical Model

2.1. Prospects For the Establishment of a Euro-MED OCA

The empirical analysis will make a useful distinction between the conditions that characterize an OCA and the conditions that are necessary for a successful monetary union. We consider the OCA conditions empirically as in Bayoumi and Eichengreen (1994) by analyzing trade data and correlations of real GDP growth rates in 7 MED countries and those of the EU.

The prospects of a MED and an EU-MED Monetary Union are evaluated using co-integration analysis on variables inspired by the Maastricht treaty criteria for nominal convergence within the EMU. Based on Mundell's pioneering contribution, the following criteria will be carefully studied within the Euro-MED region: (1) Are the 2 regions exposed to common economic shocks? (2) Are the 2 regions vulnerable to similar or symmetric shocks? (3) Can the 2 regions have similar responses to common shocks? (4)

If the 2 regions are subject to asymmetric or region specific shocks, then we will ask are they capable of quick adjustments? (5) How open are the economies under consideration? Since the more open an economy is the more ready it will be to join on OCA.[27]

It should be clear from the earlier discussion that if a group of economies is subject to symmetric economic shocks, the economies are flexible enough to handle asymmetric shocks, and they are also open economies with high trade links, then it is highly likely that they will have synchronized business cycles and will require a common policy response; that is the group of economies will be an OCA.[28]

To check this hypothesis empirically, we first look at trade links among the EU- and MPCs that have already ratified the Barcelona Treaty. Those are Tunisia and Israel in 1995, Morocco in 1996, and Jordan in 1997. Tables 11, 12 and 13 report MED-EU trade flows over the period 1990-2002 in million of US dollars. As seen from those tables, total exports, imports, and total trade have all increased uniformly among the EU-MED countries. Tables 11 and 12 report total exports and imports between MPCs and the EU. Exports from Morocco to the EU nearly doubled after the ratification of Barcelona, increasing from USD 2.9 billion in 1995, to USD 5.4 billion in 2002. Imports have also uniformly increased from USD 4.7 million in 1995, to USD 7.8 billion in 2002. Israel is in a similar situation where exports increased from USD 4.8 billion in 1994 to USD 7.2 billion in 2002, while imports went up from USD 14.7 billion in 1995 to USD 15.4 billion in 2000. In Tunisia, imports increased from USD 5.6 billion in 1995 to USD 6.7 billion in 2002, while exports went up from USD 4.5 billion to USD 5.2 billion in 2002.

[27] McKinnon (1963) showed that for a small open economy wishing to achieve simultaneously internal balance, external balance and price stability the optimal is to adopt a fixed exchange rate. In this setting, flexible exchange rates contribute to greater variability of the domestic price level, and the negative effects to exchange rate variability are likely to be larger the more open is the economy.

[28] A currency area is basically a collection of countries or regions that operate under some tight form of fixed exchange rates. Kenen (1997) gives a useful definition of a currency area: "A currency area is a group of countries that undertake to contain their bilateral exchange rates within narrow bands defined in respect of agreed central rates which they can change unilaterally." The Exchange Rate Mechanism (ERM) of the EMS is an example of a currency area. Based on Mundell's pioneering contribution, economists have basically agreed on the following criteria that make a currency area optimal, that is criteria for an OCA to exist: (1) Regions are exposed to common economic shocks; (2) The shocks are similar or symmetric; (3) The regions should have similar responses to common shocks; (4) If regions are subject to asymmetric or region specific shocks, they need to be capable of quick adjustment. The more open an economy is the more ready it will be to join on OCA (McKinnon (1963)). Along with the OCA criteria, some additional conditions must be satisfied for a successful monetary union (i.e., one money, one central bank and one monetary policy, Kenen (1997)) to exist. Whatever these conditions may be, they must include credible policy action by the member states that make their economic policies converge to common trend that is consistent with achieving and maintaining a currency union. The nominal convergence criteria laid down by the Maastricht Treaty in the context of EMU countries had to satisfy specific target with respect to their bilateral exchange rates, inflation rates, long-term interest rates and government deficits and debts in order to qualify for participation in the EMU.

Table11. Exports of Selected MPCs to the EU: 1990-2002

X to EU Million of USD	Israel (1995)	Jordan (1997)	Morocco (1996)	Tunisia (1995)
1990	4344.10	33.54	2787.91	2732.78
1991	4112.10	52.79	2709.20	2965.61
1992	4525.80	28.43	2582.45	3140.23
1993	4431.00	40.82	2410.44	3021.53
1994	4832.00	58.42	2559.31	3723.65
1995	5957.20	89.97	2918.23	4539.44
1996	6570.70	121.65	2917.56	4417.82
1997	6796.00	109.66	2838.53	4408.02
1998	7191.30	97.55	2716.88	4589.97
1999	7650.20	86.05	5429.53	5940.91
2000	8563.50	50.03	5100.70	4712.81
2001	7652.70	87.52	5161.95	5276.65
2002	7278.90	164.67	5465.76	5276.72

Notes: X represents exports, and EU refers to the European Union countries.
Numbers in bracket refers to the date of the ratification of the Barcelona Agreement.
Source: IMF, Direction of Trade Statistics, 2002.

Table 12. Imports of Selected MPCs From the EU: 1990-2002

M from EU Million of USD	Israel (1995)	Jordan (1997)	Morocco (1996)	Tunisia (1995)
1990	7865.1	807.2	3944.35	3986.55
1991	8338.2	876.79	4022.83	3986.47
1992	9681.2	1027.73	4176.71	4711.47
1993	10549.2	1175.36	3906.27	4603.34
1994	12671.4	1199.48	4054.42	4728.02
1995	14717.1	1226.85	4776.17	5643.31
1996	15487.6	1359.13	4469.18	5599.52
1997	14858.9	1335.68	4100.38	6108.71
1998	13335.4	1252.23	4634.64	6217.13
1999	14386.4	1153.75	7745.39	7493.96
2000	15466.2	1414.6	7813.44	6074.99
2001	13933.0	1374.37	5799.99	6773.46
2002	13554.3	1562.93	7852.21	6778.14

Notes: M represents imports, and EU refers to the European Union countries.
Numbers in bracket refers to the date of the ratification of the Barcelona agreement.
Source: IMF, Direction of Trade Statistics, 2002.

Table 13. Total Trade of Selected MPCs With the EU: 1990-2002

X+M with EU Million of USD	Israel (1995)	Jordan (1997)	Morocco (1996)	Tunisia (1995)
1990	12209.2	840.74	6732.26	6719.33
1991	12450.3	929.58	6732.03	6952.08
1992	14207.0	1056.16	6759.16	7851.70
1993	14980.2	1216.18	6316.71	7624.87
1994	17503.4	1257.90	6613.73	8451.67
1995	20674.3	1316.82	7694.40	10182.75
1996	22058.3	1480.78	7386.74	10017.34
1997	21654.9	1445.34	6938.91	10516.73
1998	20526.7	1349.78	7351.52	10807.10
1999	22036.6	1239.80	13174.92	13434.87
2000	24029.7	1464.63	12914.14	10787.8
2001	21585.7	1461.89	10961.94	12050.11
2002	20833.26	1727.60	13317.97	12054.86

Notes: X is exports while M represents imports, and EU refers to the European Union countries.
Numbers in bracket refers to the date of the ratification of the Barcelona agreement.
Source: IMF, Direction of Trade Statistics, 2002.

Table 13 indicates an overall increase in trade patterns between the EU and MPCs with the exception of Jordan. In Morocco, total trade has nearly doubled with the EU, increasing from USD 7.3 billion in 1996 to USD 13.3 billion in 2002. In Tunisia, the increase in total trade has been relatively lower but still significant, increasing from USD 10.18 billion in 1995 to USD 12.05 billion in 2002. Total trade between Israel and the EU, increased from USD 20.67 billion in 1995 to USD 24.02 billion in 2000, but went down in 2002 to USD 20.83 billion in 2002. In Jordan there was no significant increase in trade patterns with the EU, where total trade has been hovering around USD 1.6 billion.

Even though trade between the EU and MPCs that have ratified the Barcelona Treaty has been significantly increasing after the signing date, the unanticipated modest increase in exports is due mainly to the 30 percent depreciation of the euro against the USD since its introduction in 1999. Because all MPCs have a USD exchange rate peg, this has meant a 30 percent real appreciation of their domestic currencies, which translated negatively on the competitiveness of these countries' exports in EU's market. This trend has, however, reverted since the beginning of 2002 when the euro appreciated against the USD by about 30 percent back to its introduction value of 1.15/USD.

Appendix Tables A.1-A.7 indicate that even though trade is already significant between MPCs (Algerian, Egypt, Lebanon, and Syria) who have still not ratified the Barcelona Treaty and the EU, there is no significant change in these trade patterns.

Tables 14, 15, and 16 report the indices of economic openness in terms of the ratios exports/GDP, imports/GDP and total-trade/GDP. It shows that all MED economies have become more open to the EU since the beginning of the Barcelona period with the exception of Jordan. From 20.35 percent, the ratio of total trade with the EU to GDP in Morocco nearly doubled to reach 40.35 percent in 2002. In Israel and Jordan, the increase was less significant hovering around the 22 percent level. While in Tunisia this ratio went up from 56.7 percent to 61.62 percent.

Table 14. Exports/GDP of Selected MPCs to the EU: 1990-2002 in (%)

	Israel (1995)	Jordan (1997)	Morocco (1996)	Tunisia (1995)
1990	8.41	0.83	10.53	21.22
1991	6.95	1.24	9.11	21.20
1992	7.72	0.55	9.62	21.76
1993	7.10	0.74	9.33	21.63
1994	6.49	0.96	8.21	23.31
1995	6.92	1.39	8.77	25.29
1996	6.82	1.83	8.04	23.17
1997	6.82	1.57	8.65	24.25
1998	7.72	1.33	7.31	22.36
1999	7.83	1.06	15.83	30.10
2000	7.80	0.60	15.28	24.54
2001	7.02	0.95	15.58	26.97
2002	6.74	1.73	16.56	26.97

Notes: EU refers to the European Union countries. Numbers in bracket refers to the date of the ratification of the Barcelona agreement.
Source: IMF, Direction of Trade Statistics, 2002.

Table 15. Imports/GDP of Selected MPCs to the EU: 1990-2002 in (%)

	Israel (1995)	Jordan (1997)	Morocco (1996)	Tunisia (1995)
1990	15.23	20.11	14.90	30.96
1991	14.09	20.63	13.52	28.50
1992	16.52	20.07	15.56	32.65
1993	16.90	21.44	15.12	32.96
1994	17.02	19.79	13.00	29.59
1995	17.09	19.07	14.36	31.44
1996	16.08	20.45	12.31	29.36
1997	14.92	19.14	12.50	33.61
1998	14.32	17.14	12.47	30.28
1999	14.74	14.29	22.59	37.96
2000	14.10	16.96	23.41	31.64
2001	12.79	14.97	17.51	34.62
2002	12.55	16.44	23.79	34.65

Notes: EU refers to the European Union countries. Numbers in bracket refers to the date of the ratification of the Barcelona agreement.
Source: IMF, Direction of Trade Statistics, 2002.

Table 16. Total Trade/GDP of Selected MPCs to the EU: 1990-2002

	Israel (1995)	Jordan (1997)	Morocco (1996)	Tunisia (1995)
1990	23.65	20.95	25.43	52.18
1991	21.05	21.87	22.63	49.70
1992	24.24	20.633	25.18	54.42
1993	24.00	22.18	24.45	54.60
1994	23.51	20.76	21.21	52.91
1995	24.01	20.47	23.13	56.73
1996	22.90	22.28	20.35	52.54
1997	21.75	20.719	21.16	57.87
1998	22.05	18.47	19.78	52.64
1999	22.58	15.35	38.43	68.06
2000	21.91	17.56	38.70	56.19
2001	19.82	15.93	33.09	61.59
2002	19.29	18.17	40.35	61.62

Notes: EU refers to the European Union countries. Numbers in bracket refers to the date of the ratification of the Barcelona agreement.
Source: IMF, Direction of Trade Statistics, 2002.

Tables 17 and 18 report the correlation of GDP growth rates for the respective MPCs and the EU, and between MPCs. Table 17 lists MPCs that have already ratified the Barcelona Declaration, while Table 18 lists MPCs that did not yet ratified the Barcelona Treaty. As shown in these Tables, the correlation coefficients between each MPC and the EU GDP growth rates are relatively higher for MPCs that have already signed the Barcelona Treaty. This can be explained by the increase in trade flows, and their consequent impact on the growth rates of GDP. With the exception of Jordan, in Table 17, the correlation coefficients range between 0.34 and 0.54, while in Table 18 and with the exception of Algeria the range is between -0.02 and 0.12.

This evidence provides a strong support to the claim that for those MPCs that have ratified the Barcelona Agreements, greater trade integration is gradually leading to greater economic integration with the EU, and MPCs' business cycles are becoming relatively highly synchronized with that of the EU. This is also due to geographic proximity and the long trade and manufacturing links between the two geographic regions. Also, this can be explained by the high integration of the two regions in terms of manufacturing services and trade. Since the rule for declaring a weak OCA is a 40 percent cross-correlation value in regional GDP growth rates, then, we can declare the EU, Israel, Morocco, and Tunisia as a weak OCA.

By contrast, the remaining MPCs economies are somehow not at pace with the EU. In fact, the evidence in Table 18 shows that the EU and the Algerian and Egyptian economies are largely independent of each other, and if anything else they tend to move in opposite directions. Although, the evidence for Syria and Lebanon shows that the two economies move in tandem with that of the EU, the co-movements of these economies with that of the EU is rather weak.

Table 17. Correlations of GDP Growth Rates of Selected MPCs: 1990-2002

	Israel	Jordan	Morocco	Tunisia	Europe
Israel	1	0.79	0.95	0.98	0.34
Jordan		1	0.62	0.75	-0.11
Morocco			1	0.96	0.54
Tunisia				1	0.39
Europe					1

Source: Authors' Estimates.

Table 18. Correlations of GDP Growth Rates of Selected MPCs: 1990-2002

	Algeria	Egypt	Lebanon	Syria	Europe
Algeria	1	0.43	-0.09	0.07	-0.43
Egypt		1	0.66	0.75	-0.02
Lebanon			1	0.96	0.12
Syria				1	0.10
Europe					1

Source: Authors' Estimates.

2.2 Prospects For the Establishment of a Euro-MED Monetary Union

In the previous section, it was shown that the EU, Israel, Morocco, and Tunisia form a weak OCA, while Algeria, Egypt, Lebanon and Syria, are far from forming an OCA with the EU. The present section uses yearly data for the period 1960-2001, collected from the International Financial Statistics database, to study the prospects of a Euro-MED Currency Union. We exclude from our sample MPCs that have not ratified the Barcelona Treaty and those who did not qualify as an OCA. The data set includes data on regional GDP growth rates, short-term interest rates, nominal exchange rates and inflation rates.

The statistical concept of cointegration is a useful device to formalize nominal convergence and evaluate empirically the prospects of a successful currency union for the EU-MED region. If there exist stationary linear combinations of a set of *n* nonstationary variables, then we say that these variables are cointegrated. These linear combinations or cointegration relations describe stable long-run equilibrium among these variables that are driven by a number of common stochastic trends. If the number of cointegrating relations is *r* then the number of common stochastic trends is *n-r***.** For a concrete example, consider the inflation rates of Morocco, Tunisia and Jordan, and assume that each is a nonstationary variable. If the three inflation rates are cointegrated once, then they are bound together by a stable long-run equilibrium relation, which in turn implies that the monetary policies of the three countries have converged to two stochastic common trends that determine the stable equilibrium relation. For the interpretation of the empirical results, there will be complete convergence of government policies among a set of n countries, if there exist $r = n - 1$ cointegrating relations, and a single common stochastic trend among them. Otherwise, if *r* is in the interval $0 < r < n-1$, then there will be only partial convergence of government policies. Convergence in this context means that government policies have been coordinated so that the variables of interest move to a long run equilibrium, and do not drift too far apart over time. We comment on these issues more below in the context of the analysis of the empirical results.

The Johansen (1991, 1995) cointegration test will be used to test for the existence of a long run relationship between the data series (X_i) corresponding to GDP, inflation rates, interest rates, and nominal exchange rates, after establishing non–stationarity of the individual series by applying both the Phillips-Perron (PP) and Augmented Dickey–Fuller (ADF) unit root tests.

The following regressions are estimated

$$\Delta X_t = \beta_1 + \beta_2 X_{t-1} + \sum_{i=1}^{k} \delta_i \Delta X_{t-i} + \varepsilon_t, \tag{23}$$

where Δ is the first–difference operator; $(X_{i,t})$ represents the respective time series of interest; β_i, δ_i, are constant parameters; and ε_t is a stationary stochastic process. The number of lags (k) will be determined based on the Akaike Information Criterion (AIC).

To determine the order of integration of the series, model (23) is modified to include second differences on lagged first and k lags of second differences. That is,

$$\Delta^2 X_t = \lambda_1 \Delta X_{t-1} + \sum_{i=1}^{k} \mu_i \Delta^2 X_{t-i} + \varepsilon_{1t} \tag{24}$$

where, $\Delta^2 X_t = \Delta X_t - \Delta X_{t-1}$,; λ_i, μ_i, are constant parameters; and ε_{1t} is a stationary stochastic process. The k lagged difference terms are included so that the error terms ε_t and ε_{1t} in both equations are serially independent.

The unit root tests results are reported in Tables B.1-B.4 of Appendix B. Results show that in general all variables are non-stationary in level, and thus contain a unit root. In other words, they are all integrated of order one, I(1) series. There are, however, few exceptions. The EU nominal exchange rate series is I(2). The Moroccan rate of interest is I(1) with no time trend.

Since all the series are integrated of order one, I(1), we next move to study whether the series are cointegrated. We study first South-South cointegration to see whether MPCs set their macro and monetary policies independently, or follow some sort of policy convergence, and can therefore form a Monetary Union. We then study the prospects of a monetary union in the Euro-MED region by again looking at monetary and macroeconomic policy convergence in the EU-MED region. For this purpose, the Johansen (1991, 1995) efficient maximum likelihood test is applied using alternative lag lengths in the vector autoregression (VAR). More specifically, consider a VAR of order z

$$X_t = A_1 X_{t-1} + ... + A_z X_{t-z} + \varepsilon_t, \tag{25}$$

where X_t is our y-vector of the non-stationary I(1) macroeconomic series, and ε_t is a vector of innovations. We can rewrite the VAR as

$$\Delta X_t = \theta X_{t-1} + \sum_{i=1}^{z-1} \lambda_i \Delta X_{t-i} + \varepsilon_t, \tag{26}$$

where, $\theta = \sum_{i=1}^{z} A_i - I_i$, and $\lambda_i = -\sum_{j=i+1}^{z} A_j$.

Granger's representation theorem asserts that if the coefficient matrix θ has reduced rank r<y, then there exist y x r matrices ω and Ω each with rank r such that $\theta = \omega\Omega'$ and $\Omega' X_t$ is stationary. r is the number of cointegrating relations (the cointegrating rank) and each column of Ω is the cointegrating vector. The elements of ω are known as the adjustment parameters in the vector error correction model. Johansen's method is used to estimate θ matrix in an unrestricted form, then test whether we can reject the restrictions implied by the reduced rank of θ.

The cointegration test results are reported in Tables B.5-B.12 of Appendix B. South-South cointegration results show no convergence in MED monetary or macroeconomic policies in general. Table B.5 indicates no long run relationship between the GDP of Israel, Morocco and Tunisia (see Figure B.1(a)). Thus, there is no convergence in MED business cycles. The same is true for nominal exchange rates where again exchange rate policies appear to be set independently. Table B.7 reports no significant long-run relationship between MPCs exchange rates. This is not surprising, as was argued earlier in the study, that exchange rate misalignments cannot be ruled out in the MED region, and that there is a significant degree of heterogeneity in MED exchange rates policies (Figure B.1 (c)). There, however, appear to be a weak convergence of MED government policies with respect to inflation. Table B.6 reports the existence of one cointegrating vector and two stochastic trends. The presence of two stochastic trends implies that two of the three MPCs are setting their inflation policies independently. This weak convergence in government monetary policies cannot be attributed to more coordination in MED monetary polices, but is rather due the fact that all MPCs have been devoting significant efforts to contain inflationary pressures of the late 1980s. After several episodes of high inflation rates, these rates appear to have been contained in early 1990s in all MPCs (see Figure B.1 (b)). Table B.8 reports the cointegration results for the rate of interest in Morocco and Tunisia only, due to the lack of long data series for Israel. Therefore, not much could be said about interest rates policies in the MED region. Despite the lack of data for Israel, interest rates polices appear to be converging fully between Morocco and Tunisia, due to the presence of one cointegrating vector (see also Figure B.1(d)). Overall, the empirical results are pointing towards little convergence in MPCs government policies, and the prospects of a currency union within the MED region are still a far-reaching goal. Greater monetary and macroeconomic policy coordination is required in the MED region.

Next, we look at the EU-MED region, and study whether greater convergence in government polices is existent. The existence of more convergence in government policies could constitute a first step towards the formation of a currency union in the region by the full adoption of the euro by MPCs. Table B.9 reports the cointegration results for the GDP of the EU, Israel, Morocco and Tunisia. The table reports one cointegerating vector and three stochastic trends pointing towards a weak convergence in EU-MPCs' business cycles (see also Figure B.2(a)). This weak convergence can be explained by the fact that trade has steadily been increasing between the MPCs and the EU after the ratification of the Barcelona Treaty. The increased Euro-MED trade is apparently leading to higher correlation in GDP, and more synchronization in the

Euro–MED business cycles. No doubt the full adoption of the euro by MPCs will lead in the future to the intensification of Euro-MED trade. There is ample empirical evidence suggesting (see for example Rose (2000), and Glick and Rose (2002)) that the adoption of a common currency, by joining a currency union, has a significant positive impact on trade. For instance, using a sample of 217 countries covering the period 1948-1997, Glick and Rose (2002) have shown that countries joining a currency union have experienced economically and statistically significant increases in trade. They also show that the increase in trade could be as high as 300 percent.

A similar result is obtained when considering the convergence of inflation rates in the Euro-MED region. Table B.10 reports the existence of one cointegrating vector and three stochastic trends. Clearly, the monetary policy stance of the ECB for price stability on one hand, and the fact that the remaining MPCs have been trying to contain inflationary pressures since the early 1990s on the other, explain what is observed empirically. However, the weak convergence in inflation rates and the presence of three stochastic trends imply that at least 3 of the four countries have been setting their inflation policies independently (Figure B.2(b)).

Table B.11 reports the cointegration results for nominal exchange rates in the Euro-MED region. The table indicates no significant long-run relationship between the exchange rate of the EU and those of the remaining MPCs. Euro-MED exchange rates have been behaving quite differently especially during the various episodes of exchange rate volatility (see FigureB.2(c)). This is not surprising, and is due to the lack of coordination of exchange rate polices whether within the MED region, or between the Euro-MED regions. MED countries should set their future exchange rate policies in such a way to eliminate the existence of exchange rate misalignments, and to better reflect the changing trading patterns in the Euro-MED region. The full adoption of the euro by MPCs in the future will not only eliminate exchange rate misalignments, but will also contribute to enhancing Euro-MED trade flows.

Finally, Table B.12 reports the cointegration results for the Euro-MED interest rates excluding Israel due to lack of data. The Table indicates no cointegrating vectors between the EU and the remaining MPCs. This can be explained by the fact that while the EU's financial market is moving fast towards becoming one integrated and developed financial market, the remaining MPCs'markets are still underdeveloped and lack regional integration. In addition, the non-existence of cointegration between the Euro-MED interest rates is another evidence against Euro-MED monetary policy coordination.

Overall, this section has shown that South-South financial and monetary integration is still a far-reaching goal. However, a weak convergence of monetary and financial polices have started to emerge within the Euro-MED region. The intensification of trade between MPCs and the EU has led to more synchronization in Euro-MED business cycles, and inflation policies. Thus, the prospects for the establishment of a EMMU are still weak despite some weak signs of convergence of Euro-MED government policies. More government policy coordination is required in the future to achieve monetary and financial integration within the Euro-MED region, and to dampen the negative implications of exchange rate misalignments on the Euro-MED Partnership. Specifically, convergence in Euro-MED exchange rate policies would alleviate the problems arising from exchange rate disagreements.

VII. Conclusions And Policy Implications

The policy issues raised by risks and concerns of the Euro-MED Regional Integration Agreements are numerous. Traditional analysis has focused on the traditional trade issues of regional integration agreements, namely the change of trade patterns resulting from a new tariff structure and its welfare implications. The empirical analysis in this research project has focused on the problems caused by divergent exchange rates within the Euro-MED preferential trade agreements, which we showed may have significant effects on trade, FDI and foreign debt, and may have crucial welfare implications.[29] In fact, if exchange rate disagreements prevail within the Euro-MED region, then they might end up weakening the Euro-MED regional integration agreements. Thus, MED governments need to devote particular attention on these issues.

In fact, a US dollar exchange rate peg alongside the depreciation of the euro currency against the US dollar in between 1999-2002, have been the main cause for a steady appreciation of the region's average real exchange rate. In addition, the existence of exchange rate misalignments within the MED region has had a direct negative impact on intra MED trade. With the prevailing MED exchange rate arrangements, this study has shown that these misalignments will be amplified within the Euro-MED region right after the ratification of Barcelona, and even before the establishment of the FTA in 2010, with a direct negative impact on the Euro-MED Partnership.

One stylized fact is that a major portion of MPCs' trade is with the EU, and this trend is expected to continue and strengthen in the future. The successful monetary and exchange rate unification in the EU, and the introduction of the euro currency in 1999, coupled with the ratification of the Euro-MED Barcelona Agreements, are all presenting MPCs with a unique opportunity to harmonize their exchange rate policies, to first reflect their trading patterns, and eliminate any source of misalignments which can be very damaging to trade and the flow of FDI in the Euro-MED region. In addition, the recent EU-MED trade agreements and the establishment of a free trade area by the year 2010 are all expected to accelerate and enhance trade and financial links among the EU-MED countries, shortening therefore the time span whereby the two regions can harmonize their economic policies.

The empirical findings of the study constitute an essential tool for policy makers in the region in formulating future monetary, trade, and debt management policies within the context of the Euro-MED Partnership. The study has shown that the MED region should accelerate trade, financial and economic integration to be able to reap the benefits of the Euro-MED partnership.

The Euro-MED Partnership should be a partnership covering all aspects of monetary, financial and macroeconomic cooperation. MPCs will no longer be able to trade and do business in one currency (the euro) and peg their currencies to another (the US dollar). The Euro-MED Partnership Agreements should be deep and should eventually lead to consistent macroeconomic and exchange rate policies. If, for whatever reasons, the full adoption of the euro is not a feasible scenario in the foreseeable future, then greater fixity to the euro will be increasingly justified, as more MED countries join

[29] The traditional analysis of preferential trade agreements also falls short in its implications for financial integration and other aspects of economic integration whose welfare implications may dominate those accounted by traditional trade-related gains.

those agreements. This is especially the case for Lebanon, Syria, Egypt, and Jordan. The success of exchange rate flexibility adopted in Morocco and Tunisia has not been proven yet, and the recent flexibility in Egypt appears to be very costly to the Egyptian economy, where domestic wages have been slashed in half with no sign of improving the purchasing power of the Egyptian population. The shift to flexible regimes should be paired with structural and institutional changes, a process which is expected to take some time in the MED region. The absence of such structural change would endanger the sustainability of flexible exchange rate regimes. Therefore, and in the medium run, greater fixity to the euro will be favored as more countries join the Association Agreements. Greater fixity may subsequently constitute a stepping-stone towards full conversion by MPCs to the euro. This will totally eliminate the serious problems that have been shown to arise from the Euro-MED trade agreements. These problems which we have shown will have serious problems on the whole EU-MED Partnership.

The second section of the study has shown that Euro-MED exchange rates are misaligned. The empirical results have also shown that, in general, exchange rate misalignments whenever they exist whether within the MED region, or between the Euro-MED regions, are not eliminated even in the long-run. In other cases, when such a tendency exists, the adjustment is rather slow. While misalignments within the MED region are significant with an average correction period between 3-6 years, the misalignments between the EU and MPCs appear to be more significant and do not tend to be eliminated even after 10 years. With the Barcelona Declaration, the enhancement of the Euro-MED Partnership and the establishment of the FTA in 2010, MPCs are now presented with a unique opportunity to effectively adopt proper exchange rate arrangements. A fixed exchange rate to the euro, or a flexible anchoring to the euro, or anchoring with a band to the euro, might prove to be the pareto optimal arrangement for the MED region as a way to eliminate exchange rate misalignments.

This section has also shown that Algeria, Morocco, Lebanon and to a lesser extent Egypt appear to have relatively limited monetary policy intervention via interest rates to counter fluctuations in the exchange rate. This not the case in Jordan and Tunisia, where monetary policy appears to be using more the rate of interest as a policy instrument to dampen the impact of exchange rates volatility on their domestic economies. It is also shown that for Algeria, Egypt, Tunisia and Morocco monetary policy appears not to be independent, and the adoption of a fixed exchange rate to the euro would not entail high costs in terms of monetary independence. Syria does not have an interest rate policy, as domestic interest rates have not changed over the last three decades. In Lebanon and Jordan, the empirical results were inconclusive. With the exception of Algeria, which appears to be using the rate of interest as a tool to counteract fluctuations in GDP, none of the remaining MPCs are using the rate of interest in particular, or monetary policy in general, as an anti cyclical monetary tool. Overall, this part has shown that in almost all cases, there is weak empirical evidence to suggest that MPCs have adopted an independent monetary policy. Therefore, one can safely conclude that the costs associated with a loss of monetary independence, as a result of greater exchange rate fixity, appear to be very low.

Section III has studied the impact of exchange rate misalignments on EU-MED trade flows. It was shown that the Euro-MED Trade Agreements should be paired in the

future with exchange rate coordination, and closer trade links will require higher Euro-MED monetary coordination. In addition, the presence of Euro-MED regional goods is likely to amplify the transmission of macroeconomic shocks among the EU-MED countries that are members of the EU-MED trade agreement. This section has also shown that the presence of real exchange rate misalignments are in fact very damaging for EU-MED exports. Exchange rate misalignments can, by building pressure for the introduction of protectionist measures, be very damaging for the future EU-MED Trade Agreement, and the presence of these trade agreements may amplify even further the well-established relationship between real exchange rate appreciation and currency crisis.

This section has also tested whether a MPC's misalignment vis-à-vis its RIA partners has a larger impact, other things being equal, than a similar misalignment vis-à-vis nonmembers. It was shown that the EU-MED Regional Integration Agreements are expected to increase the importance of regional goods. Specifically, the elasticity of total exports with respect to exchange rate misalignments is higher when the source of the misalignment lies within the EU-MED RIA. In Particular, the empirical results have shown that real exchange rate misalignments are a statistically significant and quantitatively important determinant of exports within the Euro-MED region. The empririal results indicated that a 1 percent real exchange rate appreciation is associated with a 2.3 percent decrease in exports. In addition, the results also point to large and significant differences in the effect of regional and non-regional misalignments over exports. Specifically, a one-percentage point contribution of the regional real exchange rate to multilateral appreciation is associated with a significant decrease in exports of approximately 3.48 percent. It was also shown that a one-percentage point contribution of the non-regional real exchange rate to multilateral appreciation is associated with a significantly lower decrease in exports of approximately 0.4 percent. Overall, the empirical results have shown that the impact of real exchange rate misalignments on EU-MED exports is likely to be amplified as more countries join the Agreements, and as trade is intensified between the Euro-MED RIA member countries.

Section IV studied whether the presence of the Euro-MED Regional Integration Agreement affects the location of FDI. Real exchange rate misalignments are known to be associated with FDI flows. As in the case of trade, we were interested in whether the effect of Euro-MED exchange rate misalignments on foreign direct investment is amplified by the presence of the Euro-MED Trade Agreement.

The empirical results of this section suggested that movements in the real bilateral exchange rate have a much stronger impact among MPCs that are already members of the Euro-MED RIA. In this case, a one percent depreciation of the real bilateral exchange rate increases relative FDI by 2.5 percent. In contrast, among the remaining MPCs that are not yet members of the Euro-MED RIA, the impact of bilateral exchange rates is not statistically significant. In addition, the empirical results also point to the existence of EU-MED FDI that are tariff-jumping, and which are more likely to relocate in case of exchange rate disagreements among MPCs.

Section V has argued that since the Euro-MED Trade Agreements are likely to increase trade flows with EU countries, then this is likely to increase the balance sheet effects of exchange rate misalignments. A real devaluation increases the domestic

currency value of foreign debt, and weakens therefore a country's debt position. By weakening countries and firms' balance sheets, any real devaluation prevents domestic firms from increasing production or investment. If the balance–sheet effect is large enough, devaluation can be contractionary. This was shown to be a serious issue in the Euro-MED agreement in which firms may end up borrowing in one currency (the US dollar) and exporting to the Euro area in another (the euro).

Section V has shown that the USD dominates the currency composition of MPCs' foreign debt. These observed high proportions of debt levels denominated in USD-when these countries have either joined the Euro-MED partnership or will soon be joining- are expected to amplify the balance sheets effects of exchange rate movements once EU-MED trade is intensified in the coming few years.

The empirical results have shown that MPCs' economic activity is significantly affected by fluctuations in the exchange rate. In Particular, a one percent devaluation in the debt weighted exchange rate leads to a 1.5 percent reduction in GDP. These results can be explained by the fact that most MPCs' debt is in USD, thus any devaluation against the USD means a higher debt level and debt service in the future. Thus, a devaluation means basically a deterioration in a MPC's balance sheet, a higher debt and debt service and a deterioration in economic activity, while at the same it means a higher bill for the MPCs imports. Balance–sheet effects appear to be large enough in the MED region such that a devaluation is causing a contraction in economic activity as measured by GDP.

Since the establishment of an OCA or a EMMU may constitute a plausible solution to the misalignment problems in the region, the prospects of establishing a Euro-MED OCA, and may be in the future a monetary union, with the full adoption of the euro by MPCs were studied in Section VI.

The empirical results have shown that total exports, imports, and total trade have all increased uniformly between the EU and Israel, Morocco, and Tunisia. This evidence provides a strong support to the claim that for those MPCs that have ratified the Barcelona Agreements, greater trade integration is gradually leading to greater economic integration with the EU, and MPCs' business cycles are becoming relatively highly synchronized with that of the EU. Thus the EU, Israel, Morocco, and Tunisia are already forming a weak OCA.

The South-South cointegration results have shown no convergence in MED monetary or macroeconomic policies in general. More efforts will have to be devoted in the future to have macroeconomic and monetary policy convergence in the MED region. The empirical results show no convergence in MED business cycles. The same is true for nominal exchange rates, where exchange rate policies are set independently. The heterogeneity in exchange rate policies has been very damaging to the region's trade and FDI flows, as well as, on the debt burden in these countries. There, however, appear to be a weak convergence of MED government policies with respect to inflation.

Overall, the empirical results in Section VI are pointing towards very little convergence in MPCs government policies, and the prospects of a strong OCA or currency union within the MED region are still a far-reaching goal. Greater monetary and macroeconomic policy coordination is required in the MED region, for the region to be able to reap the benefits of the Associations Agreements with the EU.

With regard to policy convergence in the Euro-MED region, the empirical results report a weak convergence in the EU-MPCs' business cycles. This weak convergence can be explained by the fact that trade has steadily been increasing between MPCs and the EU after the ratification of the Barcelona Treaty. The increased Euro-MED trade is apparently leading to higher correlation in GDP, and more synchronization in the Euro–MED business cycles. No doubt, the full adoption of the euro by MPCs will lead in the future to the intensification of Euro-MED trade. The adoption of a common currency, by joining in the future a Euro-MED currency union, will have a significant positive impact on EU-MED trade flows.

A similar result is obtained when considering the convergence of inflation rates in the Euro-MED region. However, the weak convergence in inflation rates is not because MED countries are coordinating their inflation policies with each other and the EU, but because inflation rates have been recently contained in the MED region. It was also shown that there is no significant long-run relationship between the exchange rate of the EU and those of the remaining MPCs. Euro-MED exchange rates have been behaving quite differently especially during the various episodes of exchange rate volatility.

MED countries should set their future exchange rate policies in such a way to eliminate the existence of exchange rate misalignments, and to better reflect the changing trading patterns in the Euro-MED region. The full adoption of the euro by MPCs in the future will not only eliminate exchange rate misalignments, but will also contribute to enhancing Euro-MED trade flows.

Overall, this section has shown that South-South financial and monetary integration is still a far reaching goal. However, a weak convergence of monetary and financial polices have started to emerge within the Euro-MED region. The intensification of trade between MPCs and the EU has led to more synchronization in Euro-MED business cycles. Thus, the prospects for the establishment of a EMMU are still weak despite some weak signs of convergence of Euro-MED government policies. More government policy coordination is required in the future to achieve monetary and financial integration within the Euro-MED region. MPCs should pursue credible policy action that make their economic policies converge to common trends that are consistent with achieving and maintaining a currency union.

This study has shown that the likelihood and size of potential exchange rate shocks depend on the underlying macroeconomic volatility of the MPC and its divergence in terms of fundamentals and policy. In this connection, from the point of view of an individual country, countries with lower volatility (e.g. EU countries) and countries with similar (convergent) exchange rate regimes and similar cyclical macroeconomic patterns would make better partners. This is, however, not the case within the Euro-MED RIA, where the EU countries have adopted the euro, while their MPCs are still following diverging exchange rate policies. Another important consideration may be the structure and currency composition of financial liabilities in MPCs. Differences in the structure of liabilities may induce MPCs to respond to common shocks with different policies. A MPC with short-term financial liabilities, denominated in domestic currency is more likely to respond to a shock with a devaluation, than a MPC where most liabilities are denominated in foreign currency. Different debt structures may, therefore, generate important exchange rate disagreements, and consequently different

policy responses. Thus, there is a need to harmonize the structure of foreign debt to reflect more the MPCs' trading patterns, and be able to respond to external macroeconomic shocks in a similar fashion.

MPCs should adapt their economic policies to reduce their vulnerability to the Euro-MED RIA. A key example would be their exchange rate policy. For example, MPCs could relax or abandon an exchange rate commitment potentially inconsistent with their partners' exchange rate policies. Competitiveness and industrial policy can also be adapted to protect MPCs against excessive specialization in "regional goods," that is, goods that are difficult to redirect to alternative markets outside the Euro-MED RIA block. As we saw, the tariff preferences in the Euro-MED RIA causes a trade pattern of high concentration in regional goods that exacerbates the impact of exchange rate disagreements within the Euro-MED RIA, and may likely lead to crisis when countries face exchange rate overvaluation. A key area of coordination emphasized in this project is exchange rate coordination to avoid harmful misalignments within the Euro-MED RIA, whose substantial effects on trade and FDI, and eventual currency crises have been shown in detail.

On one extreme is the possibility of a Euro-MED monetary union, which would totally eliminate exchange rate misalignments within the Euro-MED RIA. Such monetary union may involve the adoption of the euro. Short of a monetary union, coordination between MED national currencies may take the form of consistency with respect to the euro so that the bilateral exchange rates within the Euro-MED RIA are limited to a band.

Another critical area of coordination is the institutional design of the euro-MED RIA itself. Making the Euro-MED RIA more flexible may diffuse the pressure of significant exchange rate misalignments on currencies and on the Euro-MED regional integration agreement itself. For example, the strain on the tradable sector of the country facing sudden depreciation of its partner may be alleviated with a Euro-MED RIA providing for temporary countervailing tariffs and subsidies that would translate into a lower effective bilateral misalignment.

Similarly, the Euro-MED RIA should perhaps include mechanisms to coordinate the provision of incentives to attract FDI. The Euro-MED RIA may create an extended space of intense competition for FDI, since the elimination of trade barriers will make it possible to serve the whole extended MED market from the EU. In the absence of such mechanisms, countries can engage in "beggar thy neighbor" competition in subsidies, which may result in the foreign investors appropriating most of the benefits associated to FDI. Coordination may allow MPCs to collectively extract a larger share of these benefits, both during normal times and in the event of exchange rate misalignments.

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APPENDIX A: EU-MED Trade Patterns

Table A.1 Exports of MPCs to the EU: 1990-2002 (Million of USD)

X to EU	Algeria	Egypt	Lebanon	Syria
1990	7673.590	1018.440	116.720	1756.020
1991	8733.030	1578.420	116.660	1648.370
1992	8386.120	1210.570	103.790	1945.770
1993	7117.900	1247.340	77.230	1912.390
1994	6104.890	1527.270	104.550	1979.140
1995	6067.030	1577.430	161.740	2262.300
1996	6658.700	1612.730	204.690	2441.900
1997	8718.290	1621.280	163.280	2100.840
1998	6405.670	1195.800	182.670	1454.880
1999	8146.480	1237.200	175.830	2108.640
2000	13755.400	2984.840	142.130	2868.940
2001	12962.200	1301.040	245.370	3356.360
2002	12243.300	2770.900	161.930	3454.020

Notes: X represents exports, and EU refers to the European Union countries.
Source: IMF, Direction of Trade Statistics, 2002.

Table A.2 Imports of MPCs From the EU: 1990-2002 (Million of USD)

M from EU	Algeria	Egypt	Lebanon	Syria
1990	6263.780	4016.600	1088.360	1070.450
1991	5020.970	3357.220	1771.110	1150.530
1992	5752.560	3411.730	1903.460	1360.800
1993	5397.060	3720.080	2315.050	1629.760
1994	5730.830	3836.850	2936.320	1931.830
1995	6394.310	4562.850	3204.570	1619.720
1996	5692.800	4711.260	3293.370	1726.290
1997	4929.770	5030.910	3538.830	1268.540
1998	5396.590	5977.520	3275.790	1268.750
1999	5157.920	5728.020	2877.520	1169.270
2000	6158.260	7978.050	2741.960	1779.810
2001	7374.650	3753.650	3014.380	2047.920
2002	8366.710	6569.070	3096.190	2130.290

Notes: M represents imports, and EU refers to the European Union countries.
Source: IMF, Direction of Trade Statistics, 2002.

Table A.3 Total Trade of Selected MPCs With the EU: 1990-2002 (Million of USD)

X+M with EU	Algeria	Egypt	Lebanon	Syria
1990	13937.37	5035.04	1205.08	2826.47
1991	13754	4935.64	1887.77	2798.9
1992	14138.68	4622.3	2007.25	3306.57
1993	12514.96	4967.42	2392.28	3542.15
1994	11835.72	5364.12	3040.87	3910.97
1995	12461.34	6140.28	3366.31	3882.02
1996	12351.5	6323.99	3498.06	4168.19
1997	13648.06	6652.19	3702.11	3369.38
1998	11802.26	7173.32	3458.46	2723.63
1999	13304.4	6965.22	3053.35	3277.91
2000	19913.66	10962.89	2884.09	4648.75
2001	20336.85	5054.69	3259.75	5404.28
2002	20610.01	9339.97	3258.12	5584.31

Notes: X is exports while M represents imports, and EU refers to the European Union countries.
Source: IMF, Direction of Trade Statistics, 2002.

Table A.4 Exports/GDP of MPCs to the EU: 1990-2002 in (%)

	Algeria	Egypt	Lebanon	Syria
1990	16.87	2.12	4.11	7.34
1991	21.66	4.73	2.61	5.93
1992	17.77	2.90	2.00	5.87
1993	14.43	2.67	1.00	5.18
1994	17.60	2.95	1.12	4.39
1995	15.78	2.60	1.43	4.44
1996	14.55	2.39	1.55	4.06
1997	18.31	2.14	1.09	3.22
1998	13.75	1.44	1.12	2.10
1999	17.56	1.39	1.06	2.89
2000	25.40	3.27	0.86	3.59
2001	23.47	1.35	1.49	4.18
2002	22.11	2.83	0.97	4.24

Source: IMF, Direction of Trade Statistics, 2002.

Table: A.5 Imports/GDP of MPCs to the EU: 1990-2002 in (%)

	Algeria	Egypt	Lebanon	Syria
1990	13.77	8.35	38.39	4.47
1991	12.45	10.06	39.75	4.14
1992	12.19	8.18	36.83	4.11
1993	10.94	7.97	30.18	4.42
1994	16.52	7.43	31.59	4.28
1995	16.64	7.54	28.37	3.18
1996	12.44	6.99	25.03	2.87
1997	10.35	6.65	23.61	1.94
1998	11.59	7.22	20.15	1.83
1999	11.11	6.45	17.48	1.60
2000	11.37	8.74	16.72	2.22
2001	13.35	3.90	18.38	2.55
2002	15.11	6.71	18.58	2.61

Source: IMF, Direction of Trade Statistics, 2002.

Table A.6 Total Trade/GDP of MPCs to the EU: 1990-2002 in (%)

	Algeria	Egypt	Lebanon	Syria
1990	30.64	10.479	42.50	11.82
1991	34.12	14.79	42.37	10.08
1992	29.96	11.09	38.83	9.98
1993	25.37	10.64	31.19	9.61
1994	34.12	10.39	32.72	8.67
1995	32.43	10.15	29.80	7.63
1996	27.00	9.38	26.59	6.93
1997	28.67	8.79	24.70	5.17
1998	25.34	8.67	21.27	3.94
1999	28.68	7.84	18.54	4.49
2000	36.78	12.02	17.58	5.82
2001	36.82	5.25	19.87	6.73
2002	37.22	9.54	19.55	6.85

Source: IMF, Direction of Trade Statistics, 2002.

APPENDIX B: Unit Root and Cointegration Tests

Table B.1 Unit Root Tests: EU

	GDP	Interest Rate	Nominal Exchange Rate	Inflation	Mackinnon's Critical Values 5 %	Mackinnon's Critical Values 1%
Constant and Time Trend						
PP (3)	-1.57	-0.54	-2.00	-1.99	-3.52	-4.19
PP FD (3)	-6.21**	-5.67**	-2.33	-4.04*	-3.52	-4.20
Constant						
PP (1)	-1.50	-1.25	-2.02	-1.76	-2.93	-3.59
PP FD (1)	-6.15**	-5.26**	-2.56	-4.08**	-2.93	-3.60
Constant and Time Trend						
ADF (1)	-1.30	-0.56	-2.40	-2.16	-3.52	-4.20
ADF FD (1)	-4.06*	-4.72**	-2.65	-4.38**	-3.52	-4.20
Constant						
ADF (1)	-1.44	-1.01	-2.49	-1.96	-2.93	-3.60
ADF FD (1)	-3.96**	-3.94**	-2.85	-4.23**	-2.93	-3.60

Notes: 1- PP is the Phillips-Perron test; FD is the first difference, and ADF is the Augmented Dickey Fuller. 2-The numbers in parenthesis are the proper lag lengths based on the Akaike Information Criterion (AIC). 3- A * indicates rejection of the null hypothesis of non-stationarity at the 5% level of significance, while ** indicates a stronger rejection at the 1% level. 4-For most variables the time trend variable is statistically insignificant.

Table B.2 Unit Root Tests: Tunisia

	GDP	Interest Rate	Nominal Exchange Rate	Inflation	Mackinnon's Critical Values 5 %	Mackinnon's Critical Values 1%
Constant and Time Trend						
PP (3)	-2.42	-1.62	-0.62	-3.68*	-3.51	-4.18
PP FD (3)	-7.32**	-5.17**	-6.47**	-8.21**	-3.52	-4.19
Constant						
PP (1)	0.64	-1.44	1.68	-1.04	-2.93	-3.59
PP FD (1)	-7.15**	-5.11**	-5.93**	-7.86**	-2.93	-3.59
Constant and Time Trend						
ADF (1)	-2.35	-1.58	-0.59	-3.13	-3.52	-4.19
ADF FD (1)	-4.37**	-3.90*	-4.15*	-4.94**	-3.52	-4.20
Constant						
ADF (1)	0.65	-1.53	1.43	-0.54	-2.93	-3.59
ADF FD (1)	-4.28**	-3.88**	-3.61**	-4.83**	-2.93	-3.60

Notes: 1- PP is the Phillips-Perron test; FD is the first difference, and ADF is the Augmented Dickey Fuller. 2-The numbers in parenthesis are the proper lag lengths based on the Akaike Information Criterion (AIC). 3- A * indicates rejection of the null hypothesis of non-stationarity at the 5% level of significance, while ** indicates a stronger rejection at the 1% level. 4-For most variables the time trend variable is statistically insignificant.

Table B.3 Unit Root Tests: Morocco

	GDP	Interest Rate	Nominal Exchange Rate	Inflation	Mackinnon's Critical Values 5 %	Mackinnon's Critical Values 1 %
Constant and Time Trend						
PP (3)	-2.54	1.02	-1.89	-2.99	-3.51	-4.18
PP FD (3)	-6.00**	-3.19	-3.57*	-10.14**	-3.52	-4.19
Constant						
PP (1)	-0.27	0.39	-0.06	-3.06*	-2.93	-3.59
PP FD (1)	-6.07**	-3.26*	-3.44*	-10.06**	-2.93	-3.59
Constant and Time Trend						
ADF (1)	-2.52	-0.14	-2.54	-1.92	-3.52	-4.19
ADF FD (1)	-3.87*	-3.21	-3.99*	-6.53**	-3.52	-4.20
Constant						
ADF (1)	-0.35	0.09	-0.45	-1.96	-2.93	-3.59
ADF FD (1)	-3.94**	-3.17*	-3.82**	-6.52**	-2.93	-3.60

Notes: 1- PP is the Phillips-Perron test; FD is the first difference, and ADF is the Augmented Dickey Fuller. 2-The numbers in parenthesis are the proper lag lengths based on the Akaike Information Criterion (AIC). 3- A * indicates rejection of the null hypothesis of non-stationarity at the 5% level of significance, while ** indicates a stronger rejection at the 1% level. 4-For most variables the time trend variable is statistically insignificant.

Table B.4 Unit Root Tests: Israel

	GDP	Interest Rate	Nominal Exchange Rate	Inflation	Mackinnon's Critical Values 5 %	Mackinnon's Critical Values 1 %
Constant and Time Trend						
PP (3)	-2.39	-1.45	-2.83	-2.46	-3.59	-4.35
PP FD (3)	-3.19	-4.84**	-3.76*	-4.21*	-3.60	-4.37
Constant						
PP (1)	-0.23	-1.94	-0.34	-2.14	-2.97	-3.70
PP FD (1)	-3.33*	-3.48*	-3.86**	-4.26**	-2.98	-3.72
Constant and Time Trend						
ADF (1)	-3.29	-0.74	-4.31*	-3.17	-3.60	-4.37
ADF FD (1)	-4.36**	-8.49**	-5.11**	-4.96**	-3.61	-4.39
Constant						
ADF (1)	-0.54	-1.52	-0.71	-2.54	-2.98	-3.72
ADF FD (1)	-4.42**	-1.87	-5.20**	-4.92**	-2.99	-3.73

Notes: 1- PP is the Phillips-Perron test; FD is the first difference, and ADF is the Augmented Dickey Fuller. 2-The numbers in parenthesis are the proper lag lengths based on the Akaike Information Criterion (AIC). 3- A * indicates rejection of the null hypothesis of non-stationarity at the 5% level of significance, while ** indicates a stronger rejection at the 1% level. 4-For most variables the time trend variable is statistically insignificant.

TableB.5 Cointegration Tests For GDP: Israel, Morocco and Tunisia

Hypothesis			Critical Values	
Null	Alternative	Trace Statistics	(5%)	(1%)
$r = 0$	$r \geq 1$	24.54	29.68	35.65
$r \leq 1$	$r \geq 2$	8.17	15.41	20.04
$r \leq 2$	$r = 3$	0.56	3.76	6.65

Notes: 1-The Johansen Cointegration Likelihood Ratio Test is based on the Trace of the Stochastic Matrix.
2-The test allows for a linear deterministic trend in the data, and no constant.
3-r represents the number of cointegrating vectors. Maximum lag 1 year in VAR.
4-A **and * indicate significance at the 1 and 5% level of significance respectively. The asymptotic critical values are from Osterwald-Lenum (1992).

Table B.6 Cointegration Tests For Inflation: Israel, Morocco and Tunisia

Hypothesis			Critical Values	
Null	Alternative	Trace Statistics	(5%)	(1%)
$r = 0$	$r \geq 1$	54.89**	29.68	35.65
$r \leq 1$	$r \geq 2$	5.07	15.41	20.04
$r \leq 2$	$r = 3$	0.83	3.76	6.65

Notes: 1-The Johansen Cointegration Likelihood Ratio Test is based on the Trace of the Stochastic Matrix.
2-The test allows for a linear deterministic trend in the data, and no constant.
3-r represents the number of cointegrating vectors. Maximum lag 1 year in VAR.
4-A **and * indicate significance at the 1 and 5% level of significance respectively. The asymptotic critical values are from Osterwald-Lenum (1992).

Table B.7 Cointegration Tests For Nominal Exchange Rates: Israel, Morocco and Tunisia

Hypothesis			Critical Values	
Null	Alternative	Trace Statistics	(5%)	(1%)
$r = 0$	$r \geq 1$	22.35	29.68	35.65
$r \leq 1$	$r \geq 2$	6.44	15.41	20.04
$r \leq 2$	$r = 3$	0.74	3.76	6.65

Notes: 1-The Johansen Cointegration Likelihood Ratio Test is based on the Trace of the Stochastic Matrix.
2-The test allows for a linear deterministic trend in the data, and no constant.
3-r represents the number of cointegrating vectors. Maximum lag 1 year in VAR.
4-A **and * indicate significance at the 1 and 5% level of significance respectively. The asymptotic critical values are from Osterwald-Lenum (1992).

Table B.8 Cointegration Tests For Interest Rates: Tunisia and Morocco

Hypothesis			Critical Values	
Null	Alternative	Trace Statistics	(5%)	(1%)
r=0	$r \geq 1$	16.60*	15.41	20.04
$r \leq 1$	$r = 2$	0.20	3.76	6.65

Notes: 1-The Johansen Cointegration Likelihood Ratio Test is based on the Trace of the Stochastic Matrix.
2-The test allows for a linear deterministic trend in the data, and no constant.
3-r represents the number of cointegrating vectors. Maximum lag 1 year in VAR.
4-A **and * indicate significance at the 1 and 5% level of significance respectively. The asymptotic critical values are from Osterwald-Lenum (1992).

Table B.9 Cointegration Tests For GDP: EU, Israel, Morocco and Tunisia

Hypothesis			Critical Values	
Null	Alternative	Trace Statistics	(5%)	(1%)
$r = 0$	$r \geq 1$	58.72**	47.21	54.46
$r \leq 1$	$r \geq 2$	24.37	29.68	35.65
$r \leq 2$	$r \geq 3$	7.05	15.41	20.04
$r \leq 3$	$r = 4$	1.25	3.76	6.65

Notes: 1-The Johansen Cointegration Likelihood Ratio Test is based on the Trace of the Stochastic Matrix.
2-The test allows for a linear deterministic trend in the data, and no constant.
3-r represents the number of cointegrating vectors. Maximum lag 1 year in VAR.
4-A **and * indicate significance at the 1 and 5% level of significance respectively. The asymptotic critical values are from Osterwald-Lenum (1992).

Table B.10 Cointegration Tests For Inflation Rates: EU, Israel, Morocco and Tunisia

Hypothesis			Critical Values	
Null	Alternative	Trace Statistics	(5%)	(1%)
$r = 0$	$r \geq 1$	75.96**	47.21	54.46
$r \leq 1$	$r \geq 2$	27.36	29.68	35.65
$r \leq 2$	$r \geq 3$	13.11	15.41	20.04
$r \leq 3$	$r = 4$	0.65	3.76	6.65

Notes: 1-The Johansen Cointegration Likelihood Ratio Test is based on the Trace of the Stochastic Matrix.
2-The test allows for a linear deterministic trend in the data, and no constant.
3-r represents the number of cointegrating vectors. Maximum lag 1 year in VAR.
4-A **and * indicate significance at the 1 and 5% level of significance respectively. The asymptotic critical values are from Osterwald-Lenum (1992).

Table B.11 Cointegration Tests For Nominal Exchange Rates: EU, Israel, Morocco and Tunisia

Hypothesis			Critical Values	
Null	Alternative	Trace Statistics	(5%)	(1%)
$r = 0$	$r \geq 1$	40.25	47.21	54.46
$r \leq 1$	$r \geq 2$	21.67	29.68	35.65
$r \leq 2$	$r \geq 3$	10.43	15.41	20.04
$r \leq 3$	$r = 4$	0.29	3.76	6.65

Notes: 1-The Johansen Cointegration Likelihood Ratio Test is based on the Trace of the Stochastic Matrix.
2-The test allows for a linear deterministic trend in the data, and no constant.
3-r represents the number of cointegrating vectors. Maximum lag 1 year in VAR.
4-A **and * indicate significance at the 1 and 5% level of significance respectively. The asymptotic critical values are from Osterwald-Lenum (1992).

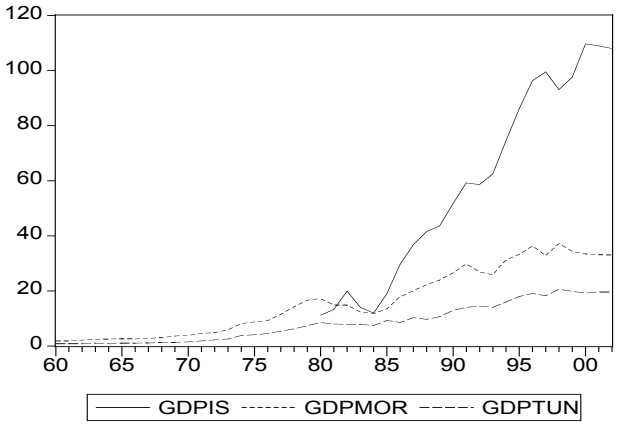
Table B.12 Cointegration Tests For Interest Rates: EU, Morocco and Tunisia

Hypothesis			Critical Values	
Null	Alternative	Trace Statistics	(5%)	(1%)
$r = 0$	$r \geq 1$	28.39	29.68	35.65
$r \leq 1$	$r \geq 2$	11.56	15.41	20.04
$r \leq 2$	$r = 3$	1.53	3.76	6.65

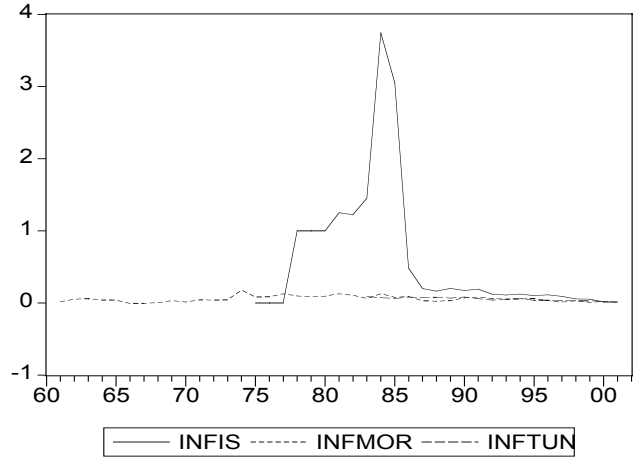
Notes: 1-The Johansen Cointegration Likelihood Ratio Test is based on the Trace of the Stochastic Matrix.
2-The test allows for a linear deterministic trend in the data, and no constant.
3-r represents the number of cointegrating vectors. Maximum lag 1 year in VAR.
4-A **and * indicate significance at the 1 and 5% level of significance respectively. The asymptotic critical values are from Osterwald-Lenum (1992).

Figure B.1 South-South Cointegration

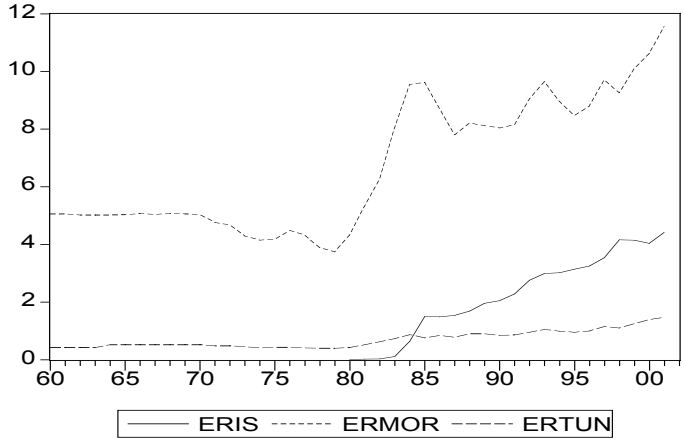
(a) GDP: Israel (IS), Morocco (MOR) and Tunisia (TUN)



(b) Inflation Rates (INF): Israel (IS), Morocco (MOR) and Tunisia (TUN)



(c) Exchange Rates (ER): Israel (IS), Morocco (MOR) and Tunisia (TUN)



(d) Interest Rates (R): Morocco (MOR) and Tunisia (TUN)

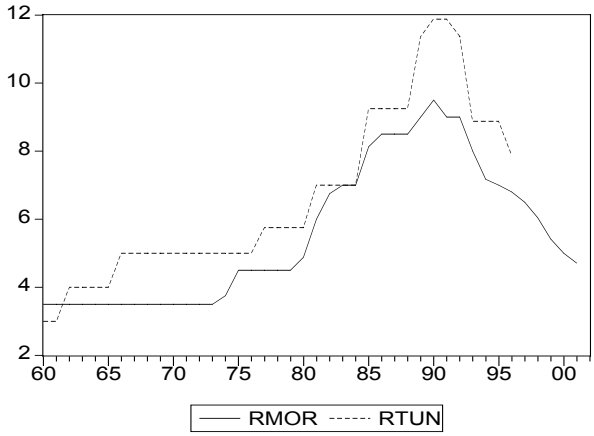
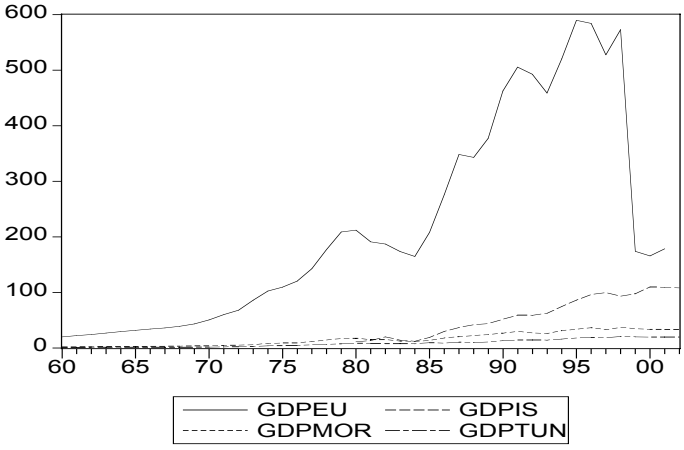
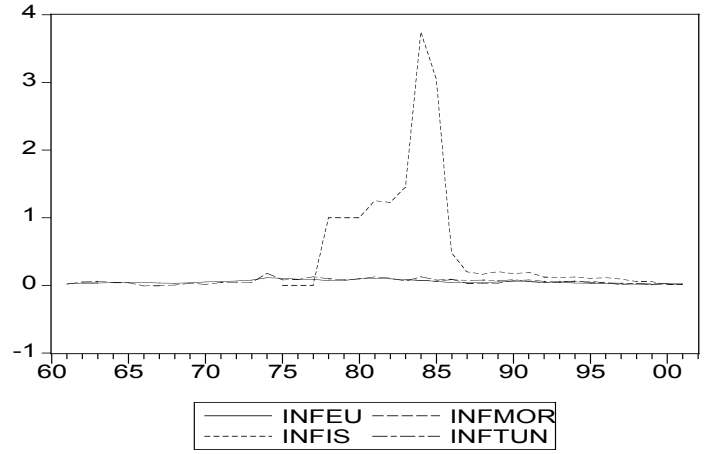


Figure B.2 North-South Cointegration

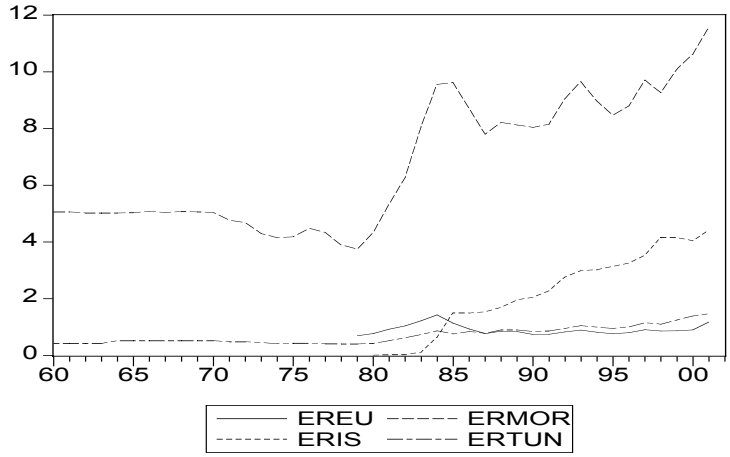
(a) GDP: EU, Israel (IS), Morocco (MOR) and Tunisia (TUN).



(b) Inflation Rates (INF): EU, Israel (IS), Morocco (MOR) and Tunisia (TUN).



(c) Exchange Rates (ER): EU, Israel (IS), Morocco (MOR) and Tunisia (TUN).



(d) Interest Rates (R): EU, Morocco (MOR) and Tunisia (TUN)