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## Tunisia's Experience with Real Exchange Rate Targeting and the Transition to a Flexible Exchange Rate Regime

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**IMF Working Paper**

Middle Eastern Department

**Tunisia's Experience with Real Exchange Rate Targeting and the Transition  
to a Flexible Exchange Rate Regime<sup>1</sup>**

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**Abstract**

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Over the past decade or so, Tunisia has experienced a strong economic performance while pursuing a constant real exchange rate rule (CRERR). The limitations of this rule are now beginning to emerge in the context of a more open economy, regional integration, a more market-based monetary policy, and the desire to relax capital controls. This paper explores how Tunisia avoided the pitfalls of real exchange rate targeting as predicted by the theoretical models. By estimating the equilibrium real exchange rate based on fundamental variables and assessing different measures of competitiveness, the paper finds no evidence of a misalignment in the current level of the exchange rate.

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## I. INTRODUCTION

1. During the past decade or so, Tunisia's foreign exchange policy has aimed at maintaining a stable real exchange rate against a basket of currencies weighted according to the country's main trading partners and competitors.<sup>2</sup> This policy amounted to a constant real exchange rate rule (CRERR) according to which the authorities adjusted periodically the nominal exchange rate so as to maintain the real exchange constant. This paper reviews Tunisia's experience with the CRERR, identifies the reasons why Tunisia succeeded in avoiding the pitfalls of real exchange rate targeting as predicted by the theoretical models on CRERR, examines evidence of whether the current real exchange rate is overvalued, and finally, argues that increasing economic liberalization and integration with the global economy will make it difficult to follow the CRERR in future. In this regard, a gradual transition to a float for the dinar would be desirable.

2. The period during which Tunisia has followed a CRERR approach has been fairly successful for Tunisia: inflation declined from over 5 percent in the early 1990s to 1.9 percent in 2001 and real GDP and real export growth (nonenergy) averaged 4.8 percent and 7.4 percent, respectively, between 1991 and 2001. During the late 1990s, the authorities pursued the CRERR in conjunction with very prudent monetary and fiscal policies, control of capital flows, and comprehensive structural improvements and market opening. More recently, the monetary authorities have been more flexible in implementing the rule, relying on a broader set of competitiveness indicators to set the CRERR, including market shares, and allowing for larger fluctuations of the real effective exchange rate.<sup>3</sup> Moreover, Tunisia did not fall into the trap of a high and "plateau-type" inflation as predicted by the theoretical models on CRERR for a number of reasons: (i) the absence of significant shocks during the period; (ii) a prudent macroeconomic policy mix; and (iii) price and wage rigidities, including incomes policies.

3. With respect to the current level of the dinar exchange rate, the evidence suggests that it is appropriately valued. A regression analysis estimating the equilibrium real exchange rate based on different fundamental variables indicates that Tunisia's real effective exchange rate was close to the equilibrium rate estimated by the model, and by 2000, was well in line with what would be predicted by the level of Tunisia's fundamental determinants at that time. Second, most measures of competitiveness suggest no evidence of a misalignment in the current level of the exchange rate: the consumer price index (CPI)-based real effective exchange rate appreciated only by 2 percent from 1990 to 2001; unit labor cost (ULC)-based exchange rate indices show that Tunisia is maintaining cost competitiveness relative to key partners; productivity in the late 1990s grew by about 2.2 percent a year in the manufacturing sector; the relative price of nontradables to tradables has decreased; and Tunisia has increased its export shares to the European Union (EU).

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<sup>2</sup> Information on the basket of currencies is not disclosed.

<sup>3</sup> The real exchange rate depreciated by 0.6 percent and 2.5 percent in 2000 and 2001, respectively.

4. While the CRERR approach has served Tunisia well, its limitations are beginning to emerge in the context of the opening of the economy, increased regional and global integration (catalyzed by the Association Agreement with the European Union (AAEU)), a more sophisticated market-based monetary policy, and the need to relax capital controls to diversify external financing sources and to maximize the benefits of foreign capital for investment and growth. As this new environment could have a significant impact on the equilibrium exchange rate and make it more difficult for the authorities to gauge where the underlying rate is, they are now considering alternative exchange rate regimes. In addition, as many of these changing conditions will make the defense of any type of pegged rate more difficult, moving gradually to a floating exchange rate would seem the most appropriate approach at this stage. Recent IMF staff research has concluded that “countries that tighten their links with modern, global financial markets are increasingly vulnerable to shifts in market sentiment, making the defense of pegged rates substantially more difficult.”<sup>4</sup>

5. With the transition to a more flexible exchange rate regime, other macroeconomic policies will need to be adapted to the changing environment. Indeed, the monetary authorities will need to establish a clear framework for monetary policy, with price stability as the main objective. Once this framework is in place and monetary policy serves as the anchor for price and exchange rate expectations, the central bank could start gradually to reduce its intervention in the foreign exchange market, with the objective of eventually letting the dinar float.

6. The paper is organized in the following manner: Section II presents a literary survey of the research on CRERR. Section III discusses other cases of CRERR and the degree to which theory on CRERR was borne out by these countries’ experiences. Section IV assesses Tunisia’s experience with CRERR in terms of inflation performance and discusses possible reasons for Tunisia’s apparent success at avoiding the pitfalls of CRERR as predicted by the theoretical models. Section V presents a regression analysis estimating the equilibrium real exchange rate based on different fundamental variables and compares this to the path of the actual exchange rate. Section VI assesses Tunisia’s external competitiveness over the past decade using a range of indicators, including export performance, market share, wage and price-based real exchange rate indices, and profit developments. Finally, Section VII draws some conclusions from the analysis and proposes gradually making a transition to a flexible exchange rate regime.

## **II. LITERARY SURVEY AND MAIN CONCEPTUAL ISSUES WITH CRERR**

7. Tunisia’s economic performance while pursuing the CRERR has been fairly successful (see Section IV), especially compared to the experiences of other countries like Brazil or Yugoslavia. This section analyzes the economic mechanisms behind the CREER in order to assess the reasons for Tunisia’s strong performance, which, at first glance, appears to contradict the main theoretical findings.

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<sup>4</sup> See Mussa, Masson, Swoboda, Jadresic, Mauro, and Berg (2000).

8. The choice of a CRERR in Tunisia reflected the authorities' willingness to index the nominal exchange rate to the domestic price level in an effort to avoid losses in competitiveness. However, a constant real exchange rate rule prevents the nominal exchange rate from serving as a nominal anchor: shocks to the domestic price level may be fully accommodated by a faster rate of exchange rate depreciation and a faster rate of monetary growth. Moreover, a CRERR does not permit any adjustment in the real exchange rate when the economy is subject to real (exogenous) shocks. It can therefore lead to a divergence between the actual real exchange rate and the equilibrium real exchange rate. This section elaborates further on this premise.

9. When a country is subject to a positive demand shock—which could, for example, be induced by an improvement in the terms of trade, an increase in government consumption, or a fall in the world nominal interest rate—excess demand for nontraded goods will occur. Under a fixed exchange rate system, the balance of the nontraded goods market is restored through a relative increase in the price of nontraded goods compared to traded goods, that is, an appreciation of the real exchange rate. Under a real exchange rate rule, such an appreciation would not occur: when the prices of nontraded goods increase, the nominal exchange rate would depreciate at a rate that would maintain the real exchange rate constant. Thus, while the equilibrium exchange rate appreciates as a result of the shock, the actual value of the real exchange rate is kept constant. The adjustment that would have taken place through movements in the relative price of nontraded goods (under a fixed exchange rate regime) must occur through an adjustment in the overall level of prices. This would lead to hyperinflation.<sup>5</sup>

10. However, Adams and Gros<sup>6</sup> found that, under a CRERR, the inflation rate will be whatever it was in the past, modified by shocks to prices in the current period (i.e., inflation follows a random walk). The intuition is that, as the exchange rate moves to fully accommodate all price shocks, de facto it has no long-run equilibrium value. However, more recent literature suggests that a new steady-state equilibrium can be reached in the aftermath of a demand shock, although at this new equilibrium, inflation would be higher than before the shock. Under real exchange rate targeting, changes in the inflation rate can arise from either a fiscal or external shock. In this sense, the CRERR has a bias toward higher rates of inflation, even if it does not lead to hyperinflation. This outcome has been observed in country cases targeting the real exchange rate. A number of developing countries have suffered through prolonged periods of high but stable inflation. In these cases, inflation often moves quickly to a higher, but stable "plateau." Jumps in inflation in Argentina, Brazil, and Israel in the mid-1980s (preceding stabilization programs) are likely to have been prompted by exchange rate adjustments in response to adverse external shocks, followed by a period of real exchange rate targeting.

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<sup>5</sup> Of course, a negative demand shock could place in motion a deflationary process, although the experience with the CRERR does not include countries which have responded to a negative demand shock with a nominal appreciation of the exchange rate.

<sup>6</sup> See Adams and Gros (1986).

11. Among the more recent papers describing this phenomenon, Montiel and Ostry<sup>7</sup> show that real demand shocks can result in a permanent increase in inflation. In their model, the demand for nontraded goods depends positively on the real exchange rate and on real private wealth. When the economy is subjected to a positive shock, excess demand for nontraded goods results in an increase in their price. As the authorities adjust the nominal exchange rate in line with the increase in the price of home goods, the price of traded goods in local currency increases by an equivalent amount. If the general increase in the price level does not alleviate excess demand pressures in the nontraded goods market, there will be nothing to limit its rate of increase under a CRERR and hyperinflation would ensue. However, the general increase in prices alleviates excess demand pressures through a wealth effect on real consumption (equivalent to an inflation tax on consumption).<sup>8</sup> That is, increases in the price level involve a negative wealth effect, thereby lowering demand for all goods and helping to restore internal balance.

12. However, the rate of inflation will rise. This is because the improvement in the terms of trade results in a current account surplus, which raises the rate at which the private sector accumulates financial wealth. Over time, this creates additional demand pressure in the home goods market, and a new equilibrium is therefore reached only once this pressure from private sector wealth is offset by an ongoing increase in the general price level, i.e., inflation.

13. The nature of fiscal policy can influence the likelihood of hyperinflation. If the government uses the inflation tax to increase expenditure (or the central bank accumulates claims on the rest of the world), the higher inflation rate increases the inflation tax on real money balances paid by the private sector, thereby helping to offset the increase in the private sector's holdings of financial assets. However, if the inflation tax is used by the government to reduce taxes on the private sector, the accumulation of wealth is no longer offset by the erosion of wealth due to inflation (because the tax cut acts as a further accumulation of wealth by the private sector). Hyperinflation would ensue because continuous wealth accumulation would add to continuous demand and price pressures. Finally, a one-time increase in inflation could be avoided in theory by a fiscal response such as a cut in government spending on nontraded goods of an appropriate magnitude.

14. Moreover, Montiel and Ostry<sup>9</sup> show that monetary policy cannot be used to restore long-run price stability. For example, under perfect capital mobility, the money supply would be endogenous and sterilization policies could not be used to control the money supply. A reduction in credit would be fully offset by the private sector by a reduction in its holdings of foreign assets. While there would be some changes in the composition of the capital account, changes in credit growth would not affect inflation. The authorities could impose capital controls in an attempt to control the domestic money supply. However, in this case, a parallel foreign exchange market would be likely to emerge. A real shock would again cause a jump in the price level and a

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<sup>7</sup> See Montiel and Ostry (1991).

<sup>8</sup> It is assumed that wealth is not fully indexed to price level changes.

<sup>9</sup> See Montiel and Ostry (1992).

current account surplus, and the authorities would have to sterilize the associated increase in international reserves. If the terms of trade improvement is permanent, this policy is unsustainable in the long run since a permanent credit contraction would cause agents to sell foreign exchange in the parallel market. Given a fixed stock of foreign assets in the country and a contraction in credit, the parallel market exchange rate would appreciate. The increasing gap between the official and parallel market rates would in turn lead to a breakdown of capital controls. Thus, control of the money supply and inflation would also be compromised.<sup>10</sup>

15. To summarize, real shocks under a CRERR require an adjustment in the overall level of prices to restore external equilibrium. Increases in the price level help alleviate excess demand in the home goods market through a wealth effect on consumption. However, inflation will rise over time because the terms of trade improvement results in an increase in private wealth coming from the current account surplus. This creates additional demand pressure in the home goods market, and a new equilibrium is therefore reached only once this pressure is offset by an increase in inflation. Even under capital controls, monetary policy would be ineffective at controlling the money supply over the long term.

### III. COUNTRY EXPERIENCES WITH CRERR

16. The past experience of other countries following a CRERR has been mixed. On the one hand, the CRERR followed by Yugoslavia during the 1980s has been blamed for playing an important role in the hyperinflation experience there in the late 1980s. While the restrictions on external capital transactions could have allowed the authorities to pursue an independent monetary policy temporarily, the central bank's practice of underwriting the foreign currency losses (on foreign currency deposits redeposited by commercial banks with the central bank) circumscribed the scope for pursuing an independent monetary policy.<sup>11</sup> Consequently, monetary accommodation led, through a classic wage-price-exchange rate spiral, to hyperinflation.

17. In Brazil, CRERR implementation also led to rising inflation. Between August 1968 and February 1983, with a break in 1979, Brazil followed a real exchange rate rule under which the exchange rate was changed by small amounts at irregular intervals of time so as to keep the real exchange rate constant.<sup>12</sup> This system was mainly aimed at preserving the competitiveness of Brazilian production in a context of high and endemic inflation, while avoiding the speculative capital flows characterizing the previous system of infrequent and large parity changes. While successful in keeping the real exchange rate constant, it contributed, along with the indexation of wages to prices, and consistent with the theoretical literature (see paragraph 7), to inflation

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<sup>10</sup> Calvo et. al. (1995) have also defended the argument according to which, under a CRERR, the authorities can only target the exchange rate for a limited period of time.

<sup>11</sup> Lahiri (1991).

<sup>12</sup> Thus, for instance, between August 1968 and December 1976, the cruzeiro was devalued 81 times, or about once every 38 days. The mean devaluation was 1.5 percent. This crawling peg system, known in Brazil as *minidesvalorizações*, was implemented later for short intervals.

inertia: consumer price inflation increased progressively from about 20 percent in 1969 to more than 40 percent in 1978. Moreover, the depreciation of the equilibrium real exchange rate resulting from the 1972 oil shock led to a sharp deterioration in the current account. Thus, the authorities devalued the exchange rate by 30 percent in November 1979 and in February 1983. In the meantime, consumer price inflation increased to more than 100 percent.

18. On the other hand, Chile followed a CRERR from 1985 to 1992 and was able to target its real exchange rate while keeping inflation in check.<sup>13</sup> The CRERR came under pressure in 1992 when capital inflows placed upward pressure on the currency and the peso was revalued by 5 percent. During the 1986–92 period, inflation, which had averaged 130 percent in the 1970s, averaged 19 percent, slightly less than during the first half of the 1980s. Inflation declined to about 15 percent by mid-1992. Calvo et al. argue that the lack of strong inflationary pressures could stem from the fact that, through most of the 1978–92 period, the actual real exchange rate was closely tracking the equilibrium real exchange rate.<sup>14</sup>

#### IV. TUNISIAN EXPERIENCE

19. Tunisia's economic performance while pursuing the CRERR has thus far been fairly successful. During the 1990s, Tunisia was able to preserve competitiveness while reducing inflation. After fluctuating around 5 percent during the first half of the 1990s, CPI inflation declined from 6.3 percent in 1995 to 1.9 percent in 2001. Meanwhile, real GDP and real non-energy export growth averaged 4.8 percent and 7.4 percent, respectively, between 1991 and 2001. Moreover, no significant parallel foreign exchange market emerged during that period.

20. This experience does not reflect the outcome predicted by theoretical models. The following different factors appear to have helped Tunisia avoid the relatively high and "plateau-type" inflation described earlier: (i) the absence of significant shocks during the period; (ii) the prudent macroeconomic policy mix followed by the authorities; and (iii) price and wage rigidities, including incomes policies.

21. After experiencing a sharp deterioration, in the range of 25 percent, in its terms of trade during the first half of the 1980s, Tunisia has not been affected by significant terms of trade shocks. The fact that Tunisia's energy trade has been broadly balanced during the last few years helped to protect it from oil price shocks.<sup>15</sup> The terms of trade remained almost unchanged during the first half of the 1990s, and then deteriorated gradually by about 8 percent during the

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<sup>13</sup> In July 1985, an exchange rate was established whose central parity was adjusted daily according to a schedule based on inflation during the previous month less the estimated world inflation rate.

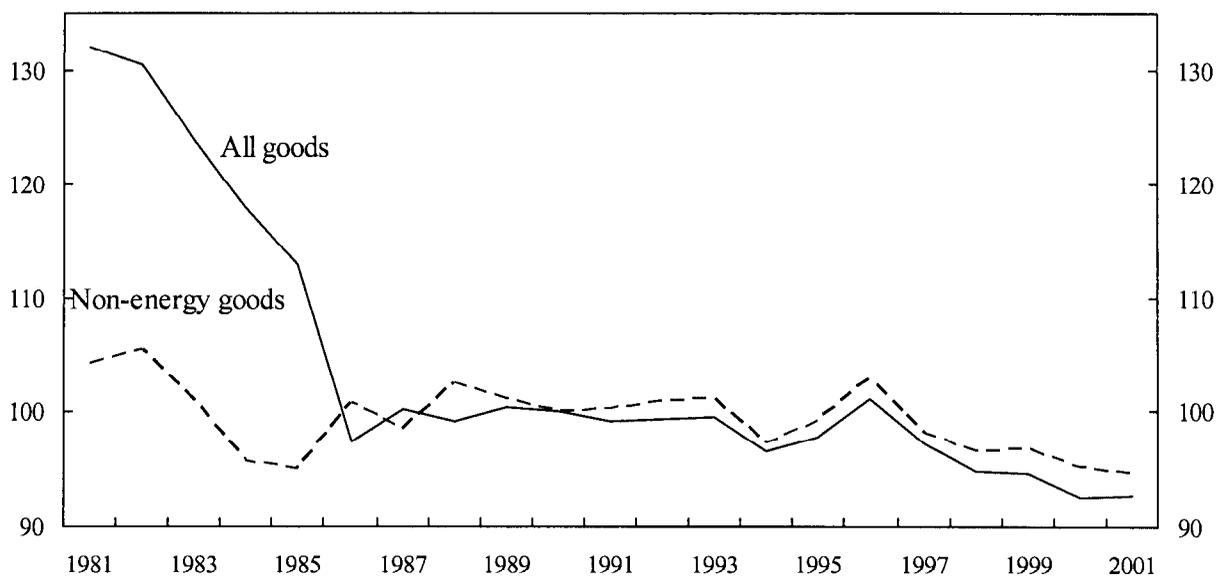
<sup>14</sup> Calvo et al. Ibid.

<sup>15</sup> Tunisia exports oil but imports refined products. As a result, changes in oil prices do not modify significantly the country's wealth. Tunisia could become more sensitive to oil price fluctuations in the future as its oil production declines.

second half. This deterioration, resulting partly from the decline of agricultural export prices, helped to keep inflationary pressures in the nontraded goods sector subdued. Moreover, the domestic prices of petroleum products and of some agricultural products are administered by the government. This allowed the government to limit the impact of international price fluctuations on Tunisian consumers and, in the context of a CRERR, this reduced the scope for the wealth effects described in Section III to take effect (see Figure 1).

Figure 1. Tunisia: Terms of Trade, 1981–2001

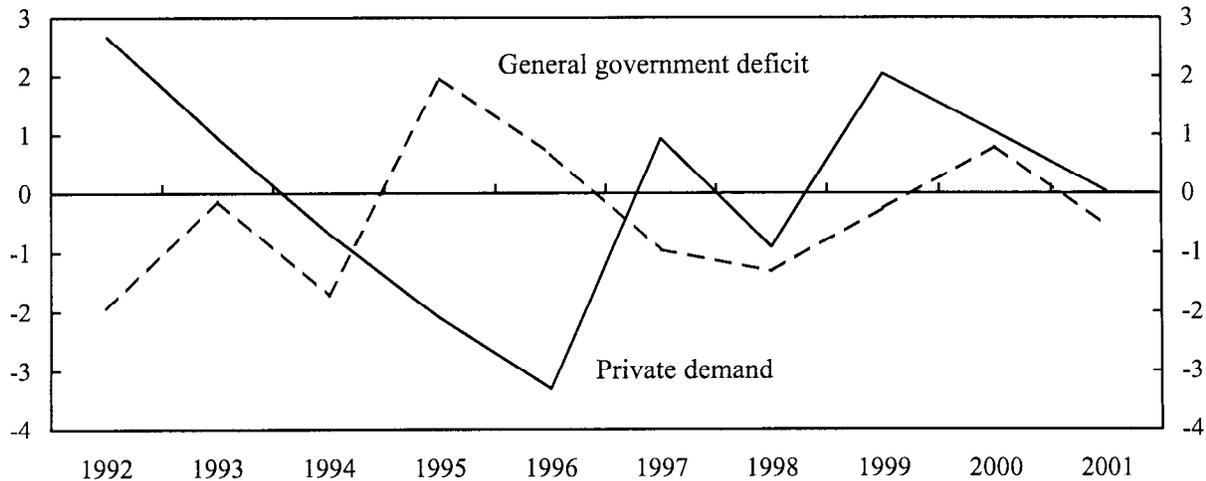
(Index, 1990=100)



Sources: Tunisian authorities and IMF staff estimates.

22. While the demand shocks experienced by Tunisia were limited, the macroeconomic policies followed by the authorities helped to limit the impact of shocks on the economy. The authorities have worked to rein in the budget deficit over the past decade: the consolidated central government budget deficit declined from 6 percent of GDP in 1991 to 2.4 percent in 2001. This adjustment was even sustained during the periods when private demand was growing quickly, between 1991–93 and 1997–99. This helped to reduce demand pressures for nontraded goods and to alleviate inflationary pressures (see Figure 2).

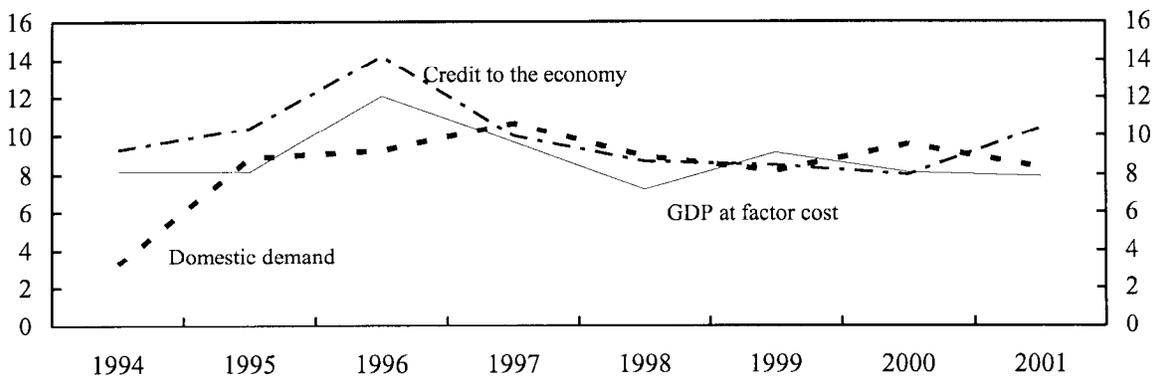
Figure 2. Tunisia: Budget Deficit and Private Demand, 1992–2001  
(Change in the ratio to GDP, in percent)



Sources: Tunisian authorities and IMF staff estimates.

23. At the same time, extensive restrictions on capital inflows and outflows were aimed at ensuring that domestic savings financed domestic investment. This policy allowed the central bank to pursue an independent monetary policy that has been very prudent over the period: the authorities focused on setting the target rate of expansion in credit to the economy around the rate of nominal GDP growth, in effect also targeting growth in broad money. In this respect, the objectives set by the monetary authorities were met over the period, credit to the economy having been broadly in line with domestic demand. Moreover, the authorities have shown their willingness to tighten monetary policy in order to moderate domestic demand when necessary (see Figure 3).

Figure 3. Tunisia. Credit to the Economy, 1994–2001  
(Growth in percent)



Sources: Tunisian authorities and IMF staff estimates.

24. Despite the ongoing liberalization process, however, many prices are still administered. At end-2001, the prices of petroleum, water, basic commodities, electricity, telephone, and public transportation were still controlled, while intermediation margins on some food products, including cereals, fruits, and vegetables, were regulated. In all, 19 percent of prices at the retail level, making up a third of the CPI basket, are still administered. At the same time, wages could be more flexible, since wage increases are set, at a sectoral level, every three years after centralized negotiations between the government and its social partners. This limited flexibility in prices and wages helped, at least in the short term, to prevent any wage-price spiral from occurring as a result of demand shocks.

## V. A FUNDAMENTAL MODEL-BASED MEASURE OF MISALIGNMENT

25. A real appreciation of a currency is often interpreted as a loss of competitiveness for an economy. However, an appreciation may not signal a loss of competitiveness if the exchange rate is already misaligned or if the movement in the real rate is caused by a fundamental improvement in productivity. Competitiveness is affected, however, when the observed real exchange rate deviates significantly from its “equilibrium value.” The equilibrium exchange rate is a function of many fundamentals, including factor productivity and relative factor endowments, the terms of trade, consumer taste, the composition of government spending, the tariff structure, access to capital markets, etc.

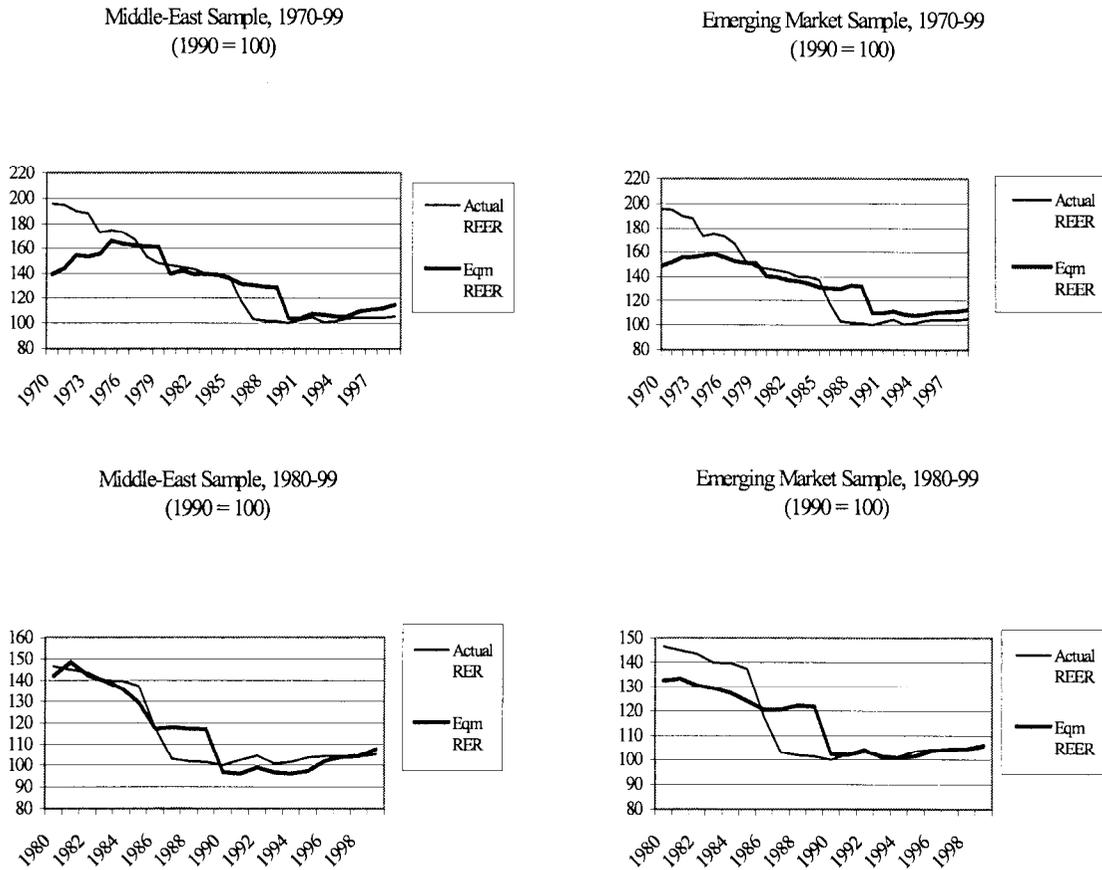
26. In this paper, a panel data analysis is used to measure misalignment of the exchange rate by computing the deviation of the observed real exchange rate from the “equilibrium” level that would be predicted on the basis of certain fundamental determinants. The three fundamental variables used to estimate the equilibrium exchange rate in this model are net external liabilities of the country, the terms of trade, and GDP per capita relative to its partners.<sup>16</sup> Under this fundamental model-based measure, the evolution of the exchange rate is considered in conjunction with the exchange rate behavior of a group of Middle Eastern countries and a group of developing countries. The results indicate that the real effective exchange rate during the last decade has moved broadly in line with what would have been predicted on the basis of these fundamental determinants. According to this regression, the equilibrium exchange rate, after decreasing significantly in the 1980s, increased only moderately during the 1990s (see Figure 4). Moreover, the actual exchange rate was close to the equilibrium rate estimated by the model over the latter period.

27. The fundamental determinants in this model were chosen because of their important and comprehensive effect on the real exchange rate. The net external asset position of the country is used because it can affect the real exchange rate through a number of different channels. From a Keynesian approach, countries with large external liabilities would need to run large trade surpluses, and hence a more depreciated real exchange rate, to service them. Under an

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<sup>16</sup> This analytical framework was developed by Lane and Milesi-Ferreti (1999) and (2000). This model has been preferred over that of Edwards (1994) since it is derived from a fully specified dynamic optimization model.

Figure 4. Tunisia: Actual and Equilibrium Real Exchange Rate Indices  
(Panel data estimation)



Source: IMF staff estimates.

intertemporal optimizing model, the transfer effect can, for example, operate through the presence of a home preference for domestic tradables, in which case a transfer abroad implies a decline in demand for home goods. Alternatively, a transfer effect can operate through the impact of wealth effects on labor supply whereby a transfer abroad reduces domestic wealth and hence raises labor supply, leading to a decrease of the relative price of exportables. Tunisia's net foreign asset position was estimated using balance of payments data: the adjusted current account balance net of capital transfers (adjusted for valuation effects) is added to the stock of the preceding year's external asset position.

28. The second fundamental variable, GDP per capita, is used because changes in GDP per capita can result in important movements in the exchange rate over time. For example, an increase in relative GDP per capita can result in a more appreciated real exchange rate through a Balassa-Samuelson effect, i.e., an increase in the relative price of nontraded goods resulting from higher productivity gains in the traded goods sector. It could also result from a shift of household demand from traded goods to nontraded goods, notably to services. GDP per capita is calculated as the ratio of Tunisia's GDP per capita relative to its partners' GDP per capita weighted by their share in Tunisia's trade.

29. Finally, terms of trade developments are used as the third fundamental variable since they can be expected to affect the equilibrium exchange rate, for example, through wealth effects.

30. This provides a different approach to the “equilibrium exchange rate” that is sometimes defined as the value consistent with internal and external balance over the medium term, where internal balance is defined normally as real growth at the level of potential output and external balance is defined, albeit vaguely, as an equilibrium position in the current and capital accounts.<sup>17</sup>

31. An intertemporal optimizing model of the transfer effect is used, resulting in the following equation:<sup>18</sup>

$$\log(RER) = \alpha + \beta_1 \frac{B}{Y_0} + \beta_2 \log(Y_T) + \beta_3 \log(P_T^x)$$

where RER is the real effective exchange rate, B is the net foreign asset position,  $Y_T$  is the output of tradables, and  $P_T^x$  is the terms of trade. Then cross-country estimates of the parameters are obtained using the following specification (a panel version of the dynamic ordinary least square estimator developed by Stock and Watson):

$$\begin{aligned} \log(RER_{i,t}) = & \alpha_i + \phi_t + \beta^{NFA} NFA_{i,t} + \beta^{YD} \log(YD_{i,t}) + \beta^{TT} \log(TT_{i,t}) \\ & + \sum_{k=-1}^{k=1} v_k^{NFA} \Delta NFA_{i,t+k} + \sum_{k=-1}^{k=1} v_k^{YD} \Delta \log(YD_{i,t+k}) + \sum_{k=-1}^{k=1} v_k^{TT} \Delta \log(TT_{i,t+k}) + \varepsilon_{i,t} \end{aligned}$$

where  $RER_{i,t}$  is the real effective exchange rate,  $\alpha_i$  is a country dummy,  $\phi_t$  is a year dummy,  $NFA_{i,t}$  is the ratio of net foreign assets to GDP,  $YD_{i,t}$  is GDP per capita relative to the country’s trading partners,  $TT_{i,t}$  is the terms of trade and  $\varepsilon_{i,t}$  is a residual term.

32. These panel estimates are then applied to Tunisia to estimate the equilibrium exchange rate. The results correspond to (i) two different groups of countries: a group of Middle Eastern countries including Egypt, Israel, Jordan, Pakistan, Tunisia, and Turkey, and a group of countries comprising mostly emerging markets from a diverse geographical nature; and (ii) to different time periods (see Figure 4). According to these results, the equilibrium exchange rate, after decreasing significantly in the 1980s, increased slightly in the 1990s.<sup>19</sup> More importantly, the results indicate that Tunisia’s real effective exchange rate was close to the equilibrium rate

<sup>17</sup> See Clark, Bartolini, Bayoumi, and Symanski (1994).

<sup>18</sup> See Lane and Milesi-Ferreti, bid. The results presented here are based on their parameter estimates. Their small open economy model does not include any fiscal variable.

<sup>19</sup> The depreciation of the equilibrium exchange rate in the 1980s was primarily due to the decrease of net foreign assets and secondly to a deterioration in the terms of trade.

estimated by the model over the latter period, and by 2000, was well in line with what would be predicted by the level of Tunisia's fundamental determinants at that time. These results appear to be consistent with the analysis developed in Section IV explaining why Tunisia did not experience inflationary pressures.

## **VI. EXTERNAL COMPETITIVENESS AND THE REAL EXCHANGE RATE**

### **A. Background**

33. A range of indicators is examined over the last decade in an attempt to assess Tunisia's competitiveness. The indicators used in this analysis are real effective exchange rates (REERs) based on different prices, including consumer prices, GDP deflators, and the relative price of nontraded to traded goods.<sup>20</sup> In addition, indicators of export performance are examined to review the composition of exports and the development of market shares. An index of ULCs, a measure of REERs based on costs, is also analyzed.

34. Given the shortcomings of REER indicators and data deficiencies, results should be interpreted with some caution. This is also why many different REER indices are considered in drawing overall conclusions. In general, all REER indicators suggest that Tunisia has pursued an appropriate exchange rate policy, which is consistent with the findings from the fundamental model described in Section V. In this regard, Tunisia has gained export market shares in the EU over the last decade and has widened its export base in the manufacturing sector. In addition, gradual trade liberalization and comprehensive structural reforms appear to have produced positive results in terms of productivity.

### **B. Real Exchange Rate Indicators Based on Prices**

35. The REER index compares nominal exchange rates between a country and its trading partners, adjusting for differences in inflation. REER indicators found in the literature include measures of REERs based on production prices, consumer prices, ULCs, wholesale prices, GDP deflators, and export unit values.<sup>21</sup>

36. The most commonly used REER indicator is the one based on consumer prices. CPIs are constructed according to a basket of goods that is fairly comparable across countries. Also, they are published regularly, are easily available, and their construction is generally accurate. In order to gauge profitability in the tradable sector, CPIs may be used as an acceptable proxy for factor

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<sup>20</sup> Unless otherwise specified in the text, foreign prices for each REER indicator have been calculated on the basis of the weighted basket of 15 countries that include Tunisia's competitors and its major trading partners following the standard IMF methodology. All indices are expressed in U.S. dollar terms and period-average exchange rates are used. See Zanello and Desruelle (1997) for more details on the IMF methodology.

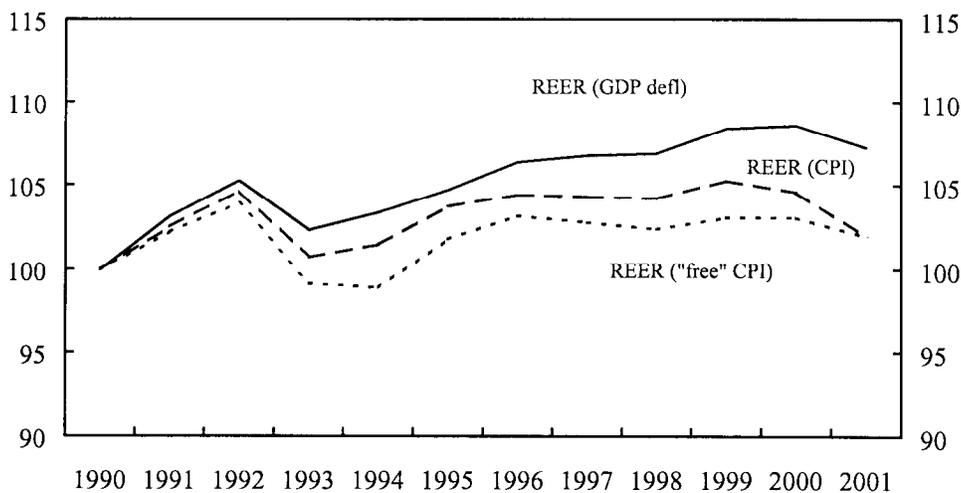
<sup>21</sup> For a comprehensive assessment of REER indicators, see Marsh and Tokarick (1994) and Maciejewski (1983).

costs. According to Turner and Van't dack (1993), many productive inputs, such as labor, are priced in line with consumer prices. However, CPIs possess several shortcomings. In particular, Tunisia's CPI contains some prices that are controlled (one-third of the index), and many of the services included in the CPI are not traded which may render the index inappropriate.

37. The GDP deflator-based REER may be regarded as a composite index of the cost of all primary factors of production. The main problem with the GDP deflator is that it is generally constructed using market prices which include indirect taxes, which leads to notable comparability problems.

38. Figure 5 displays three REER indicators for Tunisia for the period 1990–2001. In general, all indices show similar trends: a real appreciation at the beginning of the 1990s, a depreciation in 1993, a gradual appreciation which stabilizes during the second half of the 1990s, and a depreciation after 1999. Over the entire period, the CPI-based REER appreciated only by about 2 percent and in 2001, it returned to the level registered in 1991.<sup>22</sup> Given that 33 percent of the Tunisian CPI basket is subject to price controls, a REER based on an adjusted CPI has been constructed by removing goods with administered prices from the overall CPI basket. This “free” CPI-based REER moved very closely to the CPI-based REER drawn from the Information Notice System (INS). Finally, the GDP deflator-based REER appreciated by under 7 percent over the last eleven years.

Figure 5. Tunisia: Real Exchange Rate Indicators, 1990–2001  
(Index, 1990=100)



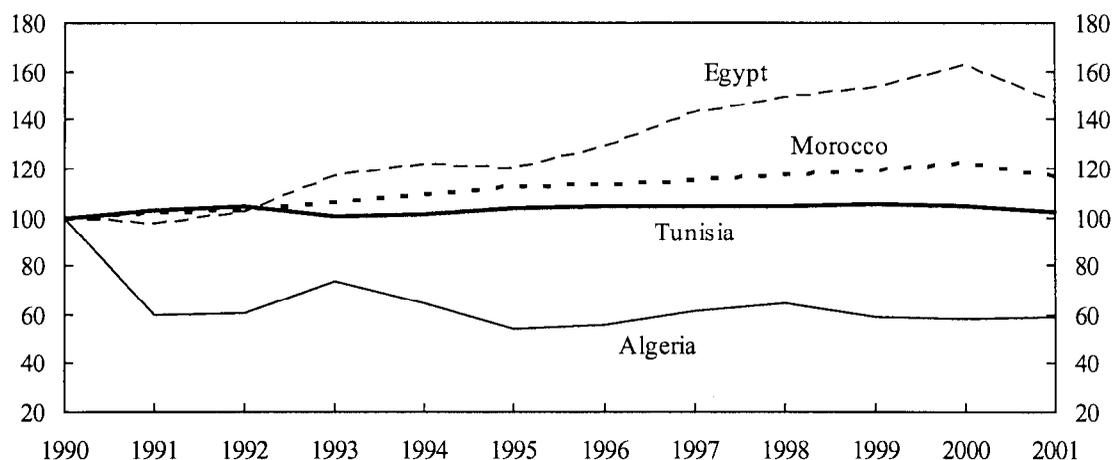
Sources: IMF, Information Notice System and World Economic Outlook; and IMF Staff estimates.

<sup>22</sup> The REER based on export unit values appreciated by about 19 percent over the last eleven years. However, this indicator is not very reliable since it assesses export performance exclusive of imports, providing an incomplete analysis of competitiveness. In addition, it represents average values which make comparisons across countries sensitive to the composition of exports.

39. Figure 6 compares CPI-based REERs in selected Middle Eastern and North African (MENA) countries. Tunisia's REER was relatively stable, a result that is consistent with the CRERR pursued by the authorities. Morocco's REER appreciated by 20 percent over the last eleven years and Egypt's REER appreciated by 50 percent.<sup>23</sup> Overall, the REERs in Egypt, Morocco, and Tunisia followed a common trend, depreciating during the last two years. In contrast, the REER in Algeria depreciated by almost 40 percent and has experienced significantly volatile movements over the last eleven years. These findings indicate that Tunisia's competitiveness based on relative CPI measures performed favorably compared to countries in the region.

Figure 6. Selected Middle East and North Africa (MENA) Countries: CPI-Based Real Effective Exchange Rates, 1990–2001

(Index, 1990=100)



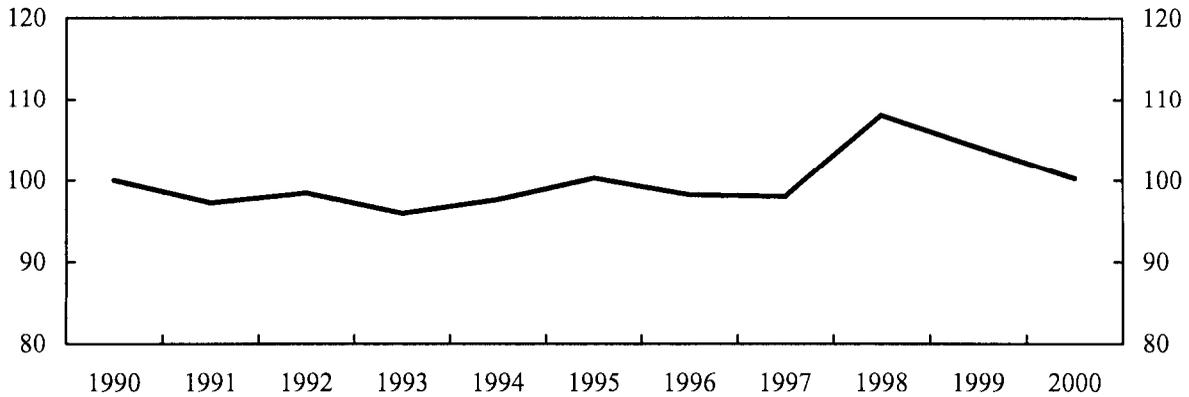
Source: IMF, Information Notice System.

40. A different CPI-based REER was constructed to reflect the evolution of the exchange rate with respect to Tunisia's competitors. This index was computed by using weights constructed on the basis of EU imports from Tunisia's major competitors during 1990–2000.<sup>24</sup> In order to avoid exaggerating changes in international price competitiveness, Turkey was excluded from the sample because of its high inflation rate and exchange rate appreciation during the second half of the 1990s. As shown in Figure 7, this index had a stable evolution until 1998, when it appreciated by about 10 percent. This was mainly due to the large devaluation of the nominal exchange rate of the Asian Tigers vis-à-vis the U.S. dollar. The indicator returned in 2000 to its initial 1990 level. This would suggest that, consistent with Figure 6, the dinar has not experienced significant real appreciation over the period.

<sup>23</sup> In 2001, the nominal exchange rate in Egypt was devalued by about 9 percent and in Morocco by 5 percent.

<sup>24</sup> The competitors comprise Morocco, Spain, Greece, Hong Kong SAR, Indonesia, Malaysia, Philippines, Portugal, Korea, Singapore, and Thailand.

Figure 7. Tunisia: EU Import-Weighted CPI-Based Real Effective Exchange Rate, 1990-2000  
(Index, 1990=100)



Sources: Trade Analysis and Reporting System (TARS) and IMF staff estimates.

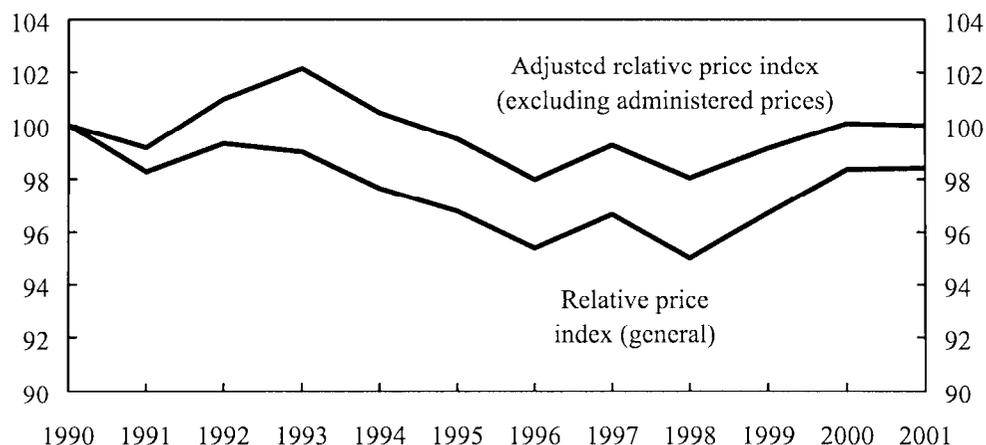
41. Productivity in the traded goods sector and the pattern of consumption between traded and nontraded goods in a country is another useful price-based indicator of competitiveness. A common measure used is the relative price of nontraded to traded goods. An increase in the ratio of nontraded to traded prices indicates a real exchange rate appreciation, which leads to an increase in the production of nontraded goods by shifting resources away from tradables to the nontradable sector. On the demand side, the change in relative prices raises the domestic consumption of tradables, which is met by an increase in imports. Consequently, the trade account worsens. However, prices of nontraded goods generally tend to rise over time due to an increase in income per capita which, on its own, can boost the demand for nontraded goods. In other words, the move in relative prices is not a sufficient condition to conclude that the country is experiencing a loss of competitiveness (Marsh and Tokarick, 1994). If the increase in prices is matched by an increase in productivity, the exchange rate appreciation does not represent a loss of competitiveness for the country.

42. Given the difficulties in drawing a line between traded and nontraded goods, the Standard Industrial Classification (SIC) is often used as a first approximation. The implicit deflators of traded and nontraded goods are drawn from the national accounts in national currency. Traded goods are proxied with manufactured goods, while nontraded goods include hydrocarbons, electricity, water, services (transport, telecommunication, tourism, commerce, and government wages), and construction and public works. Agricultural products are excluded from this analysis since they suffer from price distortions due to subsidies and price controls.

43. Figure 8 shows the index of general relative prices of nontraded to traded goods and an adjusted measure excluding administered prices in the nontraded sector (electricity, water, and hydrocarbons). In general, both indicators moved in the same direction but with different magnitudes. The adjusted relative prices in 2001 remain unchanged compared to 1990,

suggesting no real appreciation over the period. More importantly, the general indicator of relative prices, which shows a downward trend relative to 1990, also supports this conclusion.

Figure 8. Tunisia: Relative Prices of Nontraded to Traded Goods, 1990–2001  
(Index, 1990=100)



Sources: Tunisian authorities and IMF staff estimates.

### C. Indicators Based on Labor Costs

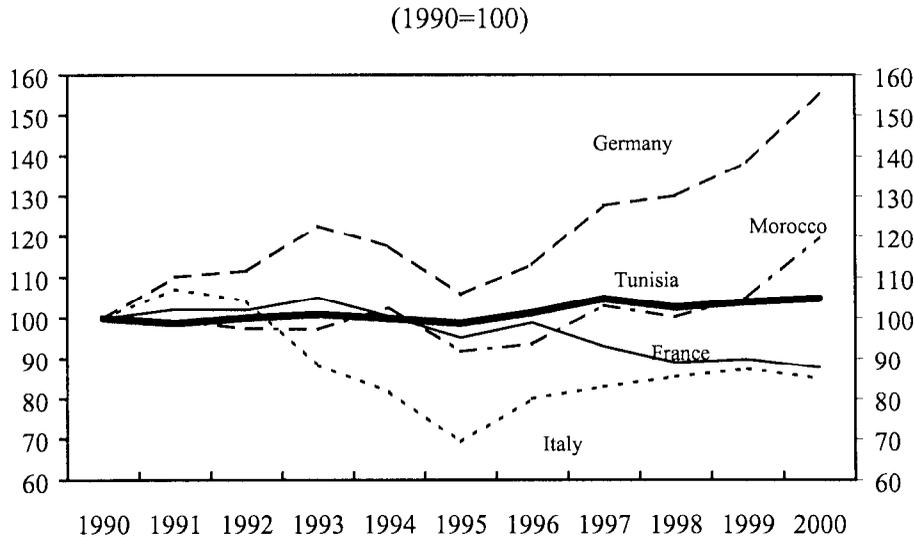
44. The most widely used indicators based on costs are real wages and unit labor costs. Wages denominated in a common currency have the advantage of being easily comparable across countries, although they may suffer from distortions due to exchange rate fluctuations. In addition, the differences in the definition of wages can hamper cross-country comparisons.

45. The ULC index is calculated as the wage bill in the manufacturing sector divided by real GDP in that sector. The ULC index in the manufacturing sector incorporates information on production costs, although it shows only a partial picture of a country's competitiveness since it neglects the role of capital, which can substitute for labor in the production process over the long run. For example, if ULCs decrease and the cost of capital rises, the ULC index may overstate competitiveness. In particular, there are problems with data on ULCs in manufacturing. These data include only the costs of labor services incurred directly in manufacturing, thus excluding the costs of other important labor inputs such as labor contracted from the services sector (e.g., legal or marketing services) and indirect labor costs associated with intermediate inputs. Moreover, differences in the definition of the manufacturing sector could lead to problems of international comparability.

46. Figure 9 depicts ULC indices in the manufacturing sector for European and North African countries. Tunisia's ULC index was stable in the first half of the 1990s and increased slightly in the second half, probably reflecting productivity gains as a result of the industrial

restructuring program. Tunisia's ULC index moved together with Morocco's until 1999, after which time Morocco's ULCs increased significantly. The ULC in Tunisia grew faster than in France and Italy, but slower than in Germany. These findings should be interpreted with some caution due to the shortcomings mentioned above.

Figure 9. ULC Indices in the Manufacturing Sector in Tunisia's Main Trading Partners and Morocco, 1990–2000



Sources: Organization for Economic Cooperation and Development and IMF staff estimates.

47. Given the risks of relying uniquely on the evolution of ULCs, this analysis reviews an alternative measure based on profitability, along the lines of the one developed by Lipschitz and McDonald (1991).<sup>25</sup> This index is calculated as the ratio of the ULC-based REER and the GDP deflator-based REER in the total economy.<sup>26</sup> A rise in the index is associated with a loss in competitiveness and a worsening in the trade balance because the share of labor costs in value added rises relative to that of competitors. Unlike the ULC index, this indicator captures losses in competitiveness which result from a rise in the price of an intermediate input.

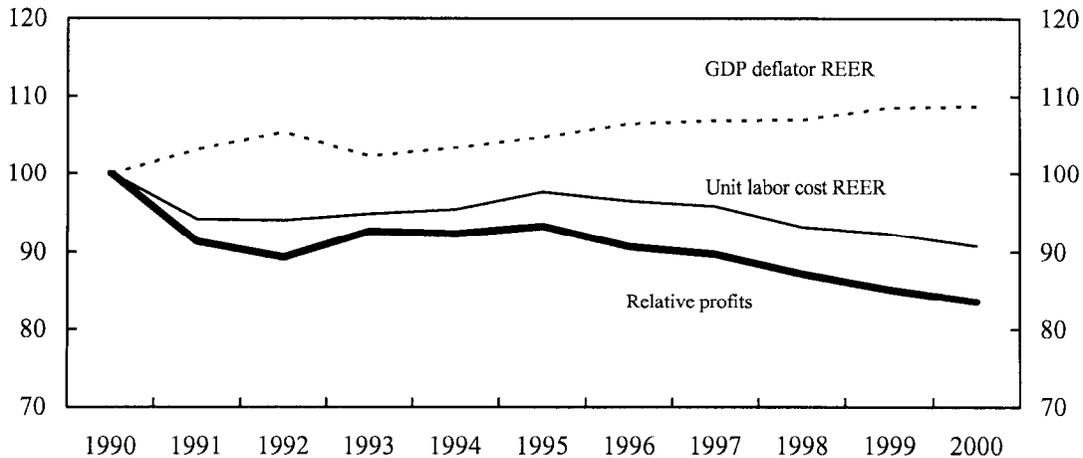
48. Figure 10 shows the real effective exchange rates and the relative profit indicator for the total economy. The relative profit indicator decreases over time as a result of a lower share of labor costs in value added in Tunisia relative to its competitors and partners. The decline in

<sup>25</sup> See also Feldman and Maciejewski (1983).

<sup>26</sup> The best indicator for relative profits would be the one based on ULC and GDP deflator-based REERs in the manufacturing sector. However, due to data limitations, this index could not be constructed.

relative profits is associated with a gain in competitiveness, consistent with the relative price index indicator.

Figure 10. Tunisia: Effective Exchange Rates and Relative Profits, 1990–2000  
(Index, 1990=100)



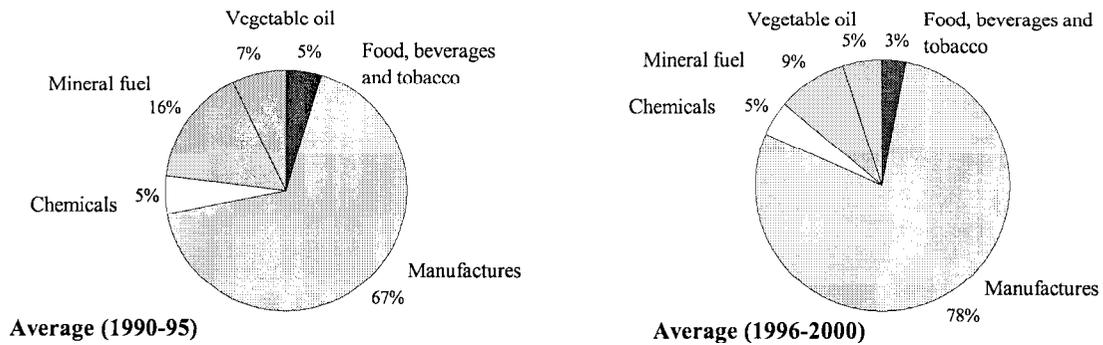
Sources: IMF, International Financial Statistics and World Economic Outlook; Tunisian authorities; and IMF staff estimates.

#### D. Indicators of Export Performance

49. The main indicators of export performance considered in this analysis are export composition and export market shares. The composition of trade provides some indication of diversification of the economy and thus some information on the country's vulnerability to sectoral shocks. Trade openness in Tunisia, measured as the sum of real exports and imports as a share of real GDP, increased from 98 percent in 1990 to 105 percent in 2001. The value of goods exports grew by 11 percent per year while the volume grew by 6 percent per year. Total exports as a share of GDP rose from 28.5 percent in 1990 to 33 percent in 2001. In conjunction with increased trade, the export composition also changed. Figure 11 illustrates the evolution in the composition of Tunisian exports to its main trading partners, Germany, Italy, and France.<sup>27</sup> Tunisia's share of exports of manufactured goods to these countries increased from 67 percent on average from 1990–95 to 78 percent from 1996–2000. This increase most likely reflected strengthened efforts to upgrade the industrial sector and liberalize external trade.

<sup>27</sup> About 74 percent of Tunisia's trade in 2000 was with the EU, in particular, Italy, Germany, and France accounted for 60 percent of Tunisia's exports.

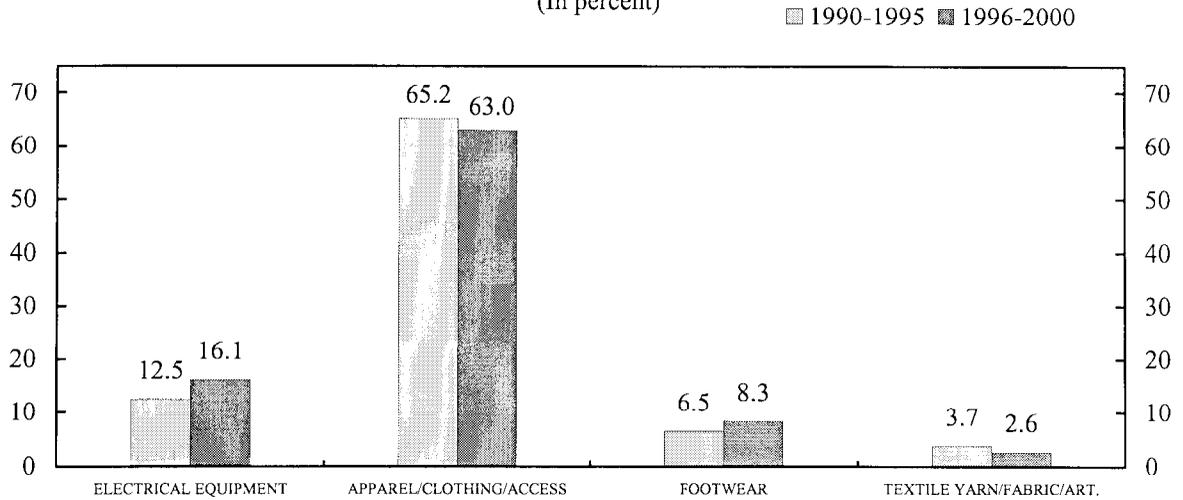
Figure 11. Composition of Tunisian Exports to its Main Trading Partners, 1990–2000



Source: Trade Analysis and Reporting System (TARS).

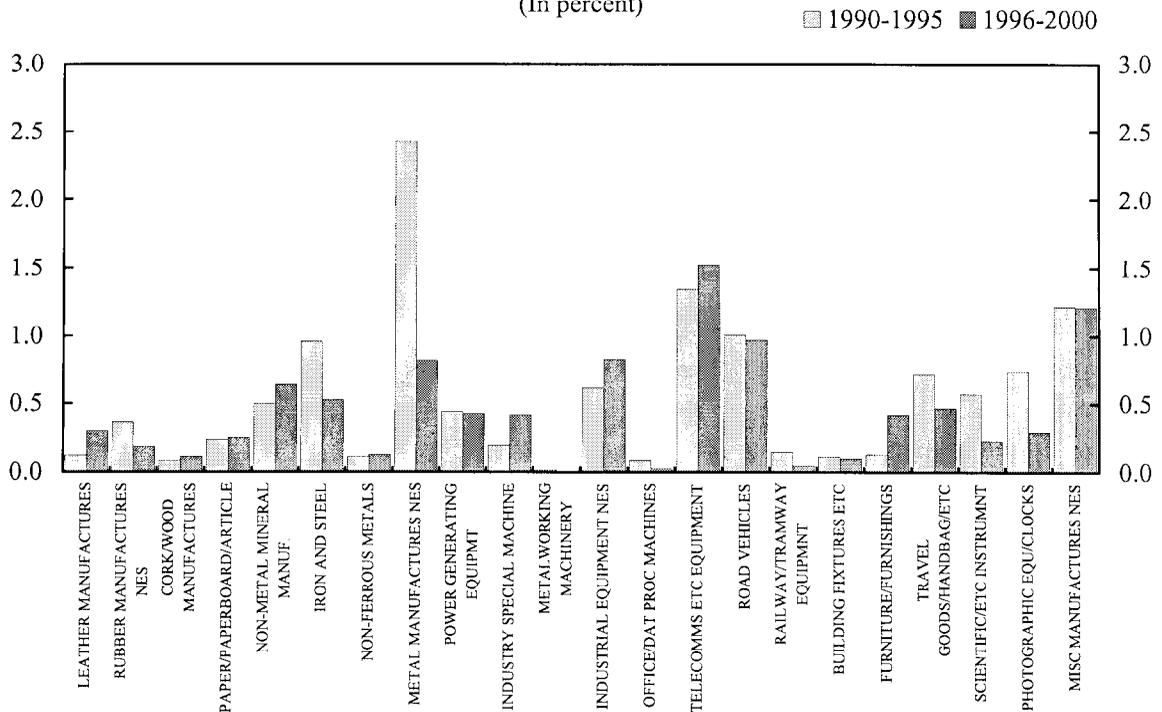
50. Tunisia has improved the diversification of its export base within the manufacturing sector. As indicated in Figure 12 (Panels a and b), the composition of Tunisia's manufactured goods exports to its main trading partners is relatively diverse. Its main manufactured exports consist of apparel/clothing/accessories, electrical equipment, textiles, and footwear. Electrical equipment has performed well, with the average share of exports to Tunisia's trading partners increasing from 12.5 percent over 1990–95 to 16 percent over 1996–2000. Similarly, the average share of Tunisia's exports of footwear to these trading partners increased from 6.5 percent to 8.3 percent. In contrast, other industries, such as textiles and apparel/clothing/accessories, have experienced a small decline in their export shares.

Figure 12a. Tunisia: Manufacturing Export Shares of the Major Exporting Sectors, 1990-2000  
(In percent)



Source: Trade Analysis and Reporting System (TARS).

Figure 12b. Tunisia: Export Shares of Manufactures, 1990-2000  
(In percent)

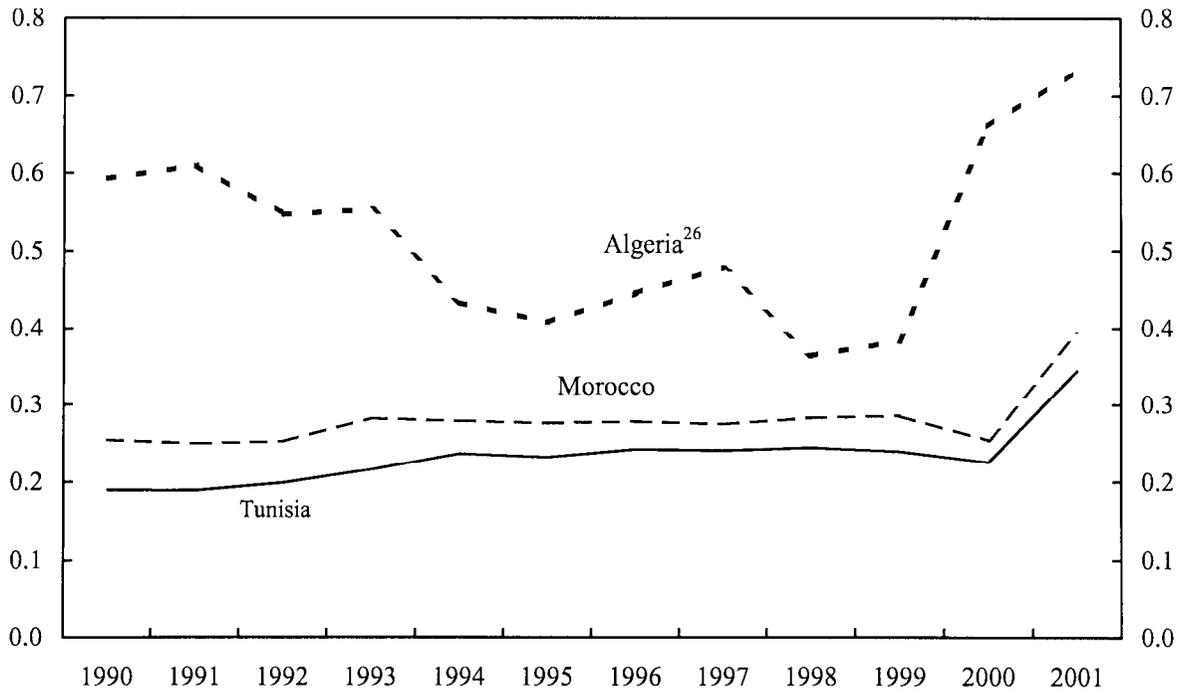


Source: Trade Analysis and Reporting System (TARS).

51. Figure 13 shows the evolution of export shares in North African countries with respect to EU imports. Export shares in Tunisia and Morocco both increased during the first half of the

1990s, stabilizing afterwards until 2001 when they experienced a significant rise following the REER depreciation. Algeria, however, had more volatile movements in export shares.<sup>28</sup>

Figure 13. Export Market Shares with Respect to EU Imports, 1990–2001  
(In percent)



Source: IMF, *Direction of Trade Statistics*.

## VII. CONCLUSIONS

52. The main findings of the paper suggest that the CRERR worked well in Tunisia and that there is no evidence of an overvaluation of the dinar exchange rate. Tunisia avoided the trap of a high and “plateau-type” inflation as predicted by the theoretical models on CRERR for a number of reasons: (i) the absence of significant shocks during the period; (ii) price and wage rigidities, including incomes policies; and (iii) a prudent macroeconomic policy mix. Tunisia has not been affected by sharp terms of trade shocks since the mid-1980s, and the balance in Tunisia’s energy trade has helped protect it from oil price shocks. In addition, inflationary pressures in the nontraded goods sector remained subdued in the 1990s because of a gradual decline in the terms of trade (related to falling agricultural export prices) and domestic price controls (e.g., on petroleum products and basic commodities), which limited the impact of international price fluctuations on consumers and reduced the scope for the wealth effects described in Section III. Finally, prudent macroeconomic policies combined with the structural reforms undertaken by the authorities in the last few years have helped Tunisia gain market share in the EU, particularly in exports of manufactured goods. Access to European markets has helped Tunisia integrate into the world economy, upgrade its industry, and widen its export base.

<sup>28</sup> Note that over 95 percent of Algeria’s exports to the EU are hydrocarbon products.

53. The other main findings of the paper suggest that there is no evidence of an overvaluation of the dinar exchange rate. The estimates of the equilibrium real exchange rate based on different fundamental variables indicate that Tunisia's real effective exchange rate followed closely the equilibrium rate estimated by the model, and by 2000, was well in line with what would be predicted by the level of Tunisia's fundamental determinants at that time. In addition, most measures of competitiveness suggest that the current level of the real exchange rate is broadly appropriate: the CPI-based exchange rate appreciated only by 2 percent from 1990 to 2001; ULC-based exchange rate indices show that Tunisia is maintaining cost competitiveness relative to key partners; labor productivity in the late 1990s grew by about 2.2 percent a year in the manufacturing sector; the relative price of nontradables to tradables has decreased; and Tunisia has increased its export shares to the EU. The analysis of a number of standard competitiveness indicators confirms that Tunisia has not experienced significant real exchange rate appreciation since 1990. Sizable improvements in labor productivity, the movement of the relative price of tradable and nontradable goods, and the increase in export shares to the EU all point to evidence that Tunisia has maintained a competitive position in international markets.

54. While the CRERR approach has served Tunisia well, its limitations are now beginning to emerge in the context of the opening of the economy, increased regional and global integration, a more sophisticated market-based monetary policy, and the relaxation of capital controls. While the current level of the dinar parity does not give cause for concern, it is this new policy environment which makes it necessary to consider alternative approaches to exchange rate policy in the medium term. Indeed, Tunisia is facing an economic environment undergoing significant changes, both domestically and abroad. Many of these changes have important implications for the choice of exchange rate regime, and most are likely to make the defense of any type of pegged rate difficult. For a number of reasons, this suggests that moving to a floating exchange rate regime might be the most appropriate strategy for Tunisia.

55. First, greater capital mobility will help to diversify external financing sources and raise investment and growth, but it could also create the potential for greater instability related to sudden reversals. For instance, the government has issued an increasing quantity of foreign currency liabilities in recent years and the market for these assets is not believed to be very deep. If market sentiment were to turn against Tunisia for contagion-related reasons, the currency could come under strong pressure as investors in a thin market rush to sell Tunisian assets. Moreover, commitment to a predetermined exchange rate in the context of an open capital account could lead to excessive foreign currency borrowing by the private sector, who would view the peg as an implicit guarantee. This could give rise to significant contingent liabilities in the event of a devaluation. Third, changes in Tunisia's trade profile have made the domestic economy more sensitive to the exchange rate. For instance, greater openness to trade means that given changes in the exchange rate have a greater impact on output and prices. Fourth, the supply and demand for manufactured goods show significant sensitivity to exchange rates, unlike commodity exports, where supply and demand for individual exporters are generally found to be independent of the exchange rate.<sup>29</sup>

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<sup>29</sup> See Eichengreen, Masson, and others (2000), Appendix I, pp. 37–39.

56. With these issues in mind, recent crises involving emerging market economies have led to a growing consensus that pegged exchange rate regimes are inherently crisis-prone for emerging market economies. In this respect, a move to a flexible exchange rate in Tunisia would seem appropriate, particularly in view of the domestic policy changes under way, the increased integration with global markets, and Tunisia's ultimate status as a small open economy. Based on the findings of this paper, which shows no evidence of an overvaluation of the current dinar exchange rate, the authorities should take steps to deepen the foreign exchange market with the objective of eventually moving to a floating exchange rate system.

57. With the transition to a more flexible exchange rate regime, other macroeconomic policies would also need to be adapted to the changing environment. While the monetary authorities have already taken steps to allow interest rates to play a larger role in credit allocation and to give monetary policy a more prominent role in demand management, they would need to establish a clear framework for monetary policy, with price stability as the main objective.<sup>30</sup>

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<sup>30</sup> Recommendations related to reform of the exchange rate market and monetary policy are discussed in the IMF's "2002 Article IV Consultations Report," available at: <http://www.imf.org/external/country/TUN/index.htm>.

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