

An Assessment of the Real Exchange Rate Misalignments in Egypt: An Application of the Behavioral Equilibrium Approach

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Received: 4 February 2015 Accepted: 5 March 2015 Published: 15 March 2015

Abstract

This paper estimates the equilibrium real effective exchange rate for the Egyptian economy during the period (1974-2012). The paper reviews the evolution of Egypt's exchange rate policy and the most significant developments of its real effective exchange rate during the same period. Using a behavioral equilibrium exchange rate (BEER) approach, it calculates the extent of real effective exchange rate misalignments in Egypt. There is evidence that the actual real effective exchange rate has deviated from the equilibrium real effective rate with various degrees during the estimation period. The Egyptian pound was overvalued before the launch of the ERSAP. The latter marked an undervaluation period that lasted till 1998. The findings indicate that the pound approached to its equilibrium level thereafter.

Index terms— egypt, real effective exchange rate, beer, exchange rate misalignment. GJHSS-E Classification : FOR Code: C32, F31, F41, O55 AnAssessmentoftheRealExch

1 Introduction

Exchange rate stability is a major monetary policy goal in emerging countries. Particularly, the question of real exchange rate misalignments, perceived as a key economic indicator has a critical interest for policymakers. It represents an important link between the domestic economy and the rest of the world and reflects movements in relative prices of currencies. Real exchange rate misalignments -defined as the deviation of the actual real exchange rate from the equilibrium real exchange rate -are harmful for the economic performance of an economy.

This raises concerns about any potential departures of the actual exchange rate from its equilibrium level, especially if such departures are significant and/or persistent (Montiel, 1998). The theoretical and empirical research suggest that misalignments in the real exchange rate can potentially lead to serious economic repercussions on trade, competitiveness, inflation, investment and hence, economic growth and stability (see for instance, Willet (1986), Edwards (1987) and Rajan and Siregar (2002).

Fears about such misalignments call for frequent evaluation of both the actual and equilibrium exchange rates so that policymakers can maintain a sustainable external position of their economies. However, the equilibrium exchange rate is not directly observable and appropriate models should be used to estimate it (Borowski and Couharde, 2003; Ajevskis et al., 2012).

Many empirical papers that focus on examining this concept of equilibrium exchange rate have been produced on the scale of developed countries. Only recently, there has been a prominent interest on exchange rate topics for developing and emerging countries. Several studies have tried to estimate the equilibrium real exchange rate and identify its link to the real economy.

The exchange rate literature has been witnessing a proliferation and development of many econometric and statistical techniques in this regard. Accordingly, it is an overriding research question to investigate whether the real exchange rate is misaligned in a given economy and adopt the needed measures to correct any misalignments.

The present study employs a behavioral equilibrium exchange rate approach to check if real exchange rate in Egypt is misaligned during the period . The paper is organized in eight sections. The next section provides an

3 EXCHANGE RATE REGIME AND DEVELOPMENTS -A HISTORICAL OVERVIEW

44 overview of the exchange rate policy in Egypt with particular attention to the most significant developments of
45 the real effective exchange rate during the estimation period. Section III presents a discussion of the theoretical
46 background and empirical literature. Section IV describes the methodology used. Section V and VI provides
47 some preliminary data analysis and the estimation results, respectively. Section VII shows an empirical estimate
48 of the equilibrium exchange rate in Egypt between 1974 and 2012 based on the BEER methodology and section
49 VIII concludes.

2 II.

3 Exchange Rate Regime and Developments -A Historical Overview

53 The conduct of exchange rate policy has witnessed many shifts and developments in Egypt since E launching the
54 Economic Reform and Structural Adjustment Program (ERSAP) in the early 1990s.

55 Before the official launch of the ERSAP, several measures were undertaken to switch from a fixed parity to
56 a flexible peg regime and from multiple rates to a unified rate. The Egyptian overall experience of exchange
57 rate regimes until 1991 can be described as one of repeated failed trials to establish a unified exchange rate.
58 During the 1970s, Egypt maintained a multiple exchange rate regime with a relatively appreciated or subsidized
59 exchange rate for food imports 1 Due to the persistent pressures on the Egyptian pound and in an attempt to
60 prevent extra drainage of the foreign reserves, a series of devaluations started in 2000 and 2001

61 . The regime consisted of three main pools; an official Central Bank rate, a commercial bank rate, and an
62 illegal yet tolerated parallel foreign exchange market; each had its own sources and uses of foreign exchange and
63 with separate rates (Abdel-Khalek, 2001).

64 Egypt started the ERSAP in 1991, which was designed to achieve macroeconomic stability and create a
65 decentralized open market oriented economy. At the heart of the program were a massive fiscal adjustment, a
66 supportive monetary policy, exchange rate liberalization and unification, and price deregulation (Mohieldin and
67 Kouchouk, 2003;El-Shazly, 2011).

68 A significant step was undertaken in February 1991 when the three-tier exchange rate regime was temporarily
69 replaced by a dual exchange rate system consisting of a primary market and a secondary market. The two
70 rates were finally merged and unified under ERSAP in October 1991. Since then, the Central Bank of Egypt
71 intervened to maintain a stable foreign exchange rate against the US dollar using the pound/dollar exchange
72 rate as a nominal anchor for monetary policy. This represented a new phase in the exchange rate management
73 in Egypt (Kheir-El Din and El-Shawar by, 2000; Central Bank of Egypt, Economic Review, 2009/2010).

74 The development of the real effective exchange rate during the period ??1988) ??1989) ??1990) ??1991) was
75 affected by the several administrative adjustments (i.e. nominal devaluations) that occurred since 1987, which
76 resulted in a sharp depreciation of the real trade-weighted index of exchange rate. The trend had completely
77 been reversed after the stabilization effort took place; between 1991 and 1996, the real effective exchange rate
78 has appreciated by almost 27 (see appendix). movement to a more flexible exchange rate regime in late 2000.
79 In 2003, the objective of price stability was formally declared to be the main objective of the monetary policy
80 (Mabrouk and Hassan, 2012). In addition, it was the prominent feature of the monetary policy up to 2003 to
81 officially peg or manage the Egyptian Pound against the US Dollar. At the end of January 2003, the official
82 exchange rate shifted to a free float (Moursi and Mossallamy 2010;Ahmed, 2012).

83 A free float of the Egyptian pound was announced on January 28, 2003, abandoning the managed peg exchange
84 rate system. The floatation of the pound came as an attempt to resolve the policy inconsistency, originating from
85 a combination of exchange rate rigidity, a reluctance to run down international reserves to support the peg to
86 the dollar, and to reduce interest rates to activate the economy. Accordingly, the exchange rate ceased to be the
87 nominal anchor of monetary policy in Egypt (Galal, 2003;Hassan, 2003). This caused the real effective exchange
88 rate to lose nearly 69 percent of its value between 1999 and 2003.

89 In 2005, the CBE announced its intension to adopt the policy of Inflation Targeting (IT), which introduced
90 a new framework for the monetary policy in Egypt. However, these developments were not sufficient to achieve
91 the price stability objective under the lack of an official nominal anchor since 2003. On June 2, 2005, the CBE
92 developed a new framework for the monetary policy, which replaced the overnight interest rate on interbank
93 transactions as an operational target instead of the excess reserve balances of banks (Al-Mashat, 2008; Mabrouk
94 and Hassan, 2012).

95 During 2006 and 2007, the Egyptian economy has witnessed several positive external factors such as favorable
96 terms of trade, high external demand and an increase in foreign capital inflows. This had an appreciating effect on
97 the real exchange rate during the same period. On the contrary, the Egyptian Pound exchange rate depreciated
98 by roughly 4. Furthermore, the Egyptian economy has suffered from unstable political and economic conditions
99 since the outbreak of the January 25 th revolution in 2011. Some adverse consequences included a rise in capital
100 outflows, a decline in tourism receipts, an increase in the dollarization process and a triggered mainly by an
101 outflow of capital and a decline in tourism receipts in addition to a widening current account deficit (Handy,
102 2001;Panizza, 2001).

103 downgrade in Egypt's credit rating. The CBE reacted by withdrawing from the net international reserves,

104 which dropped by about USD 11 billion or nearly 42 percent between June 2011 and June 2012 (Central Bank of
 105 Egypt, 2011/2012). The CBE introduced a new system of dollar auctions through which domestic banks can buy
 106 or sell US dollars to avoid further declines in the net international reserves (Brixiova, Égert and Essid, 2013).

107 The improvement on the political spectrum in 2012 has led to a light deceleration in the dollarization process
 108 3 III. ??1994).Edwards' model is an intertem poral general equilibrium model, which defines the equilibrium real
 109 exchange rate as that relative price of tradables to non-tradables that, for given sustainable or equilibrium values
 110 of a number of variables (known as real exchange rate fundamentals), results in the attainment of simultaneous
 111 internal and external equilibrium. According to this model, the internal equilibrium reflects the case in which
 112 the nontradable goods market clears in both the current and future periods while the external equilibrium occurs
 113 when the discounted flows of the current account balances is equal to zero (i.e. current and future values of the
 114 current account balances should be compatible with the long-run capital flows).

115 Edwards' model has been extended by Clark and MacDonald (1998) who introduced the BEER as a new
 116 framework for empirical analysis. They provided a comparison between the FEER and BEER estimates for
 117 the German mark, the Japanese yen, and the US dollar. The model they apply starts from the risk-adjusted
 118 uncovered interest parity (UIP) condition, which can be expressed by the following equation:?? ?? (? ?? ??
 119 ??+??) = (?? ?? ? ?? ?? *) ? ??(1)

120 where ?? ?? is the foreign currency price of a unit of home currency, ?? ?? denotes a compounded nominal
 121 3 The dollarization ratio declined from roughly 21 percent in June 2011 to around 20.6 percent in June 2012.
 122 This was attributed to a decline in the proportion of foreign currency deposits in total deposits between the two
 123 time points. While local deposits comprised L.E.664.6 billion of a total of L.E.841. 5 interest rate for k periods
 124 on a bond with the maturity horizon k and an asterisk denotes a foreign variable, ? ?? is the k-period difference
 125 operator so that ?? ?? (? ?? ?? ??+??)=? ? (? ??+?? ? ?? ??), ?? ?? is the rational expectations
 126 operator conditional on the information set at time t, and c is a constant risk premium.

127 Equation (1) can be expressed in real terms by subtracting the expected inflation differential, ?? ?? (? ?? ??
 128 ??+?? ? ? ?? ?? ??+?? *), from both sides of the equation. Thus, after rearrangement, we obtain the following
 129 equation:?? ?? = ?? ?? (? ??+??) ? (? ?? ? ?? ?? *) + ?? (2)

130 where?? ?? is the real exchange rate, ?? ?? = ?? ?? ? ?? ?? (? ?? ?? ??+??) is the expected compounded
 131 real interest rate for k periods. Accordingly, equation (2) is a condition for the risk-adjusted real UIP such that
 132 the real exchange rate is determined by three components; the expectation of the real exchange rate, the real
 133 interest rate differential and the risk premium ??Clark and Mac Donald, 2004;Nilsson, 2004). Assuming that the
 134 unobservable expectation of the exchange rate, ?? ?? (? ??+??), is the long-run equilibrium exchange rate,
 135 ?? ? ?? , then the current equilibrium exchange rate defined as ????? (which is different from the actual rate
 136 ?? ??) will be expressed as a function of the component, ?? ? ?? , and the real interest rate differential 4 In
 137 practice, the BEER approach amounts to estimating a reduced-form relationship between the real exchange rate
 138 and some fundamental variables, which themselves should be at sustainable or equilibrium levels ;???? = ?? ?
 139 ?? + (? ?? ? ?? ?? *)(3)

140 The long-run equilibrium exchange rate is mainly driven by three key fundamentals; the relative price of traded
 141 to non-traded goods as a proxy for the BS effect, the net foreign assets, which is explained by the determinants
 142 of national savings and investment (particularly, demographics and fiscal balances), and the TOT (MacDonald,
 143 2000; ??lark and MacDonald, 2004). Real interest rates are excluded since they are used to explain the current
 144 equilibrium exchange rate and not as a determinant of the long-run equilibrium rate (Dufrenot and E ?gert,
 145 2005; Clark and MacDonald, 2004). 5 4 Clark and MacDonald (2004) clarify that equation (3) can be modified
 146 to include the risk premium term included in equation (2). However, in their empirical work, this term proved to
 147 be insignificant and thereby, was removed. 5 The current equilibrium exchange rate (? ?? ?) is determined by
 148 the current values of the economic fundamentals. The long-run equilibrium exchange rate (? ?? ?), however,
 149 is determined by the long-run values of these fundamentals. The latter are obtained using the Hodrick-Prescott
 150 filter (Baak, 2012). (Ndlela, 2010). The "B" for "behavioral" in BEER means that the approach does not impose
 151 any particular functional form. Unlike the MB approach, it does not include certain normative assumptions and
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154 only searches for a significant econometric relationship between the real exchange rate and the fundamental
 155 variables with no specific conditions on the structure of that relationship 6 a) Productivity Differential (Stein,
 156 2003; ??river and West away, 2004;AlShehabi and Ding, 2008).

157 Below is a summary of the various possible determinants of the equilibrium real exchange rate (? ? in
 158 equation 3) that are used under the BEER approach.

159 The impact of productivity differential is expected to follow the BS theory. Hence, it is predicted that an
 160 increase in the productivity of the tradable goods sector of an economy will lead to a real currency appreciation
 161 resulting from the upward pressure on wages and prices of the non-tradable goods.

5 b) Investment to GDP Ratio

The effect of this variable can be ambiguous. On one hand, an increase in the investment to GDP ratio is expected to raise the productivity of an economy leading to real appreciation. On the other hand, this increase in the investment ratio can be driven by an increase in imports, which negatively affect the current account causing the opposite effect (Ajevskis et al., 2012).

6 c) Net Foreign Assets

An increase in the net foreign debt of a country (caused for instance by a deficit in the current account) has to be financed by capital inflows. This requires a depreciation of the debtor country's currency at the given interest rates. Moreover, the accumulated foreign debt, serviced with interest payments, can be financed by a surplus in the trade balance. Thus, a depreciation of the currency is needed to boost the country's exports.

7 d) Openness of the Economy

The effect of this variable on the real exchange rate is uncertain or unpredictable. Openness may lead to a decline in the domestic prices of the tradable goods resulting from a decrease in tariffs for instance. This leads, through the substitution effect, to an increase in the demand for importables causing a deteriorated trade balance and consequently, real currency depreciation. However, if openness is dictated by higher income effects and increased income is spent more on non-tradable goods, then it will lead to an appreciation of the real exchange rate (Tang and Zhou, 2013).

8 e) Government Consumption

Higher levels of government consumption, which are biased toward the non-tradable goods sector is expected to raise the relative price of non-tradable goods and hence, leads to a real exchange rate appreciation. However, if this increased consumption is financed through higher taxes, it may lead to the opposite effect (Dubas, 2009; Tang and Zhou, 2013).

9 f) Terms of Trade

It is expected that higher TOT will lead to an appreciation of the real exchange rate through the income effect of increased exports, which increases the demand for non-tradable goods. If the improvement in the TOT reflects a decline in import prices, however, then a demand shift from non-tradable goods to imports will drive the prices of non-tradable goods down causing a depreciation in the real exchange rate (Terra and Valladares, 2010; Tang and Zhou, 2013).

10 g) Fiscal Balance

An increase in the budget balance linked to contractionary fiscal policy should lead to an increase in national savings, lower levels of domestic demand and therefore, a depreciation of the real exchange rate (assuming that the nominal exchange rate does not change). Expansionary fiscal policy is expected to have the converse effect. A number of recent studies have applied the above methodology to explore the determinants of exchange rate and derive an estimate for its long-run path in various countries. Elbadawi (1994) estimated the long-run equilibrium exchange rate for Chile, Ghana and India. His set of economic fundamentals included economic openness, terms of trade, government expenditures ratio to GDP and a measure of excess money supply and covers the period from 1965 till 1990. Zhang (2001) uses the BEER methodology to calculate the real exchange rate misalignment of the Chinese RMB between the mid-1950s and 2000. He formulate the variable space such that investment ratio, government consumption, growth of China's exports and degree of economic openness are included. Lark and MacDonald (2004) analyze the real exchange rate misalignments of the US dollar, the Canadian dollar and (Ajevskis, 2012). Finally, it should be noted that once the economic fundamentals are identified, the BEER approach benefits from the co-integration technique to test for the existence of an equilibrium relationship between the real exchange rate and its main determinants, which can then be used to calculate the misalignments in the actual real exchange rate (Zhang, 2001). These effects assume the absence of the Ricardian Equivalence. The Ricardian Equivalence proposition is an economic hypothesis holding that both budget deficits and taxation have equivalent effects on the economy. A decline the government savings will lead to an offsetting increase in the desired private savings and hence, the desired national savings do not change (Barro, 1989).

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the pound sterling for the period Studies that include Egypt and country specific studies on Egypt are indeed scarce. These include (Mongardini, 1998) and (Mohieldin and Kouchouk, 2003). Mongardini (1998) Mohieldin and Kouchouk (2003) to be applied to the bilateral exchange rate. Their estimation covers the period between 1970 and 2001 and suggest terms of trade, gross capital formation, government consumption, real GDP growth, capital flows, economic openness and environmental stance as the main fundamental variables to be incorporated

217 into the model. The study underscored the presence of high degrees of misalignment during the period under
218 investigation.

219 This paper represents a recent estimation of the equilibrium real effective exchange rate in Egypt based on
220 the BEER approach. Real effective exchange rate is used rather than the bilateral rate. The former constitutes
221 a finer and more accurate index for the real exchange rate misalignment measurement. Moreover, the present
222 paper covers a longer period covering annual data from 1974 till 2012.

223 IV.

224 12 The Econometric Framework of the Beer Methodology

225 The exploratory stage of the regression results starts with the estimation of an unconstrained vector auto-
226 regression (VAR) where the lag length is determined by Akaike Information Criterion (AIC). The VAR shows
227 two lags in levels for the endogenous variables employed. The Johansen method is then used to test for the
228 existence and number of co-integrating equations between the variables. In this context, the model variables
229 are introduced to the estimation process without any adjustments such that the transitory and the permanent
230 components are maintained. Afterwards, the estimated long-run coefficients for all variables are used to calculate
231 the equilibrium exchange rate for Egypt through filtering the variables and excluding the transitory components
232 using the Hodrick-Prescott (HP) Filter.

233 It is noteworthy that the first round of estimation included an initial set of seven fundamental variables 8 and
234 resulted in the existence of at least three co-integrating relationships. Because the presence of more than one
235 co-integrating vector complicates the identification process of an equilibrium relationship between the REER and
236 its fundamental variables, one possibility is to consider the combination of variables that incorporate the most
237 important determinants of the REER through one co-integrating vector 9 .

238 The relationship between equilibrium real exchange rate and the fundamentals is expressed as vector of
239 variables;

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241 (-/+)(-/+)(-/+). Thus, in the application of the BEER approach, five endogenous variables are included. Apart
242 from the LREER, which is the logarithm of the real effective exchange rate for Egypt, four fundamental variables
243 serve to uncover the relationship and the extent of REER misalignment; LGDPC, the logarithm of the per capita
244 GDP, OPENGDP, the economy's openness (measured as the sum of exports and imports) as a ratio of GDP,
245 INVESTGDP, the investment ratio. All variables are composed as those for Egypt relative to its trading partners
246 exactly as in the formation of the REER (appendix two describes the construction of data and data sources).
247 The positive and negative signs underneath each of the explanatory variables in the parenthesis are the expected
248 signs. Moreover, two exogenous dummy variables are suggested in the sense that one can control for the exchange
249 rate floatation in 2003 (FLOATDUM), whereas the second one controls for the Global Financial Crisis, which
250 took place in 2008 (CRISDUM).

251 14 a) Description of the Econometric Methodology

252 15 ? Non-Stationarity and Unit Root Tests

253 Because most macroeconomic time series are trended, they tend to be non-stationary. The problem with non-
254 stationary or trended data is that the standard OLS regression procedures can easily lead to incorrect conclusions.
255 In other words, model estimation in the presence of non-stationary variables yields misleading results. There fore,
256 the analysis starts by testing for unit roots in all variables to determine whether the data series are stationary
257 and avoid spurious regressions.

258 Two asymptotically equivalent tests are applied: the augmented Dickey-Fuller (ADF) test and the Phillips-
259 Perron (PP) test.

260 As the error term is unlikely to be white noise, the Dickey-Fuller test was extended to an augmented version,
261 which includes extra lagged terms of the dependent variable in order to eliminate autocorrelation. The lag length
262 on the extra terms can be determined by data dependent methods such as the Akaike Information criterion (AIC)
263 or Schwartz Bayesian criterion (SBC). The ADF test may include an intercept, trend and intercept, or none of
264 the depending on the data series properties (Asteriou and Stephen, 2007).

265 In the present paper, the ADF test with intercept is applied by estimating the following equation for each of
266 the time series: $y_t = \alpha + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \dots + \beta_p y_{t-p} + \gamma_1 t + \gamma_2 t^2 + \epsilon_t$ (5)

267 where y_t is the variable of choice; \hat{I}^d is the first difference operator; t is the time trend; β_i (for $i = 1, 2, \dots, p$)
268 and γ_i (for $i = 1, 2, \dots, p$) are parameters; and ϵ_t is a stationary stochastic process. The null hypothesis that
269 series y_t is non-stationary can be rejected if β_1 is statistically significant with negative sign. The PP test is a
270 semi-parametric procedure that accounts for heteroskedasticity in the data series.

271 16 ? Time Series Co-integration

272 If the economic series have become nonstationary at level and have the same integration order then co-integration
273 becomes an over-riding requirement for any econometric model. The co-integration in multiple equations can be

274 tested by Johansen (1988) method. The testing hypothesis is the null of noncointegration against the alternative
 275 of co-integration. We use Johansen co-integration procedure to test for the presence of a co-integrating vector
 276 between capital account liberalization and economic growth in Egypt. When the variables or series are having co-
 277 integrated relationships then the linear combination of these series would be stationary and gives long relationship
 278 between the variables. Johansen’s procedure proposes two test statistics for testing the number of co-integrated
 279 vectors; the trace (trace) and the maximum eigenvalue (max) statistics where trace. The trace statistic tests
 280 the null hypothesis that the number of co-integrating vectors is less than or equal to r against, the alternative
 281 hypothesis that there are more than r . The max statistic tests the null hypothesis that the number of
 282 co-integrated vectors is r against the alternative of $(r + 1)$ co-integrated vectors. Thus, the null hypothesis $r =$
 283 0 is tested against the alternative that $r = 1$, $r = 1$ against the alternative $r = 2$, and so forth.

284 17 Vector Error Correction Model

285 If the variables included in the model are found to be co-integrated, the next step is to specify and estimate a
 286 vector error correction model (VECM) including the error correction term to investigate the short-run relationship
 287 in the model. The VECM model describes how the examined model is adjusting in each time period towards
 288 its long-run equilibrium state. The size of the error correction term indicates the speed of adjustment of any
 289 disequilibrium towards a long-run equilibrium state. With an ECM specification, we can express the relationship
 290 as follows:
$$Y_t = \alpha + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \dots + \beta_k Y_{t-k} + \gamma Y_{t-1} + \delta Y_{t-2} + \dots + \epsilon_t \quad (6)$$

291 where the matrix α captures the short-run aspects of the relationship between the elements of Y_t and the
 292 matrix β reflects the long-run information. There can be one or more co-integrating relations in a multivariate
 293 co-integration model depending on the number of linear combinations of Y_t . The rank of β , Year 2015

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295 denoted by r , can determine the number of cointegration relations. The matrix β can be decomposed in two
 296 matrices, α and β where $\beta = \alpha \gamma'$. The speed of adjustment (the error correction coefficients) are contained in
 297 matrix α that force the series back towards their underlying equilibrium relations and the cointegrating vectors
 298 are contained in matrix β that summarize the underlying long-run relations ??Johansen and Juselius,
 299 1990; Asteriou and Stephen, 2007).

300 The advantage of the Error Correction Model (ECM) is that it incorporates variables both in their levels
 301 and first differences. By doing this, ECM captures the short-run disequilibrium situations as well as the longrun
 302 equilibrium adjustments between variables. ECM term having negative sign and value between "0 and 1" indicates
 303 convergence of model towards long run equilibrium and shows how much percentage adjustment takes place every
 304 time unit in the analysis. variable in the VAR in response to shocks from all the explanatory variables either
 305 immediately or with various lags (Koop, Pesaran and Potter, 1996).

306 19 Variance Decomposition Analysis

307 Variance decomposition sheds further light on the dynamic interaction of variables in the VAR system. They give
 308 the proportion of the movements in the dependent variable that are due to their "own" shocks, versus shocks to
 309 the "other variables". In other words, it provides information on the relative importance of the economic variables
 310 in the model in accounting for variations in each data series (Maghyreh, 2004).

311 V.

312 20 Estimation Results

313 21 a) Univariate Characteristics of the Data

314 In this section, we present the estimated results on the data set described above. A necessary condition of the
 315 co-integration and VECM analysis is that each of the variables should be stationary and integrated of same order.
 316 Hence, the first step of the empirical work is to check the degree of integration of each variable by using unit
 317 root (ADF and PP) tests for the levels and first differences of each variable. The estimated results of this part
 318 are reported in table (1).

319 22 Table 1: Unit Root Test Results

320 We find that each of the series is non-stationary when the variables are defined in levels. But first differencing the
 321 series removes the non-stationary components in all cases and therefore, the null hypothesis of non-stationarity
 322 is clearly rejected at the 5 percent significance levels. Both the ADF and PP stationarity tests suggest that all
 323 the variables are integrated of order one [I (1)] in their levels and found stationary in their first differences [I (0)].

324 Since the variables are non-stationary and integrated of order one, the second task is to employ co-integration
 325 technique of Johansen to test whether there exist a long-run relationship among the variables. This provides
 326 a unified framework for estimation and testing of co-integrating relations in context of a VAR error correction
 327 model. The co-integration rank r of the time series was tested using two test statistics; trace and max.
 328 Denoting the number of co-integrating vectors by r , the maximum eigenvalue (max) test is Notes: i. r refers

to number of co-integrating equations. ii. CV 1% refers to the critical value at the 1 percent significance level.
0 = 0 r 0 ? 1 r 0 ? 2 r 0 ? 3 r 0 ? 4 r 1 > 0 r 1 > 1 r 1 > 2 r 1 > r 0 = 0 r 0 = 1 r 0 = 2 r 0 = 3 r 0 = 4 r 1 = 1
r 1 = 2 r 1 = 3 r 1 = 4 r 1 =

iii. * Denotes rejection of the hypothesis at the 1 percent level. The results of the co-integration show that both the trace and the maximum eigenvalue test statistics suggest the existence of only one co-integrating relationship among the variables at the 1 percent significance level. This gives an evidence for a long-run equilibrium relationship between the real effective exchange rate in Egypt, GDP per capita that can be used for indicating the productivity differential between Egypt and its main trading partners, investment as a share of GDP, openness of the Egyptian economy, and government consumption.

To determine the sign and magnitude of the long run relationship, we normalize the co-integrating vectors so that the co-integrating regression of the REER in Egypt can be given as shown in table (3). The long run estimated coefficients appear to be consistent with the economic theory concerning their expected signs 10 Notice that the definition of the REER in the present study is such that an increase (decrease) denotes a depreciation (appreciation).

. It appears that the productivity differential cause an appreciation of the real effective exchange rate in Egypt. The effect of the openness of the economy is dominated by substitution effects since it leads to a depreciation of the real effective exchange rate as well. Regarding the investment ratio, it has a depreciating effect on the real effective exchange rate in Egypt. This can be explained by the import intensive investment projects and thus; an increase in the ratio of investment to GDP is expected to increase absorption, worsen the current account and lead to depreciation of the REER. Government consumption causes an appreciation of the REER since it raises the prices of non-traded goods.

The results show the following magnitude of effects: ? A 1 percentage point increase in the differential between the rate of growth of the real per capita GDP in Egypt and its main trading partners is associated with a 0.85 percentage point appreciation of the REER in the long run. ? A 1 percentage point increase in the relative openness of the Egyptian economy is associated with a 0.596 percentage point depreciation of the REER in the long run. ? A 1 percentage point increase in the relative investment ratio of the Egyptian economy is associated with a 0.53 percentage point depreciation of the REER in the long run. ? A 1 percentage point increase in the relative government consumption of the Egyptian economy is associated with a 0.61 percentage point appreciation of the REER in the long run. Since long run association has been observed among these variables, it is possible to explore the possibility of a short run relationship by using an error correction model (ECM) framework. ECM permits the introduction of past disequilibrium as explanatory variables in the dynamic behavior of existing variables and thus, facilitates in capturing both the short run dynamics and long run relationships among variables 11 .

Table (4) gives the speed of adjustment from disequilibrium along with the short run coefficients of the VECM. In the ECM specifications, it is shown that the coefficient of the error correction term (ECT t-1) of the REER is significant and does have the correct sign (negative). The error correction term is the short-run forward looking self-correcting mechanism. If for instance, there is a real undervaluation in the REER, then there will be a real appreciation in the next period, self-correcting the undervaluation. The term indicates the speed of adjustment and in this case, 53 percent adjustment is observed. In other words, about 53 percent of disequilibrium (the gap between the equilibrium REER and its actual value) is corrected each year caused by the REER itself. This means that when the exchange rate deviates from its equilibrium path caused by some temporary shocks, it returns back to that path within nearly two years in the absence of any further shocks. This implies a stable long-run cointegrating relationship.

Another point to observe is that both the per capita GDP and government consumption do not help in bringing the real effective exchange rate to its equilibrium level. The two variables have a destabilizing effect on the system. A positive sign of the adjustment coefficient of the government consumption -as a determinant of the equilibrium exchange rate -means that; an undervalued exchange rate (caused by a decline of the equilibrium exchange rate), for instance, will lead to an increase in the government consumption (which in turn leads to an appreciation of the equilibrium REER) causing an increasingly undervalued REER. The same applies for the productivity differential variable. Results of variance decomposition process are shown in table (5). Variance decomposition process shows that the main source of variance in the real effective exchange rate arises from its own shocks during all periods. In the first period, the change of the exchange rate can be explained by its own shock at 100 percent. In the medium to long term, two variables represent important sources of variation in the exchange rate. These are the openness and investment ratios. For example and starting from the third period, it is seen that economic openness explains the variation in real effective exchange rate at a rate that ranges between nearly 7percent and 35 percent. Between 1.5 percent and 26 percent of the variation in the exchange rate can be explained by the investment ratio. Government consumption plays a more significant role in the variations of the real effective exchange rate from the fourth period onwards while productivity differential do not exceed the rate of 0.8 percent variation of exchange rate during all periods. The above results are also verified by the generalized impulse response functions (GIRFs), which indicates the causal properties of the system. The estimated GIRFs are plotted in figure (1) reflecting the response of LREER to 1 percent standard-deviation shocks to the explanatory variables. The results indicate that real effective exchange rate depreciates by shocks in itself starting from the first year. Shocks to GDP per capita leads to an appreciation of the REER starting from the sixth period suggesting that

392 the Balassa-Samuelson(B-S) effect is working for Egypt. dominance of the substitution effect for the latter ratio.
 393 Conversely, a 1 percent standard-deviation to the government consumptionaffects real effective exchange rate
 394 negatively (leading to an appreciation) and only clearly starting from the fourth period.

395 Shocks to both the investment and openness ratios have a positive effect on the REER suggesting the An
 396 important feature of the BEER approach is the recognition that the equilibrium exchange rate change over time
 397 with the changes in its main fundamentals. The long-run relationship estimated above allows for the calculation
 398 of the equilibrium rate by using the permanent components of the fundamentals that are imposed on the long-run
 399 relationship obtained from the Johansen co-integration method. The HP filter with a smoothing factor of 100
 400 was used to smooth the variables 12 . Figures (2) and the extent of currency misalignments during the period .

401 When the actual real effective exchange rate is above the equilibrium, it is undervalued, and when it is below
 402 the equilibrium, it overvalued. Through 1974 up till 1990, before the implementation of the ERSAP, the Egyptian
 403 trade-weighted exchange rate was always overvalued with the exception of the period ??1979) ??1980) ??1981)
 404 ??1982). Starting from 1991, Egypt witnessed an undervaluation of the exchange rate that continued till 1998.
 405 This means that the unification of the multiple exchange rates that existed before the ERSAP brought a temporary
 406 end to the currency overvaluation. Thus, despite the real appreciation of the Egyptian pound during that period,
 407 it was not as much as is needed to keep the value of the pound in line with the equilibrium ratein real terms.
 408 In addition, this is suggestive of the role of active and periodical foreign exchange market intervention that was
 409 practiced during that period to maintain the pegged exchange rate -mainly through international reserveswhich,
 410 prevented the free market determination of the pound's value. Mohieldin and Kouchouk (2003) describes the
 411 first half of the 1990s decade by an undervalued currency based on their own calculations as well.

412 A short overvaluation period during the three years between 1999 and 2001 was followed by an undervaluation
 413 period that lasted between 2002 and 2008. The latter period marked the consequences of the series of devaluations
 414 adopted in

415 23 Concluding Remarks

416 This paper estimates the equilibrium real effective exchange rate for Egypt between 1974 and 2012. In particular,
 417 the relative ability of different economic fundamentals in explaining the path of the real effective exchange rate is
 418 examined. To do so, a behavioural equilibrium exchange rate approach is specified in line with Edward's model
 419 ??1994).

420 With regard to the policy advice concluded from the paper, the BEER estimation provides several implications
 421 to decision making and exchange rate management. The obtained estimates indicate the importance of the
 422 incorporated variables in determining the path of the real effective exchange rate in Egypt. The appreciating
 423 influence of the relative per capita GDP suggests that economic growth would be a significant factor in directing
 424 the real trade-weighted exchange rate in Egypt. The government's efforts to design growth enhancing strategies
 425 can succeed in raising the value of the Egyptian pound relative to foreign trading partners. Trade policies directed
 426 to discourage import intensive production will be vital to avoid the adverse effects on the current account and
 427 strengthen the currency as well.

428 Moreover, since the impact of openness of the Egyptian economy is dictated by the substitution effect, it leads
 429 Egyptian consumers to prefer cheaper foreign goods. As such, further incentives should be offered to domestic
 430 producers and exporters to develop their industries and better serve the domestic market. An appreciation of
 431 the pound caused by the above mentioned factors is not expected to reduce the competitiveness of the Egyptian
 432 economy in international market since it is attributed to a stronger and healthier economy. Cor(LREER,LREER(-
 433 i)) Cor(LGOVCONS,LGOVCONS(-i))

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Figure 1:



Figure 2:

3



Figure 3: Table 3 :

approach to estimate the ringgit equilibrium exchange rate using quarterly data spanning from 1991 till 2008. They government consumption, economic openness and net foreign assets in their model. Terra and Valladares (2010) examine periods of appreciations and depreciations for a sample of 85 countries using data from 1960 to 1998 by applying the BEER approach to exchange rate. Four economic fundamental are used; terms of trade, economic openness, government consumption and international interest rate. Cui (2013) uses monthly data from 1997 till 2012 to estimate the equilibrium exchange rate for China by applying the BEER approach. His model incorporated the productivity differential, economic openness, terms of trade and the ratios of foreign reserves and foreign direct investment to GDP.

Sidek and Yusoff (2009) employ t

incorporate productivity differential,

Figure 4:

Figure 5:

2

? Generalized Impulse Response Function

The generalized impulse response function (GIRF) is widely used in the empirical literature to uncover the dynamic relationship between macroeconomic variables within

Unit Root Tests at:	Augmented Dicky-Fuller Test Results	Phillips-Perron Test Results
Levels Variables	Model Form: Trend and Intercept	Model Form: Trend and Intercept
LREER	-3.489972	-2.447663
LGDP	-0.811132	-0.772468
OPENGDP	-0.643166	-0.717175
INVESTGDP	-1.702153	-2.266043
LGOVCONS	-2.436753	-1.653006
First Differences Variables	Model Form: Trend and Intercept	Model Form: Trend and Intercept
LREER	-4.235938*	-3.785989*
LGDP	-3.594536*	-4.890056*
OPENGDP	-4.479195*	-6.433917*
INVESTGDP	-5.262540*	-10.18479*
LGOVCONS	-4.632161*	-6.673644*

[Note: calculated under the null hypothesis $\rho = 0$ against an alternative hypothesis $\rho = 1$. The trace test (trace) is calculated under the null hypothesis that $\rho \leq r$]

Figure 6: Table 2 :

4

ECTt-1 (-1) Coefficient	D(LREER)	D(LGDP)	D(OPENGDP)	D(INVESTGDP)	D(LGOVCONS)
	-0.377458	0.532781	0.707191	1.191666	0.183057
[t-statistic]	[-4.4419]*	[2.2492]*	[2.1506]*	[3.0688]*	[3.2437]*
Short Run Dynamics					
Variable	Estimates				[t-statistic]
D(LREER(-1))	0.616513				[3.54900]
D(LGDP(-1))	0.420893				[1.63886]
D(OPEN(-1))	-0.241882				[-1.84655]
D(INVEST(-1))	-0.350876				[-1.70692]
D(LGOVCONS(-1))	0.802357				[2.10005]
C	0.015103				[0.48294]
CRISDUM	-0.238799				[-2.09408]
FLOATDUM	0.096741				[1.14355]

Figure 7: Table 4 :

Period	LREER	LGDP	OPENGDP	INVESTGDP	LGOVCONS
1	0.153767	100.0000	0.000000	0.000000	0.000000
2	0.239862	96.99968	0.104174	1.074640	0.585517
3	0.289336	90.02097	0.727642	6.861336	1.521275
4	0.332485	74.13023	0.751258	15.68004	7.343081
5	0.381093	58.03508	0.574909	22.54783	13.77880
6	0.428734	46.73881	0.464301	26.95411	18.15387
7	0.473253	39.06328	0.392964	29.99569	21.03136
8	0.515719	33.41823	0.339437	32.24836	23.15353
9	0.556776	29.03055	0.299576	33.93716	24.83525
10	0.596247	25.57345	0.270955	35.20686	26.17531

Figure 8: Table 5 :

¹In 1981 for instance, the official exchange rate for food imports was set at L.E. 1.43 per USD and L.E. 1.19 per USD for non-food imports (Huizinga, 1995). Such devaluations represented a gradual2 Toward the late 1990s, the Egyptian economy has started to show many signals of serious economic troubles. The Egyptian economy was hit by a succession of both internal and external shocks in 1997. The East Asian crisis, the Luxor tragedy and the decline in oil international price led to a deterioration in Egypt's external position

²The selection of these fundamental variables is based on sound theoretical foundations and hence, they vary as different theories are applied. This feature allow the BEER approach to be flexible enough to include various model specifications with different explanatory variables in estimating the equilibrium real exchange rate. Moreover, this makes it possible to design country specific relationships since countries may differ in the set of economic fundamentals that determine their equilibrium real exchange rate (AlShehabi and Ding, 2008; Tang and Zhou, 2013).

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⁴These variables are: the REER, GDP per capita, net foreign assets, openness of the economy, terms of trade, government consumption and capital inflows.9 Moreover, in the case of multiple co-integrating vectors, the restrictions on the estimated parameters (? s) should be captured from the economic theory. Nevertheless, the theory did not tackle that issue.

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436 .1 Appendix One a) Real Effective Exchange Rates for the Egyptian

437 Economy To compute the REER index for the Egyptian economy, a number of factors had to be identified;
438 the range of foreign countries to be covered as trading partners, their trade weights and the price indices to be
439 compared.

440 The source of the trade data are the exports and imports with the top ten trading partners for the period
441 as reported in the Direction of Trade Statistics (DOTS) of the IMF. The source of data for consumer prices is
442 the International Financial Statistics (IFS) of the IMF for the same period. Nominal exchange rates in national
443 currency per base currency (US dollar) were obtained from the IFS, IMF as well.

444 The calculation of REER for Egypt for the period between 1974 and 2012 required dealing with three successive
445 tasks; the first represents the calculation of the trade shares of the top 10 trading partners, which involved working
446 on 39 columns each representing a year in the sample period (1974-2012), 10 rows each representing a trade partner
447 chosen, the second represents calculating the price differential between Egypt and each trading partner, which
448 involved working on 10 columns each representing the currencies of the top trading partners, 39 rows representing
449 the price indices over the sample period, and the third represents calculating the overall REER for Egypt with
450 10 columns each representing the currencies of the top trading partners, 39 rows representing the sample period.

451 .2 Variables Definition and Data Sources of the BEER Model

452 The study makes use of annual data. Data availability constrains the sample period to 1974 to 2012. Apart from
453 the data on Egypt, the study uses data on the 10 trading partners, which were included in the calculation of the
454 REER. As such, all the fundamental variables are obtained by weighting them in the same manner. Definitions
455 of the five endogenous variables and two exogenous variables along with their sources are as follows: LREER: ln
456 of REER. Source: constructed by the researcher using data from the IMF, IFS and IMF, DOTS databases.

457 LGDPC: ln of per capita GDP as a proxy for relative productivity differential between Egypt and its trading
458 partners. Source: The WB, WDI database. OPENGDP: Exports and Imports as a ratio of GDP. LGOVCONS:
459 ln of government consumption. Source:

460 The WB, WDI database.

461 [Williamson] , Williamson . p . . Washington: Institute for International Economics

462 [Asteriou and Stephen ()] , D Asteriou , G H Stephen . *Applied Econometrics* 2007. Palgrave Macmillan.

463 [Economic Review ()] , *Economic Review* 2009/2010. 50 (3) . Central Bank of Egypt

464 [Economic Research ()] , FY 2010/2011. *Economic Research* 2011. (Egypt Country Report) (ALEXBANK)

465 [Monthly Bulletin ()] , *Monthly Bulletin* 2012. Central Bank of Egypt

466 [Barro ()] R Barro . *The Ricardian Approach to Budget Deficits*, 1989. 3 p . .

467 [Hassan ()] *Can Monetary Policy Play an Effective Role in Egypt*, M Hassan . No. 84. 2003. (ECES Working
468 Paper)

469 [Driver and Westaway ()] *Concepts of Equilibrium Exchange Rates*, R L Driver , P F Westaway . 2004. Bank of
470 England (Working Paper)

471 [Concepts to Calculate Equilibrium Exchange Rates: An Overview Discussion Paper Series ()] 'Concepts to
472 Calculate Equilibrium Exchange Rates: An Overview'. *Discussion Paper Series* 2000. _____.

473 [El-Shazly ()] 'Designing an Early Warning System for Currency Crises: An Empirical Treatment'. A El-Shazly
474 . *Applied Economics* 2011. November 2009. 43 (14) p . .

475 [Nilsson ()] 'Do Fundamentals Explain the Behavior of the Swedish Real Effective Exchange Rate?'. K Nilsson .
476 *Scand. J. of Economics* 2004. 106 (4) p . .

477 [Rajan and Siregar ()] *Economic Competitiveness and the Equilibrium Real Exchange Rate: The Case of*
478 *Singapore*, R S Rajan , R Siregar . [http://www.economicsadelaide.edu.au/staff/rrajan/pubs/Chapter11\(edited\).pdf](http://www.economicsadelaide.edu.au/staff/rrajan/pubs/Chapter11(edited).pdf) 2002.

480 [Ahmed (2012)] 'Effect of Exchange Rate Regime of Egyptian Pound Against US Dollar on Price Index and
481 Inflation Rates for Consumers and Producers Basket of Livestock Goods'. I Ahmed . *The Business and*
482 *Management Review*, 2012. November 2012. 3 p . .

483 [Mongardini ()] *Estimating Egypt's Equilibrium Real Exchange Rate*, J Mongardini . 1998. Washington: Inter-
484 national Monetary Fund. (IMF Working Paper)

485 [Alshehabi and Ding ()] *Estimating Equilibrium Exchange Rates for Armenia and Georgia*, O Alshehabi , S Ding
486 . 2008. Washington: International Monetary Fund. (IMF Working Paper No. 110)

487 [Elbadawi ()] 'Estimating Long-Run Equilibrium Real Exchange Rates'. I A Elbadawi . *Estimating Equilibrium*
488 *Exchange Rates*, J Williamson (ed.) 1994. Washington: Institute for International Economics

489 [EViews 8.1, Quantitative Micro Software] *EViews 8.1, Quantitative Micro Software*,

490 [Mabrouk and Hassan ()] 'Evolution of Monetary Policy in Egypt: A Critical Review'. A F Mabrouk , S M
491 Hassan . *The International Journal of Social Sciences* 2012. 4 (1) p . .

- 492 [Ajevskis et al. ()] ‘Exchange Rate Misalignment in Developing Countries’. V Ajevskis , R Rimgailaite , U
493 Rutkaste , O Tkacevs , S Edwards . No. 2950. *Real Exchange Rates in the Developing Countries: Concepts and*
494 *Measurement*, 2012. 1987. 1989b. 20. Cambridge: National Bureau of Economic Research (Working Paper)
495 (The Assessment of Equilibrium)
- 496 [Willet ()] ‘Exchange Rate Volatility, International Trade, and Resource Allocation’. T Willet . *Journal of*
497 *International Money and Finance* 1986. 5 p. . (Supplement 1)
- 498 [Clark and Macdonald ()] *Exchange Rates and Economic Fundamentals: A Methodological Comparison of*
499 *BEERs and FEERs*, P B Clark , R Macdonald . No. 67. 1998. Washington: International Monetary Fund.
500 (IMF Working Paper)
- 501 [Figure 2 : Misalignments of the Actual REER in Egypt Based on the BEER Approach (1974-2012) in Percent Real Exchange Ra
502 *Figure 2 : Misalignments of the Actual REER in Egypt Based on the BEER Approach (1974-2012) in*
503 *Percent Real Exchange Rate of Latvia*, Bank of Latvia
- 504 [Figure 3 : Actual and Equilibrium REER in Egypt Based on the BEER Approach ()] *Figure 3 : Actual and*
505 *Equilibrium REER in Egypt Based on the BEER Approach, 1974-2012.*
- 506 [Filtering the BEER: A Permanent and Transitory Decomposition Global Finance Journal ()] ‘Filtering the
507 BEER: A Permanent and Transitory Decomposition’. *Global Finance Journal* 2004. —————
508 ——— (1) p. .
- 509 [Cui ()] ‘How Is the RMB Exchange Rate Misaligned? A Recent Application of Behavioral Equilibrium Exchange
510 Rate (BEER) to China’. Y Cui . *Journal of East Asian Economic Integration* 2013. 17 (3) p. .
- 511 [Ndlela ()] *Implications of Real Exchange Rate Misalignment in Developing Countries: Theory, Empirical*
512 *Evidence and Application to Growth Performance in Zimbabwe*, T Ndelela . 2010. (MPRA Paper No. 32710)
- 513 [Koop et al. ()] ‘Impulse Response Analysis in Nonlinear Multivariate Models’. G Koop , M H Pesaran , S Potter
514 . *Journal of Econometrics* 1996. 74 (1) p. .
- 515 [Panizza ()] ‘Macroeconomic Policies in Egypt: An Interpretation of the Past and Options for the Future’. U
516 Panizza . ECES Working Paper 2001. p. 61.
- 517 [————— and K. Juselius ()] ‘Maximum Likelihood Estimation and Inference on Cointegration with Applica-
518 tion to the Demand for Money’. *Oxford Bulletin of Economics and Statistics* ————— and K. Juselius (ed.)
519 1990. 52 (2) p. .
- 520 [Ministry of Finance ()] *Ministry of Finance*, 2012.
- 521 [Handy ()] *Monetary Policy and Financial Sector Reform in Egypt: The Record and the Challenges Ahead*, H
522 Handy . 2001. Egyptian Center for Economic Studies. (Working Paper No. 51)
- 523 [Al-Mashat ()] *Monetary Policy in Egypt: A Retrospective and Preparedness for Inflation Targeting*, Al-Mashat
524 . 2008. Rania. (ECES working paper No. 134)
- 525 [Moursi and Mossallamy ()] ‘Monetary Policy Response to Exchange Rate Movements: The Case of Egypt’. T
526 Moursi , M El Mossallamy . ECES Working Paper 2010. (158) .
- 527 [Tang and Zhou ()] ‘Nonlinear Relationship between the Real Exchange Rate and Economic Fundamentals:
528 Evidence from China and Korea’. X Tang , J Zhou . *Journal of International Money and Finance* 2013.
529 32 p. .
- 530 [Maghyreh ()] ‘Oil Price Shocks and Emerging Stock Markets: A Generalized VAR Approach, International’. A
531 Maghyreh . *Journal of Applied Econometrics and Quantitative Studies* 2004. 1 (2) p. .
- 532 [Mohieldin and Kouchouk ()] ‘On Exchange Rate Policy: The Case of Egypt’. M Mohieldin , A Kouchouk . No.
533 0312. *Economic Research Forum* 2003. 1970-2001. (Working Paper)
- 534 [Ghanem and Shaikh ()] ‘On the Brink: Preventing Economic Collapse and Promoting Inclusive Growth in
535 Egypt and Tunisia’. H Ghanem , S Shaikh . *The Brookings Project on U.S. Relations with the Islamic World,*
536 *U.S.-Islamic World Forum Papers* 2013. 2013.
- 537 [Hodrick and Prescott ()] ‘Postwar U.S. Business Cycles: An Empirical Investigation’. R Hodrick , E Prescott .
538 *Journal of Money, Credit and Banking* 1997. 29 (1) p. .
- 539 [Dufrenot and ?gert ()] *Real and Monetary Determinants of Real Exchange Rate Behavior: Theory and Evidence*
540 *from Developing Countries*, G Dufrenot , B E ?gert . 2005. 1994. 41 p. . (Real Exchange Rate in Central
541 and Eastern Europe: What Scope for the Underlying Fundamentals?. in Estimating Equilibrium Exchange
542 Rates, edited by J)
- 543 [Kemme and Roy ()] *Real Exchange Rate Misalignment: Prelude to Crisis*, D M Kemme , S Roy . 2006. 30 p. .
- 544 [Terra and Valladares ()] ‘Real Exchange Rate Misalignments’. C Terra , F Valladares . *International Review of*
545 *Economics and Finance* 2010. 19 (1) p. .
- 546 [Huizinga ()] ‘Real Exchange Rate Misalignments and Redistribution’. H Huizinga . *European Economic Review*
547 1995. 41 (2) p. .

.2 Variables Definition and Data Sources of the BEER Model

- 548 [Abdel-Khalek ()] *Stabilization and Adjustment in Egypt: Reform or De-Industrialization*, G Abdel-Khalek .
549 2001. UK: Edward Elgar Publishing.
- 550 [Johansen ()] ‘Statistical analysis of Cointegration Vectors’. S Johansen . *Journal of Economic Dynamics and*
551 *Control* 1988. 12 (2-3) p. .
- 552 [Stein ()] *The Equilibrium Real Exchange Rate of the Euro: An Evaluation of Resaerch*, J L Stein . 2003. CESifo,
553 Economic Studies. p. .
- 554 [Borowski and Couharde ()] ‘The Exchange Rate Macroeconomic Balance Approach: New Methodology and
555 Results for the Euro, the Dollar, the Yen and the Pound Sterling’. D Borowski , C Couharde . *Open Economies*
556 *Review* 2003. (14) p. .
- 557 [Dubas ()] *The Importance of the Exchange Rate Regime in Limiting Misalignment*, J M Dubas . 2009. 37 p. .
- 558 [Montiel (1998)] *The Long-Run Equilibrium Real Exchange Rate: Theory and Measurement*, P J Montiel . 1998.
559 May. Williams College. (Working Paper)
- 560 [Brixiova et al. ()] *The Real Exchange Rate and External Competitiveness in Egypt, Morocco and Tunisia*, Z
561 Brixiova , B Égert , T H A Essid . 2013. (IZA Discussion Paper No. 7822)
- 562 [Galal (2003)] ‘To Float or Not To Float: That is No Longer the Question for Egypt’. A Galal . *ECES Policy*
563 *Viewpoint* 2003. February. (13) .
- 564 [Kheir-El-Din and El-Shawarby ()] ‘Trade and Foreign Exchange Regime in Egypt’. H Kheir-El-Din , S El-
565 Shawarby . *Economic Research Forum* 2000. (Working Paper No. 2034)