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TIME SERIES APPROACHES TO TESTING INCOME CONVERGENCE IN MENA COUNTRIES

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1. Introduction

Our objective is to test for income convergence in the Middle East and North African (MENA) countries using time series techniques. Income convergence for these countries was tested, previously and quite extensively, by Guetat and Serranito (2004), using panel root tests. Underlying this approach is the assumption that the per capita income of countries approach or diverge from a target level which may either be the average of the per capita income of the group of countries being considered (which is what Guetat and Serranito use) or the per capita income of an advanced country. Pesaran (2006), however, argues that the choice of such a target level may be arbitrary and that, following Bernard and Durlauf (1995), the pair-wise convergence of all countries involved should be investigated.

Pesaran (2006) shows that, to overcome the dimensional limitations of the cointegration approach used by Bernard and Durlauf (1995), the stationarity of the pair-wise logarithmic differences between the per capita incomes may be tested. If N is the number of countries, then one has to carry out $N(N-1)/2$ unit root tests, which may be quite a large number if N is large, even moderately so. In fact, Pesaran (2006) has applied his approach to the per capita incomes of various groups of countries (including the MENA countries), the largest of which consisted of 101 series and this implied that 5050 unit root tests were performed. Of course, the number of countries to be considered in our case, as we shall explain below, is only nine which implies 36 pairs of countries but we, nevertheless, decided to use a screening procedure due to Webber and White (2004) where, roughly speaking, for a given period, the per capita income difference between two countries at the end of the period is compared, in ratio terms, to the income difference at the beginning of the period and countries are said to be converging if this ratio lies between zero and unity. Pesaran's procedure was applied to those countries that satisfied this requirement.

The plan of our paper will, then, be as follows. In the following section, an account of the empirical methods will be given. In Section 3 the data will be described and the empirical results will be presented in Section 4. The final section will contain our conclusions.

2. Methodology

We shall investigate convergence in two stages. We shall first use a descriptive method due to Webber and White (2004), by which we shall reduce the number of pair wise tests of convergence that we shall conduct. We shall then perform pair-wise unit root tests.

Let y_{it} and y_{jt} denote the per capita incomes of countries *i* and *j* at time *t* respectively. The descriptive method is based on investigating the behaviour of y_{it} vis-à-vis y_{jt} by looking at their differences in two points in time, namely, $y_{it} - y_{jt}$ versus $y_{i,t+h} - y_{j.t+h}$. If $y_{it} - y_{jt} > y_{i,t+h} - y_{j.t+h}$ then one may take this as evidence of convergence since it implies that country *i* grows slower than country *j*. Similarly, one may compare y_{it}/y_{jt} with $y_{i,t+k}/y_{j,t+k}$ or $\ln y_{it} - \ln y_{jt}$ with $\ln y_{i,t+h} - \ln y_{j.t+h}$, which is the same thing. We may then state that

- If the observations converge in both ratios *and* differences, we have *strong* convergence
- If the observations converge in ratios *or* differences, we have *weak* convergence.

It is also possible that $y_{it} > y_{jt}$ but $y_{i,t+h} < y_{j.t+h}$, i.e., the countries may switch positions. The procedure described below takes switching also account.

We shall assume, throughout, that $y_{it} > y_{jt}$. Hence, for convergence in *ratio* we shall calculate

$$X_{i,j} = \frac{\ln y_{i,t+k} - \ln y_{j,t+k}}{\ln y_{it} - \ln y_{jt}} \tag{1}$$

and conclude that if,

- $X_{ij} > 1$, countries *i* and *j* diverge in ratio without switching.
- $0 < X_{ij} < 1$, countries *i* and *j* converge in ratio without switching.
- $-1 < X_{ij} < 0$, countries *i* and *j* converge in ratio with switching.
- $X_{ij} < -1$, countries *i* and *j* diverge in ratio with switching.

For convergence in *difference*, we first apply a normalizing transformation on y_{it} as

$$c_{it} = \frac{y_{it} - \bar{y}_t}{\bar{y}_t} \tag{2}$$

where $\bar{y}_t = \sum_{i=1}^{N} y_{it} / N$, so that any bias that may result from ignoring the growth of the *N* countries as a group is avoided. We then calculate

(3) $$Y_{ij} = \frac{c_{i,t+k} - c_{j,t+k}}{c_{it} - c_{jt}}$$

and conclude that if

- $Y_{ij} > 1$, countries *i* and *j* diverge in ratio without switching.
- $0 < Y_{ij} < 1$, countries *i* and *j* converge in ratio without switching.
- $-1 < Y_{ij} < 0$, countries *i* and *j* converge in ratio with switching.
- $Y_{ij} < -1$, countries *i* and *j* diverge in ratio with switching.

Thus,

- $0 < X_{ij} < 1$ *and* $0 < Y_{ij} < 1$ would imply *strong convergence without switching.*
- $0 < X_{ij} < 1$ *or* $0 < Y_{ij} < 1$ would imply *weak convergence without switching.*
- $-1 < X_{ij} < 0$ *and* $-1 < Y_{ij} < 0$ would imply *strong convergence with switching.*
- $-1 < X_{ij} < 0$ *or* $-1 < Y_{ij} < 0$ would imply *weak convergence with switching.*

After having classified the pairs of countries, we shall choose those that exhibit strong convergence with or without switching and apply pair wise tests of convergence. The investigation of convergence using a pair wise approach is based on the definition of convergence for two countries provided by Bernard and Durlauf (1995):

(4) $$\lim_{k \to \infty} E(w_{i,t+k} - w_{j,t-k} \mid I_t) = 0 \text{ at any fixed time } t$$

where $w_{it} = \ln y_{it}$ and I_t is the information set at time *t*, containing the current and past values for $w_{i,t-k}$ for $i = 1,..., N$ and $k = 0, 1, 2, \ldots, .$ From this definition, it is concluded that in order for countries *i* and *j* to converge, their per capita outputs should be cointegrated with cointegrating vector (1,-1).

Pesaran (2006) offers an alternative definition based on the probability of the output gap $w_{it} - w_{jt}$ falling outside a predetermined interval; i.e., that the probability of

$| w_{i,t+k} - w_{j,t+k} |$ being larger than some finite positive constant *g* should be smaller than some preassigned small probability, ξ, for all horizons, *k*. Using this definition avoids the pre-testing for unit roots in w_{it} and w_{jt} that the cointegration approach, advocated by Bernard and Durlauf (1995), requires. $w_{it} - w_{jt}$ may now be tested, first, for the presence of a unit root in an autoregression that contains a linear trend and, if no unit root is found, for the presence of a linear deterministic trend.

When there are more than two countries to consider, Pesaran (2006) offers a definition which, basically, requires that the definition of convergence given for a pair of countries should hold for all *N(N-1)/2* pairs of countries being considered. Hence, unit root tests are applied to all the pairs chosen in the first stage of our investigation and to conclude that there is convergence in the group, all pairs must converge..

We initially followed Pesaran (2006) and implemented the ADF test, where the null hypothesis is divergence, and the KPSS (Kwiatowski et al, 1992) test where the null hypothesis is convergence. Let $z_{it} = w_{it} - w_{jt}$. Then the ADF test was obtained by estimating

$$\Delta z_{ijt} = d'_{tr}\beta_r + \alpha z_{ijt} + \sum_{i=1}^{P} \gamma_i \Delta z_{ijt} + \varepsilon_{ijt}, \quad r = 0,1 \tag{5}$$

where $d_{tr} = 1$ and $\beta_r = \beta_0$ for *r* = 0 and $d_{tr} = (1, t)$ and $\beta_r = (\beta_0, \beta_1)'$ for *r* = 1, and the t-ratio of α was used as the statistic to test for a unit root. In the case of *r* =1, $\beta_1 = 0$ was tested for those cases where the null hypothesis of $\alpha = 0$ were rejected.

The KPSS test, on the other hand, is based on assuming that the z_{ijt} are stationary so that they are generated by

$$z_{ijt} = \eta_0 + \varepsilon_{ijt} \tag{6}$$

Under the alternative hypothesis of nonstationarity, it is assumed that $\eta_{0t} = \eta_0 + u_t$, i.e., a random walk, with $E(u_t) = 0$ and $E(u_t^{\,2}) = \sigma_u^2 > 0$. Hence, the null hypothesis of stationarity becomes $H_o : \sigma_u^2 = 0 \quad vs \quad H_1 : \sigma_u^2 > 0$. The test statistic for this hypothesis is based on the Lagrange Multiplier approach and is obtained as

$$KPSS_{ij} = \frac{T^{-2}\sum_{t=1}^{T} S_{ijt}}{\hat{\sigma}_{\varepsilon}^{2}} \tag{7}$$

where $S_{ijt} = \sum_{\tau=1}^{t} \widehat{\varepsilon}_{ij\tau}$, $\hat{\sigma}_{\varepsilon} = T^{-1}\sum_{t=1}^{T} \widehat{\varepsilon}_{ijt}^{2} + 2T^{-1}\sum_{\ell=1}^{m} w(m/l)\left(\sum_{t=\ell+1}^{T} \widehat{\varepsilon}_{ijt}\widehat{\varepsilon}_{ij,t-l}\right)$,

$w(m/l) = 1-(\ell/(m+1))$ and the $\widehat{\varepsilon}_{ijt}$ are obtained from the OLS estimation of (6). The choice of *m* was made using a data dependent procedure due the Newey and West (1994).

The results of our descriptive approach and the plots of the pair-wise differences led to the expectation that structural shifts in the level of the output gaps, i.e., the intercept term in (5), needed to be taken into account when testing for unit roots. We did this by following the approach developed by Perron and Vogelsang (1992) and Perron (1997) where the shift in β_0 is taken to be endogeneous. Such tests are sequential tests. For the single shift case that we shall consider, we start at a shift point $t = h_0$, where $h_0 = [T\lambda]$ and λ is an appropriately chosen trimming fraction, and estimate (5) sequentially as this shift point is moved towards $t = T - h_0$. This may be done by using the dummy variables

$$\begin{aligned} DU_t(h) &= 0 \quad for \quad t = 1,\ldots,h \\ &= 1 \quad for \quad t = h+1,\ldots,T \\ D_t(h) &= 1 \quad for \quad t = 1,\ldots,h \\ &= 0 \quad otherwise \end{aligned} \tag{8}$$

where $h_0 \le h \le T - h_0$. We would then be estimating

$$\Delta z_{ijt} = d_{tr}'\beta + \delta DU_t(h) + \varphi D_t(h) + \alpha y_{t-1} + \sum_{s=1}^{p} \gamma_s \Delta z_{ij,t-s} + \varepsilon_{ijt} \tag{9}$$

The test statistics is simply the minimum value of the sequentially obtained ADF statistics (min ADF) and the shift point, $\widehat{h}$ will be the date corresponding to this minimized value.[1]

[1] Perron and Vogelsang (1992) and Perron (1997) call this the innovational outlier model, implying that the shift in the intercept term is gradual.

3. The Data

The data were obtained from the Penn World Tables Version 6.1 (Heston, Summers and Aken, 2002). They consist of annual Purchasing Power adjusted per capita real GDP series constructed in international dollars at 1996 prices. Even though the series are constructed to cover the 1951-2000 period only four MENA countries have data for this period; Israel, Egypt, Morocco and Turkey. We, thus, used the 1961-2000 period for which data exist for nine countries; Algeria, Egypt, Iran, Israel, Jordan, Morocco, Syria, Tunisia and Turkey. The same data have also been utilized by Guitat and Serranito (2004) and Pesaran (2006).

4. Empirical Results

We first consider the results of the descriptive procedure used in the first stage. We considered four base years, 1961, 1970, 1980 and 1990. We then calculated the X_{ij} and Y_{ij} values using equations (1) and (3). The results are given in Table 1 and in Tables A1-A3 in the Appendix.

To see how we may use these results, let us consider the 1961-based figures for Algeria as presented in Table 1. We find that Algeria strongly converges with Egypt for the 1961-1990 and 1961-2000 periods (both *X* and *Y* are between 0 and 1), strongly diverges from Iran for all four periods (with switching in 1961-1980 and 1961-1990), converges weakly with Israel in 1961-1980 (*X* lies between 0 and 1 but *Y* is greater than unity), converges strongly without switching with Morocco in all periods except 1961-1980 when convergence is weak; converges strongly, without switching, with Syria in 1961-1990 and 1961-2000, weakly in 1961-1980 and diverges strongly in 1961-1970; converges strongly, without switching, with Tunisia in 1961-1980 and 1961-1990 but diverges strongly, without switching, in 1961-1970 and with switching 1961-2000; and, finally, converges strongly, without switching, with Turkey in 1961-1970, diverges strongly, with switching, in 1961-1980 and without switching, in 1961-1990 and 1961-2000.

Table 1

X and Y values: Base 1961

X

	alg-egy	alg-iran	alg-isr	alg-jor	alg-mor	alg-syr	alg-tun	alg-tur
1961-1970	1.18	4.77	1.05	-18.62	**0.87**	1.46	1.39	**0.52**
1961-1980	1.43	-1.91	**0.97**	-6.99	**0.96**	**0.93**	**0.42**	-1.07
1961-1990	**0.90**	-2.79	1.12	-15.57	**0.70**	**0.93**	**0.03**	1.42
1961-2000	**0.33**	2.30	1.38	-9.85	**0.57**	**0.36**	-1.56	3.27

	egy-iran	egy-isr	egy-jor	egy-mor	egy-syr	egy-tun	egy-tur
1961-1970	1.74	1.10	**0.25**	-13.83	5.78	1.01	1.06
1961-1980	**0.91**	1.13	1.04	-21.22	-6.74	2.23	**0.99**
1961-1990	**0.32**	1.05	**0.13**	-9.06	1.31	1.59	**0.99**
1961-2000	**0.64**	1.02	**-0.14**	11.89	0.70	1.83	**0.85**

	iran-isr	iran-jor	iran-mor	iran-syr	iran-tun	iran-tur
1961-1970	**0.65**	13.14	1.47	1.95	2.40	-26.43
1961-1980	1.29	**-0.09**	**0.52**	**0.50**	**-0.27**	4.22
1961-1990	1.55	1.78	**0.16**	**0.37**	**-0.81**	28.14
1961-2000	1.28	6.65	**0.84**	**0.65**	**-0.41**	9.41

	isr-jor	isr-mor	isr-syr	isr-tun	isr-tur
1961-1970	1.57	**0.99**	1.20	1.12	1.12
1961-1980	1.18	**0.97**	**0.96**	**0.87**	1.24
1961-1990	1.57	**0.97**	1.05	**0.92**	1.09
1961-2000	1.68	1.10	1.01	**0.83**	1.14

	jor-mor	jor-syr	jor-tun	jor-tur
1961-1970	**0.52**	1.10	**0.57**	2.67
1961-1980	**0.60**	**0.58**	**-0.32**	**0.67**
1961-1990	**-0.05**	**0.20**	-1.54	6.43
1961-2000	**0.09**	**-0.09**	-2.39	7.13

	mor-syr	mor-tun	mor-tur
1961-1970	15.00	**0.47**	**0.81**
1961-1980	**0.07**	1.38	**0.61**
1961-1990	6.19	1.20	**0.82**
1961-2000	-4.57	2.19	1.04

	syr-tun	syr-tur
1961-1970	1.51	1.30
1961-1980	1.28	**0.59**
1961-1990	1.56	1.01
1961-2000	1.71	**0.85**

	tun-tur
1961-1970	1.11
1961-1980	**-0.07**
1961-1990	**0.49**
1961-2000	**0.03**

Y

	alg-egy	alg-iran	alg-isr	alg-jor	alg-mor	alg-syr	alg-tun	alg-tur
1961-1970	1.14	5.71	1.09	-15.07	**0.90**	1.33	1.35	**0.51**
1961-1980	1.41	-1.81	1.03	-6.87	1.05	1.01	**0.48**	-1.04
1961-1990	**0.92**	-2.36	1.19	-12.87	**0.74**	**0.94**	**0.03**	1.45
1961-2000	**0.31**	1.94	1.35	-6.94	**0.50**	**0.33**	-1.63	2.94

	egy-iran	egy-isr	egy-jor	egy-mor	egy-syr	egy-tun	egy-tur
1961-1970	2.04	1.10	**0.19**	-13.82	4.98	**0.93**	1.00
1961-1980	**0.77**	1.11	**0.92**	-20.85	-6.69	2.33	**0.86**
1961-1990	**0.27**	1.14	**0.11**	-9.94	1.36	1.80	1.04
1961-2000	**0.63**	1.14	**-0.12**	12.30	**0.77**	2.24	**0.89**

	iran-isr	iran-jor	iran-mor	iran-syr	iran-tun	iran-tur
1961-1970	**0.78**	12.83	1.84	2.16	2.79	-30.87
1961-1980	1.23	**-0.08**	**0.49**	**0.48**	**-0.27**	3.60
1961-1990	1.43	1.24	**0.14**	**0.32**	**-0.76**	24.40
1961-2000	1.31	4.98	**0.78**	**0.63**	**-0.45**	8.92

	isr-jor	isr-mor	isr-syr	isr-tun	isr-tur
1961-1970	1.36	1.05	1.14	1.12	1.14
1961-1980	1.16	1.04	1.03	**0.97**	1.20
1961-1990	1.43	1.10	1.14	1.06	1.17
1961-2000	1.49	1.17	1.13	1.01	1.22

	jor-mor	jor-syr	jor-tun	jor-tur
1961-1970	**-0.02**	**0.41**	**-0.47**	4.87
1961-1980	**0.59**	**0.57**	**-0.33**	**0.59**
1961-1990	**-0.05**	**0.17**	-1.40	5.46
1961-2000	**0.07**	**-0.08**	-2.22	5.70

	mor-syr	mor-tun	mor-tur
1961-1970	13.97	**0.47**	**0.81**
1961-1980	**0.08**	1.59	**0.59**
1961-1990	6.77	1.43	**0.90**
1961-2000	-4.75	2.56	1.04

	syr-tun	syr-tur
1961-1970	1.31	1.15
1961-1980	1.50	**0.58**
1961-1990	1.76	1.05
1961-2000	2.11	**0.89**

	tun-tur
1961-1970	1.04
1961-1980	**-0.07**
1961-1990	**0.55**
1961-2000	**0.03**

Table 2				
Numbers and Percentages of Strongly Diverging and Converging Pairs				
Strongly Diverging Pairs				
	1970	**1980**	**1990**	**2000**
1961	23 (63.9%)	14 (38.9%)	20 (55.6%)	21 (58.3%)
1970		13 (36.1%)	11 (30.6%)	14 (38.9%)
1980			20 (55.6%)	18 (50.0%)
1990				19 (52.8%)
Strongly Converging Pairs				
	1970	**1980**	**1990**	**2000**
1961	6 (16.7%)	16 (44.4%)	13 (36.1%)	14 (38.9%)
1970		21 (58.3%)	20 (55.6%)	21 (58.3%)
1980			14 (38.9%)	11 (30.6%)
1990				17 (47.2%)

An overall picture of convergence may be obtained from Table 2 where the numbers and percentages of strongly diverging and converging pairs are given for each period. We note that, for the 1961 based calculations, the number of strongly diverging pairs are higher than the number of strongly converging pairs except in 1961-1980. It is difficult to see a distinct pattern here except that the number of strongly diverging pairs is much higher than the number of strongly converging pairs in 1961-1970 but this difference diminishes in later periods. On the other hand, we find a reverse picture when 1970 is taken as the base; the number of converging pairs is higher than the number of diverging pairs in all three periods. This picture, however, does not continue for the 1980 and 1990 based calculations; the number of strongly divergent pairs is dominant in these cases.

The overall picture that we obtain from Table 2 does not lead us to a clear cut conclusion as to whether convergence or divergence is the dominant trend for the nine countries that we have considered for the MENA region. We shall take this a step further and first choose those pairs that this analysis suggests to be exhibiting strong convergence behaviour and then subject them to unit root tests so that statistically stronger results may be obtained.

The choice of the pairs in question was first made by tabulating, for each country, the countries with which strong convergence evidence was found. These are given in Table 3 and

in Tables A4 to A7 in the Appendix. For each country we counted the number of times it was paired with another country in its

Table 3
Strongly Converging Pairs for Algeria and Egypt

ALGERIA				
Without Switching				
Base Year				
	1970	**1980**	**1990**	**2000**
1961	Morocco	Tunisia	Egypt	Egypt
	Turkey		Morocco	Morocco
			Syria	Syria
			Tunisia	
1970		Israel	Egypt	Egypt
		Jordan	Jordan	Iran
		Syria	Morocco	Jordan
		Tunisia	Syria	Morocco
			Tunisia	Syria
1980			Egypt	Egypt
			Morocco	Morocco
			Tunisia	Syria
1990				Egypt
				Jordan
				Morocco
				Syria
With Switching				
1961				
1970		Iran	Iran	
1980				
1990				Iran

EGYPT				
Without Switching				
Base Year				
	1970	**1980**	**1990**	**2000**
1961	Jordan	Iran	Algeria	Algeria
		Turkey	Iran	Iran
			Jordan	Syria
				Turkey
1970		Iran	Algeria	Algeria
		Turkey	Iran	Iran
			Jordan	Syria
			Morocco	Turkey
			Syria	
1980			Algeria	Algeria
			Iran	Iran
			Jordan	Tunisia
			Morocco	
			Tunisia	
1990				Algeria
				Syria
				Israel
				Turkey
With Switching				
1961		Jordan		Jordan
1970				Jordan
				Morocco
1980				Jordan
				Morocco
1990				

Table and chose those pairs that occurred four or more times. For example, if we again consider Algeria, as given in Table 3, we find that it has been paired with Morocco 8 times, with Egypt and Syria 7 times with Tunisia 5 times and with Jordan and Iran 4 times. Hence, the pairs we shall consider from this Table are Algeria-Morocco, Algeria-Egypt, Algeria-Syria, Algeria -Tunisia, Algeria-Jordan and Algeria-Iran.

In Table 3 we also have Egypt and we find that it is paired with Jordan and Iran 8 times, with Algeria 7 times, with Syria 6 times, with Turkey 5 times and with Morocco 4 times. The additional pairs we shall consider from Table 3 then become Egypt-Jordan, Egypt-

Iran, Egypt-Syria, Egypt-Turkey, and Egypt-Morocco. Egypt-Algeria has, of course, been left out to avoid double-counting. Proceeding this way we find that Table A4 yields the pairs Iran-Morocco, Iran-Tunisia, Iran-Syria, Iran-Algeria, Iran-Jordan, Israel-Syria and Israel-Tunisia; Table A5, the pairs Jordan-Morocco, Jordan-Syria, Morocco-Syria and Morocco-Turkey; Table A6, the pairs Syria-Turkey and Tunisia-Turkey. Since all countries that pair with Turkey have been accounted for we obtain no additional pairs from Table A7.

Table 4

ADF Test Results

	Intercept		Intercept and Trend	
	p	ADF	p	ADF
Algeria-Egypt	0	-0.5662 (0.8666)	1	-1.9470 (0.6105)
Algeria-Morocco	9	-2.6781 (0.0896)*	1	-2.3424 (0.4022)
Algeria-Syria	0	-2.7006 (0.0830)*	0	-3.2068 (0.0980)*
Algeria-Tunisia	8	2.0903 (0.9998)	9	-0.5220 (0.9768)
Algeria-Jordan	3	-2.1913 (0.2127)	3	-2.1218 (0.5168)
Algeria-Iran	3	-1.5842 (0.4801)	3	-1.8162 (0.6759)
Egypt-Iran	0	-0.7893 (0.8110)	3	-2.9673 (0.1550)
Egypt-Turkey	1	-1.8465 (0.3531)	3	-3.0654 (0.1297)
Egypt-Jordan	0	-0.7962 (0.8091)	7	-2.5131 (0.3201)
Egypt-Syria	0	-3.0141 (0.0423)**	0	-3.0955 (0.1215)
Egypt-Morocco	0	-1.2095 (0.6607)	0	-2.5441 (0.3066)
Iran-Morocco	3	-1.5387 (0.5029)	0	-1.1657 (0.9037)
Iran-Syria	0	-1.4863 (0.5299)	0	-1.9524 (0.6082)
Iran-Tunisia	0	-1.7194 (0.8300)	8	-2.3361 (0.4035)
Iran-Jordan	3	-2.5185 (0.1196)	3	-2.7349 (0.2312)
Israel-Syria	8	-3.4311 (0.0174)**	8	-3.8312 (0.0281)**
Israel-Tunisia	1	-1.2688 (0.6340)	9	-3.1175 (0.1206)
Jordan-Morocco	3	-2.3111 (0.1741)	3	-2.4125 (0.3673)
Jordan-Syria	0	-2.2700 (0.1864)	8	-2.2458 (0.4493)
Morocco-Turkey	1	-2.0281 (0.2741)	1	-2.5181 (0.3182)
Morocco-Syria	0	-3.0688 (0.0374)**	0	-3.4067 (0.0651)**
Syria-Turkey	0	-3.2492 (0.0245)**	0	-3.2350 (0.0926)*
Tunisia-Turkey	0	-0.9835 (0.7497)	0	-1.8505 (0.6606)

Notes: 1. The figures in parentheses are p-values. They are based on MacKinnon (1996). 2. * Significant at the 10% level, ** Significant at the 5% level

The ADF test results for those chosen pairs are given in Table 4. When there is both an intercept and a trend term in (5); i.e., when r =1, we find that the per capita incomes of Algeria and Syria, Israel and Syria, Morocco and Syria, and Syria and Turkey converge. The tests of the trend term for these pairs are given in Table 5 from which we note that the trend term is not significant for any of these pairs. This, of course, implies that these pairs do not contain a common deterministic trend term. We then turn to the results for the model with

Table 5	
Testing the Significance of the Trend Term in Models with Intercept and Trend where the Unit Root Hypothesis has been Rejected	
	Trend
Algeria-Syria	-0.0033 (-1.6629) (0.1050)
Israel-Syria	-0.0028 (-1.4907) (0.1517)
Morocco-Syria	-0.0023 (-1.4410) (0.1582)
Syria-Turkey	-0.0007 (-0.4156) (0.6801)
Notes: The first parenthesis under the coefficient estimates is the t-ratio while the second is its p-value based on the standard normal distribution.	

only an intercept term (i.e., $r = 0$) and find that the same four pairs also converge in this case. In addition, we also find that the pairs Algeria-Morocco and Egypt-Syria also converge. The evidence, in the case of Algeria-Morocco, is not very strong, however, the significance level being only 10%.

Turning to the KPSS results in Table 6, we now find the number of converging pairs to be 11. Pesaran (2006) provides similar figures based on testing for all 36 pairs. Evidence regarding the four converging pairs based on the ADF test is also obtained in this case if we regard the 10% percent significance of the KPSS statistic for Algeria-Syria as indicating convergence because it is below the 5% level. However, in addition to these four pairs, we have Algeria-Morocco (that also converged in the ADF case), Algeria-Jordan, Algeria-Iran, Egypt-Turkey, Egypt-Syria (that also converged in the ADF case), Iran-Jordan, Jordan-Morocco and Morocco-Turkey.

However, when we plot the z_{ijt}'s for some of the nonconverging pairs, as given in Figure 1, we note that they show structural shifts in their levels. This is quite clear, for example, in the case of Algeria-Egypt, Egypt-Iran and Egypt-Syria. Thus, we applied the sequential unit root testing procedure described in Section 2, which involved sequentially estimating equation (9). The results are given in Table 7.

Figure 1
Plots of Selected Pairs

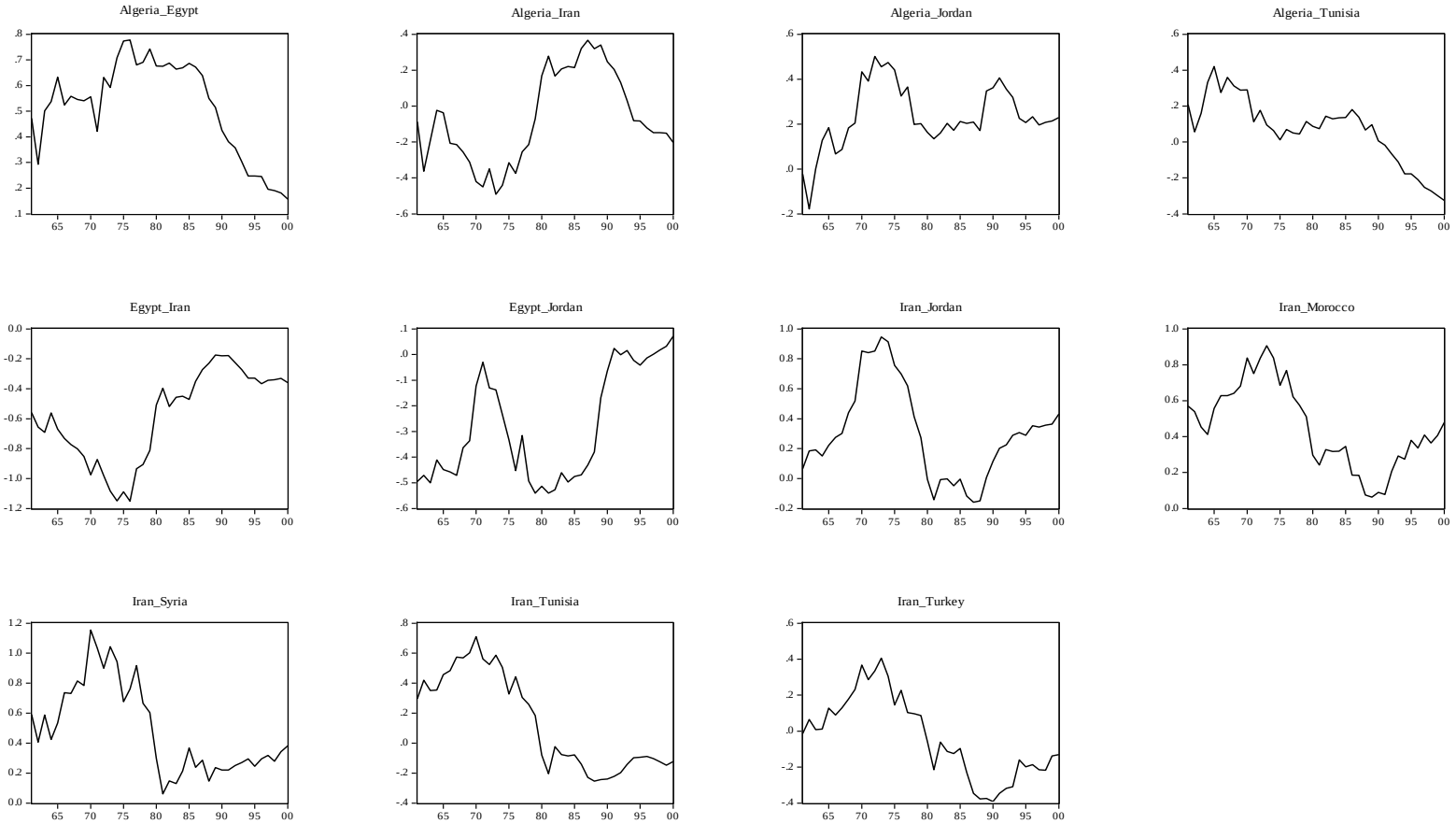

Table 6		
KPSS Test Results		
	m	KPSS
Algeria-Egypt	5	0.3637*
Algeria-Morocco	4	*0.2543*
Algeria-Syria	4	0.3752*
Algeria-Tunisia	5	0.6020**
Algeria-Jordan	4	*0.1593*
Algeria-Iran	5	*0.2921*
Egypt-Iran	5	0.4772**
Egypt-Turkey	4	*0.3160*
Egypt-Jordan	5	0.3776*
Egypt-Syria	4	*0.1499*
Egypt-Morocco	5	0.3873*
Iran-Morocco	5	0.4201*
Iran-Syria	5	0.4372*
Iran-Tunisia	5	0.6077**
Iran-Jordan	5	*0.1657*
Israel-Syria	4	*0.0742*
Israel-Tunisia	5	0.5458**
Jordan-Morocco	5	*0.1881*
Jordan-Syria	4	0.4755**
Morocco-Turkey	4	*0.2499*
Morocco-Syria	4	*0.2430*
Syria-Turkey	4	*0.1282*
Tunisia-Turkey	5	0.5771**

Notes: 1. The critical values for the KPSS test are from Table 1 of Kwiatowski et al (1992):

10%	5%	1%
0.347	0.463	0.739

2. * Significant at the 10% level, ** Significant at the 5% level+

.

We note, in the intercept and trend case, that there are five converging pairs; Algeria-Egypt, Egypt-Morocco, Iran-Syria, Israel-Syria, Morocco-Turkey and Syria-Turkey. Only two of these are the same pairs that had converged according to the ADF results of Table 4. When we test if the trend terms for these pairs are significant, we find, from Table 8, that only for Iran-Syria and Israel-Syria is it not significant. For the other five pairs, we have to conclude that convergence takes place in the presence of a common deterministic trend. We also note that the structural shifts, as represented by the estimates associated with the dummy variables, are all significant.

When we turn to the results of the intercept case, we find that there are only three pairs converging; Iran-Syria, Morocco-Syria and Syria-Turkey. We already have evidence on the convergence of Syria-Turkey from the ADF results. One can, probably, also claim

convergence for Israel-Syria as the value of min ADF is extremely close to the critical value at the 10% level.

Table 7

Min ADF Test Results

	Intercept			Intercept and Trend		
	p	min ADF	$\hat{h}$	p	min ADF	$\hat{h}$
Algeria-Egypt	1	-3.7601	1989	1	-5.4318***	1971
Algeria-Morocco	1	-3.8300	1987	1	-4.7269	1987
Algeria-Syria	3	-3.1968	1990	3	-3.2256	1990
Algeria-Tunisia	5	-3.8245	1987	4	-3.1696	1978
Algeria-Jordan	3	-2.3463	1977	3	-2.5987	1977
Algeria-Iran	3	-2.9582	1976	3	-3.7269	1978
Egypt-Iran	5	-4.1202	1979	5	-3.8822	1979
Egypt-Turkey	1	-2.7619	1978	3	-4.8321**	1973
Egypt-Jordan	5	-2.5360	1988	5	-3.5617	1977
Egypt-Syria	1	-2.5802	1982	4	-3.8982	1973
Egypt-Morocco	1	-2.1767	1989	4	-5.3762***	1973
Iran-Morocco	3	-3.6217	1978	3	-3.5664	1978
Iran-Syria	3	-5.4829***	1979	4	-5.7118***	1979
Iran-Tunisia	3	-4.0439	1978	3	-4.2788	1978
Iran-Jordan	3	-3.3946	1977	3	-4.1079	1977
Israel-Syria	5	-4.1847	1977	3	-4.5963*	1977
Israel-Tunisia	0	-3.8898	1974	1	-3.6736	1974
Jordan-Morocco	3	-2.9261	1987	3	-3.6221	1977
Jordan-Syria	1	-2.9595	1987	3	-3.9672	1975
Morocco-Turkey	1	-3.0051	1990	0	-7.4049***	1978
Morocco-Syria	5	-4.5957**	1977	5	-4.4968	1977
Syria-Turkey	5	-4.8638**	1977	5	-5.6185***	1979
Tunisia-Turkey	0	-3.1454	1970	1	-3.5463	1986

Notes: 1. The asymptotic critical values for the min ADF test in the case of only an intercept have been obtained from Perron and Vogelsang (1992), Table 2 and are given as

0.10	0.05	0.025	0.01
-4.19	-4.44	-4.69	-4.95

2. The asymptotic critical values for the min ADF test in the case of an intercept and a trend term have been obtained from Perron (1997), Table 1 and are given as

0.10	0.05	0.025	0.01
-4.58	-4.80	-5.02	-5.41

3. * Significant at the 10% level, ** Significant at the 5% level, ** Significant at the 1% level

In sum, of these test results the most favourable ones are those obtained from the KPPS tests. An exercise as to whether convergence clubs may be obtained from these results seems to indicate the following groupings: Algeria-Morocco-Syria, Algeria-Jordan-Iran, Syria-Egypt-Turkey. These groups overlap, so it is difficult to call them convergence clubs.

Table 8			
Testing the Significance of the Trend Term in Models with Intercept and Trend with Shift in the Intercept and where the Unit Root Hypothesis has been Rejected			
	Trend	DU($\hat{h}$)	D($\hat{h}$)
Algeria-Egypt	-0.0103 (-7.2750) (0.0000)***	0.1515 (4.7608) (0.0000)***	-0.2616 (-5.5676) (0.0000)***
Egypt-Morocco	0.0141 (5.7236) (0.0000)***	-0.2430 (-4.9533) (0.0000)***	0.1453 (2.6540) (0.0134)**
Egypt-Turkey	0.0079 (4.0838) (0.0003)***	-0.1455 (-3.3557) (0.0023)***	0.0798 (1.4236) (0.1656)
Iran-Syria	0.0037 (1.0818) (0.2893)	-0.5722 (-4.9849) (0.0000)***	0.3676 (2.5645) (0.0165)**
Israel-Syria	0.0039 (1.6971) (0.1008)	-0.1066 (-2.0087) (0.0543)*	0.3850 (4.5808) (0.0001)***
Morocco-Turkey	-0.0089 (-5.7679) (0.0000)***	0.1789 (5.1377) (0.0000)***	-0.0976 (-1.9907) (0.0546)*
Syria-Turkey	-0.0110 (-3.5254) (0.0017)***	0.3927 (4.6281) (0.0001)***	-0.2562 (-2.1493) (0.0419)**
Notes: 1. The first parenthesis under the coefficient estimates is the t-ratio while the second is its p-value based on the standard normal distribution. 2. * Significant at the 10% level, ** Significant at the 5% level, ** Significant at the 1% level			

The converging pairs based on the other tests are so few in number that such an exercise does not seem possible.

5. Conclusions

In investigating the per capita income convergence of the MENA countires, we used a pair-wise testing approach as opposed to the panel unit root approach implemented by Guetat and Serranita (2004), where the convergence of countries to a target variable was sought after. We first subjected the nine countries, for which a complete data set was available, to a descriptive procedure due to Webber and White (2004) and then applied unit root tests that both excluded and included structural shifts in the levels of the variables in question. Our conclusions are as follows:

1. The descriptive procedure yielded results that differed depending upon the base year and the length of the period for which comparisons of per capita income between two countries were made. When 1961, 1980 and 1990 were chosen as the base year, the number of converging pairs was usually less than the diverging ones but this number appeard to increase as the period became longer. For 1970 as the base year, however, the number of converging pairs exceeded the number of diverging pairs.
2. We chose 23 pairs that we subjected to unit root tests. The ADF results yielded four converging pairs while the KPSS results gave us eleven such pairs. When we took the possibility of shifts in the intercept term into account, we obtained seven converging pairs but, as opposed to the previous ADF results, five of these pairs appeared to have common deterministic trends.
3. An exercise to see if we may identify convergence clubs based on the KPSS results was not fruitful.
4. Hence, we may state that convergence among the nine countries under consideration is not a dominant phenomenon. Whether, as Guetat and Serranito (2004) seem to have found, different groupings of these countries based on exogeneous criteria may lead us to revise this conclusion is a point we intend to look into.

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Table A1

X and Y values: Base 1970

X

	alg-egy	alg-iran	alg-isr	alg-jor	alg-mor	alg-syr	alg-tun	alg-tur
1970-1980	1.22	**-0.40**	**0.92**	**0.38**	1.11	**0.63**	**0.30**	-2.08
1970-1990	**0.77**	**-0.59**	1.07	**0.84**	**0.80**	**0.63**	**0.02**	2.76
1970-2000	**0.28**	**0.48**	1.31	**0.53**	**0.66**	**0.24**	-1.12	6.34

	egy-iran	egy-isr	egy-jor	egy-mor	egy-syr	egy-tun	egy-tur
1970-1980	**0.52**	1.03	4.16	1.53	-1.17	2.21	**0.93**
1970-1990	**0.18**	**0.96**	**0.52**	**0.65**	**0.23**	1.58	**0.94**
1970-2000	**0.37**	**0.93**	**-0.58**	**-0.86**	**0.12**	1.82	**0.81**

	iran-isr	iran-jor	iran-mor	iran-syr	iran-tun	iran-tur
1970-1980	1.98	**-0.01**	**0.35**	**0.26**	**-0.11**	**-0.16**
1970-1990	2.39	**0.14**	**0.11**	**0.19**	**-0.34**	-1.06
1970-2000	1.98	**0.51**	**0.57**	**0.33**	**-0.17**	**-0.36**

	isr-jor	isr-mor	isr-syr	isr-tun	isr-tur
1970-1980	**0.75**	**0.98**	**0.80**	**0.78**	1.10
1970-1990	**1.00**	**0.99**	**0.88**	**0.82**	**0.97**
1970-2000	1.07	1.11	**0.85**	**0.74**	1.02

	jor-mor	jor-syr	jor-tun	jor-tur
1970-1980	-21.04	1.00	**0.52**	**0.11**
1970-1990	1.81	**0.35**	2.50	1.04
1970-2000	-3.26	**-0.16**	3.90	1.16

	mor-syr	mor-tun	mor-tur
1970-1980	**0.00**	2.95	**0.76**
1970-1990	**0.41**	2.58	1.02
1970-2000	**-0.30**	4.70	1.29

	syr-tun	syr-tur
1970-1980	**0.85**	**0.45**
1970-1990	1.03	**0.78**
1970-2000	1.13	**0.65**

	tun-tur
1970-1980	**-0.06**
1970-1990	**0.44**
1970-2000	**0.02**

Y

	alg-egy	alg-iran	alg-isr	alg-jor	alg-mor	alg-syr	alg-tun	alg-tur
1970-1980	1.23	**-0.32**	**0.95**	**0.46**	1.16	**0.76**	**0.36**	-2.05
1970-1990	**0.80**	**-0.41**	1.10	**0.85**	**0.82**	**0.71**	**0.02**	2.86
1970-2000	**0.27**	**0.34**	1.24	**0.46**	**0.56**	**0.25**	-1.21	5.79

	egy-iran	egy-isr	egy-jor	egy-mor	egy-syr	egy-tun	egy-tur
1970-1980	**0.38**	1.01	4.84	1.51	-1.34	2.49	**0.86**
1970-1990	**0.13**	1.03	**0.57**	**0.72**	**0.27**	1.93	1.03
1970-2000	**0.31**	1.03	**-0.62**	**-0.89**	**0.15**	2.40	**0.89**

	iran-isr	iran-jor	iran-mor	iran-syr	iran-tun	iran-tur
1970-1980	1.58	**-0.01**	**0.27**	**0.22**	**-0.10**	**-0.12**
1970-1990	1.84	**0.10**	**0.08**	**0.15**	**-0.27**	**-0.79**
1970-2000	1.68	**0.39**	**0.43**	**0.29**	**-0.16**	**-0.29**

	isr-jor	isr-mor	isr-syr	isr-tun	isr-tur
1970-1980	**0.86**	**0.99**	**0.90**	**0.87**	1.05
1970-1990	1.05	1.05	**1.00**	**0.95**	1.03
1970-2000	1.10	1.12	**0.99**	**0.90**	1.08

	jor-mor	jor-syr	jor-tun	jor-tur
1970-1980	-25.22	1.40	**0.71**	**0.12**
1970-1990	1.93	**0.40**	2.97	1.12
1970-2000	-3.06	**-0.19**	4.70	1.17

	mor-syr	mor-tun	mor-tur
1970-1980	**0.00**	**0.83**	**0.77**
1970-1990	**0.48**	3.08	1.10
1970-2000	**-0.34**	5.51	1.27

	syr-tun	syr-tur
1970-1980	1.15	**0.50**
1970-1990	1.35	**0.91**
1970-2000	1.61	**0.77**

	tun-tur
1970-1980	**-0.07**
1970-1990	**0.52**
1970-2000	**0.03**

Table A2

X and Y values: Base 1980

X

	alg-egy	alg-iran	alg-isr	alg-jor	alg-mor	alg-syr	alg-tun	alg-tur
1980-1990	**0.63**	1.47	1.15	2.23	**0.72**	1.00	**0.06**	-1.33
1980-2000	**0.23**	-1.21	1.42	1.41	**0.59**	**0.38**	-3.69	-3.05

	egy-iran	egy-isr	egy-jor	egy-mor	egy-syr	egy-tun	egy-tur
1980-1990	**0.35**	**0.93**	**0.12**	**0.43**	**-0.19**	**0.71**	1.01
1980-2000	**0.71**	**0.90**	**-0.14**	**-0.56**	**-0.10**	**0.82**	**0.87**

	iran-isr	iran-jor	iran-mor	iran-syr	iran-tun	iran-tur
1980-1990	1.20	-20.32	**0.30**	**0.74**	3.01	6.67
1980-2000	1.00	-76.03	1.61	1.28	1.53	2.23

	isr-jor	isr-mor	isr-syr	isr-tun	isr-tur
1980-1990	1.32	1.00	1.10	1.05	**0.88**
1980-2000	1.42	1.13	1.06	**0.95**	**0.92**

	jor-mor	jor-syr	jor-tun	jor-tur
1980-1990	**-0.09**	**0.35**	4.79	9.56
1980-2000	**0.15**	**-0.16**	7.46	10.61

	mor-syr	mor-tun	mor-tur
1980-1990	88.72	**0.88**	1.35
1980-2000	-65.43	1.59	1.71

	syr-tun	syr-tur
1980-1990	1.22	1.71
1980-2000	1.33	1.44

	tun-tur
1980-1990	-7.08
1980-2000	**-0.39**

Y

	alg-egy	alg-iran	alg-isr	alg-jor	alg-mor	alg-syr	alg-tun	alg-tur
1980-1990	**0.65**	1.31	1.15	1.87	**0.71**	**0.93**	**0.06**	-1.39
1980-2000	**0.22**	-1.07	1.30	1.01	**0.48**	**0.33**	-3.37	-2.83

	egy-iran	egy-isr	egy-jor	egy-mor	egy-syr	egy-tun	egy-tur
1980-1990	**0.35**	1.02	**0.12**	**0.48**	**-0.20**	**0.78**	1.20
1980-2000	**0.81**	1.02	**-0.13**	**-0.59**	**-0.11**	**0.96**	1.03

	iran-isr	iran-jor	iran-mor	iran-syr	iran-tun	iran-tur
1980-1990	1.17	-16.37	**0.28**	**0.66**	2.80	6.79
1980-2000	1.07	-66.02	1.59	1.32	1.68	2.48

	isr-jor	isr-mor	isr-syr	isr-tun	isr-tur
1980-1990	1.22	1.06	1.11	1.09	**0.98**
1980-2000	1.28	1.13	1.10	1.04	1.02

	jor-mor	jor-syr	jor-tun	jor-tur
1980-1990	**-0.08**	**0.29**	4.20	9.19
1980-2000	**0.12**	**-0.14**	6.65	9.61

	mor-syr	mor-tun	mor-tur
1980-1990	87.64	**0.90**	1.52
1980-2000	-61.49	1.61	1.76

	syr-tun	syr-tur
1980-1990	1.18	1.82
1980-2000	1.41	1.54

	tun-tur
1980-1990	-7.76
1980-2000	**-0.44**

Table A3

X and Y values: Base 1990

X

	alg-egy	alg-iran	alg-isr	alg-jor	alg-mor	alg-syr	alg-tun	alg-tur
1990-2000	**0.37**	**-0.82**	1.23	**0.63**	**0.82**	**0.38**	-57.18	2.30

	egy-iran	egy-isr	egy-jor	egy-mor	egy-syr	egy-tun	egy-tur
1990-2000	2.00	**0.97**	-1.12	-1.31	0.53	1.15	**0.86**

	iran-isr	iran-jor	iran-mor	iran-syr	iran-tun	iran-tur
1990-2000	**0.83**	3.74	5.36	1.73	**0.51**	**0.33**

	isr-jor	isr-mor	isr-syr	isr-tun	isr-tur
1990-2000	1.07	1.13	**0.96**	**0.90**	1.05

	jor-mor	jor-syr	jor-tun	jor-tur
1990-2000	-1.80	**-0.47**	1.56	1.11

	mor-syr	mor-tun	mor-tur
1990-2000	**-0.74**	1.82	1.27

	syr-tun	syr-tur
1990-2000	1.09	**0.84**

	tun-tur
1990-2000	**0.05**

Y

	alg-egy	alg-iran	alg-isr	alg-jor	alg-mor	alg-syr	alg-tun	alg-tur
1990-2000	**0.34**	**-0.82**	1.13	**0.54**	**0.68**	**0.35**	-54.21	2.03

	egy-iran	egy-isr	egy-jor	egy-mor	egy-syr	egy-tun	egy-tur
1990-2000	2.30	**1.00**	-1.09	-1.24	**0.56**	1.24	**0.86**

	iran-isr	iran-jor	iran-mor	iran-syr	iran-tun	iran-tur
1990-2000	**0.91**	4.03	5.58	2.01	**0.60**	**0.37**

	isr-jor	isr-mor	isr-syr	isr-tun	isr-tur
1990-2000	1.04	1.07	**0.99**	**0.95**	1.04

	jor-mor	jor-syr	jor-tun	jor-tur
1990-2000	-1.58	**-0.47**	1.58	1.04

	mor-syr	mor-tun	mor-tur
1990-2000	**-0.70**	1.79	1.15

	syr-tun	syr-tur
1990-2000	1.19	**0.85**

	tun-tur
1990-2000	**0.06**

Table A4
Strongly Converging Pairs for Iran and Israel

IRAN				
Without Switching				
Base Year				
	1970	**1980**	**1990**	**2000**
1961	Israel	Egypt	Egypt	Egypt
		Morocco	Morocco	Morocco
		Syria	Syria	Syria
1970		Egypt	Egypt	Algeria
		Morocco	Jordan	Egypt
		Syria	Morocco	Jordan
			Syria	Morocco
				Syria
1980			Egypt	Egypt
			Morocco	
			Syria	
1990				Tunisia
				Israel
				Turkey
With Switching				
1961		Jordan	Tunisia	Tunisia
		Tunisia		
1970		Algeria	Algeria	Tunisia
		Jordan	Tunisia	Turkey
		Tunisia		
		Turkey		
1980				
1990				Algeria

ISRAEL				
Without Switching				
Base Year				
	1970	**1980**	**1990**	**2000**
1961	Iran			
	Morocco			
1970		Algeria	Syria	Syria
		Jordan	Tunisia	Tunisia
		Morocco		
		Syria		
		Tunisia		
1980			Turkey	
1990				Egypt
				Iran
				Syria
				Tunisia
With Switching				
1961				
1970				
1980				
1990				

Table A5
Strongly Converging Pairs for Jordan and Morocco

JORDAN				
Without Switching				
Base Year				
	1970	**1980**	**1990**	**2000**
1961	Egypt	Morocco	Egypt	Morocco
		Syria	Syria	
		Turkey		
1970		Algeria	Algeria	Algeria
		Israel	Egypt	Iran
		Tunisia	Iran	Jordan
		Turkey	Syria	Morocco
1980			Egypt	Morocco
			Syria	
1990				Algeria
With Switching				
1961		Egypt	Morocco	Egypt
		Iran		Syria
		Tunisia		
1970		Iran		Egypt
				Syria
1980			Morocco	Egypt
				Syria
1990				Syria

MOROCCO				
Without Switching				
Base Year				
	1970	**1980**	**1990**	**2000**
1961	Algeria	Iran	Algeria	Algeria
	Israel	Jordan	Iran	Iran
	Tunisia	Syria	Turkey	Jordan
	Turkey	Turkey		
1970		Iran	Algeria	Algeria
		Israel	Egypt	Iran
		Turkey	Iran	
			Syria	
1980			Algeria	Algeria
			Egypt	Iran
			Iran	
			Tunisia	
1990				Algeria
With Switching				
1961			Jordan	
1970				Egypt
				Syria
1980				Jordan
				Egypt
1990				Syria

Table A6
Strongly Converging Pairs for Syria and Tunisia

SYRIA

Without Switching

Base Year	1970	1980	1990	2000
1961		Jordan	Algeria	Algeria
		Morocco	Jordan	Egypt
		Turkey	Iran	Iran
				Turkey
1970		Algeria	Algeria	Algeria
		Iran	Egypt	Egypt
		Israel	Iran	Iran
		Turkey	Israel	Israel
			Jordan	Turkey
			Morocco	
			Turkey	
1980			Iran	Algeria
			Jordan	
1990				Algeria
				Egypt
				Israel
				Turkey

With Switching

1961				Jordan
1970				Jordan
				Morocco
1980			Egypt	Egypt
				Jordan
1990				Jordan
				Morocco

TUNISIA

Without Switching

Base Year	1970	1980	1990	2000
1961	Morocco	Algeria	Algeria	Turkey
		Israel	Turkey	
1970		Algeria	Algeria	Israel
		Israel	Israel	Turkey
		Jordan	Turkey	
1980			Algeria	Egypt
			Egypt	Iran
			Morocco	
1990				Iran
				Israel
				Turkey

With Switching

1961		Jordan	Iran	Iran
		Turkey		
1970		Iran	Iran	Iran
		Turkey		
1980				Turkey
1990				

Table A7
Strongly Converging Pairs for Turkey

TURKEY				
Without Switching				
Base Year				
	1970	**1980**	**1990**	**2000**
1961	Morocco	Egypt	Morocco	Egypt
		Jordan	Tunisia	Syria
		Morocco		Tunisia
		Syria		
1970		Egypt	Syria	Egypt
		Jordan	Tunisia	Syria
		Morocco		Tunisia
		Syria		
1980			Israel	
1990				Egypt
				Iran
				Syria
				Tunisia
With Switching				
1961		Tunisia		
1970		Iran		Iran
		Tunisia		
1980				Tunisia
1990				