12 Productivity of Labor

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According to Dollar and Wolff (1993) labor productivity indicates the extent to which a country can be a competitive low-cost producer while maintaining high wages. Total factor productivity (TFP), on the other hand, measures the output produced by given amounts of labor and capital together with a high TFP meaning that both capital and labor can earn large returns while the cost of production remains low. According to Dollar and Wolff (1993), a nation with high labor productivity and high TFP is one that can compete internationally with high incomes and a high standard of living.

The purpose of this chapter is to provide evidence on productivity trends in MENA countries, analyze the determinants of productivity growth in those countries, and study issues related to macroeconomic stability. After studying the productivity of labor in Section 1, Section 2 concentrates on total factor productivity growth, and Section 3 deals with the determinants of total factor productivity growth. While Section 4 considers the effects of infrastructure, Section 5 concentrates on total factor productivity in Turkish manufacturing sub-sectors. Section 6 considers the effects of booms and busts on competitiveness and the chapter concludes with a summary of results.

1. Productivity of Labor

The economic performance of four MENA countries (Egypt, Morocco, Tunisia and Turkey) is shown in Table 12.1. During 1975, Turkey had the highest per capita income, followed by Tunisia, Morocco, and Egypt. During the period 1975–98 the highest growth rate of GDP was achieved by Egypt followed by Tunisia, Turkey, and Morocco. On the other hand, Egypt also had the highest population growth rate followed by Tunisia, Morocco and Turkey. That said the highest increase in per capita income was achieved by Egypt followed by Turkey, Tunisia, and Morocco. Thus, by 1998 Turkey had the highest per capita income level, followed by Tunisia, Morocco, and Egypt. Consideration of productivity figures, reveal that during 1975, Turkey had the highest productivity figure followed Tunisia, Morocco, and Egypt. During the period 1975-1998, the highest productivity increase was achieved by Egypt, followed by Turkey, Tunisia, and Morocco. By 1998, Turkey once again had the highest productivity figure, followed by Tunisia, Morocco and Egypt.

Table 12.1: Basic Indicators of Economic Growth in MENA Countries

	Population 1998	Per capita Income (constant 1995 US$) 1975	Per capita Income (constant 1995 US$) 1998	Labor Productivity (constant 1995 US$) 1975	Labor Productivity (constant 1995 US$) 1998	Growth Rate of GDP 1975-1998	Growth Rate of Population 1975-1998	Growth Rate of Labor Force 1975-1998
Egypt	61,401,300	479	1,162	1,475	3,097	5.97	2.31	2.56
Morocco	27,775,000	950	1,339	2,732	3,558	3.88	2.08	2.57
Tunisia	9,335,300	1,328	2,185	4,292	5,854	4.56	2.24	3.13
Turkey	63,451,000	1,970	3,269	4,313	6,739	4.40	2.02	2.32

Source: World Bank (2000).

In this chapter, we address the questions of what accounts for cross country differences in the levels and growth rates of labor productivity, as well as growth differences in labor productivity over time. To study these problems we consider the basic production relation:

$$Q = A\, K^{\alpha} (HL)^{\beta}$$

where Q denotes output, K is capital, L is labor, H is index of labor quality, A denotes technical progress, α indicates the output elasticity with respect to capital, and β is the output elasticity with respect to labor. Under constant returns to scale, which we assume, these weights are given by the shares of these two inputs in aggregate output. Productivity of labor is given by:

$$(Q/L) = A\, (K/L)^{\alpha} (H)^{\beta} \qquad (1)$$

where $\beta = (1-\alpha)$. Denoting by $q = (Q/L)$ the labor productivity, $k = (K/L)$ the capital-labor ratio, $\dot{q}$ the growth rate of labor productivity, $\dot{A}$ the growth rate of technical progress, $\dot{k}$ the growth rate of the capital-labor ratio and $\dot{H}$ the growth rate of labor quality. We arrive at:

$$\dot{q} = \dot{A} + \alpha\, \dot{k} + (1-\alpha)\, \dot{H} \qquad (2)$$

The equation reveals that if a country wants to increase its competitiveness through increases in productivity, it has to increase any of the following three sources of growth or a combination thereof:

- $\dot{k}$, growth in the amount of capital per worker in the economy (capital deepening)
- $\dot{H}$, improvements in the labor quality
- $\dot{A}$, total factor productivity (TFP) growth.

It has been shown by various economists that over the long run rapid economic growth does not take place without large investments in fixed capital. MENA countries are no exception, and in order to grow they need high rates of investment so that the amount of capital per worker grows over time. Table 12.2 shows that investment rates in MENA countries have been substantially lower than those in East Asian countries. Over the period of 1975–98, the average value of the investment/GDP ratio equaled 39 percent in Singapore, 32 percent in Korea, Malaysia and Thailand, and 29 percent in Hong Kong. On the other hand, the average investment/GDP ratio equaled 29 percent in Tunisia, 25 percent in Egypt, 24 percent in Morocco, and 21 percent in Turkey. Whereas the investment rate increased in East Asian countries over the period of 1975–98 the investment rates have declined in Egypt, Morocco and Tunisia.

Table 12.2: Investment, Savings, FDI and Current Account to GDP Ratio in East Asian and MENA Countries

	1975-79	1980-84	1985-89	1990-94	1995-98	Average
			Investment/GDP Ratio			
East Asia						
Hong Kong	27.44	30.64	25.39	28.51	33.11	29.02
Korea, Rep.	30.62	29.86	30.80	37.38	32.55	32.24
Malaysia	26.05	34.82	26.25	36.53	38.50	32.43
Singapore	39.86	47.39	37.49	35.89	35.93	39.32
Thailand	26.60	28.96	29.93	40.87	34.67	32.21
MENA						
Egypt	31.09	28.66	28.63	20.19	18.44	25.40
Morocco	27.40	25.56	23.14	22.99	20.91	24.00
Tunisia	29.88	32.56	24.97	30.52	26.01	28.79
Turkey	17.23	17.09	21.93	24.00	24.93	21.04
			Saving/GDP Ratio			
East Asia						
Hong Kong	32.27	31.71	35.02	34.23	30.87	32.82
Korea, Rep.	25.82	26.05	35.13	36.03	34.13	31.43
Malaysia	32.52	31.58	34.64	36.11	43.43	35.66
Singapore	33.18	43.25	40.32	45.99	50.90	42.73
Thailand	21.91	23.82	29.11	35.63	36.29	29.35
MENA						
Egypt	15.60	15.24	15.73	13.86	12.94	14.68
Morocco	13.47	12.53	14.48	13.85	12.82	13.43
Tunisia	24.68	23.75	21.55	24.63	23.18	23.56
Turkey	12.35	12.54	20.22	21.06	20.01	17.24
			FDI/GDP Ratio			
East Asia						
Hong Kong	-	-	-	-	-	
Korea, Rep.	0.13	0.11	0.54	0.51	1.16	0.49
Malaysia	1.99	2.61	1.10	3.40	2.61	2.34
Singapore	6.03	9.71	10.00	15.23	18.00	11.79
Thailand	0.20	0.35	0.51	0.85	1.23	0.63
MENA						
Egypt	1.61	1.07	1.25	0.47	0.48	0.98
Morocco	0.08	0.19	0.11	0.54	0.61	0.31
Tunisia	1.31	1.49	0.34	0.90	0.79	0.97
Turkey	0.07	0.05	0.12	0.26	0.27	0.15

Source: World Bank (2000).

In a closed economy, saving is the only source of investment, and savings and investment, by definition, must be equal. But in an open economy, investment can be financed by borrowing from abroad as well as using saving of foreigners. In an open economy, CA = S – I where CA refers to current account, S to savings and I to investment. Thus, I > S implies a current account deficit. In that case, the country must be running down its assets or accumulating foreign liabilities. In MENA countries, the average saving/GDP ratio amounted to 24 percent in Tunisia, 17 percent in Turkey, 15 percent in Egypt, and 13 percent in Morocco. Since savings rates have been substantially lower than investment rates in MENA countries these countries resorted to foreign savings. On the other hand, in East Asian countries the average value of domestic savings rate was 43 percent in Singapore, 36 percent in Malaysia, 33 percent in Hong Kong, 31 percent in Korea, and 29 percent in Thailand. Foreign savings have contributed to domestic investment financing only in Korea and Thailand. Other East Asian countries have been net investors in foreign countries.

The data reveal that the MENA countries, in order to accelerate productivity growth, have to increase not only their investment ratios but also their domestic savings rates as too much reliance on foreign savings over long period of time may cause problems of solvency and sustainability. Since a current account deficit implies that the country is running down its foreign assets or accumulating foreign liabilities, the current account equals the change in the net international investment position of the country. When the difference between the stock of foreign assets and liabilities is negative, the country is a net debtor to the rest of the world. If the country is a net debtor then— in principle— the economy must at some point in the future run current account surpluses that have a present discounted value equal to its debt. The ability of the country to generate future current account surpluses sufficient to repay existing debt is known as solvency. Thus a country is solvent if the present value of future current account surpluses is at least equal to its current external debt. On the other hand sustainability is a more complicated concept. Here we assume the continuation of present macroeconomic policies into the future. The current stance of policies is said to be sustainable if its continuation into the future does not violate the solvency constraint. If not, then the country is expected to face an exchange rate collapse or an external debt default, which in turn will imply a reduction in real income and employment during the adjustment period to sustainable policies, deviating from the long run growth path of the country.

Among external sources of finance, the most preferred one is unquestionably foreign direct investment. Table 12.2 shows developments in the foreign direct investment/GDP ratio. Whereas this ratio was 11.8 percent in Singapore and 2.3 percent in Malaysia the ratio equaled 0.98 percent in Egypt, 0.97 percent in Tunisia, 0.31 in Morocco, and 0.15 percent in Turkey. The data reveal that MENA countries have also not been successful in attracting foreign direct investment.

Table 12.3: Educational Attainment of Adult Population by Country, 1950–2000 (percent)

		No Schooling	Completed Primary		Completed Secondary		Completed Higher		Labor Quality Index	Annual Growth Rate
			No	Yes	No	Yes	No	Yes		
Egypt*	1975	86.3	3.1	1.6	2.9	2.8	0.4	2.9	134	
	1980	73.9	8.3	4.2	4.1	3.9	0.6	5.0	157	3.14
	1985	64.1	11.0	5.5	7.6	7.2	0.6	4.0	174	2.03
	1990	58.4	11.9	6.0	8.5	8.1	0.8	6.3	191	1.97
	1995	52.1	12.6	6.4	10.3	9.8	1.0	7.8	210	1.85
	2000	46.1	11.8	6.0	13.0	12.4	1.3	9.4	232	2.07
Tunisia**	1960	92.1	3.4	1.7	1.2	0.9	0.1	0.6	112	
	1965	89.1	4.7	2.4	1.6	1.4	0.1	0.7	117	0.78
	1970	85.8	6.3	3.2	2.0	1.8	0.1	0.8	121	0.73
	1975	82.7	6.5	3.2	3.2	3.2	0.1	1.1	130	1.42
	1980	72.1	11.4	5.8	4.1	4.8	0.2	1.6	145	2.26
	1985	66.3	12.6	6.3	5.4	6.6	0.3	2.5	160	1.95
	1990	56.8	17.6	8.9	5.8	7.5	0.4	3.0	172	1.45
	1995	49.2	20.6	10.4	6.7	8.7	0.5	3.9	186	1.56
	2000	41.2	23.8	11.9	7.6	9.6	0.6	5.3	201	1.59
Turkey	1950	83.1	4.9	7.0	2.3	1.7	0.5	0.5	125	
	1960	60.2	13.0	19.9	3.5	2.7	0.3	0.4	148	1.70
	1965	59.9	11.9	21.0	3.3	2.6	0.5	0.8	151	0.36
	1970	59.6	10.9	21.8	3.4	2.7	0.7	0.9	153	0.30
	1975	59.0	10.6	21.3	4.1	3.2	0.8	1.0	157	0.44
	1980	52.4	11.4	23.9	4.9	3.8	1.6	2.0	172	1.86
	1985	42.5	12.8	30.1	5.9	4.6	1.8	2.3	186	1.66
	1990	34.8	10.9	37.4	6.8	5.1	2.2	2.8	201	1.56
	1995	30.6	6.6	40.6	8.9	6.8	2.8	3.7	220	1.79
	2000	28.1	6.9	42.7	7.8	6.0	3.7	4.8	226	0.58
Labor Quality Weights			100	146	213	308	445	508	579	

*Notes: *Data unavailable for 1950–74. ** Data unavalaible for 1950–59.*
Source: Barro and Lee (1994)

Table 12.4: Educational Attainment of Adult Population in East Asia, 1975-2000 (percent)

		No Schooling	Completed Primary		Completed Secondary		Completed Higher	
			No	Yes	No	Yes	No	Yes
Hong Kong	1975	28.5	19.8	22.5	9.9	15.5	1.6	2.2
	1980	22.5	16.7	23.1	13.2	17.3	3.0	4.2
	1985	18.4	16.5	19.1	17.7	20.6	3.3	4.4
	1990	15.7	14.5	15.8	17.8	25.5	4.5	6.2
	1995	11.4	12.9	14.0	18.6	28.6	6.2	8.3
	2000	10.7	12.7	13.9	18.7	28.7	6.6	8.7
Korea	1975	25.2	22.0	17.2	14.5	14.2	1.8	5.1
	1980	19.7	17.4	17.1	18.2	18.7	2.3	6.6
	1985	15.4	9.5	18.1	19.7	25.6	3.0	8.7
	1990	11.0	0.8	20.9	18.9	35.0	3.5	9.9
	1995	8.7	0.9	17.3	15.7	36.2	5.5	15.7
	2000	8.0	0.8	15.9	15.0	34.5	6.7	19.1
Malaysia	1975	37.8	28.3	19.7	6.6	6.0	0.3	1.3
	1980	34.3	21.4	23.0	10.1	9.8	0.2	1.2
	1985	29.9	25.0	19.8	12.2	11.1	0.3	1.7
	1990	25.6	21.8	22.7	13.2	13.9	0.4	2.4
	1995	16.7	13.0	20.6	19.3	23.5	1.0	5.9
	2000	13.9	13.8	21.8	19.4	23.6	1.2	6.3
Singapore	1975	40.7	20.8	11.4	16.0	8.1	1.0	2.0
	1980	43.7	24.5	13.8	9.6	5.0	1.1	2.3
	1985	35.3	24.8	15.3	13.2	7.1	1.4	2.9
	1990	29.1	19.5	15.4	23.2	8.1	1.5	3.2
	1995	14.3	11.2	16.5	36.8	13.7	2.4	5.1
	2000	12.7	11.5	16.8	35.3	13.2	3.4	7.1
Taiwan	1975	29.6	20.7	24.0	9.2	10.8	2.8	2.9
	1980	23.0	6.3	38.1	10.0	13.3	4.6	4.7
	1985	19.3	13.8	24.9	13.6	17.4	5.4	5.6
	1990	16.4	14.8	18.9	16.7	21.0	6.0	6.2
	1995	14.2	13.1	16.9	17.8	22.4	7.6	8.0
	2000	12.4	12.1	15.4	18.2	22.9	9.4	9.6
Thailand	1975	32.5	44.1	16.5	3.6	1.8	0.0	1.5
	1980	20.5	67.3	2.4	4.5	2.3	0.0	3.0
	1985	21.5	44.3	21.4	4.7	3.1	0.0	5.0
	1990	22.3	34.7	27.2	4.5	3.5	0.0	7.8
	1995	19.6	34.8	27.3	5.0	3.9	0.0	9.4
	2000	17.3	34.9	27.3	5.2	4.1	0.1	11.1

Source: Barro and Lee, (1994).

Table 12.3 shows the educational attainment of the adult population in MENA countries and Table 12.4 presents the same for East Asian countries, derived from data obtained from Barro and Lee (1996). Comparison of the figures in the two tables reveals that the East Asian education system is superior

to that in MENA countries. In 2000, the proportion of the adult population with no schooling in Egypt was 46.1 percent, with 41.2 percent in Tunisia and 28.1 percent in Turkey. On the other hand, the proportion of adult population with no schooling was 10.7 percent in Hong-Kong, eight percent in Korea, 13.8 percent in Malaysia, 12.7 percent in Singapore, 12.4 percent in Taiwan, and 17.3 percent in Thailand. The proportions of the adult population that had completed secondary schooling were 12.4 percent in Egypt, 9.6 percent in Tunisia and six percent in Turkey. In East Asian countries, the corresponding proportions are 28.7 percent in Hong-Kong, 34.5 percent in Korea, 23.6 percent in Malaysia, and 22.9 percent in Taiwan. Similarly, the proportion of adult population with higher education is 9.4 percent in Egypt, 5.3 percent in Tunisia, and 4.8 percent in Turkey. The corresponding proportions in East Asian countries are 8.7 percent in Hong-Kong, 19.1 percent in Korea, 6.3 percent in Malaysia, 7.1 percent in Singapore, 9.6 percent in Taiwan, and 11.1 percent in Thailand.

The above considerations reveal that in order to accelerate productivity growth the MENA countries have to considerably increase their investment in human capital formation. MENA countries have to increase not only the proportion of the adult population with primary, secondary, and higher education, but also the quality of education at each of these levels.

2. Total Factor Productivity Growth

To estimate TFP growth in MENA countries empirically we rearrange terms in equation 2 and obtain:

$$\dot{A} = \dot{q} - \alpha \dot{k} - (1-\alpha) \dot{H}.$$

The estimation of TFP growth thus requires estimates of the series Q_t, K_t, L_t, and H_t as well as an estimate of the parameter α. Once the residual $\dot{A}$ is obtained for each of the time periods under consideration using the above relation, these residuals are averaged over the entire sample period to give an estimate of the amount of variation in productivity growth that is unexplained by the growth rates of the factor inputs, i.e. TFP.

As an estimate of the size of output elasticity with respect to capital, denoted by α, Maddison (1987) uses α value of equal to 0.3 for industrial countries. Young (1995) obtains a capital share of 0.32 for Korea, 0.29 for Taiwan, 0.53 for Singapore, and 0.37 for Hong-Kong. On the other hand Collins and Bosworth (1996) use a uniform capital share of 0.35 for all countries under their consideration. Recently Senhadji (1999), who has estimated the technology parameter α econometrically using panel data for 66 countries over the period of 1960–94, maintains that the parameter value equals 0.44 for East Asia, 0.65 for the Middle East, and 0.54 for the industrial countries.

Let us now turn to the discussion of the series Q_t, K_t, L_t, and H_t for the countries under consideration. In our calculations, we use output and capital stock data expressed in terms of national currency. As output figures expressed in terms of national currency, except for Turkey, we use the GDP figures measured at constant domestic prices given by the World Bank (2000), and as capital stock figures expressed in terms national currency, we consider the Nehru and Dhareshwar (1993) capital stock data extended to 1998 using the World Bank (2000) investment data and the perpetual inventory formula:

$$K_t = K_{t-1} + I_t - \delta K_{t-1} \qquad (3)$$

where I_t denotes investment during time period t and δ indicates the constant depreciation rate of capital. Following Nehru and Dhareshwar, we assume that $\delta = 0.04$. In the case of Turkey, we consider the GDP and investment series measured in constant prices provided by the State Institute of Statistics. For the capital stock series, we use equation (3) together with an initial capital stock figure estimated in the following way: we assume, following Young (1995), that the growth rate of investment in the first five years of the national accounts investment series is representative of the growth of investment prior to the beginning of the series. In particular, the initial capital stock is estimated by the formula:

$$K_0 = \sum_{i=0}^{\infty} I_{-i-1}(1-\delta)^i = \sum_{i=0}^{\infty} I_0(1+g)^{-i-1}(1-\delta)^i = I_0 / (g+\delta) \qquad (4)$$

where I_0 is the first year of investment data calculated as the average investment figure during the first five years of investment series, g is the average growth of investment in the first five years of the investment series and $\delta = 0.04$.

For labor, again excepting Turkey, we use the labor force data provided by the World Bank (2000). In the case of Turkey, we use the employment data provided by Turkish State Institute of Statistics (2000). The index H is constructed following the Barro and Lee (1994) methodology based on educational attainment. It is defined as follows:

$$H = \sum_{j=1}^{7} \lambda_j \pi_j$$

where π_j represents the share of the population that completed the level of education j (j varies from 1, corresponding to the share of population with no schooling, to 7, corresponding to post-secondary education) and λ_j represents aggregation weights based on the observed relative earnings of the different educational groups. The relevant data on π_j and λ_j are shown in Table 12.3, derived from the study by Psacharopoulos (1994).

Table 12.5: Sources of Productivity Growth
(Nehru-Dhareshwar Capital Stock and World Bank Output)

			Capital share = 0.30			Capital share = 0.40			Capital share = 0.45		
		Productivity Growth	(K/L) Ratio Contribution	Human Capital Contribution	TFP	(K/L) Ratio Contribution	Human Capital Contribution	TFP	(K/L) Ratio Contribution	Human Capital Contribution	TFP
A. Percentage points per year											
Egypt	1960–98	3.29	1.58	1.44	0.26	1.81	1.33	0.15	2.03	1.22	0.03
Morocco	1961–98	2.69	1.12	-	1.57	1.28	-	1.41	1.44	-	1.25
Tunisia	1960–98	2.59	1.00	0.95	0.64	1.14	0.88	0.57	1.29	0.80	0.50
Turkey	1950–99	3.12	1.19	0.78	1.15	1.36	0.72	1.15	1.53	0.66	1.15
B. Percentage points with percentage distribution											
Egypt	1960–98	3.29	48.10	43.94	7.96	54.97	40.56	4.47	61.84	37.18	0.98
Morocco	1961–98	2.69	41.74	-	58.26	47.70	-	52.29	53.66	-	46.33
Tunisia	1960–98	2.59	38.65	36.73	24.62	44.18	33.90	21.92	49.70	31.08	19.23
Turkey	1950–99	3.12	38.10	25.15	36.75	43.55	23.21	36.75	48.99	21.28	36.75

Source: Author's calculations.

Table 12.6: Productivity, Productivity Growth and Percentage Contribution to Growth by TFP

		Percentage Contribution to GDP Growth by TFP					
		Productivity Growth Productivity	World Bank* (1961–98)	Young (1995)	Christenson, Colins & Bosworth (1966)	Cummings & Jorgenson (1980)	Present Study
OECD							
France	81.8	2.85	-	-	-	55	-
W. Germany	81.8	2.76	-	-	-	56	-
Italy	83.4	3.07	-	-	-	64	-
Japan	58.7	4.08	-	-	-	42	-
UK	72.7	2.07	-	-	-	52	-
US	100.0	1.43	-	-	-	33	-
East Asia							
Hong Kong	60.8	4.64	44	32	-	-	-
Korea	38.0	4.84	37	17	28	-	-
Singapore	60.6	5.27	15	2	39	-	-
Taiwan	44.5	4.24	42	28	35	-	-
Malaysia	26.7	3.18	-	-	24	-	-
Thailand	15.7	3.53	-	-	40	-	-
MENA							
Egypt	18.7	3.29	-	-	-	-	3
Morocco	18.7	2.69	-	-	-	-	27
Tunisia	21.7	2.59	-	-	-	-	11
Turkey	21.8	3.12	-	-	-	-	21

*Source: Productivity figures are from Hall and Jones (1999). Productivity growth rates for OECD countries are from European Commission (1999) and for other countries they have been estimated using the World Bank (2000) data.Percentage contribution to GDP growth by TFP for MENA countries are estimated for capital share of 0.4. *World Bank (1993)*

Based on this study we assume following Hall and Jones (1998) a rate of return of 13.4 percent for primary education. For secondary education we assume a value of 13.1 percent. Finally, for higher education, we use the value Psacharopoulos reports for the OECD, which is 6.8 percent. The values of the labor quality index are shown in Column 8 of Table 12.3.

Table 12.5 shows the productivity growth as well as the sources of productivity growth of the MENA countries for three different values of capital share, namely $\alpha = 0.35$, $\alpha = 0.4$ and $\alpha = 0.45$. Table 12.6 shows the levels of productivity, productivity growth, and percentage contribution to productivity growth by TFP in OECD, East Asian and MENA countries. The tables reveal the following aspects:

- The productivity levels in MENA countries are generally low relative to the productivity levels in OECD and East Asian countries.
- The productivity growth rates in MENA countries are generally low relative to the growth rates achieved in OECD and East Asian countries.
- The percentage contributions to growth of GDP by TFP in MENA countries are generally lower than those in OECD and East Asian countries.

The labor productivity levels shown in Table 12.6 are from Hall and Jones (1999). Their data refer to the year 1988 and are derived from the Penn World Tables Mark 5.6 revision of Summers and Heston (1991). The table shows that productivity in MENA countries is generally much lower than those in East Asian countries. According to the table, the productivity in Egypt equals 49.2 percent of that in Korea, and 42 percent of that in Taiwan. On the other hand the productivity in Turkey equals 57.4 percent of that in Korea and 49 percent of that in Taiwan. Similar considerations apply to other MENA countries.

Comparison of average productivity growth rates in MENA and East Asian countries reveal that the Egyptian growth rate equals 68 percent of that in Korea, and 77.6 percent of that in Taiwan. Similarly, the Turkish productivity growth rate equals 64.5 percent of that in Korea and 73.6 percent of that in Taiwan. Whereas the productivity growth rates in Egypt and Turkey exceed those in France, Germany, Italy, the UK and the USA the growth rates in Morocco and Tunisia fall short of the growth rate in France, Germany and Italy.

Table 12.6 further reveals that the percentage contributions to growth of GDP by TFP in MENA countries are very low relative to those in OECD and East Asian countries. Whereas the contribution of TFP to GDP growth is 64 percent in Italy and 35 percent in Taiwan the contribution of TFP to GDP growth is 3 percent in Egypt , 11 percent in Tunisia , 21 percent in Turkey and 27 percent in Morocco. Thus the GDP growth in MENA countries is attributable mainly to capital accumulation, that is, accumulation of both physical and human capital. On the other hand Table 12.8 shows that similar considerations

hold for productivity growth. The percentage contribution of physical capital to productivity growth ranges between 48.1 percent and 61.8 depending on the value of the share of capital. Similarly, the percentage contribution of physical capital in Turkey varies between 38.1 and 49 percent. The percentage contribution of human capital contribution varies between 48.1 and 37.2 percent in Egypt and 38.1 and 21.3 percent in Turkey.

3. Determinants of Total Factor Productivity Growth

The sources of TFP growth are better technology, better organization, gains from specialization, and innovations on the shop floor. It has been shown by various economists that among the factors determining TFP, the following two factors are of prime importance: (i) acquiring knowledge, and (ii) competitive pressure and prudent macroeconomic policies as measured by an index of openness and the inflation rate in the economy.

Firms and societies use technical knowledge to improve their efficiency in the production of goods and services. Sometimes they create the knowledge themselves while at other times they adopt knowledge created by others. To create knowledge, industrial countries invest considerable resources in research and development. Without a system that protects the rights of those who create knowledge, it is unlikely that individuals and firms would spend as much as they do. Patents provide such protection. They provide to knowledge creators with the legally-enforceable power to exclude others from using their knowledge for a specified period. However, the importance of the protection provided by patents differs among industries. Patents are more important in industries where products tend to be long-lived (such as pharmaceuticals and chemicals). In other industries with shorter products cycles (such as electronic products), firms prefer secrecy to patents as an exclusion strategy.

It is expected that stronger patent protection should lead to greater R&D efforts in countries that offer such protection. The benefits of patents go beyond stimulating investment in R&D. Developing countries often use knowledge produced in industrial countries. Without strong patent protection in the developing countries, firms in industrial countries have no incentive to transfer knowledge paterns in the developing world. The level and quality of patent protection in developing countries, therefore, influences both FDI and direct technology transfer through licensing agreements and the vertical integration of multilateral firms

Recently Ginarte and Park (1997), who have quantified the levels of protection across countries, constructed an index of patent rights by examining five categories of patent laws: (i) extent of coverage, (ii) membership in international patent agreements, (iii) provisions for loss of protection, (iv) enforcement mechanism, and (v) duration of protection. The extent of coverage is

measured by the patentability of pharmaceuticals, chemicals, food, plant and animal varieties, surgical products, microorganisms, and utility models. Under membership in international patent agreements, membership in the Paris Convention of 1883 (and subsequent revisions), the Patent Cooperation Treaty of 1970, and the International Convention for the Protection of New Varieties of Plants of 1961 have been examined. Provisions for loss of protection have concentrated on protection against losses arising from (a) working requirements, (b) compulsory licensing, and (c) revocation of patents. Working requirements refer to the exploitation of inventions. Compulsory licensing requires patentees to share exploitation of the invention with third parties. On the other hand enforcement concentrates on the availability of preliminary injunctions, contributory infringement pleadings, and burden-of-proofs reversals. Here preliminary injunctions refer to pre-trial actions that require individuals to cease an alleged infringement. Contributory infringements are actions that do not infringe a patent right but cause or otherwise result in infringement by others. Burden of proof reversals are procedures that shift the burden of proof in process patent infringement cases from the patentee to the alleged infringer. Finally, the duration of the patent is important for ensuring adequate returns on innovative activity. The index developed by Ginarte and Park ranges in value from zero to five, and high values of index indicate stronger protection. The index values for MENA, East Asian and OECD countries are shown in Table 12.7. The table shows that MENA and East Asian countries have not provided strong patent rights protection until recently.

Table 12.7: Index of Patent Rights, 1960-90

	1960	1965	1970	1975	1980	1985	1990
OECD							
France	2.76	3.10	3.24	3.24	3.90	3.90	3.90
Germany	2.33	2.66	3.09	3.09	3.86	3.71	3.71
Italy	2.99	3.32	3.32	3.46	3.71	4.05	4.05
Japan	2.85	3.18	3.32	3.61	3.94	3.94	3.94
US	3.86	3.86	3.86	3.86	4.19	4.52	4.52
East Asia							
Hong Kong	2.04	2.04	2.04	2.04	2.24	2.57	2.57
Korea, Rep.	2.8	2.8	2.94	2.94	3.28	3.61	3.94
Malaysia	2.37	2.37	2.37	2.37	2.37	2.37	2.37
Singapore	2.37	2.37	2.37	2.37	2.57	2.57	2.57
Thailand	1.51	1.51	1.51	1.51	1.85	1.85	1.85
MENA							
Egypt	1.99	1.99	1.99	1.99	1.99	1.99	1.99
Morocco	2.38	2.38	2.38	2.38	2.38	2.38	2.38

Source: Ginarte and Park (1997).

The situation is expected to change after Egypt, Morocco, Tunisia and Turkey have signed the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs). On the other hand the OECD countries do provide strong patent rights with the US being the leader followed by Italy, Japan, France and Germany.

The index of patent rights developed by Ginarte and Park concentrates on statutory protection. But actual protection may differ from statutory protection. Consideration of the case of Turkey reveals that new patent, copyright, trade mark and industrial designs laws came into effect in Turkey in June 1995. The laws are compatible with the TRIPs Agreement as well as with EU regulations as a requirement of the Customs Union Decision (CUD) of 1995. But Turkey still receives complaints about its lack of a patent enforcement mechanism. Efforts are under way to educate businesses, consumers, judges, and prosecutors regarding the implications of the laws. Turkey is in the process of establishing a number of special courts to hear intellectual property related cases under the new laws.

Table 12.8 shows annual patent applications by residents and non-residents in OECD, East Asian, and MENA countries. The table reveals that the number of patent applications by residents in MENA countries is negligible compared to those in OECD countries. Only in Singapore is the number of patent applications by residents relatively large. Most of the patent applications in East Asian countries and Turkey are from non-residents. For the rest of MENA countries even the number of patent applications by nonresidents is negligible.

Developing countries need local research in order to take advantage of the technological knowledge accumulated in industrial countries. Since the private sector in general is not willing to invest in R&D in developing countries, governments have tried to encourage it. Table 12.6 shows R&D expenditures as a percentage of GNP. The table reveals that the share of R&D in GNP is rather low in MENA countries compared to the levels in OECD countries, Korea and Singapore. Similarly, the number of scientists and engineers in R&D per million people is also low in MENA countries compared to the levels in OECD countries and Korea. The table shows that Korea, which has a significant industrial sector, has started to invest in industrial R&D. Other East Asian and MENA countries still do not feel the need for local research.

A second factor determining the TFP, aside from knowledge acquisition, is competitive pressure as measured by market concentration ratios, import penetration rates and the index of openness of the economy. Competition forces firms and countries to create knowledge themselves as well as adopting the knowledge created by others. Here the channels are mainly international trade, FDI, and licensing.

Table 12.8: Basic Data on Patents, R&D, and Royalty and License Fees

	Patent Applications of Residents	Patent Applications of Nonresidents	R&D Expenditure (% of GNP)	Scientists & Engineers in R&D (per million people)	Royalty and License Fees Payments (million US$)	Royalty and License Fees Receipts (million US$)
OECD						
France	18,669	93,962	2.25	2,659	2,716.7	2,335.9
W. Germany	62,052	113,543	2.41	2,831	4,893.4	3,252.3
Italy	2,574	88,836	2.21	1,318	1,154.9	476.7
Japan	351,487	66,487	2.80	4,909	8,947.3	7,388.0
UK	26,591	121,618	1.95	2,448	6,122.7	6,723.9
US	125,808	110,884	2.63	3,676	11,292.0	36,808.0
East Asia						
Hong Kong	26	2,359	..	..	..	..
Korea	64	37,184	2.82	2,193	2,369.3	260.1
Malaysia	179	6,272	0.24	93		
Singapore	8,188	29,467	1.13	..	..	..
Thailand	238	5,205	0.13	103	513.9	7.1
MENA						
Egypt	504	706	0.22		392.0	56.0
Morocco	90	237	..	..	171.5	6.6
Tunisia	46	128	0.30	125	2.6	10.5
Turkey	233	27,985	0.45	291	..	..

Source: World Bank (2000).

Kawai (1994) maintains that trade and capital liberalization can bring about productivity growth that allowing enterprises to achieve economies of scale by taking advantage of market expansion, enabling them to absorb technologies and knowledge through their participation in foreign markets, through importation of products incorporating advanced foreign technologies, and/or through foreign investment ventures. This, in turn, pressures them to reduce X-inefficiency in order to cope with competition from foreign enterprises, and forces them to refrain from rent seeking behavior. At the market level, trade and capital liberalization spreads higher productivity through interindustry transaction and the spillover helps achieve efficient resource allocation as prices come closer to international levels, and this enables a country to import advanced capital goods as its exports expand, removing foreign exchange constraints. Furthermore, over the long term, learning effects will be brought about. Finally, licensing provides another mechanism for the transfer of technology. Table 12.8, which shows the licensing and loyalty payments of OECD, East Asian and MENA countries, reveals that the transfer of technology achieved through licensing in MENA countries has been rather limited. Licensing and royalty payments in Egypt amount to only 16.5 percent of those in Korea.

Asides acquiring knowledge and competitive pressure, the factors determining TFP include macroeconomic policies. This is illustrated by Burnside and Dollar (2000) in their work on the effects of foreign aid on growth. They find that openness, sustainable fiscal policy, and low inflation are all conducive to higher growth. They develop a policy index that summarises the growth impact of openness and a country's macroeconomic policies by regressing per capita real GDP growth on the budget surplus, the inflation rate, the openness dummy variable developed by Sachs and Warner (1995), and a set of institutional and policy variables. The authors estimate the model using a panel of 56 countries and six four-year time periods ranging from 1970–73 until 1990–93. The policy index is given by:

$$\text{Policy} = 1.28 + 6.85 \times \text{budget surplus} - 1.40 \times \text{inflation} + 2.16 \times \text{openness}$$

where the budget surplus is measured relative to GDP. The policy index measures the per capita growth rate that a country's economic policies would produce if all other country characteristics were equal to their averages in the cross country database. A close consideration of the equation reveals that the openness dummy has a large impact on the policy index. Furthermore, the index can be negative if inflation is high, or if the budget deficit is very large. The authors emphasise that the mean value of the index is 1.2.

In the following, a basic model is introduced to elaborate statistically the relationship between the TFP and trade policies. We consider the case of

Turkey and use in the model a variable representing the stability of macro policies:

$$TFP = \alpha_0 + \alpha_1 \text{ INFLATION} + \alpha_2 \text{ OPEN} + \alpha_3 \text{ BUDGET SURPLUS}$$

where INFLATION refers to the rate of inflation measured by GDP deflator, OPEN indicate the trade indicator, and BUDGET SURPLUS denotes the budget surplus to GDP ratio. The second term in the equation indicates the effect of instability in macro economic policies. We hypothesize that instability in macroeconomic policies may negatively influence productivity change, and therefore its coefficient should be negative. The third term refers to trade policies measured by the ratio of exports and imports to GDP. The coefficient would be positive if trade liberalization contributes to productivity enhancement. Finally, we hypothesise that budget surplus may positively influence productivity change. We consider data for the period 195–1999. The estimation yields the result:

$$\begin{array}{l} TFP = 0.593 - 0.0713 \text{ INFLATION} + 0.2454 \text{ OPEN} + 0.6832 \text{ BUDGET SURPLUS} \\ \qquad\quad (0.477)\ (-2.741) \qquad\qquad (2.693) \qquad\quad (1.996) \end{array}$$

$$1951\text{-}1999;\ n = 49;\ R^2 = 0.311;\ DW = 2.2686$$

The estimation results show that the variables have the expected signs. As hypothesized, instability in macroeconomic policies proxied by the inflation rate negatively influences productivity change. On the other hand, trade liberalization and budget surplus positively effect productivity change, as in the Burnside and Dollar (2000) study.

Using the Burnside-Dollar index we note that Turkey would have very poor rates in the early 1980s for three reasons. First, according to Sachs and Warner (1995), Turkey was a closed economy until 1989. Second, the central government deficit averaged about five percent of GDP during the 1980s. Third, the inflation rate hovered near 40 percent. Together, these facts imply a policy index of 0.4 in the 1980s, well below the sample average of 1.2 across the 56 developing economies in the Burnside-Dollar data set. However, with the liberalization of trade and capital movements, Turkey had become an open economy by the 1990s. To take full advantage of the impact of increased openness on growth, Turkey must embark on a reform aimed at restoring sound fiscal policy and reducing inflation. Because of deteriorating fiscal policy and inflation, Turkey's policy index towards the end of the 1990s was barely above that of the average developing country.

4. Effects of Infrastructure

Infrastructural services such as transport, power, and telecommunications are intermediate inputs in production, and any reduction in these input costs

raises the profitability of production, thus permitting higher levels of output and employment. These services also raise the productivity of other factors of production by reducing workers' commuting time, and improving information flows through electronic data exchange. The contributions of infrastructure to economic growth derive not from the mere existence or creation of physical facilities but from their operation and the value of the services generated.

The World Bank (1994) emphasizes that increased globalization and intensified competition in world trade has resulted not only from the liberalization of trade policies in many countries, but also from major advances in communication, transport and storage technologies. These developments have transformed the traditional organization of production and marketing to focus on the management of logistics (the combination of purchasing, production and marketing functions) in order to achieve cost savings in inventory and working capital and permit rapid response to changing consumer demands. "Just in time" delivery to customers is projected to increase over time. Virtually all the improved practices that reduces logistical costs have been based in some way on information technologies using telecommunications infrastructure. The exigencies of modern logistical management in industrial countries impose similar requirements on other countries wishing to compete in world markets. Inadequate and unreliable infrastructure in developing countries cripples the ability of countries to engage in international trade. Thus, the adequate quantity and reliability of infrastructure are key factors in countries' ability to compete in international trade.

Recently, global sourcing has created interwoven networks of international trade and industrial relations, in which businesses in several countries produce different goods and services components of the same final product. The information revolution and new technologies have made it possible to divide the industry's value chain into smaller functions that can be contracted out to independent suppliers. This fragmentation of production offers developing countries an opportunity to move from servicing small local markets to supplying large firms abroad and, indirectly, customers all over the world. Under these circumstances, integration into the production and marketing arrangements of the multinational corporations has become the most efficient way to take advantage of the growth opportunities offered by the global economy. But this, too requires adequate and reliable infrastructure. Hence, the ability of countries to provide the transportation and communications services essential for modern logistical management will increasingly determine their ability to compete for export markets and foreign direct investment.

Empirical research on this topic has examined the infrastructural variable in terms of public gross capital expenditure, as a proxy for net increments to the stock of infrastructure facilities. By contrast Canning and Fay (1993) use physical measures of infrastructural networks (kilometers of paved roads and

railways, and number of telephones) to explain growth in a panel of 104 countries at five-year intervals between 1960 and 1980. This study finds that both transportation and telephone systems have significant effects on growth rates. In a later paper, Canning (2000) uses panel data on a cross section of countries to estimate aggregate production function, including infrastructure capital. Other variables include physical capital, excluding infrastructural capital and human capital. Canning finds that the elasticity of output with respect to physical capital is around 0.37. For human capital in the form of education the author finds an elasticity of around 0.1. For infrastructure he finds that electricity generating capacity and transportation networks have roughly the same marginal productivity as capital as a whole. However, telephone networks appear to have higher marginal productivity than other types of capital. The elasticity of output with respect to telephone stock is estimated as 0.14.

Table 12.9 shows measures of infrastructure provision in East Asian and MENA countries. From the table, it follows that the East Asian countries of Singapore, Hong Kong and Korea have better infrastructural capital than the MENA countries. In the case of paved roads, we note that during 1990, paved roads per square kilometer of the country's surface area covered 4,446.8 meters in Singapore, 345 meters in Korea, 107 meters in Tunisia and 58.8 meters in Turkey. In terms of electricity production per capital production was is 5,774 kilowatt-hours in Singapore, 2,770 kilowatt-hours in Korea, 1,025 kilowatt-hours in Turkey and 754 kilowatt-hours in Egypt. Similarly, the number of telephone connections per 1000 people was 433.9 in Hong-Kong, 309.7 in Korea, 122.8 in Turkey and 16.7 in Morocco.

Table 12.10 provides recent and detailed information on international telecommunication comparators. From the table it follows that Korea had 20.5 million telephone lines in 1999 and that the telephone lines over the period 1995–99 grew at the compound annual growth rate (CAGR) of 2.5 percent. On the other hand, during the same period Turkey had 18 million telephone lines and telephone lines over the period 1995–99 grew at the annual rate of 8.1 percent. While telephone lines per hundred inhabitants amounted to 57.6 in Hong Kong, 43.8 in Korea, 27.8 in Turkey, and 5.3 in Morocco, waiting time for telephone lines was zero in Hong Kong and Korea, 0.4 years in Turkey and 0.7 years in Morocco. Since competition is made more difficult with lower degrees of digitalization, we note that in Hong-Kong and Malaysia, 100 percent of the main telephone lines were digital. The ratio was 86 percent in Egypt and 84 percent in Turkey. Regarding tariffs we note that while connection costs amounted $147 in Egypt they were $13 in Malaysia. While monthly subscription costs amounted to $11.6 in Hong Kong the costs were $2.2 in Tunisia. Finally, charges per call in Malaysia and Singapore amounted to $0.02, and were $0.08 in Morocco.

Table 12.9: Measures of Infrastructure Provision

	Paved Roads (kilometers)		Electricity generating Capacity (thousands of kilowatts)		Electricity production (millions of kilowatt-hours)		Telephone main lines (number of connections)		Railroad tracks (kilometers)	
	1980	1990	1980	1990	1980	1990	1980	1990	1980	1990
East Asia										
Hong Kong	1,161	1,484	3,227	8,342	12,649	28,938	1,279,000	2,474,998	92	..
Korea	15,587	34,248	10,272	24,056	39,979	118,740	3,325,000	13,276,449	3,135	3,091
Malaysia	20,461	27,720	2,430	5,037	10,186	24,722	396,000	1,585,744	2,082	2,222
Singapore	2,180	2,757	1,900	3,400	6,940	15,620	523,400	1,040,187	38	38
Thailand	23,613	39,910	4,010	9,722	15,112	46,180	366,000	1,324,522	3,735	3,940
MENA										
Egypt	12,658	14,601	3,583	11,738	16,910	39,545	430,000	1,717,498	4,667	5,110
Morocco	25,358	29,130	1,593	2,362	4,924	9,628	167,000	402,410	1,756	1,901
Tunisia	12,278	17,509	928	1,524	2,797	5,537	112,000	303,318	2,013	2,270
Turkey	35,632	45,527	5,119	16,316	23,275	57,547	1,301,558	6,893,267	3,198	8,695

	Paved Roads (meters/sq. km)		Electricity generating Capacity (kilowatts per capita)		Electricity production (kilowatt-hours per capita)		Telephone main lines (number of connections per 1000 people)		Railroad tracks (meters/sq. km)	
East Asia	1980	1990	1980	1990	1980	1990	1980	1990	1980	1990
Hong Kong	1,085.0	1,386.9	0.640	1.462	2,510.2	5,072.8	253.8	433.9	86.0	..
Korea	157.0	345.0	0.269	0.561	1,048.7	2,769.8	87.2	309.7	31.6	31.1
Malaysia	62.1	84.1	0.177	0.277	740.1	1,358.2	28.8	87.1	6.3	6.7
Singapore	3,516.1	4,446.8	0.833	1.257	3,041.2	5,774.3	229.4	384.5	61.3	61.3
Thailand	46.0	77.8	0.086	0.175	323.5	830.7	7.8	23.8	7.3	7.7
MENA										
Egypt	12.6	14.6	0.088	0.224	413.7	754.1	10.5	32.8	4.7	5.1
Morocco	56.8	65.2	0.082	0.098	254.1	400.4	8.6	16.7	3.9	4.3
Tunisia	75.0	107.0	0.145	0.187	438.1	678.9	17.5	37.2	12.3	13.9
Turkey	46.0	58.8	0.115	0.291	523.2	1,025.3	29.3	122.8	4.1	11.2

Source: World Bank, (1994).

Table 12.10: Telecommunications Comparators

	Main Telephone Lines			Waiting	Percent of Digital Switches	Telephone Tariffs		
						Residential		Local
	Total (k) 1999	CAGR (%) 1995-99	per 100 inhabitants	Time (years) 1999	in Main Telephone Lines (%)	Connection (US$) 1999	Monthly Sub-scription (US$) 1999	Call (US$) 1999
East Asia								
Hong Kong	3,868.8	4.2	57.6	-	100.0	61.0	11.6	-
Korea	20,518.1	2.5	43.8	-	73.9	84.0	3.4	0.04
Malaysia	4,430.8	7.4	20.3	0.7	100.0	13.0	5.3	0.02
Singapore	1,876.6	7.1	48.2	-	100.0	47.0	5.1	0.02
Thailand	5,215.6	10.6	8.6	1.2	100.0	89.0	2.6	0.08
MENA								
Egypt	4,686.4	14.6	7.5	2.3	86.0	147.0	1.1	0.03
Morocco	1,466.6	6.1	5.3	0.7	100.0	51.0	6.6	0.08
Tunisia	850.4	13.0	9.0	0.9	100.0	67.0	2.2	0.03
Turkey	18,054.0	8.1	27.8	0.4	84.0	30.0	4.8	0.10

Source: International Telecommunications Union (2001).

The above considerations reveal that the MENA countries are lagging behind the East Asian countries in terms of infrastructure . Since adequate quantity and reliability of infrastructure are key factors in the ability of countries to compete in international trade, it seems that MENA countries have to increase the quantity and reliability of infrastructure in order to increase the productivity of labor over time and to compete better for export markets and foreign direct investment.

5. Total Factor Productivity in Turkish Manufacturing Sub-sectors

Among the MENA countries the only country that has relatively reliable data on manufacturing sub-sectors is Turkey. We therefore consider in the following the case of Turkey. Our data come from "Annual Manufacturing Industry Statistics," "Small Manufacturing Industry Statistics" and the 1996 input-output table, all published by State Institute of Statistics. The first survey covers all firms in the public sector, and private firms employing ten or more employees while the second survey covers all private firms employing less than ten employees. Table 12.11, using the survey results for 1998, reveals that the sectors with the highest shares in total value added of the manufacturing sector were "petroleum and coal" with a share of 14.49 percent, "textiles" with a share of 12.67 percent, "food processing" with a share of 11.09 percent, and "basic metals" with a share of eight percent. In terms of employment, the sectors with the highest shares in total manufacturing employment were "textiles," with a share of 18.7 percent, "food processing" with a share of 14.69 percent, "apparel and footwear" with a share of 10.2 percent, and "metal products" with a share of 8.14 percent. The sixth column gives the share of 1998 public sector value added in total value added of the corresponding manufacturing sub-sector. From the table it follows that the average share of public sector in manufacturing industry was 22.55 percent. "Petroleum and coal" had the highest share with 93.98 percent, followed by "beverages" industry with a share of 45.52 percent, and the "tobacco" industry with a share of 44.67 percent.

Columns 7 and 8 of Table 12.11 indicate exposure to international trade. Column seven provides a measure of competitiveness on the domestic market, measured by the rate of import penetration. If Q, X and M stand, for the sectoral output, exports and imports respectively, the domestic demand D will be equal to $D = Q - X + M$, and the rate of import penetration will equal $[M * 100 / D]$. A low level of penetration does not necessarily mean that there are barriers to entry. The table reveals that the "professional and scientific measuring equipment" sector had the highest import penetration with 80.34 percent, followed by the "machinery" sector with a share of 55.57 percent, and "chemicals" with a share of 47.29 percent.

Table 12.11: Characteristics of Turkish Manufacturing Industries, 1998

ISIC	Products	Value Added 1998 (US$ million)	Share of Sector in total Man. Value Added (%)	Employment 1998	Share of Sector in total Man. Employment (%)	Public Sector Value Added 1998 (US$ million)	Share of Public Sector in Total Sectoral Value Added (%)	Import Penetration 1996	Export Ratio 1996	Rate of Exposure to International Competition 1996	1998 Share of Labor in Value Added	Depreciation Rate
311+312	Food Processing	5,020.7	11.09	257,452	14.69	590.3	11.76	10.17	10.52	19.62	24.56	3.839
313	Beverages	992.1	2.19	12,478	0.71	451.6	45.52	7.56	26.32	31.89	14.24	3.839
314	Tobacco	869.9	1.92	20,778	1.19	388.6	44.67	4.69	10.23	14.44	26.30	3.961
321	Textiles	5,736.3	12.67	327,779	18.70	147.5	2.57	17.25	18.56	32.61	29.16	4.110
322+324	Wearing Apparel and Footwear	1,919.8	4.24	178,728	10.20	25.6	1.33	12.24	56.58	61.89	28.83	4.450
323	Fur and leather products	153.3	0.34	14,677	0.84	0.0	0.00	27.36	19.53	41.55	28.57	4.271
331	Wood and cork products	471.5	1.04	68,546	3.91	21.6	4.59	4.47	2.44	6.80	26.47	4.358
332	Furniture and fixures	460.7	1.02	76,014	4.34	0.0	0.00	14.16	7.91	20.95	24.61	4.358
34	Paper and products	1,297.8	2.87	58,870	3.36	128.6	9.91	21.81	7.26	27.48	22.02	4.032
351+352	Chemicals	3,573.3	7.89	60,328	3.44	505.1	14.13	47.29	14.80	55.09	24.95	4.271
353+354	Petroleum and coal	6,563.7	14.49	10,077	0.58	6,168.6	93.98	10.95	2.72	13.37	5.02	3.889
355+356	Rubber and plastic products	1,500.8	3.31	59,489	3.39	0.0	0.00	19.63	10.44	28.02	26.37	4.032
36	Non-metallic minerals	2,951.1	6.52	100,156	5.71	45.2	1.53	8.70	11.42	19.12	22.40	3.789
37	Basic metals	3,620.7	8.00	72,814	4.15	1,417.3	39.15	46.39	21.34	57.83	21.21	3.889
381	Metal products	2,094.9	4.63	142,618	8.14	55.6	2.65	14.59	6.22	19.90	25.20	4.190
382	Machinery	2,197.4	4.85	104,564	5.97	99.9	4.55	55.57	9.75	59.91	27.87	4.190
383	Electrical machinery	2,492.2	5.50	72,755	4.15	40.6	1.63	42.35	19.54	53.61	28.73	4.190
384	Transport equipment	2,754.6	6.08	88,097	5.03	117.8	4.28	44.48	13.99	52.25	30.14	4.190
385	Professional and sci. measuring eq.	457.6	1.01	11,776	0.67	6.2	1.36	80.34	14.66	83.23	34.40	4.190
39	Other Manufacturing Industries	156.2	0.34	14,525	0.83	2.3	1.46	18.09	10.06	26.32		
3	Manufacturing	45,284.5	100	1,752,521	100	10,212.6	22.55	28.47	15.45	39.52	24.21	

Source: Author's calculations.

On the other hand Column 8 of Table 12.11 gives the export ratio defined as [X * 100 / Q]. It follows that the sector "apparel and footwear" had the highest export ratio with a share of 56.58 percent, followed by "beverages" with 26.32 percent, and "basic metals" with a share of 21.34 percent. Finally column nine gives the rate of exposure to international competition defined as [(Export Ratio) + [1 – (Export Ratio/100)] * Import Penetration]. The construction of this indicator rests on the idea that the exported share of production is 100 percent exposed and that the share sold on the domestic market is exposed in the same proportion as the penetration of the market. The table reveals that the sector "professional and scientific measuring equipment" had the highest exposure to international competition with an index value of 83.23 percent, followed by the "apparel" sector, with an index value of 61.89 percent, and the "machinery" sector, with an index value of 59.91 percent.

In the calculation of TFP we consider the "Annual Manufacturing Industry Statistics" for the period 1970–98 and abstract from consideration of the "Small Manufacturing Industry Statistics," as the latter data are available from 1992 onwards. We deflate the value added series, measured in current price, by the manufacturing sector value added deflator derived from the national accounts statistics. We deflate the investment series measured in current prices by the price deflator of investment goods obtained from national income statistics. To derive the capital stock series, we use the real investment series together with equations (3) and (4).

To obtain the depreciation rates of capital in the various sub-sectors of manufacturing used in equation (3) we note that, according to the State Planning Organization (1977), the economic life of buildings in Turkey is 33 years, while that for machinery and equipment is 15 years. It is shown that about two-thirds of total investment is in machinery and equipment, and about one third in buildings and other construction, and that the economic life of buildings does not vary significantly between industries, but may for machinery and equipment. Following Krueger and Tuncer (1980), we scale the estimates of the economic life of machinery and equipment so that the weighted average is 15 years. We then multiply those estimates by two-thirds and add one-third times the length of life of buildings to form the estimates of each sector's depreciation rates. The resulting depreciation rates are shown in Column eleven of Table 12.11.

To derive the TFP by sub-sectors of manufacturing we need estimates of the labor share in sectoral value addeds. Column 10 of Table 12.11 shows the 1998 value of the share of labor in sectoral value added obtained from "Annual Manufacturing Industry Statistics." The table reveals that the average labor share in the manufacturing sector was 24.21 percent. The "Professional and scientific measuring equipment" sector had the highest share, with a share of 34.4 percent followed by the "transport equipment"

sector with a share of 30.14 percent and "textiles" sector with a share, of 29.16 percent.

Table 12.12 shows the estimates of TFP in manufacturing sub-sectors over the period 1980–98. From the table it follows that highest TFP occurred in the sectors of "professional and scientific measuring equipment," "petroleum and coal," "furniture and fixtures" and "basic metals." Of these sectors the "petroleum and coal" sector had the highest public sector share. The other sectors had a relatively high rate of exposure to international competition, as revealed by the data in Table 12.11.

Table 12.12: Total Factor Productivity in Turkish Manufacturing Sector

		1980-1998	1980-1988	1989-1998
311+312	Food Processing	5.11	4.68	5.90
313	Beverages	-0.61	-4.27	4.64
314	Tobacco	-6.42	-3.07	-11.60
321	Textiles	2.73	1.31	5.15
322+324	Apparel and footwear	1.72	2.15	-0.73
323	Fur and leather products	3.04	1.71	1.42
331	Wood and cork products	2.40	1.60	4.69
332	Furniture and fixures	11.06	19.52	6.07
34	Paper and products	2.61	4.09	3.07
351+352	Chemicals	2.18	4.08	5.25
353+354	Petroleum and coal	13.88	22.86	2.19
355+356	Rubber and plastic products	1.11	1.75	3.00
36	Nonmetallic minerals	5.90	9.44	3.81
37	Basic metals	6.39	7.19	8.44
381	Metal products	2.43	1.23	4.47
382	Machinery	4.62	3.80	7.05
383	Electrical machinery	3.45	1.35	3.91
384	Transport equipment	3.81	1.55	6.03
385	Professional and sci. measuring eq.	15.85	16.76	21.26
3	Manufacturing	3.67	4.60	2.79

Source: Author's calculations.

Chapter 3 on "Trade and the Foreign Exchange Regime in Turkey" showed that the import regime in Turkey was very restrictive until the 1980s. Until 1981 annual import programs that itemized commodities under the liberalization list, the quota list, and a list enumerating the commodities to be imported under bilateral trade arrangements, regulated all imports into Turkey. Importation of goods not enumerated in any of the lists was prohibited. In 1981, the quota list was partially phased out. A major reform was introduced in January 1984, when the country adopted the negative list

approach. Liberalization of foreign trade intensified during the period of 1988–89 when nominal protection rates (NPR) were reduced substantially. Thus the import regime was liberalized mainly after 1988. Furthermore, in 1989, foreign exchange operations and international capital movements were liberalized entirely. In line with the full convertibility of the Turkish lira, in 1990 banks were left completely free to determine exchange rates in their operations begining in 1990.

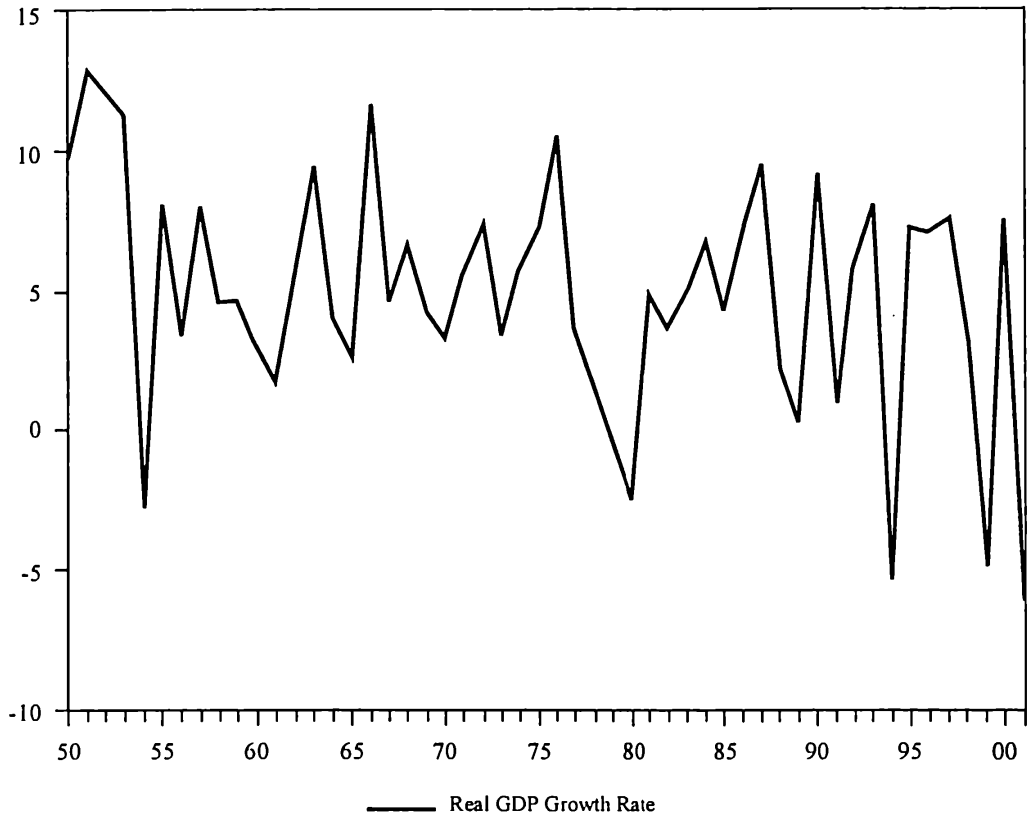
Since liberalization of trade and capital movements was achieved largely after 1988 we divide the period 1980–88 into two sub-periods: 1980–88 and 1989–98. Table 12.12 shows the estimates of TFP in manufacturing sub-sectors over these two periods 1980–88 and 1989–98. From the table it follows that during the post 1989 period the highest TFP occurred in the sectors of "professional and scientific measuring equipment," "basic metals," "machinery" and "transport equipment." These are the sectors with relatively high exposure to international competition, as revealed from Table 12.11.

6. Macroeconomic Stability

While the previous sections have concentrated on long run issues concerning the determination of TFP and TFP growth, we now turn to the analyses of macroeconomic stability and its effect on competitiveness. We consider the case of Turkey and analyze how periods of high GDP growth are interrupted by periods of balance of payments crisis, high inflation, and political unrest. We make an argument for the importance of macroeconomic stability for attaining sustainable increases in productivity and competitiveness.

Figure 12.1 shows the growth rate of GDP over the period 1950–2001. From the figure it follows that GDP growth in Turkey has been characterized by booms and busts. Although the average rate of growth has been 4.86 percent we note that Turkish GDP fluctuated considerably due to natural disasters in 1954 and 1999 and due to balance of payments crises in 1958, 1970, 1978–80, 1994 and 2001, with considerable effects on productivity. During 1954, the country faced a massive crop failure due to bad weather, and agricultural value added decreased by 13.5 percent. Since agriculture formed a high percentage of GDP during the 1950s, GDP during 1954 decreased by 2.87 percent. On the other hand, during 1999, Turkey was hit twice by severe earthquakes. The earthquake disasters lead to a drop in GDP by 5.02 percent. By contrast, we note that the balance of payments crises of 1958, 1970, 1978–80, 1994 and 2001 were due to policy mistakes. The main policy mistakes common to all the crises were the deterioration of public finances and appreciation of the real exchange rate for a period of several years before the crises. The crises led to the introduction of stabilization measures such as the depreciation of the currency and stabilization of public finances.

Figure 12.1: Real GDP Growth Rate



In the following, we concentrate on the crisis, of 2001. Among all the crises faced by the country during the last 50 years this was the severest. By 2001 Turkey had a high level of 'liability dollarization,' with high public and private foreign debt, denominated in foreign currencies. Turkey also had a high share of foreign currency-denominated bank deposits in total bank deposits. With the sharp depreciation of the exchange rate, the gross and net indebtedness of the economy increased leading to bankruptcies in the banking and real sectors, and this detrimental effect of the depreciation of the currency more than offset the positive effect of depreciation on the demand for exports.

During 2001, GNP contracted by 9.4 percent and the loss of employment has been put at more than 1.4 million. The reasons for the crisis of 2001 are various. They can be summarized under the headings of deterioration of fiscal balances, banking problems, and mismanagement of the real exchange rates. Since the real exchange rate policy employed during the 1990s has been explained in Chapter 1, and the banking problems in Chapter 3 we turn now to consideration of public finances during the 1990s.

The public sector in Turkey consists of central government, revolving funds, social security institutions, extra-budgetary funds, local governments, non-financial state economic enterprises (SEEs), and SEEs under privatization. We note that public finance management had peculiar features in Turkey. As late as 1999, a substantial part of the activities of the public sector were carried out by

semi-autonomous entities called budgetary funds and extra-budgetary funds. The activitities of the funds could be divided into four categories: (i) public consumption and investment, (ii) price regulation and control, (iii) transfers, such as subsidies and social security, and (iv) insurance and miscellaneous activities. In 1999, there were 83 different funds or fund-like institutions. The funds received their financing from the goverment budget, taxes, and user charges. They were also used to raise tax revenue for the central government budget. The degrees of autonomy of the funds varied, but they were free from central government control to some extent, especially on the expenditure side.

As emphasized by Sak (2000) the fund system goes back to the 1930s, but the system begun to be exploited in earnest in the 1980s. It seems to have been a response to increasing needs for public services and to effect structural change. The regular public finance system was not used for this, because of the legal, bureaucratic and political difficulties in raising taxes and redirecting public expenditures to new areas. The system got out of hand in the 1990s, in response to the parliamentary situation.[1] In addition to the funds, there were other entitites that could override central government control, such as SEE's, local administrations, and social security institutions.

Since the financial problems of social security institutions have been analyzed in Chapter 6 we concentrate in the following discussion on problems encountered by SEEs and local administrations. In Turkey, the SEEs have played a significant role since the early 1930s. They have been and still are active in almost all sectors of the economy, playing a role in the provision of services, commodity trading, banking, mining, the production of basic metals and chemicals, and defense. Initially, the SEEs had performed well. But after some time they begun to show poor economic performance. The reasons are related to the fact that SEEs are not subject to Commercial Code, and therefore to the bankruptcy law, that standard reporting and auditing rules are not applicable for SEEs, that management autonomy in areas such as pricing, employment and investment decisions is restricted by formal or sometimes informal arrangements, that the law on SEEs limits effective performance monitoring and management autonomy, and that SEEs receive substantial subsidies from the government in the form of direct transfers, equity injections, and debt consolidation. On the other hand the local governments comprises provinces, large metropolitan municipalities such as those of Istanbul and Ankara and smaller municipalities. The municipalities have autonomy in setting their expenditure priorities. The expenditures of local governments are largely financed from their revenue sharing arrangements with the central government. While local governments can in principle issue their own domestic bonds only the largest municipalities are able to issue their own domestic debt. In addition, municipalities borrowed from abroad with a central government guarantee, while the metropolitan municipalities borrowed for large projects from abroad without a central government guarantee.

Table 12.13: Macroeconomic Developments in Turkey

	GNP Growth Rate	PSBR/GNP	Current Account/ GNP	Inflation Rate	Total Public Debt/GNP	Compound Interest Rate on Gov't Bonds	Public Sector Interest Payments/ GNP	Real Exchange Rate
1990	9.37	7.41	-1.7	60.3	42.3	54.3	3.5	80.52
1991	0.35	10.16	0.2	66.0	46.2	80.7	3.8	78.09
1992	6.40	10.57	-0.6	70.1	48.1	86.7	3.7	81.55
1993	8.11	12.01	-3.5	66.1	48.5	87.3	5.8	73.99
1994	-6.06	9.10	2.0	106.3	67.7	159.7	7.7	100.46
1995	7.95	5.20	-1.4	88.0	54.1	124.0	7.3	94.57
1996	7.12	13.10	-1.3	80.4	57.5	131.9	10.0	94.57
1997	8.29	13.10	-1.4	85.8	55.7	99.9	7.7	89.41
1998	3.86	15.60	1.0	84.6	51.9	107.5	11.5	81.30
1999	-6.08	24.20	-0.7	64.6	64.5	108.9	13.7	76.42
2000	6.13	19.60	-4.9	54.9	62.8	35.2	16.3	68.98
2001	-9.40	17.60	2.3	54.4	124.9	98.8	22.6	85.07
Average	3.00			73.5		97.90		

Note: The PSBR/GNP figures for the period 1990-1993 are from the Treasury and for the period 1994-2001 from IMF.
Real exchange rate data have been obtained using the approach developed in Chapter 1.

During the 1990s a succession of coalition and minority goverments exploited the fund system, municipalities, state banks and other state economic enterprises in order to please their voters and enhance their own power. Thus, the problems of public finances in Turkey culminating in the crisis in 1999–2001 were due to a combination of political competition and the availability of insufficiently regulated public funds.

The best indicator of a generous government is the ratio of public sector borrowing requirements (PSBR) to GNP. Table 12.13 reveals that the public sector ran a deficit measured by a PSBR/GNP ratio equal to 13.1 percent in 1997, 15.6 percent in 1998, 24.2 per cent in 1999, 19.6 percent in 2000 and 17.6 percent in 2001. The high deficit was financed by borrowing from the private sector at very high real interest rates.[2] As a result of these developments gross public debt at the end of 2001 increased to 124.9 percent of GNP and interest payments during 2001 formed 22.6 percent of GNP. The situation was was clearly unsustainable.

To study problems of the sustainability of fiscal policy consider the government budget constraint:

$$G_t - T_t + i_t D_{t-1} = D_t - D_{t-1} + M_t - M_{t-1}$$

where G refers to government expenditures excluding the interest payments, T indicates government revenues, D denotes total debt of the public sector, and i refers to the nominal interest rate on government debt. Suppose that government expenditures and government revenues are both constant fractions of nominal GNP such that $G_t = \gamma Y_t$ and $T_t = \tau Y_t$. Assume that the quantity theory of money holds so that $M V = p y$ where y is real GNP and p is the GNP price deflator. Letting π be the rate of inflation, g denotes the growth rate of real GNP and r refers to the real rate of interest we have:

$$p_t = p_{t-1}(1 + \pi)$$
$$y_t = y_{t-1}(1 + g)$$
$$Y_t = p_t y_t$$

$$(1+r) = \frac{(1+i)}{(1+\pi)}$$

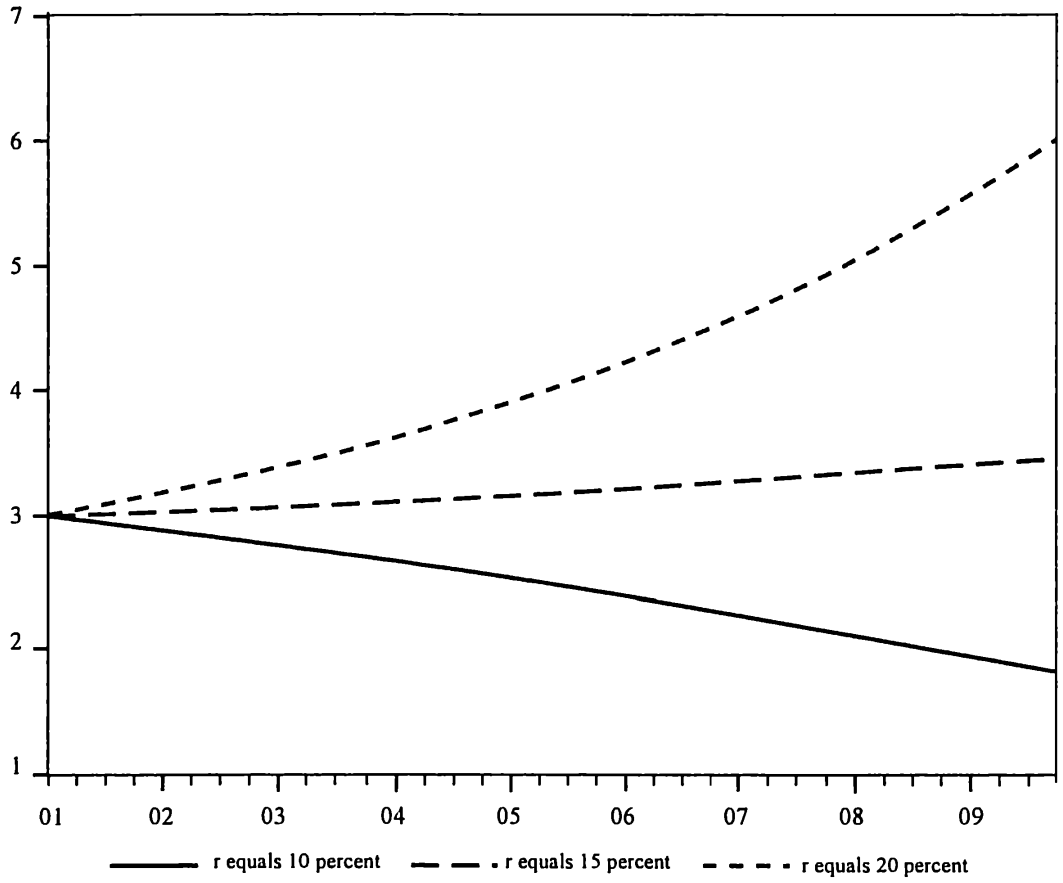
Hence the equation determining the time path of d, the debt/GNP ratio, can be written as:

$$d_t = \gamma - \tau + \frac{(1+r)}{(1+g)} d_{t-1} - \frac{1}{V} \frac{g+\pi+\pi g}{(1+\pi)(1+g)}$$

Considering the data for the year 2001, we have for the parameter values of γ and τ the values of $\gamma = 0.243$ and $\tau = 0.308$, and for primary surplus as a percent of GNP, we get the value of 6.5 percent, as indicated in the letter of intent

that the government of Turkey sent to the IMF. We assume, following the projections of the IMF, that the growth rate of real GNP will be 3 percent and that inflation will run at the rate of 35 percent. The initial value of GNP for the year 2001 is taken as $Y_{2001} = 184.7$ quadrillion TL, the initial value of price level $p_{2001} = 1$ and the initial value of real GNP $y_{2001} = 184.7$. The initial value of net public debt determined as 92.2 percent of initial GNP equals $D_{2001} = 170.29$.[3] Concentrating on quarterly data we take the velocity of base money as V = 6.568. Figure 12.2 shows the time path of debt to GNP ratio under alternative assumptions about the real interest rates. Consideration of the figure reveals that a real rate of interest of about 14 percent is critical. As long as the real rate of interest exceeds 14 percent, the debt/GNP ratio starts to increase over time.

Figure 12.2: Time Path of Debt/Gnp Ratio



To further study the sustainability of fiscal deficits we abstract from monetary considerations and write the government budget constraint as:

$$G_t - T_t + i_t D_{t-1} = D_t - D_{t-1}$$

Denoting $T_t - G_t$ by primary surplus shown as $SURP_t$ we obtain the relation

$$D_t = (1 + i) D_{t-1} - SURP_t$$

which can be iterated forward N period to yield:

$$D_{t-1} = \sum_{j=0}^{N} \frac{SURP_{t+j}}{(1+i)^{j+1}} + \frac{D_{N+1}}{(1+i)^{N+1}}$$

A no-Ponzi game restriction is imposed by the requirement that the last term in the above equation goes to zero in the limit:

$$\lim_{N\to\infty} \frac{D_{N+1}}{(1+i)^{N+1}} = 0 .$$

The condition requiring that debt must grow more slowly than the interest rate implies that the government debt at any point in time must equal the present value of expected future primary surpluses:

$$D_{t-1} = \sum_{j=0}^{N} \frac{SURP_{t+j}}{(1+i)^{j+1}}$$

To illustrate the importance of this relation we consider again the data given above, namely $\gamma = 0.243$, $\tau = 0.308$, $V = 6.568$, $y_{2001} = 184.7$ quadrillion TL, $p_{2001} = 1$ and $D_{2001} = 170.29$ quadrillion TL. Assume again that the annual growth rate of real GNP equals three percent and that the annual inflation rate is 35 percent. Concentrating on quarterly analysis we determine the value of the real rate of interest for which the present value of future primary surpluses just equals the initial value of public debt. This value of the real rate of interest equals 11.91 percent. Thus for real rates of interest above 11.91 percent the fiscal sustainability condition is not satisfied, i.e. the initial value of public debt exceeds the present value of future primary surpluses. Next we alter the value of the tax rate τ and obtain for each value of τ the corresponding value of primary surplus as a percent of GNP. We obtain then the critical value of real interest rate for which the present value of future primary surpluses just equals the initial value of public debt. Table 12.14 shows these relations. The table reveals that with decreases in primary surplus below 6.5 percent, the corresponding critical value of real interest rate decreases. Hence the system becomes unsustainable, even for smaller values of the real interest rate.

Table 12.14: Relation between Primary Surplus and Real Interest Rate

Primary Surplus as percent of GNP	Critical Valueof Real Interest Rate
9.5	16.43
8.5	14.93
7.5	13.43
6.5	11.91
5.5	10.36
4.5	8.76
3.5	7.05

Turning now to issues related to external sustainability we define F = R - K^f - D^f as net stock of foreign assets measured in terms of foreign currency, where R denotes the foreign exchange reserves of the country, K^f refers to foreign capital invested in the country, and D^f indicates the foreign debt of the country. Defining $TB^{\$}$ as the non-interest current account measured in terms of foreign currency, the balance of payments relation can be written as:

$$F_t - F_{t-1} = TB_t^{\$} + iF_{t-1}$$

where i denotes the foreign rate of interest. Letting E be the exchange rate, p the GNP deflator, y be the real GNP:

$$f_t = \frac{E_t F_t}{p_t y_t}, \quad tb_t = \frac{E_t TB_t^{\$}}{p_t y_t}, \quad E_t = E_{t-1}(1+\frac{\dot{E}}{E})$$

$p_t = p_{t-1}(1+\pi)$ and $y_t = y_{t-1}(1+g)$ the balance of payments relation can now be written as:

$$f_t = tb_t + (1+i)\frac{(1+\frac{\dot{E}}{E})}{(1+\pi)(1+g)} f_{t-1}$$

Letting $q_t = \frac{E_t p_t^*}{p_t}$ be the real exchange rate and ε be the rate of depreciation of the real exchange rate the above equation is reduced to:

$$f_t = tb_t + (1+i)\frac{(1+\varepsilon)}{(1+\pi^*)(1+g)} f_{t-1}$$

where π* denotes the rate of inflation in the rest of the world. The condition for external sustainability can now be defined by the requirement that the ratio of net stock of foreign liabilities to GNP stays constant over time, i.e. $f_t = f_{t-1} = f$. In this case the above equation becomes:

$$tb = -\frac{(1+i)(1+\varepsilon)-(1+\pi^*)(1+g)}{(1+\pi^*)(1+g)} f$$

To obtain the values of the parameters in the above equation, we consider the data for the period of 1993–2001 given in Table 12.15. The table reveals that net foreign assets/GNP ratio in Turkey fluctuated between –37 and –76 percent, and that π* = 1.97 percent and ε = 1.52 percent. Table 12.16 shows different values of sustainable values of non-interest current account as a percent of GNP for different values of the foreign interest rate. The table reveals that the sustainable level of non-interest current account increases sharply with increases in foreign interest rates. Furthermore the sustainable level of non-interest current account decreases with increases in real GNP growth rate.

Table 12.15: Data for External Sustainability Analysis

	External Debt (million $)	FDI Inward Stock (million $)	FDI Outward Stock (million $)	International Reserves (million $)	Net Foreign Assets (million $)	Current Account (million $)	Interest Payments to Abroad (million $)	Interest Income from Abroad (million $)	Non-interest Current Account (million $)	Rate of Devaluation of Real Exchange Rate	Real GNP Growth Rate	Foreign Inflation Rate	Non-interest Current Account / GNP	Net Foreign Assets / GNP
1993	67,356	3,610	260	17,761	-52,945	-6433	3,574	1,135	-8,872	-9.27	8.11	2.40	-4.88	-37.18
1994	65,601	4,218	309	16,514	-52,996	2,631	3,923	890	-402	35.78	-6.06	2.10	-0.31	-50.99
1995	73,278	5,103	268	23,316	-54,797	-2339	4,303	1,488	-5,154	-5.86	7.95	2.20	-3.00	-39.50
1996	79,632	5,825	371	24,966	-60,120	-2437	4,200	1,577	-5,060	0.00	7.12	1.90	-2.74	-41.90
1997	84,912	6,630	622	27,138	-63,782	2638	4,588	1,900	-50	-5.46	8.29	1.90	-0.03	-43.20
1998	97,238	7,437	929	29,499	-74,247	1,984	4,823	2,481	-358	-9.07	3.86	1.20	-0.17	-42.47
1999	103,138	8,353	1,641	34,128	-75,722	-1360	5,450	2,350	-4,460	-6.00	-6.08	1.40	-2.38	-50.86
2000	119,602	9,335	2,511	34,761	-91,665	-9819	6,299	2,836	-13,282	-9.74	6.13	2.30	-6.57	-49.19
2001	118,848	-	-	28,820	-96,852	2,896	7,694	2,700	-2,098	23.33	-8.50	2.30	-1.39	-76.31
Average										1.52	2.31	1.97	-2.51	-44.41

Source: FDI inward and outward stock figures are from various issues of World Investment Report, all other data are obtained from Central Bank of Turkey.
Note: Net foreign assets for the year 2001 have been determined under the assumption that the difference between FDI inward and outward stock of the year 2000 does not change in 2001.

Table 12.16: Sustainable Level of the Non-Interest Current Account as a Percent of GNP

Foreign Interest Rate (percent)	Real GNP Growth Rate 2 percent	3 percent	4 percent
5	0.73	-0.02	-0.75
6	1.46	0.71	-0.04
7	2.19	1.43	0.68
8	2.93	2.16	1.40
9	3.66	2.88	2.12
10	4.39	3.61	2.84
11	5.13	4.34	3.56
12	5.86	5.06	4.28

Source: Author's Calculations.

Table 12.17: External Financing (Billion of U.S. Dollars)

	2001	2002	2003
Outflows	35.1	44.0	41.7
Interest	5.0	5.8	6.5
Amortization			
Debt Securities	2.1	2.5	4.1
Medium and Long Term Debt	15.0	13.0	13.5
Short Term Debt	28.9	18.3	15.4
Change in Reserves (+ denotes increase)	-15.9	4.4	2.2
Inflows	34.1	35.1	40.4
Non Interest Current Account Surplus	7.3	3.9	4.8
FDI	2.2	0.9	1.0
Portfolio Investment	-5.1	-0.9	-0.2
Eurobond	1.1	2.0	4.5
Medium and Long Term Inflows	12.2	13.9	12.8
Short Term Debt	18.5	15.3	17.5
Errors and Omissions	-2.1	0.0	0.0
Financing Gap	1.0	8.9	1.3
GNP	150.3	165.6	183.0
Non Interest Current Account Surplus/GNP Ratio	4.86	2.36	2.62

Source: IMF (2002).

In particular, Table 12.16 shows that the level of the non-interest current account as a percent of GNP consistent with constant levels of net foreign assets to GNP ratio must to be 5.13 percent when the foreign interest rate equals 11 percent and the real GNP growth rate equals 2 percent, and that it equals 3.56 percent when the real GNP growth rate equals four percent. From

Table 12.17, on the other hand one can determine the estimated values of non-interest current account/GNP ratio for the period 2001–03. The estimated values are 4.86 percent for 2001 and 2.49 percent for the period average of 2002–03. Thus, the figures in Table 12.16 show that Turkey, in order to attain external sustainability, has to increase its non-interest current account to GNP ratio over the next few years above the level of 2.49 percent as long as the real GNP growth rate equals three percent and the foreign interest rate is above eight percent. With an 11 percent foreign interest rate Turkey has to increase its non-interest current account to GNP ratio to a level above 4.34 percent, which can only be achieved through depreciating real exchange rates.

It is now nearly three years since the start of the currency crisis of February 2001. The severity of the crisis has surprised nearly all observers. The loss of income and wealth and the associated social and political stresses created in the country are unprecedented.

It is still too early to state that Turkey will achieve lasting improvements in its economic conditions over the next few years. As a country with a primary surplus of 6.5 percent of GNP, Turkey may still face problems with sustainability of fiscal deficits over the next few years. As of early 2002, the country still faces a tough job in implementing what will prove to be a painful and politically unpopular program of spending cuts and structural reforms. In addition, Turkey has to consider issues related with sustainability of external deficits. Thus macroeconomic instability due to unsustainable fiscal deficits and current account developments, as emphasized by Hutchison (2001) and Bruno and Easterly (1998), lead to significant output losses, TFP growth rates and hence to reductions in productivity and competitiveness.

7. Conclusion

This chapter has provided an overview of some recent evidence on productivity trends in MENA countries, as well as an analysis of the determinants of productivity growth in those countries. The study has shown that the productivity levels in MENA countries are generally low relative to the productivity levels in OECD and East Asian countries, that the productivity growth rates in MENA countries are generally low relative to the growth rates achieved in OECD and East Asian countries, and that the percentage contributions to growth of GDP by TFP in MENA countries are generally lower than those in OECD and East Asian countries. Thus if the MENA countries want to increase the competitiveness of their products they have to follow policies that will increase their productivity growth over time. This in turn requires that the countries follow, in addition to prudent macroeconomic policies, the usual policies enhancing productivity growth.

Notes

[1] During the 1990s Turkey was governed by various coalition governments. Each of these coalition governments felt that it had to please the electorate more than the previous government by increasing government expenditures.

[2] During the period of 1994–99 the average value of the real interest rate amounted to 29.82 percent.

[3] See the letter of intent that the Government of Turkey sent to the IMF on January 18, 2002