



Conférence Femise 2003

4, 5 et 6 décembre 2003, Marseille

Forum Euro-Méditerranéen des Instituts Economiques
www.femise.org

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

Simon Neaime

**Institute of Financial Economics, Department of Economics
American University of Beirut**

Étude Femise FEM21-13, Institute of Financial Economics, American
University of Beirut, Liban



Cette conférence a été réalisée avec le soutien financier de la Commission des Communautés Européennes. Les opinions exprimées dans les contributions n'engagent que les auteurs et ne reflètent pas l'opinion officielle de la Commission.

This Conference was produced with financial support from the Commission of European Communities. The opinions expressed in the contributions are those of the authors only and do not necessarily reflect the opinions of the Commission of European Communities.

Institut de la Méditerranée



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

Research Director: Simon Neaime
Associate Professor
Institute of Financial Economics
(Formerly the Institute of Money and Banking)
Department of Economics
American University of Beirut
Beirut-Lebanon
Email: sn01@aub.edu.lb
Tel: (9613)-829944- Fax (9611)-744484

*A summary version prepared for presentation in the FEMISE Conference, December 4-6, 2003, Marseille, France. This work has benefited from a financial grant from the Commission of the European Communities within the context of the FEMISE program. The views expressed are those of the beneficiary and therefore in no way reflect the official opinion of the Commission.

OUTLINE

I. Introduction/Motivation

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

1. Exchange Rate Policies In The Mediterranean Region
2. South-South And North-South Misalignments
 - 2.1 The Hodrick Prescott Framework For Exchange Rate Misalignments
 - 2.2 PPP And Exchange Rate Misalignments
3. Costs And Benefits of Fixing The MPCs' Exchange Rates To The Euro

III. The Euro-MED RIA And Trade Flows

1. Overview And Related Literature
2. Empirical Model And Results

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

1. Overview And Related Literature
2. Empirical Model And Results

V. The Euro-MED RIA And Debt Management Policies

1. Overview And Related Literature
2. Empirical Model And Results

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

1. Overview And Related Literature
2. Empirical Model
 - 2.1. Prospects For The Establishment of a Euro-MED OCA
 - 2.2 Prospects For The Establishment of a Euro-MED Monetary Union

VII. Conclusions And Policy Implications

I. Motivation

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

Already ratified agreements are with Tunisia (1995), Israel (1995), Morocco (1996), and Jordan (1997), and an interim agreement with the Palestinian Authority (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

Purpose of Project

Aims at analyzing problems that may arise from real exchange rate misalignments within the context of the Euro-MED trade agreements

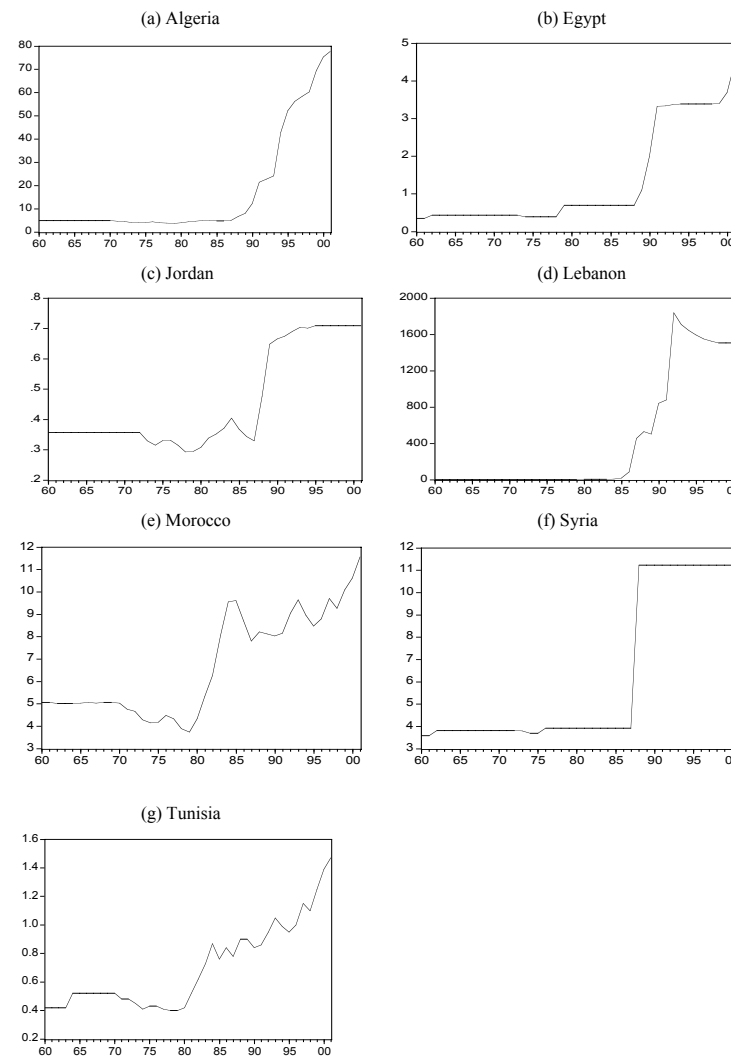
Aims at evaluating the strain that real exchange rate misalignments can put on the Euro-MED partnership.

Aims at providing policy recommendation for exchange rates, foreign direct investment (FDI), trade and debt management policies of countries within the Euro-MED partnership.

Particular focus will be put on:

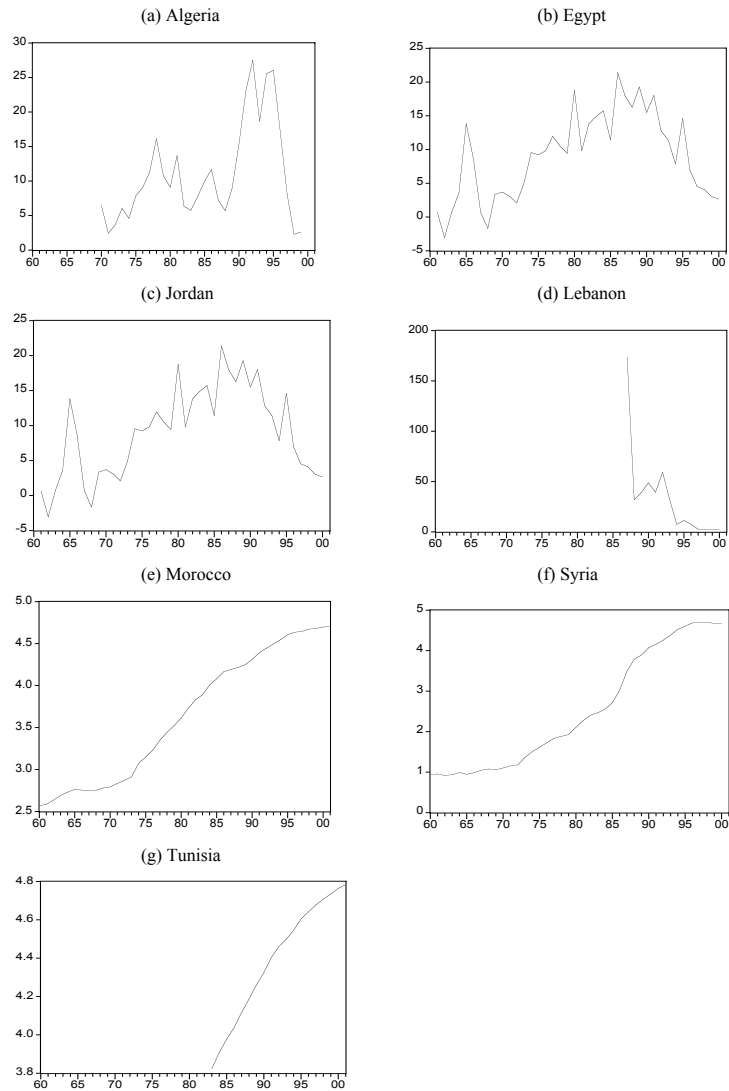
- (1) Policy responses that may help alleviate problems arising from trade agreements and exchange rate disagreements
- (2) Implications of reducing MPCs' real exchange rate volatility on trade policy management
- (3) Relationships that might arise with the Euro
- (4) Relocation of foreign direct investment
- (5) The structure of foreign debt in relation with exchange rate policies (balance sheet effects)

FIGURE 1: The Dynamics of Selected MPCs Nominal Exchange Rates: 1960-2001



Source: International Monetary Fund (IMF), IFS.

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

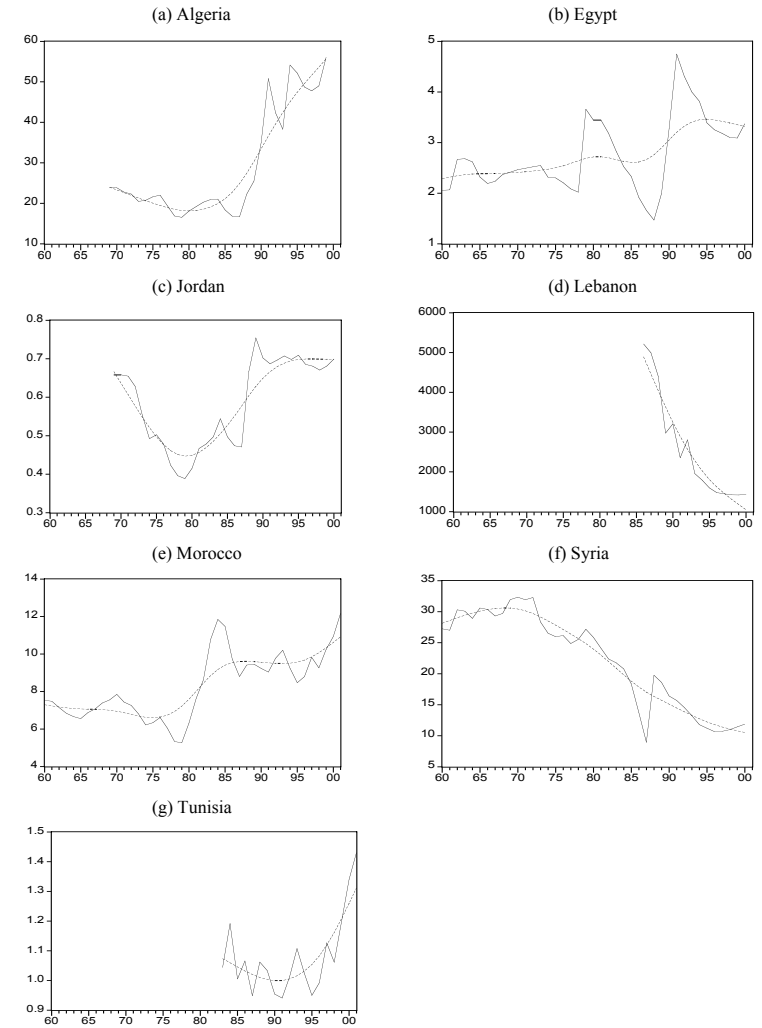


Source: International Monetary Fund (IMF), IFS.

2. South-South And North-South Misalignments

2.1 Hodrick Prescott Framework

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



Source: Authors' Estimations.

2.2 PPP And Exchange Rate Misalignments

The real exchange rate q_t is given by

$$q_t = \frac{e_t P_t^*}{P_t} \quad (2)$$

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

$$e_t = \frac{P_t}{P_t^*} \quad (3)$$

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

$$e_0 = \frac{P_0}{P_0^*}. \quad (4)$$

Equations (3) and (4) imply that

$$e_t = e_0 \frac{P_t / P_0}{P_t^* / P_0^*}. \quad (5)$$

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

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

Equation (6) implies that the real exchange rate is exogenous or constant over time and thus PPP holds. In what follows, the misalignment index (M) will be measured by the percentage deviation of the spot rate from the one implied by PPP

$$M_t = 100 \left[\frac{e_t}{\bar{e}_t} - 1 \right] \quad (7)$$

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

The misalignment index in equation (7) is 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

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

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	-54.7	8.96
Tunisia	-96.51	-89.12	0	-61.2	69.25	-99.94	-92.17	16.12
Egypt	-89.14	65.47	18.70	0	40.00	-99.84	-85.0	23.90
Jordan	-97.77	-92.97	-39.10	-78.2	0	-99.96	-96.5	-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	-65.8	-68.54	-99.95	-67.0	0

Source: Authors' Estimations.

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 by Sargan (*QEEA*, 1984) and later popularized by Engel and Granger (*Econometrica*, 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

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

Table 2. Results of Cointegration Tests

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

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

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.

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 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

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

$$RVEI = \frac{\sigma(DEP)}{\sigma(i)} \quad (12)$$

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

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

$$i_t = a + bi_t^* + u_t. \quad (14)$$

Table 4. Regression Results: Equation (14)

	Algeria	Egypt	Jordan	Lebanon	Morocco	Syria	Tunisia
b, on EU							
Interest Rates	-1.001	0.84	-0.03	0.17	0.41	0.00	0.65
t-statistics	-2.7**	2.77**	-0.27	0.28	3.89**	5.84**	3.94**
b, on US							
Interest Rates	-0.98	0.007	-0.17	-0.30	0.18	-0.00	0.06
t-statistics	-3.5**	0.02	-1.90	-0.53	1.71	-5.9**	0.36

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

$$i_t = a + bGAP_t + u_t, \quad (15)$$

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	-2.7**	-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

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

Terms of trade shocks (TT=PPI/CPI) measured as the change in terms of trade multiplied by openness

A dummy variable (TF) taking a value of 1 when the exchange regime is truly fixed

$(TF_{i,t} * \Delta TT_{i,t})$ represents the interaction between TF and terms of trade shocks

Table 6. Regression Results: Equation (16)

	Egypt	Jordan	Morocco	Syria	Tunisia
β	-3.40	-2**	1.56	-0.46	-2.88
t- stats	(-0.27)	(-2.40)	(0.64)	(-0.32)	(-1.28)
γ	0.07	0.02	0.04	0.004	0.03
t- stats	(0.31)	(0.40)	(0.85)	(0.06)	(0.50)
θ	2.63	3.24	-1.68	-0.99	3.02
t- stats	(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.

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

III. The Euro-MED RIA And Trade Flows

Eichengreen (*JEL*, 1993) pointed out that in some instances trade agreements should be paired with exchange rate coordination

Obstfeld (*Brookings Paper*, 1997) makes a similar point, and suggests that closer trade links may require higher monetary coordination

1. A real exchange rate appreciation negatively affects exports, but it is necessary to ask why would the impact be any different for countries that belong to a trade agreement?
2. 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
3. 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)
4. 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 (*Economia*, 2001) label exports that cannot easily be relocated as regional goods
5. 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
6. 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

2. Empirical Model And Results

The 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 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

1. Annual observations on 8 MPCs and the EU between 1980 and 2002
2. The data was obtained from the IMF's Direction of Trade Statistics and International Financial Statistics
3. Because our data contains information on cross sectional units observed over time, a panel data estimation technique is adopted

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

where $i = 1, 2, \dots, 9$ cross sections, and $t = 1, 2, \dots, 22$

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

The intercept α_i is a country fixed effect that controls for country specific factors that do not vary over time

Real exchange rate misalignments are computed as the percentage difference between the actual real exchange rate and the trend exchange rate, using a Hodrick-Prescott decomposition

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

$$q_{i,t} = w_i RIA q_{i,t} + (1 - w_i) NRIA q_{i,t} \quad (18)$$

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

$$\ln(X_{i,t}) = \alpha_i + \beta RMIS_{i,t} + \gamma NORMIS_{i,t} + \theta \ln(Y_{i,t}) + u_{i,t} \quad (19)$$

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

1. MPCs are split into two groups: those who have already ratified the Barcelona Treaty and those who did not
2. MPCs that belong to EU-MED regional integration agreement are Jordan, Israel, Morocco and Tunisia
3. While the remaining countries Algeria, Egypt, Lebanon and Syria are assumed to be outside of the RIA

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

Dependent Variable	All MPCs and the EU	RIA and EU; and NORIA
log(Exports)	(1)	(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.

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 EU-MED RIA member countries

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

There exists ample empirical evidence suggesting that exchange rate misalignments do affect FDI flows (see Froot and Stein (*QJE*, 1991), Blonigen, (*AER*, 1997), and Klein and Rosengreen, (*JIE*, 1994))

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

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

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 use the following empirical model

$$\log\left(\frac{FDI_{i,t}}{FDI_{j,t}}\right) = \alpha + \beta \log\left(\frac{GDP_{i,t}}{GDP_{j,t}}\right) + \theta(OP_{i,t} - OP_{j,t}) + \gamma(NSRIA_{ij})q_{ij,t} + \delta(SRIA_{ij})q_{ij,t} + u_{ij} + \varepsilon_{ij,t} \quad (20)$$

$FDI_{i,t}$ 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

Openness is defined as exports plus imports over GDP

$q_{ij,t}$ 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; and u_{ij} is a country-pair specific fixed effect, and $\varepsilon_{ij,t}$ is an error term

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

Data Source: the World Bank's Global Development Finance and the IMF's International Financial Statistics

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

Dependent Variable $\log(\text{FDI}_{i,t} / \text{FDI}_{j,t})$	All MPCs and the EU
$\text{Log}(\text{GDP}_{i,t} / \text{GDP}_{j,t})$	0.74**
t-stats	(4.67)
$(\text{OP}_{i,t} - \text{OP}_{j,t})$	-0.12**
t-stats	(2.45)
$(\text{NSRIA} * q_{ij,t})$	0.016
t-stats	(0.03)
$(\text{SRIA} * q_{ij,t})$	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.

Movements in the real bilateral exchange rate have a much stronger impact among MPCs that are already members of Euro-MED RIA. In this case, a one-percent depreciation of the real bilateral exchange rate increases relative FDI by 2.5 percent

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

V. The Euro-MED RIA And Debt Management Policies

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

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. (Aghion, Bacchetta, and Banerjee, *CEPR*, 2001)

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
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.

Empirical Model

Data are 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. We exclude Israel from the sample due to lack of data

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

$$Y_{i,t} = \alpha_i + \lambda(FD_{i,t-1} * \Delta e_t) + \delta(FD_{i,t-1} * \Delta i_t) + u_{i,t}, \quad (21)$$

$Y_{i,t}$ is a measure of country i 's GDP in period t

$(FD_{i,t-1} * \Delta e_t)$ is total foreign debt multiplied by changes in the exchange rate weighted by the currency denomination of debt

$(FD_{i,t-1} * \Delta i_t)$ 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;

λ measures the effect of foreign currency debt during exchange rate movements

δ measures the effect of debt during interest rate defenses that require movements of the interest rate

Table 10. Balance Sheet Effects of Selected MPCs

Dependent Variable is GDP	All MPCs
$(FD_{i,t-1} * \Delta e_t)$	-1.58**
t-stats	(2.31)
$(FD_{i,t-1} * \Delta i_t)$	-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. 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

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

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

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

We consider the OCA conditions empirically as in Bayoumi and Eichengreen (*JDE*, 1994) by analyzing trade data and correlations of real GDP growth rates in 7 MED countries and those of the EU

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

Table 11. 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 14. 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 15. 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.

The rule for declaring a weak OCA is a 40 percent cross-correlation value in regional GDP growth rates. Thus the EU, Israel, Morocco, and Tunisia are already forming a weak OCA

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

1. Yearly data for the period 1960-2001
2. We exclude from our sample MPCs that have not ratified the Barcelona Treaty and those who did not qualify as an OCA
3. The data set includes data on regional GDP growth rates, short-term interest rates, nominal exchange rates and inflation rates

$$\Delta X_t = \beta_1 + \beta_2 X_{t-1} + \sum_{i=1}^k \delta_i \Delta X_{t-i} + \varepsilon_t, \quad (22)$$

$$\Delta^2 X_t = \lambda_1 \Delta X_{t-1} + \sum_{i=1}^k \mu_i \Delta^2 X_{t-i} + \varepsilon_{1t} \quad (23)$$

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

$$X_t = A_1 X_{t-1} + \dots + A_z X_{t-z} + \varepsilon_t, \quad (24)$$

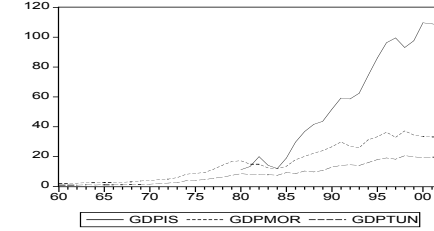
where X_t is our y -vector of the non-stationary I(1) macroeconomic series, and ε_t is a vector of innovations. We can rewrite the VAR as

$$\Delta X_t = \theta X_{t-1} + \sum_{i=1}^{z-1} \lambda_i \Delta X_{t-i} + \varepsilon_t, \quad (25)$$

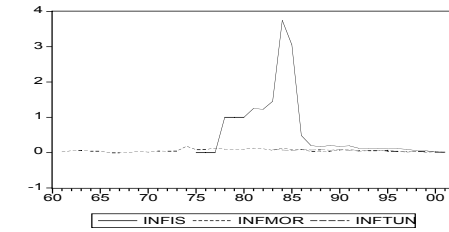
where, $\theta = \sum_{i=1}^z A_i - I_i$, and $\lambda_i = -\sum_{j=i+1}^z A_j$.

Figure B.1 South-South Cointegration

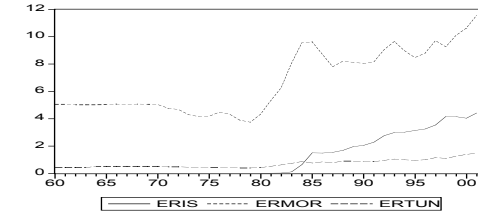
(a) GDP: Israel (IS), Morocco (MOR) and Tunisia (TUN)



(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)

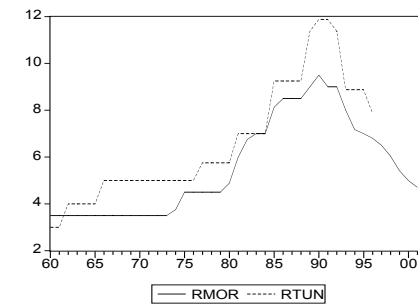
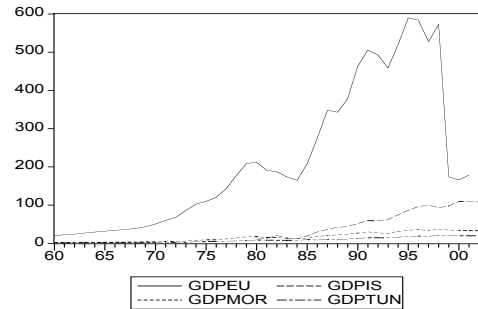
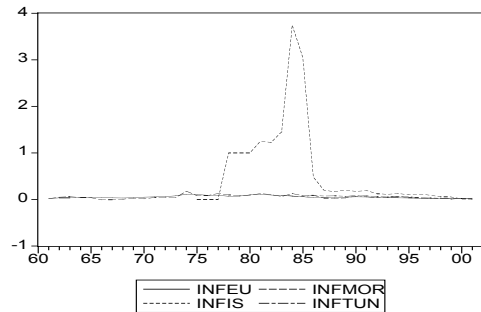


Figure B.2 North-South Cointegration

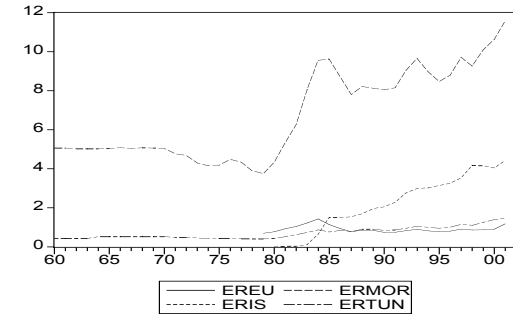
(a) GDP: EU, Israel (IS), Morocco (MOR) and Tunisia (TUN).



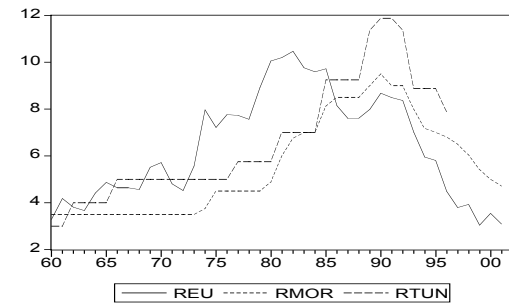
(b) Inflation Rates (INF): EU, Israel (IS), Morocco (MOR) and Tunisia (TUN)



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



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



South-South financial and monetary integration is still a far-reaching goal

However, a weak convergence of monetary and financial policies have started to emerge within the Euro-MED region: North-South integration

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 Recommendations

(To be completed later)

References

- Aghion, P. & Bacchetta, P., and Banerjee, A., (2001). A Corporate Balance Sheet Approach to Currency Crises, CEPR Discussion Papers 3092.
- Bayoumi, T., and Eichengreen, B. (1997). Ever Closer to Heaven? An Optimum Currency Area Index for European Countries, *European Economic Review*, 41: 761-770.
- Bayoumi, T., and Eichengreen, B. (1994). Monetary and Exchange Rate Arrangements For NAFTA, *Journal of Development Economics*, 43: 25-165.
- Blanchard, O., and Katz, L. (1992). Regional Evolutions, *Brookings Papers on Economic Activity*, 1: 1-16
- Blanchard, O., and Quah, D. (1989). The Dynamic Effects of Aggregate Demand and Supply Disturbances, *American Economic Review*, 79, 655-673.
- Bevilaqua, A., M. Catena and E. Talvi (2001) Integration, Interdependence, and Regional Goods: An Application to Mercosur. *Economia*, 2: 153-207.
- Blonigen, B. (1997). Firm-Specific Assets and the Link between Exchange Rates and Foreign Direct Investment. *American Economic Review*, 87(3): 447-65.
- Bulow, J., and Rogoff, K., (1989). Sovereign Debt: Is to Forgive or to Forget? *American Economic Review*, 79(1): 43-50.
- Colton N., and S. Neaime, (2003). Implications of the Introduction of the Euro for the Mediterranean Countries, *Thunderbird International Business Review*, Wiley Publisher, 45, 1: 31-49.
- Courchene, T.J., and Harris, R. G. (1999). From Fixing to Monetary Union: Options for North American Currency Integration, C.D. Howe Institute, Toronto, Canada.
- Devereux, M., and C., Engel (2000). The Optimal Choice of Exchange Rate Regime: Price Setting rules and Internationalized Production. Mimeo, University of Wahsington.
- Drecessin, J., and Fatas, A. (1995). Regional Labour Market Dynamics in Europe, *European Economic Review*, 39: 1627-1655.
- Edison, H. and Melvin, M. (1990), The Determinants and Implications of the Choice of an Exchange Rate System. In: W. Haraf and T. Willet, editors. Monetary Policy for a Volatile Global Economy. Washington, D.C., United States: AEI Press.
- Edwards, S., (1984). LDC Foreign Borrowing and Default Risk: An Empirical Investigation, 1976-80, *American Economic Review*, 74(4): 726-34.
- Eichengreen, B. (1991). The Eternal Fiscal Question: Free Trade and Protection in Britain, 1860-1929, *Economics Working Papers* 91-171, University of California at Berkeley.
- Eichengreen, B. (1992). Is Europe an Optimum Currency Area?, Reprinted in *European Monetary Unification: Theory, Practice and Analysis*, B.J. Eichengreen (ed), Cambridge, MIT Press, 51-71.
- Eichengreen, B. (1993). European Monetary Unification. *Journal of Economic Literature*, 31: 1321-1357.
- Engle, R., and C., Granger, (1987). Co-Integration and Error Correction: Representation, Estimation and Testing, *Econometrica*, 55, 251-276.
- Frankel, J. A., and Rose, A.K. (1997). Is EMU Justifiable Ex Post or Ex Ante?, *European Economic Review*, 41: 753-760.
- Fernandez-Arias, E. U. Panizza, and E. Stein (2002). Trade Agreements, Exchange Rate Disagreements, Washington, DC, United States: Inter-American Development Bank. Mimeographed document.
- Frankel, J. (1999). No Single Currency Regime is Right for all Countries or at All Times. Paper presented at the Graham Lecture, Princeton University, Princeton, New Jersey: United States.
- Frankel, J. and Wei, S-J. (1998). Regionalization of World Trade and Currencies: Economics and Politics. in: J. Frankel, editor. The Regionalization of the World Economy. Chicago, Illinois, United States: University of Chicago Press.
- Froot, K. and J. Stein (1991). Exchange Rates and Foreign Direct Investment: An Imperfect Capital Markets Approach. *Quarterly Journal of Economics*, 106: 1191-217.
- Im, Kyung So, M. Hashem Pesaran and Yongcheol Shin (2002). Testing for Unit Roots in Heterogenous Panels, *Journal of Econometrics*, 93: 16-35.
- Glick, R., and A., Rose, (2002). Does a Currency Union Affect Trade? The Time Series Evidence. *European Economic Review*, 46: 1125-1151.
- Goldfajn, I. and R. Valdés (1997). Are Currency Crises Predictable? IMF Working Paper No. 97/159. Washington, DC, United States: International Monetary Fund.
- Grubel, H. G., (1999). The Case for the Amero, Critical Issues Bulletin, The Fraser Institute, Vancouver, Canada.
- Kao, C (1999). Spurious Regression and Residual-Based Tests for Cointegration in Panel Data, *Journal of Econometrics*, 90: 1-44.
- Kenen, P. B. (1997). Preferences, Domains and Sustainability, *American Economic Review*, Papers and Proceedings, 211-213.
- Kenen, P. B. (1969). The Theory of Optimum Currency Areas: An Electic View, in McKinnon, R. (1963). Optimum Currency Areas, *American Economic Review*, 53: 717-725.
- Hausmann, R. U. Panizza, and E. Stein (2001). Why Do Countries Float the Way They Float, *Journal of Development Economics*, 66:387-414.
- Klein, M. and E. Rosengreen (1994). The Real Exchange Rate and Foreign Direct Investment in the United States, *Journal of International Economics*, 36: 373-389.
- Levy Yeyati, E., E. Stein and C. Daude (2001). Regional Integration and the Location of FDI. Washington, DC, United States: Inter-American Development Bank. Mimeographed document.
- Mark, Nelson and Donggyu Sul (1999). Cointegration Vector Estimation by Panel Dynamic OLS and Long Run Money Demand, unpublished manuscript, Department of Economics, Ohio State University.
- McKinnon, R. (1963). Optimum Currency Areas, *American Economic Review*, 53: 717-725.
- Mundell, R. (1961). A Theory of Optimal Currency Areas. *American Economic Review*, 51: 657-65.
- McKinnon, R. (1963). Optimum Currency Areas, *American Economic Review*, 53, 717-725.
- Mansoorian A., and S. Neaime (2002). Habits and Durability in Consumption and the Effects of Exchange Rate Policies, *International Economic Journal*, 16, 2: 97-114.

APPENDIX A: EU-MED Trade Patterns

Mansoorian A., and S. Neaime (2003). Durable Goods, Habits, Time Preference, and Exchange Rates, *North American Journal of Economics and Finance*, Elsevier Science Press, 14, 1: 115-130.

Mundell, R. (1961). A Theory of Optimum Currency Areas, *American Economic Review*, 51: 757-665.

Murray, J. (1999). Why Canada needs a Flexible Exchange Rate, Bank of Canada, Working Paper 99-12, Canada.

Neaime S., (2002). The Euro and the Future EU-Arab Countries Trade Relations, *Arab Economic Journal*, 11, 29: 27-49.

Neaime S., and J. Paschakis (2002). The Future of the Dollar-Euro Exchange Rate, *North American Journal of Economics and Finance*, Elsevier Science Press, 13, 1: 57-72.

Neaime S., (2001). The Arab Economies: Monetary and Financial Implications of the Euro-Currency, *Arab Economic Journal*, 10, 24: 3-28.

Neaime S., (2000). *The Macroeconomics of Exchange Rate Policies, Tariff Protection and the Current Account: A Dynamic Framework*, APF Press, Toronto, Canada.

Obstfeld, M., (1997). Europe's Gamble, Brookings Papers on Economic Activity, 2:241-317.

Panizza, U, E. Stein and E. Talvi (2002) Assessing Dollarization: An Application to Central America and Caribbean Countries, in E. Levy-Yeyati and F. Sturzenegger, Dollarization, Cambridge, MIT Press.

Reinhart, C. (2002). Default Currency Crises and Sovereign Credit Ratings, *NBER Working Papers* 8738, National Bureau of Economic Research, Inc.

Sargan., D. (1984). Wages and Prices in the United Kingdom: A Study in Econometric Methodology. In D.F. Hendry et al eds., *Quantitative Economics and Econometric Analysis*, Basil Blackwell, Oxford.

Wonacott, R., (1996). Trade and Investment in a Hub-and-Spoke System Versus a Free Trade Area, *The World Economy*, 9(3): 237-252.

White, W.R., (1994). The Implications of the FTA and NAFTA for Canada and Mexico, Bank Of Canada Ma Working Paper 99-12, Canada.

Williamson, J., (2001). Curbing the Boom-Bust Cycle: The Role of Wall street. Washington D.C., Institute for International Economics.

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 %	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 %	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 %	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 %	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.

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

Hypothesis		Trace Statistics	Critical Values	
Null	Alternative		(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).