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The Choice of the Exchange Policies in the Primary Commodity Exporting Countries: Study of the Competitiveness in Morocco

Mariam Ouchen [1, 2] *

1. Cadi Ayyad University, Marrakech Morocco.
2. University of Basel Switzerland.

* E-mail of the corresponding author: mariam.ouchen@gmail.com

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Abstract

The purpose of this paper is to estimate the equilibrium real exchange rate and derive the degree of misalignment for the Moroccan Dirham. Our estimate suggest that the fixed exchange rate regime adopted by Morocco since 1973 is not responsible for stagnating exports and trade deficit since the Dirham is close to its equilibrium level. These findings while exonerating the exchange rate from being a cause of low growth and not sufficiently dynamic exports sector, should lead us to consider other factors that could explain the low economic performances.

Keywords: real exchange rate misalignment, fixed exchange regime, competitiveness, trade deficit, autoregressive distributed lag (ARDL). Specialization in exports on clothes and textile, dependence on imported capital goods and energy product.

1. Introduction

This paper aims at contributing to the future exchange rate regime in Morocco by computing the equilibrium real exchange rate based on macroeconomic fundamentals and assesses the degree of misalignment of the Dirham in the spirit of equilibrium real exchange rate put forward by Montiel (1999), Baffes and al (1999) and Edwards (1989).

The structure of the remainder of the paper is as follows: the theoretical framework is given in section I, while section II provides details on sources of data and research methodology. Empirical results have been discussed in section III.The concluding observations have been furnished in section IV.

2. Theoretical Review on the Determinant of Real Exchange Rate

2.1 Definitions and Measurements of Real Exchange Rate

According to Montiel (1999), Baffes and al (1999) and Edwards (1989), the real exchange rate is the price of tradable goods relative to that of non-tradable goods. That is:

$$RER = e(\frac{PT}{PN})$$

Where: RER is the real exchange rate (bilateral), e is the nominal exchange rate, P_T is the price of tradable goods and P_N is the price of nontradable goods. This definition summarises incentives that guide resource allocation across the tradable and nontradable sectors. The idea is that an increase in the RER increases profitability of the tradable sector relative to the nontradable sector.

The literature defines the long-run equilibrium real exchange rate as the rate that prevails when the economy is in internal and external balance for sustainable values of policy and exogenous variables. Internal balance holds when the market of nontraded goods is in equilibrium. This occurs when:

$Y_N(e)=C_N+G_N$. (1)

Where Y_N the supply of nontraded goods under full employment is, C_N is private spending on nontraded goods.

To define external balance, we begin with the current account surplus, which is given by f=b+z+r.f (2)

Where f is total net foreign assets, b is the trade balance, z is net foreign aid received by the government and r is the real yield on foreign assets measured in traded goods. The trade balance is the difference between domestic production of traded goods Y_T, and the sum of government and private spending on these goods.

$Bc = Y_T(\text{rer}, p) - C_T - g_T$. (3)

In Montiel's model, the transactions costs (τc)associated with private spending motivate the holding of domestic money, which would otherwise be dominated in rate of return by foreign assets. External balance has been defined in various ways in literature. The most useful approach for our purposes is that of Montiel, Edwards (1989), and Rodriguez (1994) who defines external balance as holding when the country's net creditor position in world financial markets has reached steady state equilibrium. We can solve for the combinations of private spending and the real exchange rate that are consistent with this notion of external balance by holding f at its steady state level and setting the right-hand side of equation 3 to zero and combining this with equation 2 we

obtain :

$e *= e(g_n, g_T, rf + z, \tau)$ (4)

The relative price of exports and imports is given by: $P_X/P_M = \frac{\emptyset}{n}$, $\emptyset = \frac{PX}{PM}$ $n = \frac{1+tm}{1-tX}$.When $\emptyset$ is the external terms of trade and n is a parameter summarizing the stance of domestic trade policy. The equilibrium real exchange rates for imports and exports can then be written as functions of the set of fundamentals identified above, along with $\emptyset$ and n. Equation (4) then becomes $e *= e(g_n, g_t, rf + z, \tau, \emptyset, \eta)$.

Equation 4 captures the main fundamentals which determine the long run equilibrium RER.

An increase in government spending of nontraded leads to a higher price of non-tradable which appreciate the real exchange rate. A rise in private spending generates a current account deficit. To restore external balance, the real exchange rate must depreciate. An increase in transactions costs and the protection measures leads to an appreciation of the real exchange rate.

The terms of trade affect the real exchange rate through income effect and substitution effect.

The income effect: an improvement in the terms of trade increases national income measured in imported goods. This exerts the spending effect that raises the demand for goods and appreciates the real exchange rate.

The substitution effect: the income effect can be overcome by substitution effect on the demand in supply sides, leading to an overall real depreciation.

2.2 Measurements of Equilibrium Real Exchange Rate

As in the case of the determination of the values of the actual real exchange rate, a major concern in the literature on real exchange rate is the determination of the values of the (long-run) equilibrium real exchange rate and consequently the determination of the degree of misalignment between the equilibrium real exchange rate and the actual real exchange rate. The importance of the (long run) equilibrium real exchange rate hinges on the fact that policy makers are interested in knowing the right nominal exchange rate which ensures that the equilibrium real exchange rate coincides with the actual real exchange rate. Furthermore, policy makers are interested in knowing whether the currency is overvalued or undervalued, so that they can determine how to clear the misalignment since the misalignment creates distortions in the economy. These include poor export performance, low agricultural output, high import growth, destabilization of the capital account and potential for debt crisis, breed of protection against imports, high inflation and promotion of rent-seeking activities (Pfeffman, 1985). This makes a case for having knowledge of not only the value of the actual real exchange rate but also the value of the (long run) equilibrium real exchange rate. If the actual real exchange rate and the equilibrium real exchange rate are different, then the real exchange rate is said to be misaligned. When the equilibrium real exchange rate is higher (or lower) than the actual real exchange rate the real exchange rate is said to be overvalued (or undervalued). In the case of an overvalued real exchange rate, devaluation of the nominal exchange rate is often recommended under a fixed exchange rate regime, while in the case of under valuation revaluation is recommended in order to clear or reduce the misalignment. The misalignment of the real exchange rate has been measured as the percentage deviation of the real exchange rate from its equilibrium value. Hence real exchange rate misalignment also has ambiguity in its measurement since it depends on the values of the equilibrium and actual real exchange rates. That is:

$$RERM = \left(\frac{RER_{t-} \; ERER_t}{ERER_t}\right) x100$$

Where RERM is rate real exchange misalignment, ERER is the equilibrium real exchange rate, RER is the actual real exchange rate and t is the time subscript.

3. Data description and research methodology

3.1 Data description

The explanatory variables are extracted from a variety of sources including the International Financial Statistics CD-ROM, World Development Indicator CD-ROM and international monetary fund. The time series data we shall be using are annual, cover the period 1965-2011. The six variables in the real exchange rate equation were constructed in the following manner:

The real exchange rates are not readily available for Morocco over long time horizon. Thus, as a first step we construct it, following the method in Bahmani-Oskooee (1998).

The real effective exchange rate (REER) is used to estimate the real exchange rate because it is weighted by the trade shares of exporting partners (thus controlling for third country effect). Moreover, most studies that have estimated real exchange rate models have used the notion of real effective (multilateral) rather than real bilateral exchange rate. Thus, following the method in Bahmani-Oskooee (1998), the real effective exchange rate for country j with i trading partners (REJ) is constructed using the following formula:

$$RE_J = \sum_{i=1}^{15}\left[\lambda_{ij} \frac{\frac{P_j \; E_{ij}}{P_i}}{\left(\frac{P_j \; E_{ij}}{P_i}\right)_{1990}}\right] x100$$

Where P_j is the price level in country j, P_i is the price level in trading partner i, and E_{ij} is the nominal bilateral exchange rate defined as the number of units of i's currency per unit of j's currency. Note that the numerator is the real bilateral exchange rate which is set in an index form by dividing it by its own value in a base year (1990 in our case). The weighted average of these indices is then taken to arrive at the real effective exchange rate. The weights identified by λij are measured by import shares of country j from each of its trading partners such that Σλij=1. Morroco's main trading partner is the European Union. The real effective exchange rates are using yearly data over the 1965-2011 period. Bilateral exchange rate data and consumer price index are drawn from IMF's International financial statistics. The weights are computed from the exchange office database.

It is difficult to find a good proxy for trade policy due to the non-availability of consistent and longer period data on tariff revenues as a proportion of imports. The standard practice in the literature is to proxy exchange and controls by the degree of openness of the economy. This is given by the expression [X + M)/GDP], X is exports and M is imports. This formula is used as an indicator of trade policy restrictions such as tariffs and quotas. Net capital flow is defined as increases in net foreign borrowing scaled by GDP.

A common proxy used in the literature for Macroeconomic policy is money supply, measured by the broad money (M2) scaled by GDP. The data on terms of trade are constructed using the ratio of the price index of exports to the euro Zone to the price index of imports from the same zone. Government expenditure scaled by GDP is used as a proxy for non-tradable consumption by the government. All variables, except net capital flow is taken in logarithm.

3.2 Research methodology

Econometric literature has abundant techniques to investigate relationships among non-stationary macroeconomic variables and prominent among them are :univariate cointegration technique(Engel and Granger(1998)),multivariate cointegration technique (Johansen and Juselius(1990), and Johansen's(1995)) and newly developed autoregressive distributed lag(ARDL)model (Pesaran, Smith and Shin 1999).The recent studies indicate that the ARDL approach is preferable to other conventional cointegration approaches such as Engel and Granger(1987), Johansen(1995)etc. mainly because of its applicability irrespective of whether the regressors are I(0) or I(1).The statistic underlying this procedure is the F-statistic which is used to test the significance of lagged levels of the variables under consideration in an error correction model.Another reason for preferring the ARDL approach is that it is more robust and performs better for small sample sizes(Kumar 2010).

In the present study, ARDL approach (H.Pesaran R.J.Smith and Y.Shin (1999)) has been used for estimating long-run relationship and short-run dynamics. The ARDL approach involves estimating the error correction version of the ARDL model for variables under estimation. The VECM in the ARDL framework of interest could be specified as under:

$$\Delta y_{t=} c_{0+} c_1 t + \pi_{yy} Y_{t-1} + \pi_{yx.x} X_{t-1} + \sum_{i=0}^{p-1} \beta_i \Delta Z_{t-1} + \delta \Delta X_t + \emptyset V_{t-1} + \mu_t \quad (1)$$

Where $Z(Y, X)$ is the set of the dependent and independent variable s, C_0 is the drift, t is the trend π_{yy} and $\pi_{yx.x}$ are the long run multipliers of the lagged levels of the variables. V_{t-1} is the error correction term. μ_t is the perturbation.

The above specification is also based on the assumption that the disturbance μt are serially uncorrelated. It is therefore important that p, the order of the underlying VAR is selected appropriately. There is delicate balance between choosing p to be sufficiently large to mitigate the residual serial correlation problem and at the same time sufficiently small so that the model is not unduly over-parameterized, particularly in view of limited time series data which is available (Appendix II .Table 2). Finally, a decision must be made concerning the time trend in (1) and whether its coefficient should be restricted.

4. Empirical Results

4.1 Estimating the ARDL model

The time series plots of the variables clearly show steadily rising trends (Appendix V). This suggests, at least initially, that the linear trend need to be included in the equation (1). Also, the application of the Unit Root tests to the six variables perhaps not surprisingly, yields mixed results, with strong evidence of the unit root hypothesis only in the case of the real exchange rate(RER) and the money supply(MS), (Appendix I. Table 1). This does not, of course, necessarily mean that the other variables terms of trade (TOT), the degree of openness (OPEN), the government expenditure (EXP) and the net capital flow (NCF) are not likely to have long-run impacts on real exchange rate. Following the methodology developed by Pesaran et shin(1999), it is possible to test the existence of a long-run real exchange rate equation involving all the six variables irrespective of whether they are I(0), I(1) or mutually cointegrated.To determine the appropriate lag length, p, and whether a deterministic linear trend is also required, we estimated the conditional model(1) by the OLS with and without a linear time for p=0, 1 and 2(since the time variables are annual and contain 47 observations).As pointed out

earlier, all the regressions were computed over the same period 1965-2011. Appendix II.Table 2 gives the Akaike's Information and Schwartz's Bayesian Criteria, denoted respectively by AIC and SBC, and the Lagrange multiplier (LM) statistics for testing the hypothesis of residual serial correlation of order 1 and 4. These are denoted by X²sc (1) and X² sc (4) respectively. Both the AIC and the SCB criterion estimate p to be 1 irrespective of whether a deterministic trend term included in the model or not. The X²sc (1) and X² sc (4), also suggest using the lag order 1. So, and in view of the importance of the assumption of serially uncorrelated errors for the validity of the bounds test, it seems prudent to select p to be 1. A higher lag order does not seem necessary. Appendix II Table 2 reports the test results for p=0, p=1 and p= 2. The results in Table 2 also show that there is little to choose between the conditional model with and without a linear deterministic trend. Appendix II Table 3 gives the values of the F and t-statistics for testing the existence of a long-run real exchange rate equation under 3 different cases depending on whether the model contains a linear trend and whether the trend coefficients are restricted (see H.Pesaran R.J.Smith and Y.Shin (1999)), for a detailed discussion of these cases).

The various statistics in (Appendix II Table 2) need to be compared with the critical values bounds provided by Pesaran Shin and Smith (1999, 2000) .First consider the bounds F test. For the model with a deterministic trend, Fv is the standard F-statistic for testing $\pi_{yy} = 0$ and $\pi_{yx.x} = 0$, while FIV is the standard F-statistic for testing $\pi_{yy} = 0$, $\pi_{yx.x} = 0$ and $c_1 = 0,$ in (1). FIII is the same test but without a trend.

Since the model contains 5 regressors, the 95% critical value bounds are (3.28; 4.39) and (3.12; 4.25) for FIV and FV respectively. FV lies outside the 95% upper bound rejecting the null hypothesis that there exists no long-run relationship. FIV falls within the 95% lower bound so, the result is inconclusive. The relevant test statistic is FIII, and its associated 95% critical value bounds are (2.62; 3.79). FIII=0.84, lies outside the 95% lower bound, implying that there is no long-run relationship. The test results support the existence of a long-run equation, when the deterministic trend is included in the model. The two statistics reported in (Appendix II Table 2) t_V and t_{III}, are the t-ratios of the OLS estimate of π_{yy} in (1), with and without a linear trend respectively. The 95% critical value bounds for t_{III} and t_V are (-2.87; -4.19) and (-3.41; -4.25). Therefore, when a linear trend is included in the model, the bounds t-test rejects the null hypothesis. But when the trend term is excluded, the null hypothesis is not rejected.

Overall, the test results support the existence of a long-run equation, when the lag order is 1 and when the deterministic trend is included in the model. The government expenditure is dropped since it does not have long-run impact on real exchange rate. We found that the first lagged change of the net capital flow $\Delta NFA_{t-1}$and the openness $\Delta OPEN_{t-1}$ variable are not significant in any of the regressions. Therefore, for the sake of parsimony and to avoid unnecessary over-parameterization, we decided to re-estimate the regressions without these lagged variables, but including the lagged changes of all the other variables. We provide estimates of the long-run coefficients and the short-run dynamics based on a conditional equation. For this model using the ARDL approach to the estimation of the long-run relations discussed in Pesaran and Shin (1999), Appendix III Table 4 provides the level long-run equation. Furthermore, short-run dynamics from error correction have been estimated within the ARDL framework in Table 5.

The long run coefficient of terms of trade is negative and statistically significant at 1% level of significance. This negative sign tends to corroborate the fact that an increase in terms of trade affects appreciation in the real exchange rate which is in tandem with a priori This negative sign tends to corroborate the fact that an increase in terms of trade affects appreciation in the real exchange rate which is in tandem with a priori .An increase in net capital flow depreciate the real exchange rate in both the short and the long run, which is not in line with theoretical argument that increase in net capital flow leads to higher price level and eventually result into appreciation of real exchange rate. A one percent increase in net capital flow depreciates the real exchange rate by 0, 06% and 0, 01% in the short and long run respectively. The estimated coefficient of openness indicator is negative as predicted by the theory suggesting that the process of opening up of economy by implementing trade liberalization reforms deteriorates the trade balance forcing real exchange rate to depreciate. A one percent increase in openness depreciates the RER by 0, 12% and 0, 3% in the short and long run respectively .Monetary supply a proxy used for macroeconomic policy is found to be significant with it expected sign in both the long and the short-run. The result shows that a one percent increase in monetary supply tends to appreciate the short run and the long-run RER by 0.24 and 1, 42 percent respectively, which is consistent with theoretical argument assuming that expansionary macroeconomic policies may tend to appreciate the RER.

It could be seen in (Appendix IV Table 5) that signs of short-run dynamic impact are consistent with long-run coefficients. Error correction term (ECM) is negative and significant at 1% significant level implying that there is convergence to long-run equilibrium path. The coefficient of the ECM is (-) 0.40 implying that approximately 40 percent of the deviation in RER from the long-run equilibrium level is corrected in the next year. It has also been explored whether actual RER is far away from the RER fitted by the selected fundamentals. It could be

seen from figure2 that actual RER largely follows the fitted RER implying that there has not been any major deviations in the actual RER from its long-run path fitted by fundamentals in Morocco. The results of diagnostic tests are shown in Appendix VII. The results are satisfactory and indicate that the underlying equation performs well by all diagnostic tests.

4.2 Equilibrium exchange rate

So far we have estimated the relationship between real exchange rate and economic fundamentals. To assess the size of misalignment, the aim of the next step is to determine the equilibrium value of real exchange rate (ERER) over the sample period using the long-run parameters estimates and sustainable values of fundamentals. There are number of different ways to compute the long-run sustainable values of the fundamentals. Time series decomposition methods (Beveridge-Nelson technique, moving average and exponential moving average procedures, Hodrick-Prescott filter and Gonzalo-Granger technique) are the most commonly used approaches.

Figure 3 reports the size of misalignment of real exchange rate for the Moroccan Dirham over the period 1965-2011 using sustainable values of the fundamentals as computed on the basis of the methodology presented by Hodrick-Prescott filter (Baum 2006).

The dirham was tied to French Franc until May 17, 1973. The link to the FF was cut on May 17, 1973 and the dirham was pegged to an undisclosed basket of currencies, with the objective of maintaining a relatively stable effective rate for the dirham in relation to a basket of major foreign currencies (Bouoiyour and Rey 2012). On September 23, 1980, the weights in the currency basket, to which the dirham was linked, were changed in order to take into account the changes in Morocco's foreign trade pattern and the structure of currencies used in external settlements (Domaç et Shabsigh, 1999). In 1983, the authorities implemented structural adjustment policies (SAPs), started a gradual depreciation of the dirham. The exchange rate policy during 1980s aimed at achieving substantial, albeit gradual real depreciation of the dirham. Morocco's real exchange rate appears to be undervalued by 0.4% in 1989 (Appendix VI Figure 3), although the nominal exchange rate of the Dirham was officially devalued by 8.9 percent during this year. This movement of depreciation accelerates in 1990s. In 1990, Moroccan authorities forced a second devaluation of 9.3 percent. According to our computation, our estimates indicate that Morocco's real exchange rate was undervalued by 2.03% percent during this year. In January 1993, full current account convertibility was established, and during the year, virtual capital account convertibility was established for non-resident only. A major step toward liberalizing the foreign exchange market was taken with the establishment of the interbank market in June 1996(Domaç and Shabsigh, 1999).

In April 2001, ''the weight of the basket currencies was changed in favour of the euro, to better reflect Morocco's commercial and financial links with the European Union, and resulted in 5% nominal depreciation of the dirham on April 25, 2001" (IMF, 2001) and a real slight appreciation estimated at 0,01% according to our computation. In 2003-2004, the Moroccan government pursued its policy towards currency convertibility by offering the possibility for firms to keep 50 percent instead of 30 percent of this export receipts in foreign currencies for non-residents to subscribe to treasury bonds. These measures were aimed improving the depth of the foreign exchange and financial markets. The peak in 2005 coincides with the negative shock to the textile and clothing sector following the worldwide abolition of quantitative restrictions on exports of textile and clothing that came into effect on January 1, 2005. This leads to a global decrease in foreign textile prices, a decrease in the Morocco's textile exports and consequently a depreciation of the real exchange rate by -0,97% (Appendix VI figure 3) reflecting the vulnerability of the Moroccan economy to demand shocks. To reinforce the coherence of exchange control regulations with Morocco's accelerated commercial and financial integration into the global economy, liberalization measures were taken in 2007.These will make it possible to develop the exchange market through the diversification of financial products and to prepare economic agents for future developments (Bank Al Maghrib 2007). In 2009 in accordance with the article IV consultations IMF (2009), the authorities envisage an eventual move to a more flexible exchange rate regime in order to improve Morocco's competitiveness.

Appendix VI Figure3 plots the misalignment indicator. A positive (negative) value means that the dirham is overvalued (undervalued).

Based on these results, we can assert that the existing exchange regime which consists of pegging the Dirham to a basket of the main partner's currencies has been able to avoid major misalignment and has essentially managed to keep its real exchange rate very close to the equilibrium (Appendix VI figure 2).These findings exonerate the exchange regime from being a cause of low exports and consequently the trade deficit (Appendix VII Figure 4).

5. Conclusion and lessons for policy

The Moroccan authorities made watch of a rather good mastery of the exchange policy as far as real exchange rate does not go away many of its equilibrium rate (Appendix VI figure 2). These findings while exonerating the pegged exchange rate regime from being a cause of low growth and not sufficiently dynamic exports sector, should lead us to consider other factors that could explain the low economic performances such as Morocco's

exports and imports structure. The argument of the IMF that Morocco's competitiveness and trade balance will deteriorate under the current pegged regime is not right. The pegged performed well in terms of competitiveness since it generated an undervalued dirham especially in the last years (Appendix VI Figure 2). The trade deficit is mainly due to Morocco's exports and imports structure reflecting a high specialization in exports on clothes and textile (one third), agricultural products (one fifth), and a high dependence on imported capital goods and energy product. This lack of output and export diversification is likely to weaken the ability of the Moroccan economy to absorb external shocks, in particular rising energy imports. In other words, even if Morocco will adopt a more flexible regime it will not improve its trade deficit since it is mainly due to the rise of energy product imports. A more flexible regime will weaken Morocco's competitiveness, since a large proportion of Morocco's imports is used as inputs in exportable goods. Furthermore, under a more flexible regime, inflation is expected to rise due to the increase of international energy prices (imported inflation).Morocco's imports have been twice exports in recent years, and thus have driven movements in the trade balance (Appendix VII Figure 4).Price effects notably for energy products and raw materials accounted for much of the import growth, but import volumes also increased rapidly in particular for capital goods. To improve trade balance, Morocco should reduce dependence on oil imports through diversification of its energy sources and investment in renewable energy will further reduce external vulnerabilities.

The implications of these findings on the future choice of the exchange rate regime are that the pegged regime seems to be appropriate for the Moroccan economy in terms of competitiveness and inflation.

Appendix I:Table 1[1] : Results of the Test for Stationarity using Augmented Dickey Fuller (ADF) and Phillips Perron (PP (Bartlett Kernel))

Tests	ADF				PP				KPSS			
Variables	Stat	O	TCN	Lags	Stat	O	TCN	Lags	Stat	O	TCN	Lags
RER	-2,37**	**I(1)**	N	4	-6,56***	**I(1)**	C	4	0,45***	**I(0)**	T	0
TOT	-3,21*	**I(0)**	T	1	-3,16**	**I(0)**	C	4	0,39***	**I(1)**	T	0
OPEN	-3,64**	**I(0)**	T	0	-3,68**	**I(0)**	T	0	0,09***	**I(0)**	T	0
MS	-10,4***	**I(1)**	C	0	-10,4***	**I(1)**	C	2	0,16**	**I(1)**	C	
NCF	-3,71**	**I(0)**	T	4	-1,7*	**I(0)**	N	2	0,2*	**I(0)**	T	0
EXP	-2.87**	**I(0)**	C	4	-4,69***	**I(1)**	C	0	0,2*	**I(0)**	C	0
												0

Source: Author's estimates. ***, ** and * implies significant satationarity at 1, 5 and 10 percent respectively.
Stat denotes the t-statistic, O denotes the order of integration, TCN denotes trend, constant and no trend no constant respectively.

Appendix II:

Table 2: Statistics for selecting the lag order of the equation (1)

P	With trend				Without trend			
	AIC	SIC	$X^2sc(1)$	$X^2\,sc(4)$	AIC	SIC	$X^2sc(1)$	$X^2\,sc(4)$
0	-196.02	-186.77	0.47	0.13	-112,79	-105,39	0.82	0.75
1	-258.51	-240.23	P= 0.15	P=0.25	-246.56	-230.10	P=0.82	P=0.75
2	-252.94	-225.84	P=0.8	P=0.15	-234,8	-209,51	P=0.82	P=0,75

P is the lag order of the conditional model (1). X^2sc (1) and X^2 sc (4) are the LM statistics for testing the residual serial correlations of orders 1 and 4. The symbols *, ** and *** represent significance at 1% or less, 5% or less and 10% or less respectively.

[1] These results are computed using Stata 11.

Table 3: F-and t- Statistics for testing the existence of a long-run real exchange rate equation.

	Tests avec tendance			Tests sans tendance	
	F_{IV}	F_V	t_V	F_{III}	t_{III}
P=1	3.88**	4.44***	-4.31*	0.84*	-1,05***

Notes: p is the lag order of the underlying model.FIV is the F-statistic for testing zero restrictions on the coefficients of the lagged level variables and the term trend in equation (1). Fv is the F-statistic for testing 0 restrictions on the coefficients of the lagged level variables in equation (1) without the trend term. tv and t_{III} are the t-ratios of the coefficient of Yt-1 in equation(1) with and without deterministic linear trend. *denotes that the statistic lies below the 95% lower bound, ** denotes it falls within the 95% lower bound and *** denotes that it falls outside the 95% upper bound.

Appendix III Table 4: Estimated Long Run Coefficients using the ARDL Approach[2]

ARDL (1,1,0,0,1) selected based on AIC and SIC Criterion .Dependent variable RER				
Regressor	**Coefficient**	**Standard Error**	**T-Ratio**	**Probability**
TOT	**.**30760*	.086609	3.5515	.001
NCF	-.016091***	.0080681	-1.9944	.053
OPEN	-.29999**	.13681	-2.1928	.035
MS	1.4256*	.15999	8.9104	.000
T	-.019140*	.0016088	-11.8971	.000

Note: *, **, and *** denote statistical significance at 1%, 5% and 10% level, respectively.

Appendix IV Table 5: Error Correction Representation for the Selected ARDL Model

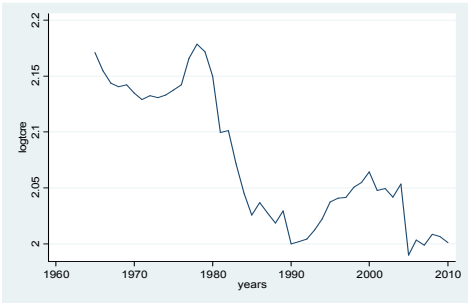
ARDL (1, 1, 0, 0, 1) selected based on AIC and SIC Criterion. Dependent variable Drer				
Regressor	**Coefficient**	**Standard**	**T-Ratio**	**Probability**
dTOT	**.**033112	.046192	.71685	.478
dNCF	-.0065324***	.0035778	-1.8258	.075
dOPE	-.12179**	.053823	-2.2628	.029
dMS	.24949**	.10661	2.3403	.024
dT	-.0077705***	.0015518	-5.0073	.000
ecm (-1)	-.40598***	.072779	-5.5783	.000

Source: Author's estimates (t-statistics are in parenthesis), while ***, ** and * implies significant at 1, 5 and 10 percent respectively.

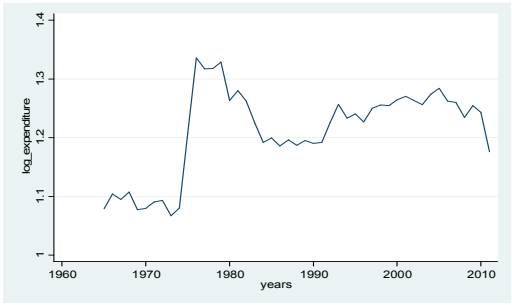
[2] The long run estimates and the standard errors are computed using Microfit 4.0. See Pesaran and Pesaran(1997)

Appendix V: The evolution of the underlying variables in the real exchange rate equation

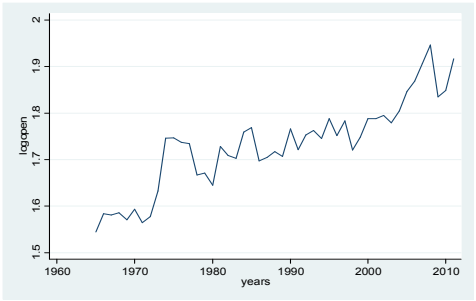
EXP



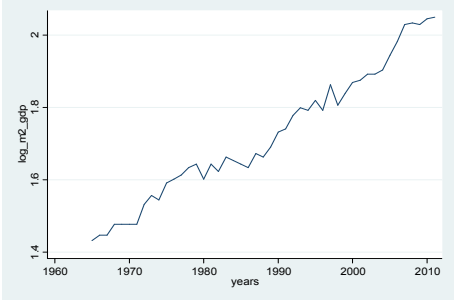
RER



OPEN



MS



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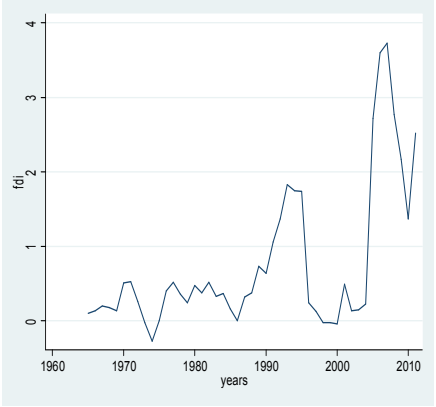
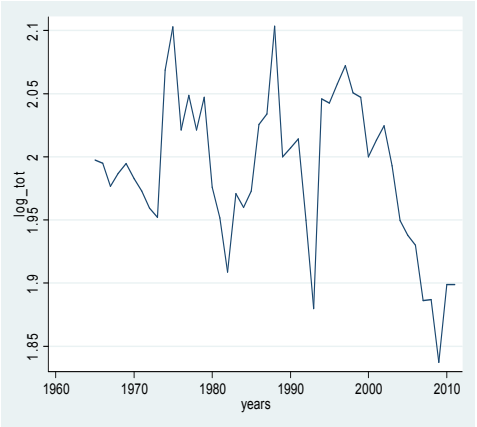


NCF



Appendix VI

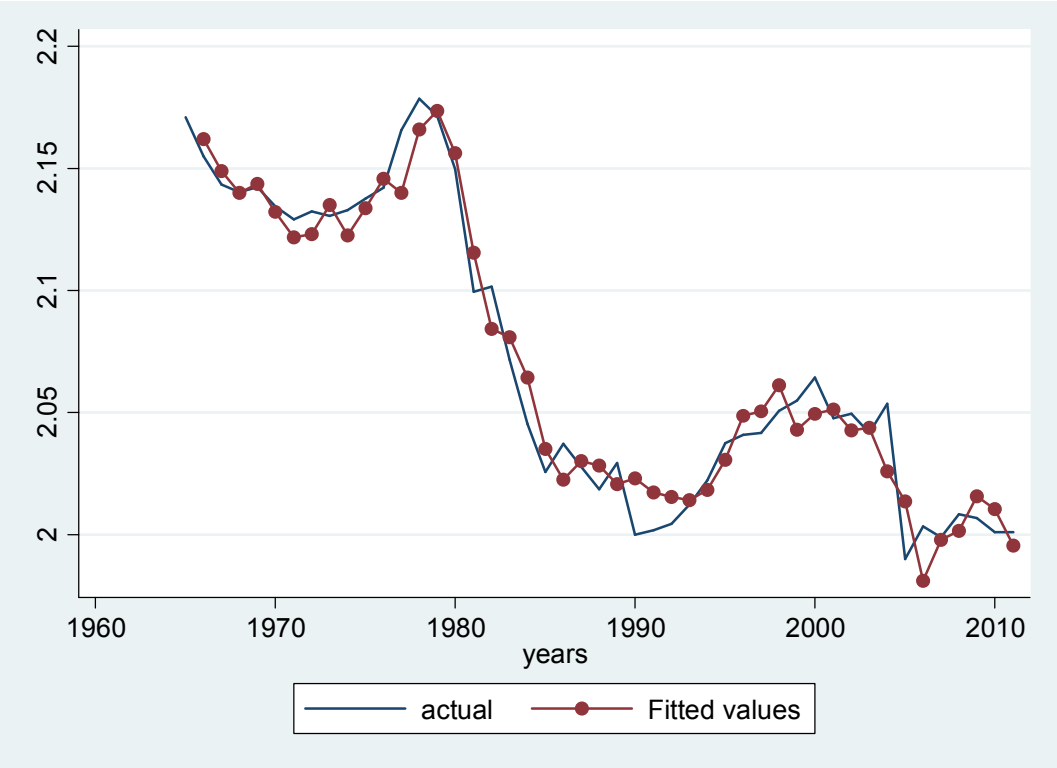


Figure 1: Actual versus fitted values of RER

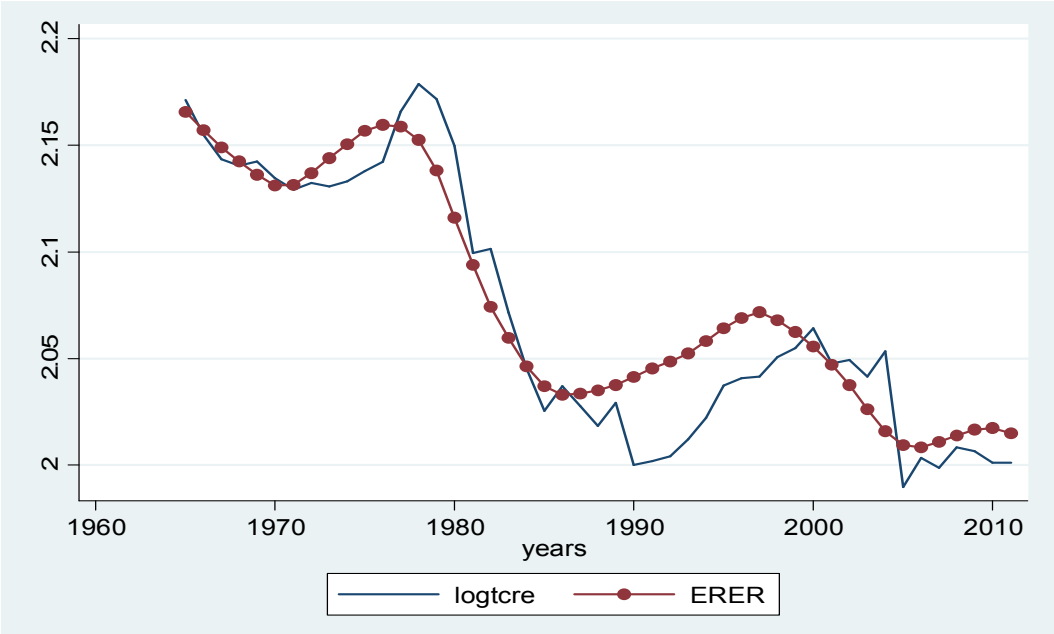


Figure 2: Equilibrium real exchange rate (1965-2011)

Appendix VII

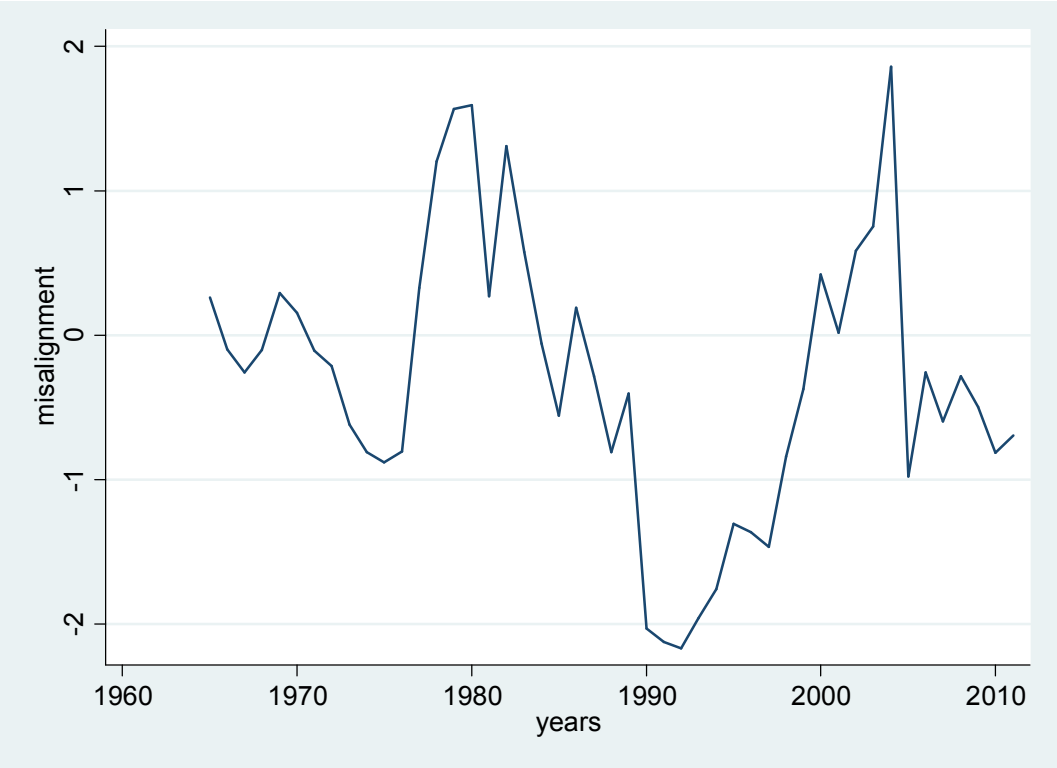


Figure 3: Real exchange rate misalignment (1965-2011)

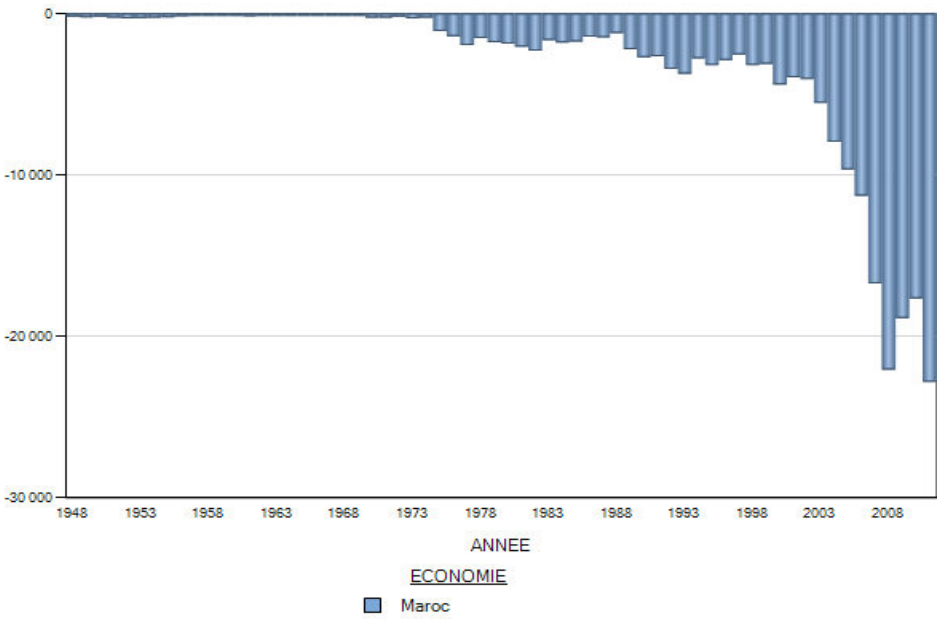


Figure 4 Trade balance in millions of dollars

Appendix VIII:

Diagnostic tests of the RER equation

Jarque Bera	Breuch godfrey	ARCH Homosc	White Heterosc	Reset Ramsy	D.W	R^2
St : 0.74 Pr : 0.69 Skew : 0.4 Kur : 0.95	St : 0.72 Pr : 0.39	St(1) :3.02 Pr : 0.08 St(2) :3.00 Pr : 0.22 St(3) :5.65 Pr : 0.12	St : 45.18 Pr : 0.42	F : 2.14 Pr : 0.11	2.35	0.95

Appendix VIII

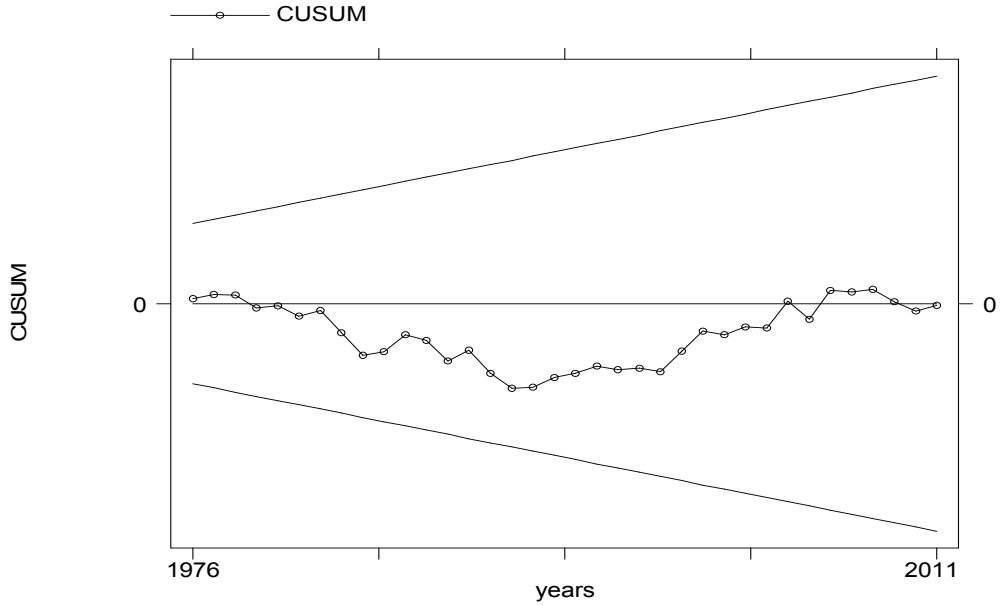


Figure 6: Plot of cumulative sum of recursive residuals for the real exchange rate equation

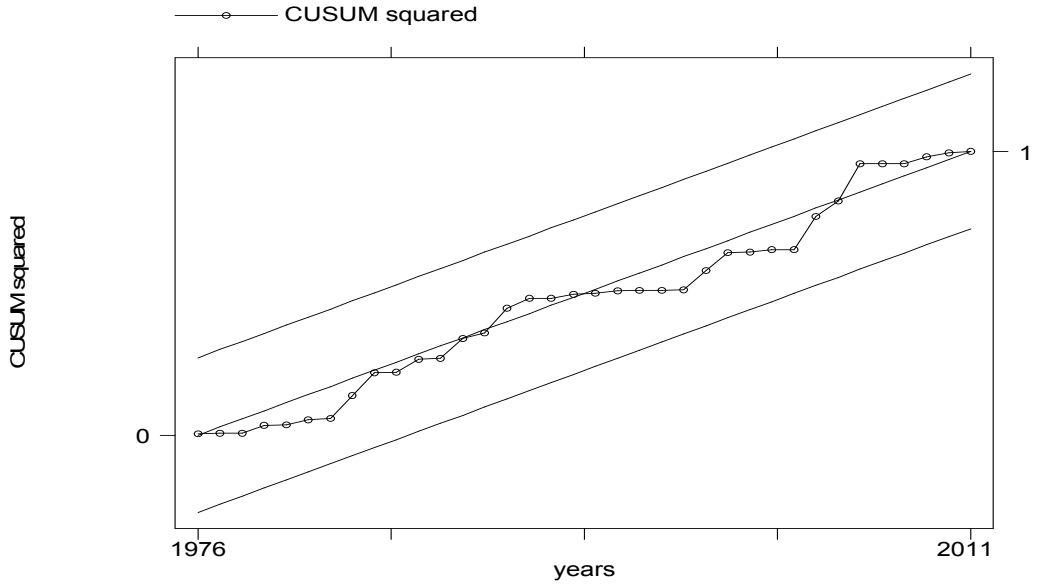


Figure 7: **Plot of cumulative sum of squares of recursive residuals for the RER equation**

Acknowledgments
"Praise to ALLAH alone and his blessing and peace be on our lord Muhammad"
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