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Exchange Rate Regime and Competitiveness of Manufactured Exports: The case of MENA Countries

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Summary

In this paper, we show that MENA countries have been characterized by a significant overvaluation of their currency during the 70s and 80s. For this purpose, we have developed an indicator of misalignment based on the estimation of an equilibrium exchange rate — following Edwards (1989) — on a panel of 53 countries, among which 10 are MENA economies. Overvaluation has however decreased in the 90s, probably due to the flexibilisation of the exchange rate regime in some MENA countries and to a better macroeconomic management in others. Misalignment remains nevertheless higher than in other regions, which may be explained by the delay of the MENA region in adopting more flexible exchange rates, as well as in reforming their economy. Our study illustrates that overvaluation had a cost for the region in term of competitiveness. This has been done through the estimation of an export equation, which shows that manufactured exports have been affected by the overvaluation of the exchange rate. This finding partly explains the lower diversification of some economies at some period of time and highlights the need for improved management of the exchange rate regime. In fact, countries that had already a more diversified economy, have benefited, specially in the 90s, from the reduction of the overvaluation of their currency.

JEL Classification: F31, F32, F34, F41, O11, O53

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1. Introduction

Recent assessments of economic policies and performances in developing countries have underlined the crucial issue of the management of the real exchange rate (RER). It has been shown that best performers are countries which have maintained an "appropriate" RER ─ i.e., close to the equilibrium real exchange rate (ERER) (Williamson, 1985; Harberger, 1986; Razin and Collins, 1997). In particular, all countries that have been successful in promoting manufactured exports avoided real exchange rate overvaluation[1].

In fact, RER misalignment ─especially overvaluation─ is damaging to economic performance because it decreases the profitability of production and export of tradable goods. In this way, RER misalignment leads to a reduction in economic efficiency and a misallocation of resources. But RER misalignment ─ by increasing uncertainty and raising the risk of macroeconomic collapse ─ can also hinder growth through deterioration of domestic and foreign investment, as well as contribution to capital flight. These negative effects of misalignment on growth and export performance have been shown by Edwards (1988), Cottani, Cavallo and Khan (1990) and Ghura and Grennes (1993) for different groups of developing countries.

In addition to misalignment, the inconsistency of macroeconomic, trade and exchange rate policies increases the variability of the RER ─ which in turn can affect growth. Higher RER volatility sends confusing signals to economic agents. It rises the uncertainty of long-run investments, as well as the one of the profitability of producing tradable goods. The sensitivity of export performances to RER volatility has been highlighted in the case of various economies by Ghura and Grennes (1993), Grobar (1993), Cushman (1993) and Gagnon (1993).

The harmful incidence of RER misalignment on exports of the MENA economies is well confirmed by our study. We show that ─ during the past decades ─ MENA countries have experienced substantial RER misalignment, with a net tendency to overvaluation of their RER. This had a negative significant impact on manufactured products exports growth, and less significantly when total exports are considered. This would have resulted in slower economic growth, as manufactured products exports have become a major factor of economic growth in developing economies, among which a larger number have now entered successfully the world markets[2].

[1] See for example Balassa (1990) and Reinhardt (1995) for empirical evidences in both developed and developing countries.

[2] In fact, export diversification ─ through promotion of manufactured exports ─ is an important factor of sustained growth for different reasons. *First*, income elasticity of demand is higher for manufactured goods

Our findings bring new empirical evidence on the subject of misalignment and exports growth ─ particularly in the case of MENA countries since no work (to our knowledge) has been previously undertaken in this area. These results have been obtained through the estimation of an export equation on a panel of 53 countries among which 10 are MENA developing economies. Our calculation covers the period 1970/80 ─ depending of the countries ─ to 1999, during which tremendous changes in trade and exchange rate policies have been observed.

For this purpose, we provide a more accurate measure of the gap (or misalignment) between RER and its equilibrium level (ERER). The estimates of ERER and of RER misalignment are based on a reduced form approach. RER behaviour is modelled using an equation which includes both the role of "fundamental" factors in the middle/long term (terms of trade, investment, capital flows, trade openness …) and the less persistent impact of short term variables (macroeconomic policies, nominal devaluations,…). The ERER is then computed using this equation, by eliminating the effect of transitory variables and using estimates of "sustainable" or "long term" values of the fundamental variables. This approach, initiated by Edwards (1989), has been extended by Elbadawi (1994) and Baffes, Elbadawi and O'Connel (1997) [3].

The use of this approach represents also a new contribution to the study of exchange rate policy in MENA economies, since previous ones are few and generally based on a time series approach (Mongardini, 1998; Domac and Shabsigh, 1999; Sorsa,

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than for primary products. Growth in foreign income are expected to improve by this way the growth prospects of the country's manufactured exports. *Second*, both price elasticity of demand and supply are presumed to be higher for manufactured goods than for primary commodities. This implies a stabilising effect on the terms of trade and a more stable growth of exports over time. *Third*, the development of the manufacturing sector involves substantial prospects for dynamic productivity gains through economies of scale, learning effects and externalities among firms and industries. See Nishimizu and Robinson (1986) for cross-country evidence at a two-digit industry level of positive correlation between export growth and TFP changes.

[3] An alternative methodology could be to calculate the "*fundamental equilibrium exchange rate"* - FEER), which is consistent with external and internal equilibrium of the economy in the middle/long term. This approach assumes ex-ante equilibrium of the balance of payments and calibration of current account balance and sustainable capital flows so as to be consistent with full employment and low inflation (internal equilibrium). The RER is assumed to converge toward this "fundamental equilibrium" level in the middle/long term. This approach was developed by Williamson (1994) and, with the concept of "natural real exchange rate" (Natrex), by Stein (1994).

Although this approach may be useful to assess consistency between macroeconomic policy in the long run and exchange rate policy, one important drawback is that this methodology assumes a particular evolution of the fundamentals, which in fact may not be in line with the actual features of the economy (full employment, low inflation). In this respect, the FEER may rather be viewed as a "normative" concept. It may well be helpful to assess consistency between macroeconomic policy in the long run and exchange rate policy, but it may provide an inappropriate indicator of the distortions which the economy is actually facing. Conversely, using a reduced form approach allows to take into account an almost comprehensive range of the factors that affect the RER. This methodology can therefore be viewed as a "positive" approach, which provides more accurate measures of the distortions. For a comparison between the two approaches, see Clark and Mac Donald (1998).

1999; Sundararajan, Lazare and Williams, 1999, Achy, 2001)[4]. In addition to the interest of panel data estimations compared to times series[5], our calculations allow some comparative analysis between the different regions, as well as between the MENA countries themselves.

This paper is organised as follows. In the second section, we present our panel data calculations of the RER's long-run equilibrium. In the third section, we discuss the misalignment and volatility of MENA countries' RER, as compared to the other regions. The fourth section presents our estimation of the impact of RER misalignment and of RER volatility on the export performance of the economies. We illustrate that misalignment had a negative influence on manufactured exports of the MENA countries. The fifth section concludes.

2. Modelling the Long-Run Equilibrium of the RER

The long-run equation explaining the RER behaviour is based on Edwards (1994) who has developed a dynamic model of RER determination for a small, open economy with a single nominal exchange rate system. The model allows for both real and nominal factor to play a role in the short run. In the long run, only real factors — the "fundamentals" — influence the ERER. In our case, the long run relation is specified as follows[6]:

$$\ln (e_t) = c + a_1.\ln (Inv_{i,t}) + a_2.\ln (Open_{i,t}) + a_3.\ln (TOT_{i,t}) + a_4.Capinf_{i,t} + a_5.\ln (DebtServ_t + \varepsilon_{i,t}. \quad (1)$$

with:

- e_t = bilateral RER between the country concerned and the United States, measured as the ratio of the consumption price index in the country (P_{Dt}) to the wholesale price index in the USA (P_{wt}), multiplied by the nominal exchange rate in local currency / US$ (E_t.). These prices indices are, respectively, used as proxies of the price of non-tradable goods (P_{Dt}) and the price of tradable goods ($P_{wt}.E_t$,).

  $RER_t = (P_{Dt}) / (P_{wt}.E_t,)$.

- Inv_t = Investment ratio to GDP;

[4] See Sekkat and Varoudakis (2002) for a panel data approach of the misalignment of North African countries.

[5] The "comparative advantage" of panel data regressions compared to time series estimations can be seen: firstly in the double dimension of the sample (time series-cross section) which improves estimates by adding information; secondly, in the country dummies variables which generally ask for an important number of degree of freedom and which improves the results of the estimations.

[6] The short-run dynamic of the RER has also been estimated through an error correction model (Equation (A3-1) in *Annex* 3. Results are shown in Table A.3.

- $Open_t$ = Indicator of trade openness, measured as the sum of imports and exports divided by GDP. An improved measure of policy induced trade openness has also been tried (Equation 1'). This indicator (TP_t) has been built from Frankel and Romer (1999). It consists in adjusting the previous proxy for the size of the country and the distance from markets calculated as "Natural Trade Openness" by these authors.

- TOT_t = External terms of trade, measured as the ratio of export to import prices (in dollars);

- $Capinf_t$ = capital inflows calculated as the net change in reserves minus the trade balance scaled by GDP[7];

- $DebtServ_t$ = debt service to total exports,

- c = intercept, a_1 to a_4 = parameters, t = time index and ε_t = error term.

Following Edwards (1989), we assume that — in the long term — an increase in the investment rate (Inv_t) results in an increase in the demand and in the relative price of non-tradable — thus appreciating the real exchange rate. This assumption implies that as the investment rate grows, investment is increasingly constituted of non-tradable products (such as for example services and construction) and relatively less of tradable goods (such as equipment). It can also be due to the multiplier effect of the investment which rises the aggregated demand of non-tradable products principally.

The RER is positively affected by trade restrictions, which implies a negative sign on the coefficient on the proxy for trade openness measured as the ratio of imports plus exports to GDP ($Open_t$). Same sign is expected for the improved measure of policy induced trade openness (TP_t).

The impact of the terms of trade (TOT_t)on the RER is more ambiguous, since there are two opposite effects: an increase in the relative price of export goods to imports goods leads to an appreciation of the RER if the income effect — which results in higher demand for non-tradable — dominates the substitution effect — associated with a decline in the relative cost of imported intermediate goods used in the production process of non-tradable.

An increase in capital inflows ($Capinf_t$) — either officially or not — involves stronger demand for both tradable and non tradable goods. They, therefore, lead to a higher relative price of non tradable, and conversely appreciates the RER — as needed for domestic resources to be diverted toward production in the non tradable sector to meet increased demand. On the opposite, a rise in the debt service ($DebtServ_t$) — which

[7] An increase in net capital inflows may result from: a) an autonomous augmentation in foreign aid. foreign voluntary lending or FDI; b) an increase in borrowing due to the removal of domestic capital controls; c) a fall in the world interest rates; or d) an increase in public borrowing to finance the fiscal deficit.

captures the impact of the debt relief which is important in many MENA countries ─ contributes to depreciate the RER.

The existence of this long-term relationship implies that variables of Equations (1) and (1') are cointegrated. It is therefore required to determine the order of integration of the series. Table A-1 in *Annex* 2 provides the results of the Augmented-Dickey-Fuller (ADF) tests of the data for our sample of 53 countries over 1970/80 (depending on the countries) to 1997. We used the Im, Pesaran, and Shin (1997) methodology ─ which provides critical values of ADF tests in the case of heterogeneous panel data. The results indicate that the series are stationary at either the 1% or 5% levels, which allowed to run Equations (1) and (1'). We then used the Engel and Granger (1991) method to test for cointegration between the variables of Equations (1) and (1'). Cointegration tests have been based on the residuals of the two equations. ADF tests conclude ─ using also Im, Pesaran, and Shin (1997) critical values ─ that residuals are stationary (see Table A-1 in *Annex* 2).

Table 1 : Estimation Results of the Cointegrating Equations (1) and (1')
Dependant variable: $\ln(e_t)$

Variable	**Eq (1)**	**Eq (1')**
$\ln(Inv_t)$	0.09	0.11
	(2.0)	*(2.3)*
$\ln(Open_t)$ or $\ln(TP)$*	-0.71	-0.32*
	(14.4)	*(6.7)**
$\ln(TOT_t)$	0.23	0.24
	(4.9)	*(4.8)*
$Capinf_t$	0.45	0.5
	(4.5)	*(4.7)*
$\ln(DebtServ_t)$	-0.18	-0.14
	(9.9)	*(7.5)*
Adjusted R^2	0.63	0.55
Fischer test	25.9	19.1
Haussmann test	20	18.8

Note: Student *t* statistics are within brackets. The number of observations used in eq (1) and (2) are respectively 1092 and 1080. Data have been compiled from WDI, GDF, GDN and LDB World Bank databases.
Source; Authors'estimations

Hence, Equations (1) and (1') describe the long-run relationship between RER and a number of fundamental variables. The equations were estimated on an unbalanced panel of 53 countries ─ among which 19 are African countries (8 CFA and 11 non CFA), 13 Latin America countries, 10 Asian countries, 11 MENA countries (of which 10 developing) (see *Annex* 1 for the list of countries)[8]. The results of the regressions ─

[8] The countries have been selected on the criteria of their level of income per capita. To preserve a kind of coherence of the sample, we have chosen most of the time intermediate income countries in order to be comparable to the ones of the MENA region.

using the White estimator to correct for the heteroscedasticity bias ─ are presented in Table 1. The equations were estimated by using the fixed effect methodology[9]. The estimated regressions explain a fairly large amount of the observed variation of the RER.

Estimated relationships between RER and its fundamentals are consistent with theory: an increase in investment and in capital income, or an improvement of the terms of trade result in a RER appreciation ─ which indicates, in the latter case, that the income effect dominates the substitution effect. Conversely, the opening of the economy and the increase in the debt service lead to a RER depreciation.

3. RER misalignment

The misalignment (MIS) of the real exchange rate (RER) is measured as the percent difference between the RER and its equilibrium value (ERER) :

MIS = (RER / ERER) -1

The estimations of the long-term relationship between the RER and its fundamental determinants have been used to compute the ERER based on equation (1) To this purpose, the "sustainable" or "equilibrium" values of the fundamental variables had to be assessed. The idea is that the deviation of the fundamental variables from their "equilibrium" ─ in addition of the variations of the short term economic policy variables (see the estimation of the error correction model through Equation (A3-1) in *Annex* 3) ─ leads to a misalignment of the RER. The "permanent" values of the five fundamental variables ─ i.e., Inv_t, $Open_t$, TOT_t, $Capinf_t$, $DebtServ_t$ ─ were computed using moving averages of the series over a three years period. This simple method was possible because our series are stationary[10].

[9] This is supported by the data as shown by the Fischer test of equality of intercepts across countries and preferable to the random effect methodology, as revealed by the value of the Haussmann test.

[10] Other attempts consisting in an "economic" determination of these "sustainable" levels, inspired by Edwards, 1988, which consists for example to take as sustainable value for openness the average of the three higher values of the variable, or in the case of capital inflows, zero if the rate of growth of the economy is inferior to the international interest rate ─ which means in this case that borrowing is not sustainable─ did not give better results as far as misalignment is concerned. They are not presented here.

Our calculation of misalignment has been adjusted according to a base year, where the RER could be considered close to its equilibrium level. This has especially been the case in periods following devaluations and structural adjustment where balance of payment was also close to the equilibrium. . For example, it has been considered that RER was in equilibrium in 1989 in the case of *Morocco*. This period has been 1991 and 1994-95 in *Algeria*; 1993-94 in *Egypt*; 1995 in *Iran;* 1992 in *Jordan;* 1980, 1994 and 1997 in *Tunisia* The method used to determine the probability of such event has been to consider the period of time where the difference between the observed and the sustainable value of the fundamental variables was very small.

Some more sophisticated calculations consist ─ when a variable has a unit root ─ in using times series techniques introduced by Nelson (1981) where variables are decomposed into a random walk with a drift and a stationary component. This technique allows ─ unlike the trend stationary model based

Following this methodology, an excessive trade protection, an unexpected appreciation of the terms of trade, an increase in investment and in capital flows or a reduction of the debt service ─ in comparison to the "normal" or long term trend in the economy ─ lead to an overvaluation of the RER. It can also be shown from the estimation of the error correction model (Table A-3 in *Annex* 3) that ─ in the short run ─ nominal devaluations (*Dev*), black market premium (*BMP*) and inflation (*Infl*) explain the deviations of the RER from the ERER.

The results confirm that ─ during the past three decades ─ the MENA countries of our sample have on average experienced substantial overvaluation of their RER ─ around 29 % per year from the mid 1970s to the mid-1980s and 22 % per year from the mid 1980s to 1999 (see Table 2 below). Globally, the extent of overvaluation does not seem to have significantly decreased during the 1990s ─ contrary to the Latin American, African or Asian economies of our sample. In addition, overvaluation remains higher than in the other regions, except than in CFA Africa (see next section for individual MENA countries experience).

Table 2: Average Misalignment and Volatility

1975/80*- 84 (in % per year)**	**Misalignment**	**Volatility**
MENA	29	7.9
Latin America	20	11.2
Africa (CFA)	61	12.7
Africa (non CFA)	29	11.3
South Asia	43	13
South-East Asia	10	5.4

*Depending on the countries.

1985-99 (in % per year)*	**Misalignment**	**Volatility**
MENA	22	12.4
Latin America	10	12.9
Africa (CFA)	28	14.5
Africa (non CFA)	13	16
South Asia	15	8.3
South-East Asia	5	8.6

Source; Authors'calculations

On the contrary, volatility of exchange rate has generally been lower in the MENA region (see Table 2 below). This can surely be explained by the less flexible exchange rate regimes of these countries. This conclusion should, however, be nuanced . In particular during the second sub-period, the volatility of the exchange rate in the MENA region is not very different from that in Latin American countries and is higher than in Asian economies.

decomposition ─ the steady state growth path of the series to shift over time. Fluctuations around the shifting permanent path reflects cyclical effects.

4. RER Management and Manufactured Export Performances

4.1. Manufacturing exports in the MENA countries

Table 3 shows data about the performance of some MENA countries in terms of manufactured exports. Over the last three decades success in increasing these exports and diversifying the economies varied widely between the countries.

Tunisia has been the most successful, along with Jordan, in increasing its exports of manufactures. Tunisian manufactured exports rose in average from 24.5% of total exports in the 1970s to 75% in the 1990s (4.6% of GDP to 21.2 %, see Table 3). If the performance of Jordan seems less impressive than in Tunisia, the increase in manufactured exports are in fact comparable in percentage of GDP (although the level of exports to GDP remains lower). Morocco has also increased significantly its exports during the 1970s and 1980s, but these gains have slowed in the 1990s.

Table 3: Average Manufactured Exports of Selected MENA Countries

	Algeria		**Egypt**		**Iran**		**Jordan**		**Morocco**		**Tunisia**	
	%X	%GDP	%X	%GDP	%X	%GDP	%X	%GDP	%X	%GDP	%X	%GDP
1970-79	3.0	0.6	27.1	3.1	2.9	0.6	25.8	1.9	16.0	2.1	24.5	4.6
1980-89	1.5	0.3	19.2	1.5	4.0	0.3	42.7	5.4	39.4	6.0	49.4	11.7
1990-99	3.3	0.8	36.6	2.4	6.6	1.5	48.9	9.5	52.9	7.5	74.9	21.2

* For the 1st sub-period, four values were missing for *Iran* (1970, 71, 72 and 73). ** As far as the 3rd sub-period, two values were missing for *Iran* (1991 and 92) and one for Jordan (1996).
Source: Authors' calculations

In Egypt manufactured exports increased slowly throughout the period, growing from 27.1% of total exports in the 1970s to only 36.6% in the 1990s (and decreasing in fact from 3.1 % of GDP to 2.4 %, see Table 3).

The two major oil exporting countries, Algeria and Iran, performance is the most dismal, as their exports of manufactures remained negligible throughout the period.

4.2. Modelling Exports of Manufactured Products

Overvaluation had a cost for the MENA countries that we would like to quantify. As seen previously, manufactured exports should suffer from RER misalignment and volatility. We use the following model to test for these effects:

$$\ln(X_t) = c + b_1.\, GDPgrTP_{i,t} + b_2.\, ln(TOTn_{i,t}) + b_3.\, ln(Inv_{i,t}) + b_4.\, ln(Roads_{i,t}) + b_5.\, ln(H1_{i,t}) + b_6.\, RERVol_{i,t} + b_7.\, ln(RERMis_{i,t}) + \varepsilon_t. \quad (2)$$

The model explains exports to GDP in logarithmic form by:

- the GDP growth rate of the trade partners *(GDPgrTP* $_{i,t}$) which can have a "pulling" role in exports.

- the logarithm of the terms of trade $ln(TOTn_{i,t})$, which improvement increases the profitability of production for export.

- the logarithm of the ratio of investment to GDP [$ln(Inv_{i,t})$], which is conducive to an increase in the overall production capacity, and thereby, to an increase in export capacity.

- the availability of core infrastructures measured by the logarithm of the length of roads [$ln(Roads_{i,t})$ in km per km2)], as well as the availability of human capital, approximated by the logarithm of the average number of years of primary schooling of adult population [$ln(H1_{i,t})$].

- the volatility in the relative prices, approximated by the volatility of the RER (*RERVol*) and calculated as the coefficient of variation of the RER over a five year period[11]. RER volatility increases uncertainty of the profitability of producing tradable goods.

- the distortions in the relative prices, as measured by the RER misalignment (*RERMis*), where overvaluation hampers competitiveness and diverts investment out of the more productive tradable goods sectors. RER misalignment can also disrupt exports by increasing RER uncertainty.

In addition, we controlled for the sample heterogeneity by considering country dummy variables. These variables reflect differences in the quality of institutions or the different endowment in natural resources ─ which can be at the origin of large discrepancies in the "natural propensity" to export. This hypothesis is supported by the data for the manufactured products exports only[12] (see Table 4 below). A dummy variable was also introduced for the years 1974-75 corresponding to the first oil shock.

4.3. Econometric Results

Equation (2) was estimated on our panel of 53 countries over 1970/80 to 99, for both total exports ($Xtot_t$), and manufactured exports ($Xmanuf_t$). The idea is that manufactured exports are more sensitive to competitiveness problems and negatively influenced by RER overvaluation. Because of missing data for some variables, the model

[11] To compute this indicator, some economists use more or less sophisticated regressions techniques, such as the variance of the residual of the regression of the RER on a time trend, or an ARCH modelisation RER behaviour. However, from an empirical point of view, all these measures are highly correlated and the standard deviation or the coefficient of variation measures perform as well as more sophisticated ones (see Kenen and Rodrik, 1986 or Grobar, 1993).

[12] As shown by the value of the Fischer test of equality of intercepts across countries and by the value of the Haussmann test as far as the random effect method is concerned (Table 4).

was finally estimated on two unbalanced panel of respectively 943 and 837 observations[13]. Results are shown in Table 4 below.

Our estimations confirm the negative impact of exchange rate misalignment on total, as well as manufactured exports performances of the countries studied. The coefficient is rather strong in the case of manufactured exports (-0.72), and remains significant as far as total exports are concerned (-0.10). The weaker elasticity in this latter case can be explained by the fact that total exports of goods and services include products that are less sensitive to competitiveness ─ as primary goods and oil products in particular, often owned and managed by governments.

Table 4 : Estimation Results of the Exports Equations
Dependant variables: ln($Xmanuf_t$) and ln($Xtot_t$)

Variable	**Manufactured Exports** ln($Xmanuf_t$)	**Total Exports** ln($Xtot_t$)
$GDPgrTP_{i,t}$	2.83	1.48
	(1.9)	*(2.52)*
$ln(TOTn_{I,t})$	-1.4	0.1
	(0.81)	*(2.49)*
$ln(Inv_{i,t})$	0.87	0.30
	(5.8)	*(8.69)*
$ln(Roads_{i,t})$	0.08	0.10
	(1.4)	*(3.48)*
$ln(H1_{i,t})$	1.92	0.26
	(11.13)	*(5.66)*
RERVol	-0.27	-0.1
	(0.80)	*(1.21)*
Ln(RERMis)	-0.72	-0.10
	(5.75)	*(2.75)*
Year1974	0.25	
	(1.65)	
Year 1975	0.34	
	(1.7)	
Intercept		-1.14
		*(*9.05*)*
Adjusted R^2	0.81	0.13
Fischer test	31.7	78.3
Haussmann test	12.4	0.20

Note: Student *t* statistics are within brackets. The number of observations used in the regressions are respectively 816 and 964. Data have been compiled from WDI, GDF, GDN and LDB World Bank databases.
Source; Authors'estimations

[13] Before proceeding to the estimation of equation (2), we have tested the degree of integration of the series entering into the regression, as well as the existence of a long-term relationship between them. The results of the ADF tests of the variables and the residuals of equation (2) ─ using Im, Pesaran, and Shin (1997) critical values ─ are shown in Table A-2, *Annex2*.

As far as MENA region is concerned, it can be shown that exchange rate policy explains losses in competitiveness and in manufactured exports. For the region as a whole, RER overvaluation has reduced — on average per year — manufactured exports to GDP over the whole period by 18%. That is to say that manufactured exports — which averaged 4.4% of GDP from 1970 to 1999 — could have reached 5.2% of GDP if no overvaluation had taken place. These losses are more concentrated in the 70s and the 80s than in the 90s, due to the higher overvaluation of the currencies during these two sub-periods.

This finding partly explains the lower diversification of some economies at some period of time. In fact, countries that had already a more diversified economy in he 70s — such as *Tunisia*, *Jordan*, *Egypt* and *Morocco* for example (see table 5) — have benefited from the reduction of the overvaluation of their currency. In *Egypt*, the increase in the overvaluation of the exchange rate in the 80s has materialised by a decrease in the manufactured exports as % of total exports. This phenomena has then been inverted in the 90s. In *Jordan*, *Morocco* and *Tunisia*, the rise in diversification in the 80s and the 90s have been accompanied by a reduction in the overvaluation of the currencies (see table 5).

In *Egypt*, loss in competitiveness has cost about 3% of manufacture exports per year in the 70s and the 80s, which means that these exports could have reached 30 and 22 % of total exports (instead of 27 and 19%, see table 5). Same conclusions can been drawn for the other counties. In the case of *Jordan* and *Morocco*, manufactured exports could have achieved 36 and 26 % of total exports (instead of 26 and 16%) in the 70s, as well as 52 and 41.4% (instead of 43 and 39%) in the 80s. In *Tunisia*, the overvaluation of the 90s has cost 8.3% of manufactured exports as percentage of total exports. In the case where no mesalignement had occurred, manufacture exports could have reached 84% of total exports.

The situations of *Iran* and *Algeria* is a bit different. The constant and huge overvaluation of the currency (except in *Algeria* in the 90s due to the flexibilisation of the exchange rate), has surely participated in the low diversification of their exports from oil. However, more important factors explain this phenomena (among which the possibility of a Dutch disease syndrome).

Table 5 : Cost of Misalignment for Selected MENA Countries

	DZA			**EGY**			**IRN**			**JOR**			**MAR**			**TUN**		
	ExpM*	Mis	Cost**	ExpM*	Mis	Cost**	ExpM*	Mis	Cost**	ExpM*	Mis	Cost**	ExpM*	Mis	Cost**	ExpM*	Mis	Cost**
1970-79	3	1.79	-1.7	**27**	**1.15**	***-2.9***	3	1.42	-0.9	26	1.57	-10.5	16	1.49	-5.7	25		
1980-89	1.5	1.59	-0.6	19	1.22	-3.0	4	1.24	-0.7	**43**	**1.31**	***-9.4***	**39**	**1.08**	***-2.4***	**49**	**1.03**	***-1.0***
1990-99	**3.3**	**1.08**	***-0.2***	**37**	**1.09**	***-2.4***	7	1.84	-4.0	**49**	**1.09**	***-3.1***	**53**	**1.10**	***-3.7***	75	**1.16**	***-8.7***
1970-99	**2.6**	**1.49**	**-0.8**	**27.6**	**1.15**	**-2.7**	**4.5**	**1.49**	**-1.8**	**39.1**	**1.25**	**-7.7**	**36.1**	**1.21**	**-3.9**	**49.6**	**1.09**	**-4.8**

Our estimations fail, however, to show the impact of RER volatility on the manufactured, as well as on the total exports of the countries studied. This finding does not confirm several empirical evidences that have been stressed for different groups of

economies [see in particular Ghura and Grennes (1993), Grobar (1993), Cushman (1993) and Gagnon (1993)].Although not significant, this effect being negative, it goes into the direction expected. Consequently in a first analysis, MENA countries less volatility in term of exchange rate, does not seem to have been pay full. This results should, however be nuanced, due to other empirical evidence which shows that volatility has an harmful incidence on exports and growth.

Our results highlight also that total ─ as well manufactured ─ exports are positively influenced by the GDP growth rate of the trade partners, the ratio of investment to GDP and the physical and human infrastructures (proxied respectively by the length of roads and the level of primary education of the population)[14].

Manufactured exports are, however, not sensitive to the improvement of the terms of trade ─ which amelioration could have given an incentive to produce for the tradable sector. This absence of effect can, however, be justified by the inadequacy of the indicator chosen. Terms of trade include prices of exports of agriculture and mining products, which cannot be considered as good criteria to stimulate the manufacturing production.

The pulling effect of the trade partners' GDP growth rate is particular strong in the case of manufactured products exports (elasticity of 2.8), almost the double than for total exports (elasticity of 1.5). This result goes into the direction expected ─ the income elasticity being higher for manufactured products than for other products in the economy.

The same conclusions can be drawn for human infrastructures ─ which improve much more investment profitability and competitiveness of the manufactured exports than of the other sectors of the economy. The particular strong effect of primary education on export performances of the manufacturing sector (elasticity of 1.9 compared to 0.26 in the case of total exports) has to be underlined. This makes of education a key factor for manufactured competitiveness in the developing world.

Physical investment exhibits, as well as expected, a stronger effect on manufactured exports than on total exports. This is the case because investment gives to the economy, ─ and to the manufacturing sector in particular ─ the capability to answer to an increase in the foreign demand.

5. Conclusion

In this paper, we have shown that MENA countries have been characterized by a significant overvaluation of their currency during the years 70s and 80s. Overvaluation has however in average decreased in the 90s, due probably to the flexibilisation of the exchange rate regime in some MENA economies, or to a better macroeconomic management in some others. Misalignment remains nevertheless higher than in other

[14] Surprisingly, in the case of roads, the elasticity for manufactured exports is weekly significant. This can be due to the fact that several MENA countries export oil as an important percentage of their total exports (as well as of their GDP), which exports have lead to construct good infrastructures.

regions of the world (except than in CFA Africa) which may be explained by the delay of MENA countries in adopting more flexible exchange rate, as well as in reforming their economy.

Although many economies have progressively adopted more flexible exchange rate regimes ─ leading to a better management of their RER ─ most of the MENA countries are still implementing (or have for a long time) fixed or adjustable pegs exchange rate policies. At the same time, even if the shift toward more open economies has begun in several of them, this process need to be deepened. This situation reduces manufactured competitiveness and weakens the incentive for exporters to increase their penetration of foreign markets. This is partly the case of oil exporting countries, which have failed to deal with the volatility of their economy and which diversification of exports is still very low. But this also explain the low diversification of other MENA countries in the 70s and in the 80s.

Our study illustrates well that overvaluation had a cost for the region in term of competitiveness. In particular, manufactured exports have been affected by the overvaluation of the exchange rate. These findings confirm the recent assessments of economic policies and performance in developing countries, that underline the crucial issue of the management of the real effective exchange rate. They corroborate the findings regarding growth and manufactured exports developed by Edwards (1988), Balassa (1990), Cottani, Cavallo and Khan (1990) for different groups of developing countries.

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Annex 1

List of countries of the sample

MENA	**AFRI CA**		**ASIA**	**LATIN AMERICA**
ArabUnited Emirates (ARE)	***CFA***	***NonCFA***	*South East Asia*	
Bahrain *(BHR)*	Burkina Faso *(BFA)*	Botswana (*BWA*)		Argentina *(ARG)*
Algeria *(DZA)*	Cote d'Ivoire *(CIV)*	Gambia, The *(GMB)*	Indonesia *(IDN*	Bolivia *(BOL)*
Egypt, Arab Rep. *(EGY)*	Gabon *(GAB)*	Kenya (*KEN*)	Korea, Rep.(*KOR)*	Brazil *(BRA)*
Iran, Islamic Rep.*(IRN)*	Cameroon *(CMR)*	Madagascar (*MDG*)	Malaysia *(MYS)*	Chile *(CHL)*
Jordan *(JOR)*	Ghana (*GHA*)	Mozambique (*MOZ*)	Philippines *(PHL)*	Colombia *(COL)*
Kuwait *(KWT)*	Niger (*NER)*	Mauritius (*MUS*)	Thailand *(THA)*	Costa Rica *(CRI)*
Malta (MLT)	Senegal *(SEN)*	Malawi (*MWI*)		Ecuador *(ECU)*
Morocco *(MAR)*	Togo *(TGO)*	Nigeria (*NGA*)	*South Asia*	Guatemala *(GTM)*
Syrian Arab Republic *(SYR)*		Tanzania (*TZA*)		Mexico *(MEX)*
Tunisia *(TUN)*			Bangladesh *(BGD)*	Peru *(PER)*
			India *(IND)*	Paraguay *(PRY)*
Other countries			China *(CHN)*	Uruguay *(URY)*
Israel (*ISR*)			Sri Lanka *(LKA)*	Venezuela, RB *(VEN)*
			Pakistan *(PAK)*	

Annex 2

Table A-1:
Augmented Dickey-Fuller *ADF* Unit Root Tests for Equations *1 and 1'*

Variable	**ADF statistic**	*k* (1)	**Critical value**(2)	**ADF test**
RER				
$\ln(e_t)$	-1.73	1	-1.69**	I(0)
Fundamentals				
$\ln(Inv_t)$	-1.92	1	-1.82*	I(0)
$\ln(Open_t)$	-1.69	1	-1.69**	I(0)
$\ln(TP_t)$	-3.77	1	-1.82*	I(0)
$\ln(TOT_t)$	-2.15	1	-1.82*	I(0)
$Capinf_t$	-2.79	1	-1.82*	I(0)
$DebtSev_t$				
Other variables				
Def_t	-2.43	1	-1.82*	I(0)
p	-2.76	1	-1.82*	I(0)
$Depr_t$	-3.07	1	-1.82*	I(0)
BMP_t	-2.69	1	-1.82*	I(0)
Residual of estimation (1) (1')	-20.23	1	-1.82*	I(0)

(1) *k* is the number of lags in the ADF test.
(2) Im, Pesaran and Shin (1997) critical values (respectively * 1% and ** 5% level).
Data have been compiled from *WDI*, *GDF*, *GDN* and *LDB* World Bank databases.
Source: Authors' calculations

Table A-2:
Augmented Dickey-Fuller *ADF* Unit Root Tests for Equation *3*

Variable	**ADF statistic**	*k* (1)***k***	**Critical value**(2)	**ADF test**
$Ln(Xmanuf_{i,t})$	-1.76		-1.69**	
$GDPgrTP_{i,t}$	-3.69	1	-1.82*	I(0)
$ln(TOTn_{i,t})$	-2.15	1	-1.82*	I(0)
$ln(Inv_{i,t})$	-1.92	1	-1.82*	I(0)
$ln(Roads_{i,t})$	-3.65	1	-1.82*	I(0)
$ln(H1_{i,t})$	-1.86	1	-1.82*	I(0)
RERVol	-2.83	1	-1.82*	I(0)
Ln(RERMis)	-2.24	1	-1.82*	I(0)
Residual of estimation Res	-3.06	1	-1.82*	I(0)

(1) *k* is the number of lags in the ADF test.
(2) Im, Pesaran and Shin (1997) critical values (respectively * 1% and ** 5% level).
Data have been compiled from *WDI*, *GDF*, *GDN* and *LDB* World Bank databases.
Source: Auhors'calculations

Annex 3

The Short-Term Dynamics of the RER

Since our variables are cointegrated, the short-term dynamic adjustment of the RER toward its equilibrium level can be estimated through an error correction model to study. The estimated equation is as follows:

$$\begin{aligned}
&\Delta\ln(e_{i,t}) = - a\,[\ln(e_{i,t-1}) - \ln(e^*_{i,t-1})] \\
&+ a'\,\Delta\ln(e_{i,t-1}) \\
&+ b_1.\Delta\ln(Inv_{i,t}) + b_2.\Delta\ln(Open_{i,t}) + b_3.\Delta\ln(TOT_{i,t}) + b_4.\Delta\ln(Capinf_{i,t}) + b_5.\Delta\ln(DebtSev_{i,t}) \\
&+c_1.\Delta\ln(Inv_{i,t-1})+c_2.\Delta\ln(Open_{i,t-1})+c_3.\Delta\ln(TOT_{i,t-1})+c_4.\Delta\ln(Capinf_{i,t-1})+c_5.\Delta\ln(DebtSev_{i,t-1}) \\
&+ d_1.\,Depr_{i,t} + d_2.\,Depr_{i,t-1} \\
&+ e_1.\,Infl_{i,t} + e_2.\,Inf_{i,t-1} \\
&+ f_1.\,Def_{i,t} + f_2.\,Def_{i,t-1} \\
&+ g_1.\,BMP_t + g_2.\,BMP_{i,t-1} + \varepsilon_{2t}. \qquad \text{(A3-1)}
\end{aligned}$$

In addition to the error correction term, i.e., the lagged error term of the cointegrating equation $[\ln(e_{t-1}) - \ln(e^*_{t-1})]$, and lagged variables of Equations (1) and (2) in first differences, we include indicators of fiscal policy (fiscal deficit as percentage of GDP, *Def*) and of exchange rate policy (nominal depreciation, *Depr*, and black market premium, *BMP*), as well as inflation(*Infl*). Our assumption is that the adjustment path of the RER toward its equilibrium level may be affected (accelerated or slowed down) by short-term economic policies, including capital controls (from which *BMP* is a proxy), nominal exchange rate depreciation and fiscal policy of which inflation can be a consequence**.** Table A-3 below shows the estimates of the error correction model.

Nominal devaluations exert a short-run impact on the RER which is in the expected direction and significant. The change in the official nominal exchange rate (NER) hence captures the strong temporary effect devaluation may exert on the RER due to price rigidities.

In addition, these estimations highlight the role of other short term economic policies through the black market premium (*BMP*) and the inflation (*Infl*). These variables (*Infl*, *BMP*), by leading to a rise in the price of non tradable goods, appreciates the RER and leads to its overvaluation. Although public deficit do not show a significant effect, it can been captured by the inflation variable, which effect is strong and which is also supposed to be a proxy for some other "bad" policies.

Table A-3 : Estimates of the Error Correction Model

Dependant variable: $\Delta\ln(e_t)$

Variable	Eq (1)		Eq (1')	
	Elasticity	**Student**	**Elasticity**	**Student**
ε_{1t-1}	-0.13	(7.29)	-0.2	(9.7)
$\Delta\ln(Inv_t)$	0.04	(1.42)	0.2	(0.78)
$\Delta \ln(Open_t$	-0.27	(6.97)	-0.5	(14.53)
$\Delta\ln(TOT_t$	0.1	(2.7)	0.1 5	(4.8)
$\Delta (Capinf)$	0.006	(1.27)	0.25	(3.8)
$\Delta\ln(DebtSev_t)$			0.02	(1.81)
$\Delta\ln(Inv_{t-1})$	0.01	(0.33)	0.03	(1.2)
$\Delta \ln(openv_{t-1})$	0.06	(1.57)	0.02	(0.5)
$\Delta\ln(TOT_{t-1})$	0.02	(0.72)	0.04	(1.4)
$\Delta (Capinf_{t-1})$	0.78	(1.81)	-0.33	(5.1)
$\Delta\ln(DebtSev_{t-1})$			0.04	(2.1)
$\Delta\ln(e_{t-1})$	0.06	(1.64)	0.16	(4.9)
$Depr$	-0. 22	(18.0)	-0.04	(10.9)
$Depr_{t-1}$	-0.05	(8.0)	0.006	(1.4)
$Infl_t$	0.19	(17.8)	0.04	(10.4)
$Infl_{t-1}$	0.05	(7.91)	-0.007	(1.6)
Def_{t-1}	0.05	(0.38)		
Def_t	0.05	(0.44)		
BMP_t	0.006	(2.5)	0.12	(5.5)
BMP_{t-1}	0.21	(0.86)	-0.003	(1.47)
D- W	1.74		2.03	

Note: Student *t* statistics are within brackets. The sample includes respectively 640 and 828 observations over 1970-1997 period. * ε_{1t-1} is the lagged error term of the cointegrating Equations (1) and (2). Data have been compiled from WDI, GDF, GDN and LDB World Bank databases.

Source; Authors'estimations