

Türk sanayicileri ve
İş adamları derneği
1987

External
Indebtedness
of Turkey

**Türk
sanayicileri
ve
iş adamları
derneği**

EXTERNAL INDEBTEDNESS
OF TURKEY

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EXTERNAL INDEBTEDNESS OF TURKEY

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INTRODUCTION

Turkey's external indebtedness more than doubled during the 1978-86 period. In fact total external debt (outstanding and disbursed) rose from \$ 14.719 million at the end of 1978 to \$ 31.228 million at end 1986. Moreover ratio of short-term debts in the total indebtedness more than tripled over the 1982-86 period (from \$ 2.164 million end 1982 to \$ 9.391 million end 1986) and its ratio to the total rose from 10.7 percent in 1982 to 30 percent in 1986.

Both of these developments should be matters of concern. In particular a short-term debt total of \$ 9.4 billion is a disturbing factor- as it exceeds annual exports. The fact that \$ 3.8 billion of this amount belongs to the Dresdner Account (some term deposit accounts) does not ease the concern, since in a crisis situation, all this deposits will be called and at least half of 1-year term deposit accounts will be due and withdrawn in the first 6 month period. As a consequence Dresdner Account is a short-term debt and should be classified as such.

An earlier analytical study of Turkish external debt is by Kızılyallı (1968)* which employs a version of Avromovic Model. In fact investment-saving gap model adjusted for workers' remittances, direct foreign investments, etc. was used.

That study predicted difficulties in debt service and balance of payments (BOP) in 1972 and 1977** of which the 1972 one was averted because of unexpected increase in the number of Turkish workers abroad and concomittant rise in workers' remittances. Whereas the 1977 crisis materialized with dire consequences.

It drew attention to ever rising incremental capital output ratio (ICOR) and its adverse effects on external debt, and recommended increase of domestic saving as an alternative.*** In fact ICOR increased much faster and greater than expected then and savings propensity even declined and external indebtedness rose to levels inconceivable then.

* H.Kızılyallı, "Türkiye'nin Dış Borçluluğu Üzerinde İstatistik bir Deneme", Üniversitelerarası İstatistikçiler Konferansı, Eylül 1967, DİE, Ankara 1968

** ibid, p.144

*** ibid, p.144

CHAPTER I

CALCULATION OF ICOR

The incremental capital output ratio (ICOR) of Turkish economy is calculated by making use of following relationship:

$$\frac{I}{\Delta Y} = \frac{I}{Y} \cdot \frac{\Delta Y}{Y}$$

Where I : investments including stock changes
Y : national income

The ratio I/Y is calculated using investment and national income figures in current prices and averaged for the period concerned. Whereas $\Delta Y/Y$ (the growth rate of national income) is the geometric growth rate at constant prices. This method conveniently bypasses the deflator problem of national accounts. This procedure is implemented in Tables: 1.13.

It is observed that ICOR which was 3 during 1963-73 period* has risen almost to 7 now. This is a high ICOR for a developing country and reflects big delays in investment implementation in late 1970's, long gestation periods in general and overemphasis in 1980's on infrastructure and housing investments to neglect of productive investments.

ICOR levels are high whether measured on the basis of GDP or GNP figures. 1980-86 period is not long-enough for sound measurement; moreover many delayed investments have been completed in 1980's which artificially lower ICOR. In case of new investment opportunities and projects ICOR should be higher, since they are mostly in social and economic infrastructure and housing.

*H.Kızılyallı "Tasarruf ve Yatırımlar Konusunda Planlı Dönemin Başarısının Ölçülmesi ve Değerlendirilmesi", (Malîye Enstitüsü Konferansları: Sene:1974, İ.Ü.İktisat Fakültesi, İstanbul-1975) içinde ss. 15-36

ICOR could be lowered only when investment projects are carefully selected with this objective in mind. Emphasis on productive investments, as in the first two plan periods (1963-1972) could also achieve this result.

Growth rate of GDP and GNP ranged between 4-5 percent during 1975-86 period (Table:1.1) It seems as if 5 percent is the upper limit to growth under the present circumstances. These growth rate are used in various scenarios later.

TABLE 1.1
CALCULATION OF ICOR

	$\frac{I/Y}{(1)}$	$\frac{\Delta Y/Y}{(2)}$	ICOR (1/2)
<u>Total Investments of GDP at Market Prices</u>			
1975-86	0.2237	0.04069	5.50
1977-86	0.2226	2.03576	6.22
1980-86	0.2115	0.05169	4.09
<u>Total Investments of GNP at Market Prices</u>			
1975-86	0.2206	0.0389	5.67
1977-86	0.2199	0.0348	6.32
1980-86	0.2091	0.0499	4.19
<u>Total Investments of GDP at Factor Prices</u>			
1975-86	0.2408	0.04095	5.88
1977-86	0.2381	0.03525	6.75
1980-86	0.2257	0.04767	4.73

TABLE: 1.2

INVESTMENTS, GDP AND GNP
AT CURRENT PRICES (IN MILLIONS OF TL)

	Investments (In Billions of TL)		In Millions of TL		Ratios (%)			
	Fixed Investments Only	Total Investments Including Stock Change	GDP (At Market Prices)	GNP (At Market Prices)	(1/3)	(1/4)	(2/3)	(2/4)
1975	106.7	116.4	519173.3	535771.0	20.55	19.92	22.42	21.73
1976	146.0	156.0	663936.9	674985.7	21.99	21.63	23.50	23.11
1977	195.0	219.6	862967.8	872893.8	22.60	22.34	25.45	25.16
1978	280.0	306.0	1274780.7	1290723.4	21.96	21.69	24.00	23.71
1979	473.0	541.0	1719933.0	1735933.0	21.96	21.48	21.90	21.37
1980	864.0	948.0	4327963.7	4435153.0	19.36	18.94	22.16	21.68
1981	1241.4	1421.0	6413610.4	6553596.2	19.10	18.85	20.79	20.52
1982	1646.9	1792.0	8620393.8	8735053.7	18.91	18.88	19.60	19.56
1983	2180.8	2260.0	11531764.2	11551860.1	18.50	18.34	19.74	19.56
1984	3369.9	3595.0	18212082.5	18374839.9	18.53	18.40	20.65	20.50
1985	5098.6	5682.0	27509109.1	27715231.1	22.03	22.03	23.19	23.19
1986	8742.9	9201.0	39682668.5	39678944.2				
1975-86 average	-	-	-	-	20.48	20.19	22.37	22.06
1977-86 average	-	-	-	-	20.32	20.07	22.26	21.99
1980-86 average	-	-	-	-	19.48	19.27	21.15	20.91

TABLE: .3

TOTAL INVESTMENTS AND GDP AT FACTOR PRICES
(IN CURRENT PRICES)

	Total Investments (Billion TL) (1)	GDP at Factor prices (Mi lion TL) (2)	Ratio (1/2)
1975	116.4	468 82.4	0.2485
1976	156.0	599 38.5	0.2602
1977	219.6	796 23.4	0.2758
1978	306.0	1190 73.2	0.2571
1979	541.0	2015 05.2	0.2684
1980	948.0	4097 61.7	0.2314
1981	1421.0	6024 34.4	0.2359
1982	1792.0	8080 92.8	0.2218
1983	2260.0	10817 12.2	0.2089
1984	3595.0	17490 55.5	0.2055
1985	5682.0	25483 00.1	0.2230
1986	9201.0	36348 31.5	0.2531
1975-86 average	-	-	0.2408
1977-86 average	-	-	0.2381
1980-86 average	-	-	0.2257

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TABLE: 1.4
GDP & GNP
AT 1968 PRICES
(Million TL)

	GDP at Factor Prices	GDP at Market Prices	GNP at Market Prices
1975	159938.0	177761.7	181383.3
1976	174129.6	193201.7	195750.6
1977	182716.0	201571.8	203358.2
1978	190638.7	207311.5	209182.6
1979	189509.2	205481.6	208343.1
1980	188521.6	203951.5	206120.9
1981	195336.8	212841.7	214671.7
1982	204150.8	223461.9	224430.6
1983	212090.1	231741.1	231863.4
1984	224853.5	245031.3	245646.2
1985	234274.0	257541.3	258086.0
1986	250939.4	278111.2	278102.4
<u>Geometric Growth Rates</u>			
1975-86	0.04095	0.0409	0.04069
1977-86	0.03525	0.0356	0.03576
1980-86	0.04767	0.0519	0.05169

DATA PROBLEM

The national income accounts suffer from many defects. It seems that prices and deflators used need to be revised. Savings and investment ratios calculated using national income at current and constant prices differ widely. The dollar value of 1986 GDP or GNP calculated using national income at current prices and 1986 average exchange rate is double the amount found by using national income at 1968 prices and 1968 average exchange rate.

Moreover national income in dollars fluctuated widely and erratically during 1976-86 period.

TABLE: 1.5

	(1) Turkish Lira GDP real increase (%)	(2) US Dollar GDP Increase (%)	(3) Implied increase in \$ prices (2-1)
1976	8.7	15.2	6.5
1977	4.3	16.2	11.9
1978	2.8	10.1	7.3
1979	-0.9	32.1	33.0
1980	-0.7	-18.0	-17.3
1981	4.4	1.3	-3.1
1982	5.0	-8.0	-13.0
1983	3.7	-3.6	-7.3
1984	5.7	-2.9	-8.6
1985	5.1	6.1	1.0
1986	8.0	11.6	3.6

The relation between GDP at constant prices in Turkish Lira and GDP in terms of dollars (converted using average exchange rate, Table: 1.5) is erratic in the sense that the difference between the two series can't be explained on ground of US inflation. Possible explanations lies in GNP deflators used and exchange rates. In any case these erratic movements need to be further investigated and dollar equivalent of Turkish GDP and GNP to be calculated unequivocally.

There are discrepancies between BOP and external debt data. In drawing up the BOP table, figures from different source should be checked and reconciled and the aim should be minimization of errors and omissions item.

CHAPTER II

EXTERNAL DEBT DATA

Tables: 2.1-2 show external debt outstanding for 1970-86 period. Breakdown is given by maturity and by Lenders, (public and private). Also average terms and conditions of new commitments are given. Compare to 1970, in 1986 interest rate was higher and maturity and grant element lower. Also magnitude of debt service increased significantly over time.

The short-term debt which rose to \$ 6 billion in 1977 again was \$ 6 billion in 1985 and \$ 9.4 billion in 1986. The percentage of short term in total at 30 percent in 1986 is too high.

Table: 2.3 contains projection of debt service for external debt outstanding at the end of each year during 1982-86 period.

Table: 2.4 shows principal repayments and interest payments scheduled as percentage of debt-outstanding including undisbursed or disbursed only. The purpose of this exercise is to determine average interest and amortisation rates for the existing Turkish debt. The table shows increase in amortization rates over time. It also shows that interest rates measured as percentage of interest payments to disbursed debt exceed 7.5 percent (year $t + 1$), in 1984 and 1985.

Table: 2.5 compares BOP and external debt data on debt service. It should be noted in this context that, external debt data and balance of payments (BOP) data do not tally with each other.* External debt data are accepted as more accurate than the BOP data, since the latter comprise estimates and have a large errors of omissions item. The relative magnitude of discrepancies in respect of capital movements are large in 1983, 1984 and 1985. Regarding short-term capital movements, significant inconsistencies exist in 1978, 1979, 1980, 1981, 1983, 1984 and 1985.

* One source of discrepancy is exchange rate fluctuations, which also affect the existing stock of debt.

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The differences can not be attributed to and explained by large errors and omissions item in 1978, 1979, 1981, 1984 and 1985. All this shows that BOP data need a lot of improvement.

Implied interest payments on short-term debt is also calculated in Table: 2.5.

Table: 2.6 contains actual debt service, which for long-term debt are taken from Tables: 2.1 and 2 and interest payments on short-term debt from Table: 2.5. It is observed that amortization rate as percent of outstanding and disbursed debt rose to 14 percent in 1985 from 7 percent in earlier years. Whether this is a transitory phenomenon or a permanent feature, has to be investigated; because it means a significant shortening of the maturity of debt. Average interest rates on long-term outstanding debt disbursed had been increasing and from 1982 on had been above 7 percent and was 7.7 percent in 1985. (1986 data of this table are not comparable with the previous years)

Interest rate on short-term debt is a rough estimate, but it is always significantly higher than the long-term rate. In view of all this, average interest rate on total debt should be 8 percent if not higher considering 30 percent of the total is short-term now.

In Table: 2.7, projected principal repayments for long-term debt are deducted from the debt outstanding, including undischursed and then amortization and interest percentages are calculated in respect of the remaining balance. This table shows that average interest rate on the existing long-term Turkish external debt is minimum 6 percent. This is the lower limit; in respect of interest rate estimate derived from Table: 2.6 which is more reliable and precise.

In respect of maturity, of the 1984 debt outstanding 70 percent will be repaid in the first 8 years and of the 1985 debt: 72 percent. The latter figure suggests an amortization rate of $72/8=9$ percent.

Short term external borrowings should take place temporarily to tide over unexpected short-term fluctuations. This kind of short-term borrowing bolsters and replenishes foreign reserves and is repaid next year. If this is not possible, then IMF lending should replace it. In any case short-term borrowing should not be for long-term purposes or needs. Otherwise crisis is invited.

Turkey after the 1974 petroleum shock did not take structural measures to cope with it and reduce the oil bill. On the contrary subsidized petroleum prices were the foremost policy goal. As a consequence domestic inflation accelerated, foreign reserves were depleted and short-term external credits were used up to the last limit, in lieu of long-term measures to correct fundamental disequilibrium. Turkey borrowed heavily short-term in 1977 and 1978, and then repaid large amounts of short-term debt in 1979 which caused the most severe BOP crisis in recent years. The extent of borrowing and repayment in 1978 and 1979 is not known for sure, BOP and external debt data differing widely in these years.

As short-term domestic borrowing by the Government is subject to an upper limit, and foreign borrowings of private sector and local administrations were used to be controlled and restricted, short-term external borrowing of the Government should also be restricted in similar fashion. This would prevent an administration from using up all foreign reserves and short-term credit facilities and pre-empting facilities and means that would and should be available to the next Administration.

From 1983 on Turkey started to borrow heavily short-term. The ratio of short-term debt to the total rose from 11% in 1982 to 30% in 1986. Turkey has to pay \$ 3.5-4 billion each year as debt service during 1987-1989 period on its long term debt and on top of this has to cope with the interest payments and renewal/rolling over of short term debt exceeding \$ 9 billion. Short-term debt including IMF credit utilized exceeds \$ 10 billion and is greater than the annual value of exports.

With a view to preventing repetition of this, it is recommended that a limit to short-term foreign borrowing in absolute and relative terms (with respect to BOP receipts, expenditures, long-term debt, GNP etc.) should be imposed and observed.

TABLE: 2.1

EXTERNAL DEBT, OUTSTANDING AND DISBURSED
(in millions of US Dollars)

	1970	1973	1974	1975	1976	1977	1978	1979
Total External Debt, Outstanding and Disbursed							<u>14719.2</u>	
Long-Term Debt	<u>1916.5</u>	<u>2983.8</u>	<u>3271.4</u>	<u>3348.7</u>	<u>3838.2</u>	<u>4778.1</u>	<u>6910.9</u>	<u>11743.0</u>
Public and Publicly Guaranteed	1874.5	2868.6	3125.7	3188.5	3590.1	4299.1	6353.9	11113.0
Private Nonguaranteed	42.0	115.2	145.7	160.2	248.1	479.0	557.0	630.0
Use of IMF Credit	<u>74.1</u>	-	-	<u>243.0</u>	<u>391.0</u>	<u>409.0</u>	<u>622.3</u>	<u>633.0</u>
Short-Term Debt						<u>6093.0</u>	<u>7186.0</u>	<u>3556.0</u>
Debt Outstanding, including undisbursed	2721.4	3976.1	4458.7	4778.3	5948.5	7191.0	9995.3	14895.1
Debt Outstanding and disbursed	1874.5	2868.6	3125.7	3188.5	3590.1	4299.7	6353.9	11113.0
Commitments	490.5	491.3	527.4	610.0	1284.1	1214.4	1384.3	4336.4
Disbursements	330.0	430.4	317.9	300.5	571.2	758.8	933.2	4222.6
Principal Repayments	128.7	127.0	148.8	157.6	166.9	195.7	265.7	402.6
Net Flows	201.3	303.4	169.2	142.8	404.2	563.1	667.6	3820.0
Interest Payments	42.6	79.9	92.1	105.6	143.9	166.8	163.5	227.3
Total Debt Service	171.3	206.9	240.9	263.2	310.9	362.5	429.1	629.9
Average Terms of New Commitments								
Interest (percent)	3.6	4.7	5.9	7.3	7.5	7.7	6.9	11.3
Maturity (years)	18.8	25.7	22.9	13.6	13.0	11.7	13.2	11.1
Grace Period (years)	4.6	7.2	5.7	3.8	4.1	4.4	3.9	4.0
Grant element (percent)	37.1	39.2	29.7	15.5	13.5	11.2	17.3	-1.7

TABLE: 2.1 (CONTINUED)

	1970	1973	1974	1975	1976	1977	1978	1979
<u>Private Non-Guaranteed Debt</u>								
Debt Outstanding and Disbursed	42.0	115.2	145.7	160.2	248.1	479.0	557.0	630.0
Disbursements	1.0	47.4	36.1	32.6	140.4	257.0	193.0	106.0
Principal Repayments	3.2	2.3	8.8	16.7	35.6	38.6	71.0	33.0
Net Flows	-2.2	45.1	27.3	15.9	104.8	218.4	122.0	73.0
Interest Payments	2.3	4.1	8.4	12.7	22.7	17.6	30.8	22.0
Total Debt Service	5.5	6.4	17.2	29.4	58.3	56.2	101.8	55.0
<u>Total Long-Term Debt</u>								
Debt Outstanding and Disbursed	1916.5	2983.8	3271.4	3348.7	3838.2	4778.7	6910.9	11743.0
Disbursements	331.0	477.8	354.0	333.1	711.6	1015.8	1126.2	4328.6
Principal Repayments	131.9	129.3	157.6	174.3	202.5	234.3	336.7	435.6
Net Flows	199.1	348.5	196.5	158.7	509.0	781.5	789.6	3893.0
Interest Payments	44.9	84.0	100.5	118.3	166.6	184.4	194.3	249.3
Net Transfers	154.2	264.5	95.9	40.5	342.4	597.1	595.3	3643.8
Total Debt Service	176.8	213.3	258.1	292.6	369.2	418.7	530.9	684.9

TABLE: 2.2

EXTERNAL DEBT, OUTSTANDING AND DISBURSED
(US \$ Millions)

	1980	1981	1982	1983	1984	1985	1986
Total External Debt,							
Outstanding and Disbursed	19520.4	19668.6	20240.8	20691.9	22469.6	26123.4	31228
Long-Term Debt	15976.2	16152.8	16621.6	16085.5	16537.4	18180.1	20752
Public and Publicly Guaranteed	15441.2	15712.8	16227.6	15686.5	16112.4	17821.2	
Private Nonguaranteed	535.0	440.0	394.0	399.0	425.0	358.9	
Use of IMF Credit	1054.2	1321.8	1455.2	1567.4	1426.2	1326.4	1085
Short-Term Debt	2490.0	2194.0	2164.0	3039.0	4506.0	6617.0	9391
(of which Treasurer Account)			(817.0)	(1251.0)	(1776.0)	(2576.0)	(2700)
Public and Publicly Guaranteed Long-Term Debt							
Debt Outstanding,							
including undisbursed	19016.3	19491.1	19200.9	19401.4	20516.3	23378.9	28218
Debt Outstanding and Disbursed	15441.2	15712.8	16227.6	15686.5	16112.4	17821.2	
Commitments	2885.9	2358.9	1501.2	2520.2	3296.8	3588.1	
Disbursements	2335.9	1903.6	2108.7	1638.5	2527.2	2718.9	
Principal Repayments	433.3	733.7	1134.8	1129.5	1166.3	2248.6	
Net Flows	1902.6	1169.8	973.9	509.0	1360.9	470.3	
Interest Payments	447.3	955.2	1118.3	1151.1	1121.7	1253.0	
Total Debt Service	880.5	1689.0	2253.1	2280.5	2288.1	3501.7	
Average Terms of New Commitments							
Interest (percent)	8.4	7.5	10.1	8.4	9.5	8.7	
Maturity (years)	15.9	15.3	13.6	14.0	12.3	11.1	
Grace Period (years)	4.9	4.7	3.8	4.3	3.9	3.6	
Grant Element (percent)	16.9	15.5	-0.6	10.0	3.7	6.7	

TABLE: 2.2 (CONTINUED)

	1980	1981	1982	1983	1984	1985
<u>Private Nonguaranteed Debt</u>						
Debt Outstanding and Disbursed						
Disbursements	535.0	440.0	394.0	399.0	425.0	358.9
Principal Repayments	75.0	50.0	51.0	55.0	81.0	42.0
Net Flows	29.0	36.0	38.0	50.0	55.0	134.0
Interest Payments	46.0	14.0	13.0	5.0	26.0	-92.0
Total Debt Service	20.0	28.0	33.0	40.0	45.0	23.5
	49.0	64.0	71.0	90.0	100.0	157.5
<u>Total Long-Term Debt</u>						
Debt Outstanding and Disbursed						
Disbursements	15976.2	16152.8	16621.6	16085.5	16537.4	18180.1
Principal Repayments	2410.9	1953.6	2150.7	1609.5	2000.0	2720.2
Net Flows	462.3	769.7	1172.8	1179.5	1221.3	2382.6
Interest Payments	1948.6	1183.8	986.9	514.0	1386.9	378.3
Net Transfers	467.3	983.2	1151.3	1191.1	1166.7	1276.6
Total Debt Service	1481.4	200.6	-164.4	-677.0	220.1	-898.3
	929.5	1753.0	2324.1	2370.5	2388.1	3659.2

TABLE: 2.3

PROJECTED PUBLIC DEBT SERVICE
(PUBLIC & PUBLICLY GUARANTEED DEBT, LONG-TERM)
(US. \$ Millions)

	1982	1983	1984	1985	30.6.1986	
Public and Publicly Guaranteed Debt						
Debt Outstanding, including undisbursed (at the end of year t)	19200.9	19401.4	20516.3	23378.9	24464	Year (t) Debt Service
Debt Outstanding disbursed only (year t)	16227.6	15686.5	16112.4	17821.2	18478	Total
Year (t+1) Debt Service Total	2574.0	2727.1	3121.0	3576.6	4403.4	Principal
Principal	1506.1	1570.2	1922.8	2233.8	2810.3	Interest
Interest	1068.8	1166.9	1209.1	1341.8	1683.1	
(Year (t+2) Debt Service Total	2281.3	2813.7	3189.7	3814.5	4613.7	
Principal	1235.2	1689.6	2056.6	2530.0	3054.7	
Interest	1046.1	1124.1	1133.2	1284.5	1559.0	
Year (t+3) Service Total	2641.8	2876.4	3114.2	3900.0	4157.5	
Principal	1648.2	1849.1	2087.6	2746.7	2770.4	
Interest	993.6	1027.3	1026.6	1153.3	1387.1	
Year (t+4) Service Total	2552.3	2903.3	3034.1	3674.4	3573.0	
Principal	1671.3	2003.6	2145.9	2689.4	2347.9	
Interest	881.1	899.7	888.3	985.0	1225.1	
Year (t+5) Service Total	2443.9	2706.3	2766.7	3173.5	3177.7	
Principal	1678.2	1957.9	2027.1	2373.3	2110.6	
Interest	765.7	748.5	739.5	800.2	1067.1	
Year (t+6) Service	2293.5	2368.6	2535.3	2411.8	2829.5	
Principal	1657.2	1769.4	1951.1	1766.6	1924.1	
Interest	636.3	599.2	584.2	645.2	905.4	

AK

TABLE: 2.3 (CONTINUED)
 PROJECTED SERVICE OF LONG-TERM EXTERNAL DEBT
 (PRIVATE NON-GUARANTEED DEBT)
 (US \$ Millions)

Year (t)	1982	1983	1984	1985
Debt Outstanding Disbursed only (at the end of year t)	<u>394</u>	<u>399</u>	<u>425</u>	<u>358.9</u>
Year (t+1) Debt Service	<u>109</u>	<u>100</u>	<u>87.4</u>	<u>112.8</u>
Principal	70	68	55.3	78.5
Interest	39	32	32.1	34.3
Year (t+2) Debt Service	<u>100</u>	<u>104</u>	<u>91.1</u>	<u>126.0</u>
Principal	68	79	63.8	93.2
Interest	32	25	27.3	32.8
Year (t+3) Service	<u>104</u>	<u>83</u>	<u>85.9</u>	<u>82.5</u>
Principal	79	66	63.8	59.6
Interest	25	17	22.1	22.9
Year (t+4) Service	<u>83</u>	<u>62</u>	<u>80.8</u>	<u>46.5</u>
Principal	66	49	63.8	31.6
Interest	17	13	17.0	14.9
Year (t+5) Service	<u>62</u>	<u>40</u>	<u>71.5</u>	<u>33.5</u>
Principal	49	31	59.5	22.9
Interest	13	9	12.0	10.6

TABLE: 2.3 (CONTINUED)

LONG-TERM DEBT
PROJECTED PUBLIC & PRIVATE DEBT SERVICE
(US Millions)

Year (t)	1982	1983	1984	1985
Total Long-Term Debt Outstanding including Undisbursed (t)	<u>19594.9</u>	<u>19800.4</u>	<u>20941.3</u>	<u>23737.8</u>
Total Long-Term Debt Outstanding Disbursed Only (t)	<u>16621.6</u>	<u>16085.5</u>	<u>16537.4</u>	<u>18180.1</u>
Total Debt Service (t+1)	<u>2683.9</u>	<u>2837.1</u>	<u>3219.3</u>	<u>3688.5</u>
Principal	1576.1	1638.2	1978.1	2312.3
Interest	1107.8	1198.9	1241.2	1376.2
Total Debt Service (t+2)	<u>2381.3</u>	<u>2917.7</u>	<u>3280.8</u>	<u>3940.5</u>
Principal	1303.2	1768.6	2120.4	2632.2
Interest	1078.1	1149.1	1160.5	1317.3
Total Debt Service (t+3)	<u>2745.8</u>	<u>2959.4</u>	<u>3200.1</u>	<u>3982.5</u>
Principal	1727.2	1915.1	2151.4	2806.3
Interest	1018.6	1044.3	1048.7	1176.2
Total Service (t+4)	<u>2635.3</u>	<u>2965.3</u>	<u>3114.9</u>	<u>3720.9</u>
Principal	1737.3	2052.6	2209.7	2721.0
Interest	898.1	912.7	905.3	999.9
Total Service (t+5)	<u>2505.9</u>	<u>2746.3</u>	<u>2838.2</u>	<u>3206.9</u>
Principal	1727.2	1988.9	2086.6	2396.1
Interest	778.1	757.5	751.5	810.8
Total Service (t+6)	<u>2333.5</u>	<u>2391.6</u>	<u>2593.8</u>	<u>2503.9</u>
Principal	1688.2	1787.4	2002.1	1839.8
Interest	645.3	604.2	591.7	664.2
Total Service (t+7)	<u>2123.9</u>	<u>2220.2</u>	<u>1589.5</u>	<u>1983.1</u>
Principal	1612.5	1761.0	1123.7	1456.7
Interest	511.4	459.2	465.8	526.4
Total Service (t+8)	<u>1999.0</u>		<u>1369.4</u>	<u>1554.4</u>
Principal	1620.8		977.3	1119.4
Interest	378.2		392.1	435.0

TABLE: 2.3 (CONTINUED)

PROJECTED LONG-TERM DEBT SERVICE

AT THE END OF 1985

(US \$ Millions)

	1986	1987	1988	1989	1990	1991	1992	1993
Projected Public Debt Service								
Total	3575.6	3814.5	3900.0	3674.4	3173.5	2411.8	1983.1	1554.4
Principal	2233.8	2530.0	2746.7	2689.4	2373.3	1766.6	1456.7	1119.4
Interest	1341.8	1284.5	1153.3	985.0	800.2	645.2	526.4	435.0
Projected Nonguaranteed Debt Service								
Total	112.0	125.0	02.5	45.5	22.5	22.2	0.0	0.0
Principal	78.5	93.2	59.6	31.6	22.9	73.2	0.0	0.0
Interest	34.3	32.8	22.9	14.9	10.6	19.0	0.0	0.0
Projected Total Long-Term Debt Service								
Total	3688.5	3940.5	3982.5	3720.9	3206.9	2503.9	1983.1	1554.4
Principal	2312.3	2623.2	2806.3	2721.0	2396.1	1839.8	1456.7	1119.4
Interest	1376.2	1317.3	1176.2	999.9	810.8	664.2	526.4	435.0

TABLE: 2.3 (CONTINUED)

PUBLIC AND PUBLICLY GUARANTEED
LONG-TERM DEBT

	30 June 1986		Projected Debt Service as of 30 June 1986	
	Debt Outstanding Disbursed Only	Debt Outstanding, Including Undisbursed	Principal	Interest Total
	18478	24464	2170.0	1850.0
			2810.3	1683.1
			2770.4	1387.1
			2347.9	1225.1
			2110.6	1067.1
			1924.1	905.4
			1605.5	764.4
			1430.0	647.4
			1202.8	546.0
				4020.0
				4493.4
				4157.5
				3573.0
				3177.7
				2829.5
				2369.9
				2077.4
				1748.8

Kaynak: Maliye ve Gümrük Bakanlığı, 1986 Ekonomik Rapor, ss. 144-45

TABLE: 2.4

PROJECTED DEBT SERVICE OF LONG-TERM DEBT:
REPAYMENT OF PRINCIPAL

As Percent of Long-Term Total Debt Outstanding Including Undisbursed		As Percent of Total Outstanding Debt Disbursed Only							
Year	1982	1983	1984	1985	1982	1983	1984	1985	1985
(t+1)	8.04	8.27	9.45	9.74	9.48	10.18	11.96	12.72	12.72
(t+2)	6.65	8.93	10.13	11.09	7.84	10.99	12.82	14.48	14.48
(t+3)	8.81	9.67	10.27	11.82	10.39	11.91	13.01	15.44	15.44
(t+4)	8.87	10.37	10.55	11.46	10.45	12.76	13.36	14.97	14.97
(t+5)	8.81	10.04	9.96	10.09	10.39	12.36	12.62	13.18	13.18
(t+6)	8.62	9.02	9.55	9.77	9.77	10.11	10.11	10.12	10.12
(t+7)	8.23	8.89	5.37	6.14	9.70	10.95	6.79	8.01	8.01
(t+8)	8.27	8.27	4.67	4.72	9.75	9.75	5.91	6.16	6.16
INTEREST PAYMENTS									
		As Percent of Total Debt Outstanding in Year (t)							
(t+1)	5.93		5.93	5.80			7.51	7.57	7.57
(t+2)	5.54		5.54	5.55			7.02	7.25	7.25
(t+3)	5.01		5.01	4.95			6.34	6.47	6.47
(t+4)	4.32		4.32	4.21			5.47	5.50	5.50
(t+5)	3.59		3.59	3.42			4.54	4.46	4.46
(t+6)	2.83		2.83	2.80			3.58	3.65	3.65
(t+7)	2.22		2.22	2.22			2.82	2.90	2.90
(t+8)	1.87		1.87	1.83			2.37	2.39	2.39

TABLE: 2.5

COMPARISON OF BOP AND DEBT DATA
BALANCE OF PAYMENTS DATA

	1978	1979	1980	1981	1982	1983	1984	1985	1986
1. Long-Term Capital Excluding									
Direct Investment	412.0	532.0	656.0	683.0	27.0	-389.0	44.0	-699.0	525.0
2. Exceptional Financing			1373.0	315.0	902.0	622.0	1002.0	676.0	0.0
3. Total			2029.0	998.0	929.0	233.0	1046.0	-23.0	525.0
4. Counterpart Items			19.0	68.0	13.0	161.0	-171.0	223.0	251.0
5. Total Long-Term Capital			2048.0	1066.0	942.0	394.0	875.0	200.0	776.0
6. Short-Term Capital	402.0	-1000.0	-2.0	104.0	81.0	1033.0	36.0	1650.0	1478.0
7. Total Payments	402.0	-1000.0	-2.0	104.0	81.0	1033.0	36.0	1650.0	1478.0
8. Errors and Omissions	-874.0	676.0	1434.0	649.0	-75.0	567.0	317.0	-808.0	4134.0
									-65.0
EXTERNAL DEBT DATA									
9. Long-Term Capital: Net Flow	789.6	3893.0	1948.6	1183.8	986.9	514.0	1386.9	378.3	
10. Interest Payments	194.3	249.3	467.3	983.2	1151.3	1191.1	1166.7	1276.6	
11. Use of IMF Credit	213.3	10.7	421.2	267.6	133.4	112.2	-141.2	-99.8	-241.4
12. Change in Short-Term Capital	1093.0	-3630.0	1066.0	-296.0	-30.0	875.0	1467.0	2111.0	
13. Implied Interest Payments on Short-Term Debt (7-10)	294.7	760.7	670.7	459.8	313.7	249.9	419.3	476.4	685.9*

* Actual, TÜSIAD, The Turkish Economy 1987, P.121

TABLE: 2.6

ACTUAL DEBT SERVICE AND EXTERNAL DEBT

	1970	1973	1974	1975	1976	1977	1978	1979
<u>Long-Term Debt</u>								
1. Principal Repayments (Year t)	131.9	129.3	157.6	174.3	202.5	234.3	336.7	435.6
2. Interest Payments (Year t)	44.9	84.0	100.5	118.3	166.6	184.4	194.3	249.3
3. Long-Term Debt Total Disbursed (Year t-1)			2983.8	3271.4	3348.7	3838.2	4778.7	6910.9
4. Long-Term Debt Outstanding, Including Undischursed (Year t)					4330.0	0190.0	7670.0	10556.5
<u>Short-Term Debt</u>								
5. Interest Payments (Year t)				5.7	50.4	135.6	294.7	760.7
6. Short-Term Debt Outstanding (Year t)							7186.0	
Amortization Rate (S ₁) (1/3) (%)	5.28			5.33	6.05	6.10	7.05	6.30
Amortization Rate (S ₂) 1/4, (%)	3.85			3.79	4.10	3.78	4.39	4.13
Interest Rate (2/3, i ₁ , %)	3.37			3.62	4.98	4.80	4.07	3.61
Interest Rate (2/4, i ₂ , %)	2.46			2.57	3.37	2.98	2.53	2.36
Short-Term Interest Rate (5/6)							4.10	

TABLE: 2.6 (CONTINUED)

ACTUAL DEBT SERVICE AND EXTERNAL DEBT

	1980	1981	1982	1983	1984	1985	1986
<u>Long-Term Debt</u>							
1. Principal Repayments (t)	462.3	769.7	1172.8	1179.5	1221.3	2382.6	(2248.5)
2. Interest Payments (t)	467.3	983.2	1151.3	1191.1	1166.7	1276.6	(1884.3)
3. Long-Term Debt Outstanding and Disbursed (t-1)	11743.0	15976.2	16152.8	16621.6	16085.5	16537.4	18180.1
4. Long-Term Debt Outstanding including undisbursed year (t-1)	15525.1	19551.3	19931.1	19594.9	19800.4	20941.3	23737.8
<u>Short-Term Debt</u>							
5. Interest Payments (t)	670.7	459.8	313.7	249.9	419.3	476.4	(249.7)
6. Short-Term Debt Outstanding (t)	2490.0	2194.0	2164.0	3039.0	4506.0	6617.0	9391.0
Amortization Rate (S_1) (1/3) (%)	3.94	4.82	7.26	7.10	7.59	14.41	12.37
Amortization Rate (S_2) (1/4) (%)	2.98	3.94	5.88	6.02	6.17	11.38	9.47
Interest Rate (i_1) (2/3) (%)	3.98	6.15	7.13	7.17	7.25	7.72	10.36
Interest Rate (i_2) (2/4) (%)	3.01	5.03	5.78	6.08	5.89	6.10	7.94
Short-Term Interest Rate (5/6)	26.94	20.96	14.50	8.22	9.31	7.20	

TABLE: 2.7

LONG-TERM DEBT, INCLUDING UNDISBURSED
 (Principal Repayments Deducted Every Year)
 AMORTIZATION RATES AND INTEREST RATES
 *CALCULATED AS PERCENTAGE

Year	t = 1983			t = 1984			t = 1985		
	Debt Outstanding, After Repayments	Amortization Rate	Interest Rate	Debt Outstanding After Repayment of Principal	Amortization Rate	Interest Rate	Debt Outstanding After Repayment	Amortization Rate	Interest Rate
t	19800.4	-	-	20941.3	-	-	22757.0	-	-
t+2	16393.6	9.74	6.33	18963.2	9.45	5.93	21425.5	9.74	5.80
t+3	14478.5	11.68	6.37	16842.8	11.18	6.12	18793.3	12.29	6.15
t+4	12425.9	14.18	6.30	14691.4	12.77	6.23	15987.0	14.93	6.26
t+5	10437.0	16.01	6.10	12481.7	15.04	6.16	13266.0	17.02	6.25
t+6	8649.6	17.13	5.79	10395.1	16.72	6.02	10869.9	18.06	6.11
t+7	6888.6	20.36	5.31	8393.0	19.26	5.69	9030.1	16.93	6.11
t+8				7269.3	13.39	5.55	7573.4	16.13	5.83
				6292.0	13.44	5.39	6554.0	14.78	5.74
Total	65.21*	97.37		69.95*	111.25		72.39	119.88	

* Percentage of Total Debt Repaid

CHAPTER III

BALANCE OF PAYMENTS PROJECTIONS

Table 3.1 gives balance of payments data for 1975-1986 period. Balance of payments projections for 1988-2000 period are shown in Tables: 3.2 and 3.3. Table 3.3 contains projections based on optimistic assumptions in respect of exports. In fact, in Table 3.2 estimating equation is:

$$(1) \ln X_T = 5.74 + 1.24 \ln EX + 0.13 T - 0.5 \ln \frac{X_{T-1} + X_{T-2}}{2}$$

(2.65) (1.72) (-0.926)

Where adjusted $R^2 = 0.938$

X_T = Total exports (FOB, Million \$) in year T

EX = An index of real exchange rate

T = Time, year.

Which yields following export growth rates:

9.21 percent for 1986-2000

10.15 percent for 1986-1992

8.51 percent for 1992-2000

These growth rates are exceptionally good and difficult to materialize. Table 3.3 is based on following linear estimating equation for exports, which gives conservative estimates.

$$(2) X_T = -511.78 + 0.876 X_{T-1} + 8.629 EX \quad (\text{Adj. } R^2 = 0.939)$$

(4.84) (0.94)

In fact growth rates of these estimates are:

3.28 percent for 1986-2000

5.62 percent for 1986-1992

1.52 percent for 1992-2000

Other estimating equations (also based on regression analysis) are common in both tables and given below:

$$(3) \ln M_t = -6.55 + 1.27 Y_t \quad (\text{Adj. } R^2 = 0.349) \\ (5.9)$$

$$(4) \ln X_t^T = 4.94 + 0.168 T \quad (\text{Adj. } R^2 = 0.919) \\ (10.04)$$

$$(5) \ln M_t^T = 3.98 + 0.2 T \quad (\text{Adj. } R^2 = 0.899) \\ (8.51)$$

$$(6) X_t^S = -703.5 + 0.15 (X_t + M_t) \quad (\text{Adj. } R^2 = 0.907) \\ (10.416)$$

$$(7) \ln M_t^S = -8.24 + 1.63 \ln M_t \quad (\text{Adj. } R = 0.798) \\ (6.67)$$

$$(8) I_t^d = 243.3 + 143.65 T \quad (\text{Adj. } R^2 = 0.62) \\ (8.359)$$

Where

M_t = Total imports (CIF, mn \$) in year t

Y_t = Gross National Product in 1968 prices (mn TL)

It is assumed to increase 5 percent p.a.

t, T = Time, year

X_t^T = Tourism receipts (mn \$) in year t.

M_t^T = Foreign Tourism and Travel expenditures (mn \$)

X_t^S = Other service revenue (mn \$)

M_t^S = Other service payments (mn \$)

I_t^d = Total foreign direct investment (mn \$)

and figures in parenthesis are t-ratios of regression coefficients.

Workers' remittances are estimated at \$ 1700 million (fixed) and unrequited transfer at \$ 310 million. Profit transfers abroad are calculated as 9.7 percent of total foreign direct investment estimated by eq (8). Interest payments are calculated only during the 1988-1992 period.

External financing (borrowing) requirement during 1987-1992 period are calculated on the basis of these BOP projections. Table 3.4 is based on Table 3.2 and Table 3.5 on Table 3.3.

Table 3.5 shows that if exports grow by -6 percent p.a. Turkey has to borrow excessively up to 1992. In fact Turkey has to borrow over \$5 billion p.a. during 1988-92, which can not be assumed continue indefinitely the fragility of the system and extreme importance of avoiding short term crises are obvious.

Short-term debts approaching \$10 billion is another delicate and hazardous aspect which calls for extreme caution, as they might lead to a crisis at any time.

As a consequence increasing tourism receipts and exports is a must. Export growth rate, in particular should be above 8 percent.

TABLE: .1

BALANCE OF PAYMENTS: 1975-1986
(In millions of Dollar)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
EXPENDITURES (A)	-3101	-2912	-3753	-2081	-2554	-4603	-3864	-2628	-2990	-2942	-2975	-3081
Exports	1401	1960	1753	2283	2261	2910	4703	5890	5905	7389	8255	7583
Imports	-4502	-4872	-5506	-4369	-4815	-7513	-8567	-8518	-8895	-10331	-11230	-10664
REVENUES (B)	1929	1563	1522	1555	2402	2833	3806	4178	3554	4173	4862	4884
Foreign Travel and Tourism Receipts	201	181	205	214	281	326	380	373	420	548	1094	950
Workers' Remittances	1312	982	982	983	1694	2071	2490	2140	1513	1807	1714	1634
Merchandise	416	400	335	299	427	436	936	1665	1621	1818	2054	2300
EXPENDITURES (C)	-601	-818	-1034	-855	-1377	-1738	-1946	-2539	-2664	-2945	-3184	-3646
Foreign Travel Payments	-143	-194	-253	-111	-83	-104	-103	-149	-128	-277	-324	-313
Interest Payments	-124	-217	-320	-489	-1010	-1138	-1443	-1465	-1441	-1586	-1753	-2134
Profit Transfers	-36	-83	-110	-7	-42	-51	-56	-43	-57	-63	-79	-40
Merchandise	-298	-319	-351	-299	-242	-445	-344	-882	-1038	-1019	-1028	-1199
REQUIRED TRANSFERS (D)	125	138	125	155	116	100	85	154	272	307	284	315
Private	86	122	86	103	105	82	69	49	36	78	48	69
Official	39	16	39	52	11	18	16	105	236	229	236	246
CURRENT ACCOUNT BALANCE (E)	-1648	-2029	-3140	-1215	-1413	-3408	-1919	-835	-1828	-1407	-1013	-1528
Direct Investments	114	10	27	14	75	18	95	55	46	113	99	125
Other Long-Term Capital	173	1049	650	42	532	656	683	27	-389	44	-699	525
Exceptional Financing	1035	1500	1763	1219	1003	1373	315	902	622	1002	676	0
Short-Term Capital	40	7373	968	412	-1000	-2	104	81	1033	36	1650	1478
Reserve Changes	677	197	367	5	87	-90	5	-168	-152	66	-275	-786
Net	-391	800	-635	-83	716	1453	717	-62	668	146	-438	18
Interpart Items	-40	30	-1	4	40	19	68	13	161	171	370	251
Errors and Omissions	-351	-830	-634	-84	676	1434	649	-75	507	317	-808	-61

TABLE: 3.2

BALANCE OF PAYMENTS PROJECTIONS
(First Approach)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
PAYMENTS (A)													
Exports	-3458.7	-3798.8	-3891.9	-3719.0	-3643.5	-3571.2	-3415.8	-3220.6	-2989.3	-2699.2	-2345.0	-1924.1	-1425.1
Imports	10080.9	10607.5	11436.5	12590.5	13710.0	14893.0	16230.3	17683.0	19252.3	20966.0	22835.0	24867.6	27081.5
REVENUES (B)	13539.6	14406.3	15328.4	16309.5	17353.5	18646.2	19646.1	20903.6	22241.6	22241.6	23665.2	26791.7	28506.6
Foreign Travel and Tourism Receipts	5684.3	6117.1	6639.9	7269.9	7962.4	8742.8	9637.7	10657.0	11819.3	13150.1	14676.5	16430.2	18448.9
workers' Remittances	1245.5	1473.4	1742.9	2061.7	2438.9	2885.0	3412.8	4037.1	4775.7	5649.3	6682.7	7905.2	9351.3
Other	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0
EXPENDITURES (C)	2738.8	2943.7	3197.0	3508.2	3823.5	4157.8	4524.9	4919.9	5343.6	5800.8	6293.8	6825.0	7397.6
Foreign Travel Payments	-4452.3	-4394.0	-4434.1	-4534.1	-4702.5								
Interest Payments	500.7	613.6	751.9	921.4	1129.0	1383.5	1695.4	2077.5	2545.8	3119.7	3822.9	4684.6	5740.5
Profit Transfers	2299.1	1956.3	1670.0	1393.7	1127.2								
Other	182.1	196.9	211.5	226.4	241.2	256.0	270.8	285.6	300.4	315.2	329.9	344.7	359.0
UNREQUITED TRANSFERS (D)	1470.4	1627.2	1800.7	1992.6	2205.1	2440.2	2700.3	2988.2	3306.8	3659.4	4049.5	4491.2	4959.0
Private	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0
Official	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
CURRENT ACCOUNT BALANCE (E)	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Direct Investments	-1916.7	-1765.7	-1376.1	-673.2	-73.6								
	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.65

Remark: 1987 data are not taken into account in projections.

TABLE: 3.3

BALANCE OF PAYMENTS PROJECTIONS
(Second Approach)

	1988	1989	1889	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
PAYMENTS													
Exports	-4540.7	-4970.1	-5509.0	-6194.4	-6903.9	-7756.0	-8652.6	-9772.0	-10936.0	-12207.0	-13589.0	-15084.2	-16696.0
Imports	8998.9	9436.1	9819.3	10115.1	10449.5	10707.0	10993.4	11131.5	11305.2	11457.3	11590.7	11707.5	11810.0
REVENUES (B)	13539.6	14406.	15328.3	16309.5	17353.4	18464.0	19464.0	20903.5	22241.5	23665.2	25180.0	26791.7	28506.6
Foreign Travel and Tourism Receipts	5526.6	5944.5	6404.3	6915.0	7487.2	8132.8	8865.8	3702.2	10661.1	11764.3	13037.0	14519.3	15222.2
Workers' Remittances	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0	1700.0
Other	2581.1	2771.1	2961.4	3153.3	3348.3	3547.8	3753.0	3965.1	4185.4	4415.0	4655.2	4907.1	5172.0
EXPENDITURES (C)	-4539.0	-4488.1	-4563.8	-4732.2	-4964.0								
Foreign Travel Payments	500.7	613.6	751.9	921.4	1129.0	1383.5	1695.4	2077.5	2545.8	3119.7	3822.9	4684.6	5740.0
Interest Payments	2185.8	2050.4	1799.7	1591.8	1388.7								
Profit Transfers	182.1	196.9	211.5	226.4	241.2	256.0	270.8	285.6	300.4	315.2	329.9	344.7	359.0
Other	1470.4	1627.2	1800.7	1992.6	2205.1	2440.2	2700.3	2988.2	3306.8	3659.4	4049.5	4481.2	4959.0
UNREQUITED TRANSFERS (D)	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0	310.0
Private	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Official	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
CURRENT ACCOUNT BALANCE (E)	-3244.0	-3203.8	-3358.6	-3701.6	-4070.7								
Direct Investments	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.65	143.6

TABLE: 3.4

NEW BORROWING REQUIREMENT

(First Approach)

	1987	1988	1989	1990	1991	1992
D_t : New Debt						
$+M_t$: Imports(-)	12725.1	13539.61	14406.26	15328.27	16309.53	17353.47
$-X_t$: Exports(+)	8500.0	-10080.90	-10607.50	-11436.50	-12590.50	-13710.00
$-X_t^S$: Other Revenue(+)	-2839.70	-2738.80	-2943.70	-3197.00	-3508.20	-3823.50
$+M_t^S$: Other Expenditures(-)	1328.70	1470.44	1627.20	1800.67	1992.65	2205.10
$-X_t^T$: Tourism Revenue	-1052.90	-1245.53	-1473.38	-1742.91	-2061.74	-2438.90
M_t^T : Foreign Travel	408.60	500.70	613.60	751.90	921.40	1129.00
$-T_t$: Unrequited Transfers	-310.00	-310.00	-310.00	-310.00	-310.00	-310.00
$-T_t^P$: +(Private)	-60.00	-60.00	-60.00	-60.00	-60.00	-60.00
$-T_t^O$: +(Official)	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00
$+P_t$: Profit Transfers(-)	167.30	182.10	196.10	211.50	226.40	241.20
$-W_t$: Workers' Remittances(+)	-1700.00	-1700.00	-1700.00	-1700.00	-1700.00	-1700.00
$+iD_{t-1}$: Interest Payments On Existing Debt	2086.80	1970.80	1695.80	1462.60	1247.80	1032.70
D_t : New Debt (on current account)	2003.96	1278.42	1194.42	858.53	217.34	-330.93
$-I_t^d$: Direct Foreign Investment	-143.65	-143.65	-143.65	-143.65	-143.65	-143.65
$+R_t$: Principal Repayments	2810.30	3654.70	2770.40	2347.50	2110.60	1924.10
$-M_t^W$: Imports With Waiver	-100.00	-100.00	-100.00	-100.00	-100.00	-100.00
ΔD_t : Change in Debt	4570.61	4689.47	3721.13	2962.38	2084.29	1349.52
i : Interest Rate	0.07	0.07	0.07	0.07	0.07	0.07
iD_t : Interest Payment on New Debt	319.94	328.26	260.48	207.37	145.90	94.47
D_t : New Borrowing Requirement	4890.55	5017.73	3981.61	3169.75	2230.19	1443.99

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TABLE: 3.5
NEW BORROWING REQUIREMENT
(Second Approach)

	1987	1988	1989	1990	1991	1992
D_t : New Debt						
$+M_t$: Imports(-)	12725.11	13539.61	14406.26	15328.27	16309.53	17353.47
$-X_t$: Exports(+)	-8500.00	-8998.90	-9436.10	-9819.30	-10115.10	-10449.50
$-X_t^S$: Other Revenue(+)	-2839.70	-2581.10	-2771.10	-2961.40	-3153.30	-3348.30
$+M_t^S$: Other Expenditures(-)	1328.77	1470.44	1627.20	1800.67	1992.65	2205.10
$-X_t^T$: Tourism Revenue	-1052.92	-1245.53	-1473.38	-1742.91	-2061.74	-2438.90
M_t^T : Foreign Travel	408.60	500.70	613.60	751.90	921.40	1129.00
$-T_t$: Unrequited Transfers	-310.00	-310.00	-310.00	-310.00	-310.00	-310.00
$-T_t^P$: +(Private)	-60.00	-60.00	-60.00	-60.00	-60.00	-60.00
$-T_t^O$: +(Official)	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00
$+P_t$: Profit Transfers(-)	167.30	182.10	196.10	211.50	226.40	241.20
$-W_t$: Workers' Remittances(+)	-1700.00	-1700.00	-1700.00	-1700.00	-1700.00	-1700.00
$+iD_{t-1}$: Interest Payments On Existing Debt	2086.30	1970.80	1695.80	1462.60	1247.80	1032.70
D_t : New Debt (on current account)	2003.06	2518.12	2538.38	2711.33	3047.64	3404.77
$-I_t^d$: Direct Foreign Investment	-143.65	-143.65	-143.65	-143.65	-143.65	-143.65
$+R_t$: Principal Repayments	2810.00	3654.70	2770.40	2347.50	2110.60	1924.10
$-M_t^W$: Imports With Waiver	-100.00	-100.00	-100.00	-100.00	-100.00	-100.00
ΔD_t : Change in Debt	4570.01	5929.17	5065.13	4815.18	4914.59	5085.22
i : Interest Rate	0.07	0.07	0.07	0.07	0.07	0.07
iD_t : Interest Payment on New Debt	319.4	415.04	354.56	337.06	343.02	355.97
D_t : New Borrowing Requirement	4890.05	6344.21	5419.69	5152.24	5258.61	5441.19

CHAPTER IV
FACTORS CONTRIBUTING TO THE GROWTH OF
EXTERNAL DEBT DURING 1979-1986

The methodology employed in the analysis of factors contributing to the growth of external debt is originally by Balassa. It is based on the BOP identity. (See also Appendix to Chapter VI), namely

$$(1) NF_t = M_t - X_t + iD_{t-1} - I_t^d - F_t + \Delta R_t$$

Where M_t stands for imports, X_t exports, D_{t-1} foreign debt outstanding at the beginning of the period, i interest rate, I_t^d direct foreign investment, F_t other capital inflow and ΔR_t change in international reserves.

Denoting trend values by overbars, we can write

$$(2) \overline{NF}_t = \overline{M}_t - \overline{X}_t + \overline{i} \overline{D}_{t-1} - \overline{I}_t^d - \overline{F}_t + \overline{\Delta R}_t$$

As adequate price data are not available, imports and exports can not be decomposed to include price variables. Imports, however, are broken down into consumer goods, raw material and capital goods. For all these variables, regression equations have been estimated and estimates of these equations for 1976 through 1986 have been accepted as trend estimates or expected values. And deviations from trend or expected values, calculated by deducting eq (2) from eq (1), indicate relative contribution of these factors to increase in external debt (or deviation of indebtedness from its trend value) Assuming also

$$\Delta R_t = \overline{\Delta R}_t$$

$$I_t^d = \overline{I}_t^d$$

$$\overline{F}_t = 0$$

one obtains

$$(3) \quad NF_t - \overline{NF}_t = M_t - \overline{M}_t - (X_t - \overline{X}_t) + (i-i) \overline{D}_{t-1} + i (D_{t-1} - \overline{D}_{t-1}) + F_t$$

Table 4.1 and 4.2 shows contribution of each factor to increased indebtedness, as estimated using this methodology. The regression equations used in this analysis are given below.

$$(4) \quad \ln M_t = -26.12 + 2.84 \ln Y_t \quad (R^2 = 0.939)$$

(18.8) (196-86)

$$(5.1) \quad M_t^R = -7023.6 + 0.0557 Q_t \quad (R^2 = 0.574)$$

(1975-86) (3.98)

$$(5.2) \quad M_t^F = -6706950.7 + 43.35 Y_t \quad (R^2 = 0.562)$$

(1962-85) (3.89)

$$(5.3) \quad \ln M_t^K = -6.2827 + 0.59801 \ln M_{t-1}^K + 0.88089 \ln I_t$$

(1983-86; R^2=0.974) (6.364) (4.312)

$$(5.4) \quad \ln M_t^C = 9.8725 + 1.28248 \ln (M_t/Y_t)$$

(22.390) (12.171)

(1962-86; R^2, 0.859)

$$(6) \quad X_t = -2641.0 + 20.3467 EX + 343.127 T + 0.06796 X_{t-1}$$

(2.856) (13.59) (10.255)

(1972-86; R^2= 0.965; Time T=1-1982)

$$(7) \quad \ln X_t^S = -9.112 + 1.7003 \ln (X_t + M_t)$$

(9.8047)

(1975-86; R^2=0.896)

$$(8) \quad M_t^S = -2074.49 + 0.012145 Y_t$$

(-4.6127) (6.0219)

(1975-86; R^2= 0.762)

$$(9) \quad \ln X_t^T = -25.6354 + 2.8723 B_t$$

(-6.541) (8.059)

(1976-85; R^2= 0.877)

$$(10) \quad M_t^T = 14.919 + 0.0219 M_t$$

(0.214) (2.472)

(1975-86; R^2= 0.317)

Where

M_t = Total imports, (CIF, million \$) All BOP variables in millions of \$.

Y_t = GNP in 1968 prices (Million TL)

M_t^R = Imports of raw materials

Q_t = GDP

M_t^F = Imports of oil and petroleum products

M_t^K = Imports of capital goods

I_t = Total investment in 1968 prices

M_t^C = Imports of consumer goods

X_t = Exports (FOB)

X_t^S = Other service receipts

M_t^S = Other service payments (debit)

T = Time

B_t = Number of beds at touristic establishments

M_t^t = Foreign travel expenditures

Trend value for unrequited transfers (credit) was estimated at \$310 million during 1979-86. Trend values for worker 's remittances and imports with waiver are estimated at \$1700 and \$100 million respectively.

Table 4.1 is based on eq.4, whereas Table 4.2 uses eq.5, i.e. breakdown of imports. In Table 4.1 it is observed that except for 1979, external borrowing exceeded its trend value or expected level, and that increasing imports played the dominant role in this.

As for the contribution of components of imports to this rising external debt, Table 4.2 shows that during the 1980-85 period import of raw materials was the major contributor. This indicates extensive negative import substitution. In 1986 import of consumer goods also rising above its trend value, contributed to increase in debt. Interest payments (on foreign) debt also were above expected value, because of positive interest differential (actual average rate on long-

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term and short-term debt is above the expected rate based on long-term rate) and of the rise of debt level above its trend.

It is considered that a selective import substitution program (without re-introducing the problem of costly and poor quality domestic inputs again) and measures to check excessive growth of imports of consumer goods are appropriate. It is also a casual observation that, excessive investments in economic and social infrastructure have caused excessive external borrowing.

TABLE: 4.1

GROWTH EXTERNAL DEBT AND FACTORS CONTRIBUTING TO IT

	1979		1980	1981		1982		
	Deviation from trend	Percent		Deviation from trend	Percent	Deviation from trend	Percent	
Imports	-817.4	-75.0	2089.4	54.7	3288.0	78.3	2507.2	76.8
Exports	-34.7	8.4	-446.8	11.7	559.6	-31.4	618.2	-41.7
Other Service Receipts	35.7	-3.3	-313.4	8.2	-194.0	4.6	365.4	-24.6
Other Service Payments	-213.8	-19.6	16.2	0.4	-188.6	-10.6	229.5	7.0
Tourism Receipts	-6.5	1.6	19.5	-5.0	21.7	-1.2	-7.3	0.2
Foreign Travel Payments	2.6	0.6	5.5	0.1	-17.7	-1.0	1.1	0.0
Unrequited Transfers	-194.0	46.9	-210.0	5.5	-225.0	5.4	-156.0	4.8
Profit Transfers	19.9	4.8	19.5	0.5	-8.3	-0.5	-37.5	-2.5
Workers' Remittances	-6.0	1.5	371.0	-95.0	790.0	-44.4	440.0	-29.7
Interest Payments	-	-	670.7	17.5	459.8	11.9	313.7	9.6
Direct Foreign Investments	150.0	36.2	-46.6	1.2	193.9	-10.9	22.4	-1.5
Imports with Waiver	23.0	-2.1	-5.0	0.1	-31.0	0.7	-51.0	1.6
Net Effect on Debt (Change in Debt)	-675.0		432.6		2418.0		1782.0	
Total Negative Effect	-1089.9		390.5		-1779.8		-1483.5	
Total Positive Effect	413.7		823.1		4197.8		3265.7	

TABLE: 4.1 (CONTINUED)

	1983		1984	1985		1986		
	Deviation from trend	Percent		Deviation from trend	Percent	Deviation from trend	Percent	
Imports	2036.3	56.0	2871.6	81.0	2335.6	77.5	508.7	23.7
Exports	-651.7	17.9	-33.4	0.9	661.4	-74.9	-453.0	21.1
Other Service Receipts	260.7	-75.1	-29.6	0.8	-117.3	3.9	+358.0	-42.5
Other Service Payments	296.6	8.2	111.7	3.1	-31.9	-3.6	-104.0	-12.3
Tourism Receipts	-91.3	2.5	-17.0	0.5	23.8	-2.7	-1111.6	51.8
Foreign Travel Payments	-53.2	15.3	54.9	1.5	51.9	1.7	-20.5	-2.4
Unrequited Transfers	-38.0	1.0	-3.0	0.1	-26.0	0.9	5.0	-0.6
Profit Transfers	-33.4	-9.6	-53.7	-18.6	-60.5	-6.9	-134.8	-15.9
Workers' Remittances	-187.0	5.1	107.0	-37.1	14.0	-1.6	-66.0	3.1
Interest Payments	249.9	6.9	419.3	11.8	476.4	15.8	-	-
Direct Foreign Investments	-39.9	1.1	127.4	-44.2	90.9	-10.3	220.6	-26.2
Imports with Waiver	-44.0	1.2	-6.0	0.2	-6.0	0.2	-6.0	0.3
Net Effect on Debt (Change in Debt)	3298.5		223.3		2094.8		1316.6	
Total Negative Effect	-347.3		288.1		-882.5		-842.9	
Total Positive Effect	3634.7		546.5		3013.2		2145.3	

TABLE: 4.2

GROWTH OF EXTERNAL DEBT AND FACTORS CONTRIBUTED TO IT

	1979		1980		1981		1982	
	Deviation from trend	Percent	Deviation from trend	Percent	Deviation from trend	Percent	Deviation from trend	Percent
Imports of raw materials	-160.0	-19.2	2730.	61.2	2684.3	69.5	1950.4	70.5
Petroleum Imports	(-1016.1)		(1681.)		(1320.2)		(823.2)	
Imports of capital goods	-331.3	-39.8	-226.	-30.5	265.7	6.9	59.6	2.2
Imports of consumer goods	69.2	-8.3	-125.	-17.0	-149.4	-7.7	-123.8	-7.7
Exports	34.7	8.4	-446.	10.0	559.6	-29.0	618.2	-38.5
Other Service Receipts	35.7	-4.3	-313.	7.0	-194.0	5.9	365.4	-22.7
Other Service Payments	-213.8	-25.7	16.	0.4	-188.6	-9.8	229.5	8.3
Tourism Receipts	-6.5	1.6	19.	-2.6	21.7	-1.1	-7.3	0.3
Foreign Travel Payments	2.6	0.6	5.	0.1	-17.7	-0.9	1.1	0.0
Unrequited Transfers	-194.0	46.8	-210.	4.7	-225.0	5.8	-156.0	5.6
Profit Transfers	19.9	4.8	19.	0.4	-8.3	-0.4	-37.5	-2.3
Workers' Remittances	-6.0	1.5	371.	-50.0	790.0	-41.0	440.0	-27.4
Interest Payments			-670.	15.0	-459.8	11.9	-313.7	11.3
Direct Foreign Investments	-150.0	36.2	-46.	1.0	193.9	-10.1	22.4	-1.4
Imports with Waiver	23.0	-2.8	-5.	0.1	-31.0	0.8	-51.0	1.8
Net Effect on Debt	-419.3			721.2		1930.5		1161.3
(Change in Debt)								
Total Negative Effect	-833.0			742.7		-1929.3		-1607.3
Total Positive Effect	413.7			463.9		3859.8		2768.6

TABLE: 4.2 (CONTINUED)

	1983		1984		1985		1986	
	Deviation from trend	Percent	Deviation from trend	Percent	Deviation from trend	Percent	Deviation from trend	Percent
Imports of raw materials	1880.1	54.1	2117.	67.3	1778.3	60.0	-315.7	-27.6
Petroleum Imports	(401.6)		(-142.)		(-694.8)			
Imports of capital goods	-33.3	-7.4	265.	8.4	-131.3	-13.0	18.4	0.8
Imports of consumer goods	-68.4	-15.6	122.	3.9	541.7	18.3	659.9	28.5
Exports	-651.7	18.7	-33.	1.1	661.4	-65.2	-453.0	19.6
Other Service Receipts	260.7	-59.6	-29.	0.9	-117.3	4.0	358.0	-31.3
Other Service Payments	296.6	8.5	111.	3.6	-31.9	-3.1	-104.0	-9.1
Tourism Receipts	-91.3	2.6	-17.	0.5	23.8	-2.3	-1111.6	48.0
Foreign Travel Payments	-53.2	-11.8	54.	1.7	51.9	1.7	-20.5	-1.8
Unrequited Transfers	-38.0	1.1	-3.	0.1	-26.0	0.9	5.0	-0.4
Profit Transfers	-33.4	-7.4	-53.	-18.6	-60.5	-6.0	-134.8	-11.8
Workers' Remittances	-187.0	5.4	107.	-37.1	14.0	-1.4	-66.0	2.9
Interest Payments	-249.9	-7.2	-419.	13.3	-476.4	16.1		
Direct Foreign Investments	-39.9	1.1	127.	-44.2	90.9	-9.0	220.6	-19.3
Imports With Waiver	-44.0	1.3	-6.	0.2	-6.0	0.2	-6.0	0.3
Net Effect on Debt	3029.0			892.7		1983.8		1156.3
Total Negative Effect	-449.0			288.1		-1013.8		1158.6
Total Positive Effect	3478.0			180.8		2997.6		2314.9

CHAPTER V

INVESTMENT-SAVING GAP MODEL

External debt can be generated by either one of the two gaps, namely the savings-investment gap or by the trade gap (current account deficit). Work on saving gap originates from Avramovic and his associates.*

The model is based on the macro economic equilibrium condition, a savings and an investment equation. Namely;

$$1) Y_t = Q_t - iD_t$$

$$2) S_t = Y_t - C_t - G_t$$

$$3) D_{t+1} - D_t = \Delta D_t = I_t - S_t$$

$$4) S_t = sY_t = sQ_0 (1 + r)^t - siD_t$$

$$5) I_t = krQ_t = krQ_0 (1 + r)^t$$

where $Y_t = \text{GNP}$

$Q_t = \text{GDP}$,

$D_t = \text{External debt outstanding}$

$S_t = \text{Domestic savings}$

$C_t = \text{Private consumption}$

$G_t = \text{Government consumption}$

$I_t = \text{Investments}$

$s = \text{Average saving propensity}$

$r = \text{GDP growth rate}$

$i = \text{Interest rate}$

$t = \text{Time (years)}$

$k = \text{Incremental capital-output ratio}$

Substituting (4) and (5) in (3) one obtains

*Avramovic et al (1964), Economic Growth and External Debt, John Hopkins, Baltimore

$$6) D_{t+1} - (1 + si)D_t = (kr - s) Q_0 (1 + r)^t$$

This is a first order difference equation solution of which for $D_0 = 0$ is given by

$$7) D_t = \frac{(kr - s)}{(r - si)} Q_0 ((1 + r)^t - (1 + si)^t)$$

and the debt / GDP ratio is

$$8) \frac{D_t}{Q_t} = \frac{(kr-s)}{(r-si)} \left(1 - \frac{(1+si)^t}{(1+r)^t}\right)$$

If $r > si$ the debt/GDP ratio decelerates and levels off to (in the limit) eq (8¹).

$$(8^1) \lim_{t \rightarrow \infty} \frac{D_t}{Q_t} = \frac{kr-s}{r-si}$$

and if $r < si$ debt accumulation becomes explosive over time.

We bring about two modifications to his system by introducing workers'

remittances (W_t) and a non-zero D_0

(W also is assumed to be fixed $W = \text{₡ } 1700$ million over the period considered)

Then

$$9) Y_t = Q_t + W_t - i D_{t-1}$$

$$10) S_t = s (Q_0 (1+r)^t + 1700 - i D_{t-1})$$

$$11) D_t - (1 + si)D_{t-1} = (kr - s) Q_0 (1 + r)^t - 1700 s$$

solution of which is

$$12) D_t = D_0 (1+si)^t + \frac{kr-s}{r-si} Q_0 (1+r) ((1+r)^t - (1+si)^t) - \frac{1700}{i} ((1+si)^t - 1)$$

$$13) \frac{D_t}{Q_t} = \frac{D_0}{Q_0} \frac{(1+si)^t}{1+r} + \frac{(kr-s)}{r-si} (1+r) \left(1 - \frac{(1+si)^t}{1+r}\right) - \frac{1700}{i Q_0} \frac{((1+si)^t - 1)}{(1+r)^t}$$

limit of the D_t/Q_t ratio, if $si < r$ is:

$$13') \lim_{t \rightarrow \infty} \frac{D_t}{Q_t} = \left(\frac{kr-s}{r-si}\right) (1+r)$$

Alternatively we can omit the W term and take care of workers' remittances by means of GDP growth rate assumed. In that case we have following equations:

$$14) D_t - (1+si)D_{t-1} = (kr - s) Q_0 (1+r)^t$$

$$15) D_t = \frac{Q_0(kr-s)}{r-si} ((1+r)^t - (1+si)^t) + D_0 (1+si)^t$$

$$16) \frac{D_t}{Q_t} = \frac{kr-s}{r-si} (1 - (\frac{1+si}{1+r})^t) + \frac{D_0}{Q_0} (\frac{1+si}{1+r})^t$$

Limit of which is given by (16') if $r > si$ and its limit is explosive otherwise

$$(16') \lim_{t \rightarrow \infty} \frac{D_t}{Q_t} = \frac{kr-s}{r-si}$$

Plugging in the initial values $D_0 = \$ 31.228$ million (1986 external debt outstanding) and $Q_0 = \$ 58.832$ million for 1986, D_t and D_t/Q_t ratios are calculated under different scenarios for 1991, 1996 and 2001. (Table 5.1)

Scenario V contains the most likely or realistic assumptions in respect of parameters concerned, in the sense that they reflect the experience of 1980's.

It shows that in the next 5 years external debt will be doubled and in 10 years time will be equal to GDP. This scenario is calculated using both eqs (15) and 16 and also eq (12). Other scenarios are calculated only employing eqs. (12) and (13) which are considered more accurate.

Scenario VI depicts a worse picture, but could be quite relevant. Values for $k(=7)$ and $r(=0.05)$ are quite realistic. But if ICOR is not lowered and GDP growth rate is maintained at 5% and if interest rate continues to exceed 7%, then saving ratio has to be increased. Because, otherwise required external borrowing could not materialize, because it will end up with excessive indebtedness namely double the GDP in 10 years' time.

Under scenario VII, ICOR is lowered ($k = 6$) by deliberate policy and action and saving propensity raised (to 20%) by suitable measures, while 5% GDP growth is maintained. Outcome of this scenario is better than the previous one, but still it should not be considered feasible.

Scenario VIII is drawn up to rectify these defects and work out a program which is feasible as far as external financing is concerned when 5% GDP growth is aimed at. It calls for further lowering of ICOR (to 5) and increase in saving propensity ($s = 0.23$).

Scenario I uses 1980's values for S, i and r; only k (=5) is on the low side, in view of an ICOR 6.75 observed during 1977-86. Despite this optimistic assumption, the outcome is not satisfactory, since in 5 years' time external debt is doubled, when the growth rate is 5 percent. When the growth rate is at 4 percent the outcome is not too bad.

Scenario II increases saving propensity (to 0.18) lowers both ICOR (to 4) and interest rate (to 0.06). When growth rate is at 5 percent, the outcome is acceptable. The growth rate, however, if increased to 6 percent, required external borrowing would be on high side.

Under Scenario III, saving propensity is put at 0.18 while k= 7 and i= 0.06. In this case external borrowing requirement will be too high even when growth rate is 4 percent.

Scenario IV depicts how Turkey could become a capital exporter even in near future by the happy combination of s(=0.24) and k(=4), provided that r= 0.04.

Scenario IX describes a realistic picture of recent Turkey. The saving propensity assumed (0.20) however requires some extra effort. But whatever ICOR is (7.6 or 5) outcome is not acceptable, since they require excessive external debt. This scenario suggests that 5 percent growth rate is too high for Turkey of 1980's, which used to grow at 7 percent during 1950-75 period.

TAB E: 5.1
CALCULATED D_t AND D_t/Q_t UNDER DIFFERENT SCENARIOS

	1991	1995	2000
<u>SCENARIO I</u>			
<u>$s=0.16, i=0.07, k=5$</u>			
(a) <u>$r=0.04$: D_t</u>	45605	59627	80959
D_t/Q_t	0.6592	0.7367	0.8221
(b) <u>$r=0.05$: D_t</u>	61906	93337	143495
D_t/Q_t	0.8530	1.0580	1.2745
<u>SCENARIO II</u>			
<u>$s=0.18, i=0.06, k=4$</u>			
(a) <u>$r=0.05$</u>			
D_t	39366	47449	60019
D_t/Q_t	0.5424	0.5379	0.5331
(b) <u>$r=0.06$: D_t</u>	52850	75173	112485
D_t/Q_t	0.6909	0.7824	0.8749
<u>SCENARIO III</u>			
<u>$s=0.20, k=7, i=0.06$</u>			
<u>$r=0.04$: D_t</u>	58363	85132	126253
D_t/Q_t	0.8436	1.0518	1.2821
<u>SCENARIO IV</u>			
<u>$s=0.24, k=4, i=0.06$</u>			
(a) <u>$r=0.04$: D_t</u>	8210	-15307	-52497
D_t/Q_t	0.1187	-0.1891	-0.5331
(b) <u>$r=0.06$: D_t</u>	33542	33516	38148
D_t/Q_t	0.4408	0.3697	0.2967

TABLE 5.1 CONTINUED

CALCULATED D_t AND D_t/Q_t UNDER DIFFERENT SCENARIOS
(in millions of Dollars)

	1991	1996	2001
<u>SCENARIO V</u>			
(S= 0.16, r=0.04, i=0.07, k=6)			
<u>Using Eqs (15) and (16)</u>			
D_t	1 3066	94129	138081
D_t/Q_t (limit=2.7778)	0 3252	1.0809	1.3033
<u>Using Eq (12)</u>			
D_t	1 3797	96103	141923
<u>SCENARIO VI</u>			
(s=0.16, r=0.05, i=0.08, k=7)			
D_t	11 1659	195993	321145
D_t/Q_t (limit=5.3629)	1 3537	2.0452	2.6256
<u>SCENARIO VII</u>			
(K=6, i=0.08, r=0.05, s=0.20)			
D_t	1 9001	120102	188453
D_t/Q_t	1.5409
<u>SCENARIO VIII</u>			
(k=5, r=0.05, i=0.07, s=0.23)			
D_t	2324	..	77006
<u>SCENARIO IX</u>			
(s=0.20, r=0.05, i=0.07)			
	<u>991</u>	<u>1995</u>	<u>2000</u>
a) K=5: D_t	4 612	69408	98364
D_t/Q_t	0. 836	0.7754	0.8736
(b) K=6: D_t	6 747	101425	158789
D_t/Q_t	0. 059	1.1150	1.4103
(c) K=7: D_t	8 882	134442	219215
D_t/Q_t	1. 282	1.5240	1.9470

CHAPTER VI

THE AGGREGATE TRADE-GAP MODEL

The aggregate trade GAP model starts with the Balance of Payments (BOP) identity or definition and attempts to analyze and calculate accumulation of external debt. The BOP Current Account balance (B) is defined as;

$$(1) \dots B_t = M_t - X_t - W_t - X_t^S + M_t^S$$

Where B_t = Current Account deficit (Gap)

M_t = Imports

X_t = Exports

X_t^S = Service receipt

M_t^S = Service payment

W_t = Workers' remittances

Whereas annual net accumulation of debt (ΔD_t) equals:

$$(2) \dots \Delta D_t = B_t - I_t^d - M_t^W$$

Where I_t^d = Direct Foreign Investments (Foreign Capital Inflow)

M_t^W = Imports with waiver

Total debt (D_t) in year (1) will equal:

$$(3) \dots D_T = D_0 + \int_{t=0}^T (M_t - X_t - W_t - X_t^S + M_t^S - I_t^d - M_t^W + iD_0) e^{i(T-t)} dt$$

Where D_t = Total external debt at the end of year T.
 D_0 = Total initial external debt (Base year debt, 1986 external debt total)
 i = Interest rate

Eq (2) allows analysis of annual accumulation of external debt, which is taken up for the 1979-86 period, in Chapter:3. An outline for this kind of analysis is in the Appendix to this chapter.

Eq(3) will be used to extrapolate future growth of external debt. In particular D_T/Q_T ratio (where Q_t is GDP in this context) will reveal future possibilities i.e. whether the ratio will level off or will be explosive. And when this ratio becomes negative the debtor country will be a net exporter of capital.

In respect of exogenous variables in Eq.(3) (i.e right hand side variables) following equations have been estimated and subsequently substituted in eq (3): (Figures below in parenthesis are t-statistics and R^2 s are adjusted).

$$(4) M_t = -5849.84 + 0.06112Y_t \dots (1972-86)$$

$$(-7.576) (14.011) (R^2 = 0.89)$$

(M_t in millions of US dollars and Y_t in millions of TL in 1968 prices)

$$(5) X_t = -168.11881 + 5.83124 EX + 0.0627X_{t-1}$$

$$(0.717) (0.732)$$

$$(1972-86) R^2 = 0.93$$

$$(6) M_t^S = -374.907 + 0.1321883 M_t (1975-86)$$

$$(-2.276) (6.32256) (R^2 = 0.78)$$

$$(7) \ln X_t^T = 4.9433373 + 0.1679959t (1976-86)$$

$$t=1=1976) (10.04466) (R^2 = 0.909)$$

$$(8) M_t^T = 0.028 M_t$$

$$(9) W_t = 1700 \text{ (millions of US dollars) Fixed}$$

$$(10) T_t^O = 250 \text{ (mil \$) : Fixed}$$

$$(11) T_t^P = 60 \text{ (mil \$) : Fixed}$$

$$(12) M_t^W = 100 \quad : \text{Fixed}$$

$$(13) I_t^d = 62.31 \text{ (From trend equation)}$$

$$(14) P_t = 31.47 + 3.240182 t \text{ (t=1-975)}$$

$$(15) X_t^S = 415.23953 + 0.1309197 (X_t + M_t) \text{ (1975-86)}$$

$$(10.3145) \quad (R^2=0.905)$$

(Base year figures refer to 1986 and are $D_0 = \$31228$ mil, $Y_0 = TL278102.4$ mil. All other variables in millions of US dollars).

Where Y_t = GNP (in millions of TL at 1968 prices)

EX = Real Effective Exchange Rate

t = Time (years)

M_t^S = Other service Payments

M_t = Imports of goods CIF

X_t = Exports of goods, FOB

M_t^T = Foreign Travel, Payments

X_t^T = Tourism Receipts

T_t^O = Unrequited Transfers, official

T_t^P = Unrequited Transfers, private

P_t = Profit Transfers (of foreign capital)

X_t^S = Other Service Receipts

Some of the equations have to be further processed before being used in the next stage; and additional information are required for some, all of which is given below.

In eqs. (6) and (8) M_t is substituted from eq(4) and Y_t by $Y_0 e^{rt}$ (where r is growth rate of GNP) and then all three are combined to give

$$(16) M_t + M_t^S + M_t^T = -7161.82 + 0.0709107 Y_0 e^{rt}$$

Regarding eq (6) a regression equation giving better fit

$$(6') \dots \ln M_t^S = -8.24009 + 1.6327869 \ln M_t (1975-86) \\ (-3.796) (6.672) \quad (R^2 = 0.798)$$

is not employed because of calculation complications it will introduce when M_t equation is of linear form. Eq(6) grossly underestimates (Under 5 percent GNP growth assumption the 2000 year estimate is \$4959 mil. by eq(6'), whereas estimate of eq(6) is only \$3300 mil).

The fact that expenditure on foreign services is an item which should grow rapidly, exacerbates this defect. We have to keep in mind that this factor cause underestimation of future debt.

For foreign travel expenditures (M_t^T) following regression equations are obtained.

$$(17) \ln M_t^T = 3.6756597 + 0.0682375t \quad (1978-85) \\ (34.15) \quad (3.202) \quad R^2 = 0.569$$

$$(17') \dots M_t^T = 14.919 + 0.0219028 M_t \quad (1975-86) \\ (0.214) (2.472) \quad (R^2 = 0.317)$$

Both equations however underestimate grossly for 1985 and 1986. 1980's data suggest that 2.8% of M_t is a better estimate and eq(8) is derived from this finding.

The export equation (5) is a difference equation whose solution is given by

$$(18) X_t = (-14684.15)(0.90627)^t + 2226.15$$

In respect of W_t , T_t^O , T_t^P and M_t^W no systematic pattern could be discerned other than that they fluctuate around a given figure.

In case of direct foreign investments (I_t^d) and profit transfers many attempts simply failed. Moreover there is a data problem in respect of I_t^d . Annual figures of foreign capital registered under law no 6224 differ greatly from BOP actual inflow figures. (See Table:5.1) It is estimated that only 50% of registered capital materializes in actual flow. Following regression equation in respect of accumulated registered foreign capital (K_t) could not be of much use because of referred discrepancy with BOP figures:

$$K_t^i = -242.3288 + 143.64546t \quad (1975-86) \\ (t=1=1975) \quad (-1.916) \quad (8.359) \quad (R^2=0.362)$$

In respect of BOP accumulated direct investment figures ($K_t = \sum I_t^d$, Table: 5.1) following regression equations have been obtained:

$$(19) \quad K_t = 664.94846 e^{0.06081t} \quad (1975-86) \\ (t=1=1975) \quad (R^2=0.979)$$

$$(19) \quad K_t = 605.16 + 62.311189t \quad (1975-86) \\ (t=1=1975) \quad (R^2=0.95)$$

TAE.E: 6.1

PROFIT TRANSFERS AND DIRECT FOREIGN INVESTMENT
(In Million of US Dollars)

	BOP Figures			Registered			
	Profit Transfers (1)	Direct Investment (2)	Accumulated Foreign Investment (3)	Profit Rate (1/3) (4) %	Annual Foreign Capital (5)	Accumulated Foreign Capital (6)	Profit Rate (1/6) (7) (%)
1975	36	114	751.6*	4.8	15.1	204.7	17.6
1976	83	10	761.6	10.9	8.9	213.6	38.9
1977	110	27	788.6	13.9	9.2	222.8	49.4
1978	47	34	822.6	5.7	11.7	234.5	20.0
1979	42	75	897.6	4.7	-6.4	228.1	18.4
1980	51	18	915.6	5.6	97.0	325.1	15.7
1981	56	95	1010.6	5.5	337.5	662.6	8.5
1982	43	55	1065.6	4.0	167.0	829.6	5.2
1983	57	46	1111.6	5.1	102.7	932.3	6.1
1984	63	113	1224.6	5.1	271.0	1203.3	5.2
1985	79	99	1323.6	6.0	234.5	1437.8	5.5
1986	-	125	1448.6		364.0	1802.0	-

* Includes \$637.6 million total foreign direct investment over the 1956-1974 period (Source: H.Kızılyallı, Türk Ekonomisindeki Gelişmelerin Parasal Faktörlerle Açıklanması: 1946-74, Boğaziçi Üniversitesi, 1978, ss.180-82)

Despite the fact that eq(19') has a higher R^2 , linear one, eq (19) is preferred because the former gives too high estimates; in view of the fact that annual inflow during 1975-86 fluctuate around \$100 mil (Table: 6.1).

$$(20) \dots I_t^d = K_t - K_{t-1} = 62.31$$

Considering that profit rate during 1978-85 averaged 5.2% (Table:5.1 Column:4) Profit transfers become:

$$(21) \dots P_t = 0.052K_t = 31.47 + 3.2401t$$

In Eq (15) by substituting for X_t and M_t from eqs (18) and (4) one obtains

$$(22) \dots X_t^S = 1734.10977 + (-1922.4451)(0.90627)^t + 0.008Y_0 e^{rt}$$

After substituting these equations in eq(24) below, plugging in the initial values (1986) for $Y_0 = 278102.4$ and $D_0 = 31228$ and writing for

$$(23) -W_t - T_t^O - T_t^P - M_t^W = -2110$$

And integrating it, D_t is calculated by evaluating the integral from $t=0$ to T :

$$(24) D_t = D_0 + \int_0^T ([M_t + M_t^S + M_t^T] - X_t - W_t - T_t^O - T_t^P - M_t^W - X_t^T - I_t^d + P_t - X_t^S + iD_0) e^{i(T-t)} dt$$

$$(25) \dots D_T = D_0$$

$$\begin{aligned} &+ \left\{ \frac{-7161.82}{i} (e^{iT} - 1) + \frac{19720.4358}{r-i} [e^{rT} - e^{iT}] \right\} \\ &- \left\{ \frac{14684.15}{(0.09842+i)} [(0.90627)^T - e^{iT}] - \frac{22267.15}{i} (1 - e^{iT}) \right\} \\ &+ \left[-2110 + (31228)i \right] \left(\frac{e^{iT} - 1}{i} \right) \\ &- \left[\frac{e^{6.7912922+01679959T} - e^{6.712922+iT}}{(0.1679959-i)} \right] \\ &+ \left\{ \left(8.042184 + \frac{3.240182}{i} \right) \left(\frac{e^{iT} - 1}{i} \right) - \frac{3.240.182}{i} T \right\} \\ &- \left\{ \frac{1922.44451}{0.09842+i} [(0.90627)^T - e^{iT}] - \frac{1734.10977}{i} (1 - e^{iT}) \right\} \\ &+ \left\{ \frac{2224.8192}{r-i} [e^{rT} - e^{iT}] \right\} \end{aligned}$$

The variables in this equation are i , r & T . Taking $i=0.07$ and $r=0.04$ (Scenario-0), calculated D_t , D_t/Q_t are shown in Table:5.2 (If growth rate of GNP (r) is increased to 0.05 the picture worsens) Results of scenario-V under Savings Gap Model is reproduced in the Table 6.2 for comparison. These indicate that the present performance on foreign exchange and BOP front is not good enough, from a longer perspective. In the future, trade Gap will be greater than the savings Gap under present trends. In particular exports have to grow faster to avert this crisis.

TABLE: 6.2

FOREIGN DEBT TRAJECTORY

(Milyon \$)

	Year 1991	Year 1996	Year 2001
<u>Trade Gap Model</u>			
<u>i=0.07, r=0.04</u>			
D_t	63.824	107.192	168.826
D_t/Q_t	0.839	1.231	1.593
<u>Saving Gap Model</u>			
<u>Scenario-V</u>			
(i=0.07, r=0.04, s=0.16, k=6)			
D_t	59.036	94.129	138.081
D_t/Q_t	0.815	1.081	1.303
<u>Trade Gap Model</u>			
<u>i=0.07, r=0.05</u>			
D_t	67.217	125.933	224.015
D_t/Q_t	0.815	1.314	1.832
<u>Saving Gap Model</u>			
<u>Scenario-VII</u>			
(i=0.07, r=0.05, s=0.20, k=6)			
D_t/Q_t	0.96	1.410	2.778

Higher interest rates will obviously worsen the outcome and better export performance and/or tourism receipts will conversely improve the picture; on the other hand, an increase in the GNP growth rate also deteriorates the outcome (This result should be interpreted as short-term effect, in the long run, provided

that GNP growth results in increase in productive and exporting capacity, BOP and external indebtedness picture should improve). If r goes up to 0.05, then not only external indebtedness increases, the debt/GNP ratio also rises. This outcome can be compared with Scenario-II of Saving Gap Model, which is reproduced in Table:5.2. But in this case Trade Gap Model describes a far better picture in the 2001. But here the results are theoretical, since external debt approaching or exceeding twice the amount of Gap is inconceivable.

VALUATION APPROACH TO DEBT PROBLEM

Another approach to debt issue is using the Valuation Model developed by Gennotte and his associates*. Current reserves and stream of future exchange revenues are in a sense collateral of external debt. A Country's external or tradable wealth, defined as capital stock in the mining and manufacturing sector plus non-gold foreign reserves are the underlying asset against the foreign liabilities.

The asset-debt ratio along with interest rates, the rescheduling policy, etc. give an estimate of the market price (or implicit value) of debt, through the simulation results provided.

Evaluation of a country's underlying assets is made as follows**: The total replacement value of the capital stock is calculated by summing investment over the preceding 15 years and assuming a 10 percent depreciation rate. The initial capital stock in 1968 was taken to be 4 times GDP of that year. It is considered that, 4 represent, the normal capital-output ratio for a developing country. As countries with low incremental capital output ratios (ICOR) have many new investment opportunities, and as a consequence the actual value of assets exceeds the replacement value and hence the replacement value is multiplied by $4/ICOR$.

* G.Gennotte, H.Kharas, and S.Sadeg, 'A Valuation Model for Developing Country Debt with Endogenous Rescheduling', The World Bank Economic Review, Vol 1, No 2, 1987, pp.237-271

**Ibid, pp. 266-71

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The share of capital in the traded sector is calculated by multiplying the total capital stock by the average share of mining plus manufacturing in GDP. The total traded assets are obtained by adding non-gold foreign reserves to the value of traded capital.

Two versions of the asset-debt ratio are calculated: (i) Total assets over total debt. (ii) Net assets, defined as total assets minus official debt divided by commercial debt. The model estimate successfully market price of foreign debt for many countries, which are corroborated by actual market prices (implicit in loan swap arrangements by commercial banks)

The Model's explanation in case of Turkey is not found satisfactory even by authors themselves in the sense that Turkey's creditworthiness is ranked 16 th among the 20 developing countries for 1983, whereas the Euromoney ranking for Turkey was 4 th in 1984.

For Turkey replacement capital of \$102353 mil., an ICOR of 7.8, tradables share in GDP of 0.224, trade capital of \$11757.4 mil. and total assets of \$13027.4 mil. were calculated for 1983. The asset/total debt ratio of 0.70 and net asset/commercial debt ratio of 0.29 were calculated and estimated market price of commercial debt was found to be 10 cents per US \$ for 1983*

We recalculated the 1983 estimate and applied the model to 1984-86 actual figures and then applied it to forecast figures up to year 2001 with a view to both estimating the future market price of Turkish commercial debt and establishing limits to foreign borrowings. As Turkey will make increasing use of commercial credits over time, she can not ignore the implicit market price of her debt. The fact that the model is not able to explain the 1983 outcome, should not deter us from taking it as a broad guideline.

Application To The Period 1983-1986

As already pointed out, the initial capital stock in 1968 was taken to be four times GDP of that year, representing the normal capital output ratio for a developing country. For Turkey the incremental capital-output (ICOR) ratio was found to be 3 for 1963-67 period and 3.1 for 1968-72 period by Kızılyallı**. Therefore the initial capital stock in 1968 was estimated by multiplying GDP of that year by 3 (ICOR of the First Five Year Plan Period).

* Ibid, pp. 267-69

** H. Kızılyallı 'Tasarruf ve Yatırımla Konusunda Planlı Dönemin Başarısının Ölçülmesi ve Değerlendirilmesi, in (Maliye Enstitüsü Konferansları, 1974, İÜ İktisat Fakültesi, İstanbul, 1975) pp.15-36

The calculation of capital stock in \$, is shown in Table: 6.1. There is a big difference whether investments in 1968 prices or current prices are used. Infact the US \$ value of capital stock based on current prices is double the one based on constant prices (Table:6.2) This indicates the shaky nature of investment deflator, which needs improvement

Similar wide discrepancy exist in GNP estimates in US dollars. 1986 GNP estimate in 1968 prices converted into US \$ using the 1968 exchange rate \$1=TL 9.08 gives a GNP figure of \$30628 million (=TL 278 102.4 billion /9.08); whereas the 1986 GNP estimate at current prices TL 39.678.944 million converted using the 1986 average exchange rate (\$=TL 6 4.51) gives \$58.826 million.

The calculation of value of total tradable assets for 1983-86 is shown in Table:6.3. The relevant ICOR for the model should be the one based on GDP at factor prices. This ICOR was estimated at 5.88 during 1975-86 and 6.75 during 1977-86. In view of rising trend of ICOR from 3 in 1960's to 6.75, ICOR was rounded to 7.

The breakdown of external debt (official and commercial) is given in Table: 6.4. Commercial debt include publicly guaranteed private debt plus private non guaranteed debt and short-term debt.

Asset/debt ratios and market price of commercial debt are shown in Table: 6.5. Total Assets/Debt ratio declined from 0.72 in 1983 to 0.55 in 1986. Net Assets/Commercial debt ratio* declined much faster; in fact from 30 cents per dollar in 1983 to 3 cents in 1986. Genotte and his associates price estimate of commercial debt is 1-2 cent, however prior to regulatory default the minimum market price is put at 10 cents, under these circumstances.

This analysis also shows from another angle the critical nature of fast growth of Turkish external debt in particular the short-term debt. Turkey will face difficulties in rolling over the short-term debts or increasing its external indebtedness.

*
$$\frac{(\text{Total Assets} - \text{Official Debt})}{\text{Commercial Debt}}$$

Applying The Model to Future

By projecting value of assets under various scenarios, it is possible to estimate market price of commercial debt in future.

We proceed as follows:

(1) $K_t = 0.9 K_{t-1} + I_t$

(2) $I_t = krQ_t = krQ_0(1+r)^t$

(3) $K_t - 0.9K_{t-1} = krQ_0(1+r)^t$

Where K_t = Capital stock in year t

I_t = Investments

Q_t = GDP

r = Growth rate of GDP

k = ICOR

and 10 percent depreciation rate is assumed as reflected in the coefficient 0.9.

Solution of eq(3) is given by

(4) $K_t = \left[K_0 - \frac{krQ_0}{(0.1+r)} \right] (0.9)^t + \frac{krQ_0(1+r)^{t+1}}{0.1+r}$

The tradables share in GDP and hence in investments and capital stock is estimated by the trend equation:

(5). $y = 16.4 + 1.0388t$ ($R^2 = 0.9695$)
(1975-86) ($t = 1 = 1975$)

ICOR and external debt value of the scenarios concerned are taken. Regarding the breakdown of external debt between official and commercial debt, the 1986 ratio (0.54 official and 0.46 commercial) is assumed to continue. And foreign reserves (excluding gold) are fixed at \$3110 mil, the end 1986 level.

Results of calculations are shown in Table:6.6.

From the Net Asset/Commercial Debt ratios and estimated price of commercial debt in Table:6.6, one observes that Scenario-V and VII will run into debt renewal or servicing difficulties, because of excessive borrowing they entail. Whereas Scenario-VIII is viable from external financing viewpoint.

TABLE: 6.1

INVESTMENT AND CAPITAL STOCK

Year	In 1968 Prices (Mn TL)		Total Investment (Current Prices) (Bil. TL)	Exchange Rate (TL/\$)	Total Investments (Million\$)	Accumulated Total Investments (10% Depreciation) (Mn \$)
	Total Investments	Accumulated Total Investments (10% depreciation)				
1968(GDP)	107.238*	-	107.238	-	35.431	
1968	22.456	344.170	22.0	9.08	2.423	37.854
1969	23.983	333.736	24.8	9.08	2.731	36.800
1970	25.935	326.297	28.5	10.84	2.629	35.749
1971	25.864	319.532	34.2	15.14	2.259	34.433
1972	27.671	315.249	43.8	14.30	3.063	34.053
1973	25.647	309.372	55.2	14.28	3.866	34.513
1974	37.625	316.059	81.2	14.06	5.775	36.837
1975	43.596	328.049	116.4	14.56	7.995	41.148
1976	47.021	342.266	156.0	16.17	9.647	46.680
1977	47.712	355.751	219.6	18.09	12.139	54.151
1978	35.428	355.604	306.0	24.282	12.602	61.338
1979	35.514	355.557	541.0	31.078	17.408	72.612
1980	41.742	361.774	948.0	76.04	12.467	77.818
1981	45.557	371.126	1421.0	111.22	12.776	82.812
1982	43.249	377.263	1792.0	162.55	11.024	85.555
1983	43.584	383.121	2260.0	225.46	10.024	87.024
1984	44.569	389.378	3595.0	366.68	9.804	88.125
1985	47.218	397.658	5680.0	521.98	10.882	90.195
1986	52.855	410.747	9201.0	674.51	13.641	94.816

* GDP at factor prices in 1968, multiplied by 3 the actual ICOR for Turkey during 1963-67 period gives an estimate of initial capital stock.

TABLE 6.2

CAPITAL STOCK

(Million \$)

Year	Based on 1968 prices	Based on Current Prices
1968	37.904	37.854
1969	36.755	36.800
1970	35.936	35.749
1971	35.191	34.433
1972	34.719	34.053
1973	34.072	34.513
1974	34.808	36.837
1975	36.129	41.148
1976	37.694	46.680
1977	39.180	54.151
1978	39.163	61.338
1979	39.158	72.612
1980	39.840	77.818
1981	40.873	82.812
1982	41.549	85.555
1983	42.194	87.024
1984	42.883	88.125
1985	43.795	90.195
1986	45.236	94.816

TABLE: 6.3

CAPITAL STOCK

(Million \$)

Year	Capital Stock	ICOR*	Tradables Share**	Value of Traded Capital***	Total Reserves Minus Gold	Total Assets
1983	87.024	7	26	12.929	1984	14.863
1984	88.125	7	26	13.093	2682	15.775
1985	90.195	7	26	13.400	2239	15.639
1986	94.816	7	26	14.087	3110	17.197

* : ICOR in Turkey during 1977-86 was 5.88 and 6.75 during 1977-86. ICOR is taken 7.

** : Share of mining and manufacturing averaged 23.2% during 1975-86. During the period it showed an increasing trend, as indicated by

$$y = 16.4 + 1.0388t \quad (R = 0.9695) \\ (t = 1 \text{ for } 1975)$$

The tradables share was 26.7% in 1986. It averaged 26.3% during 1981-86.

*** : Value of Traded capital = capital stock $\left(\frac{4}{7}\right)(0.26)$

Multiplication by $(4/ICOR)$ is because a country with lower ICOR than 4 have many profitable investment opportunities remaining, and the actual value of their capital exceeds the replacement value and vice versa.

TABLE: 6.4

EXTERNAL DEBT
(OUTSTANDING AND DISBURSED)

	1983	1984	1985	1986
Official Debt-Long term	10.797.9	11.064.8	12.370.5	15.690
use of IMF credit	1.567.4	1.426.2	1.326.4	1.085
<u>Official Debt Total</u>	<u>12.365.3</u>	<u>12.491.0</u>	<u>13.696.9</u>	<u>16.775</u>
Publicly Guaranteed-Private Debt	4.888.5	5.047.6	5.450.6	-
Private Nonguaranteed Debt	399.1	425.0	358.9	5.062
Short Term Debt	3.039.1	4.506.0	6.617.0	9.391
<u>Total Debt</u>	<u>20.691.0</u>	<u>22.469.6</u>	<u>26.123.4</u>	<u>31.228</u>
<u>Commercial Debt</u>	<u>8.326.6</u>	<u>9.978.6</u>	<u>12.426.5</u>	<u>14.453</u>

TABLE: 5.5

MARKET PRICE OF TURKEY'S COMMERCIAL DEBT

	(1) Official Debt	(2) Commercial Debt	(3) Total Assets	(4) Assets/ Total Debt (4)=(3)/(1+2)	(5) Net Assets/ Commercial Debt (3-1)/2	(6) Estimated Price Commercial Debt*	(7) Estima- ted Price**
1983	12.365.3	8.326.6	14.863	0.72	0.30	0.02	0.10
1984	12.491.0	9.978.6	15.775	0.70	0.33	0.02	0.10
1985	13.696.9	12.426.5	15.639	0.60	0.16	0.01	0.10
1986	16.775	14.453	17.197	0.55	0.03	0.01	0.10

* : From Table 4 sensitivity simulations (Gennotte et al, ibid, p.270)

** : Minimum price prior to regulatory default.

TABLE 6.6
ASSET/DEBT RATIO IN 1995 AND 2001

	Scenario VII		Scenario IX		Scenario X	
	k=6, r=0.04 1991	2001	K=6, r=0.05 1991	2001	k=5, r=0.05 1991	2001
K_t	121.666	16.825	140.716	250.930	123.997	212.362
Tradables Share	0.341	0.445	0.341	0.445	0.341	0.445
Value of Traded Capital*	27.659	5.425	31.989	74.443	33.826	75.601
Total Assets**	30.769	8.535	35.099	77.553	36.936	78.711
Total Debt	59.066	18.081	69.001	188.453	42.324	77.005
Official Debt	31.896	4.564	37.261	101.765	22.855	41.583
Commercial Debt	27.170	13.517	31.740	86.688	19.469	35.422
Assets/Total Debt	0.52	0.42	0.51	0.41	0.87	1.02
Net Assets/Commercial Debt	-0.04	-0.25	-0.07	-0.28	0.72	1.05
Estimated Price	0.10	0.10	0.10	0.10	0.51	0.71

* : Value of Traded Capital = $K_t(4/ICR) \times (\text{Tradables Share})$
 ** : Includes \$ 3110 mil. foreign reserves.

AN EVALUATION OF THE EXISTING
FOREIGN DEBT LEVEL

A model by Sjaastad* approaches the debt problem from viewpoint of possible levels of inflow of foreign capital (external debt accumulation) and the needed surplus in BOP for debt service. Let,

- i = Interest rate, i.e ratio of interest payment to external debt
- δ = Amortization rate
- D = External debt outstanding, in dollars
- Y = Gross Domestic Product (GDP), in dollars
- GB = Gross new Borrowing, in dollars
- d = Debt to GDP ratio (=D/Y)
- γ = GB/D

* Larry A.Sjaastad, Causes of and Remedies for the Debt Crisis in Latin America, in (Michael P.Claudon (editor), World Debt Crisis: International Lending on Trial, Bollinger publishing Co, Cambridge, Massachusetts, 1986) pp.249-266.

g = Growth rate of GDP ($=\dot{Y}/Y$)

DS = Debt service in dollars

NDS = Net debt service (the needed surplus, i.e. requisite trade account surplus) in dollars.

\dot{D} = The growth of external debt, i.e. the surplus in the capital account of BOP ($\dot{D}=dD/dt$)

Then,

$$DS = (i + \delta)D$$

$$\dot{D} = GB - \delta D = (\gamma - \delta)D$$

$$(1) NDS = iD - \dot{D} = (i - \gamma + \delta)D$$

$$NDS/Y = (i - \gamma - \delta)(D/Y) = (i - \gamma - \delta)d$$

$$\dot{d} = \frac{d}{dt} \left(\frac{D}{Y} \right) = \frac{\dot{D}}{Y} - g d = (\gamma - \delta - g)d$$

$$(2) NDS/Y = d [i - g - (\dot{d}/d)]$$

Various scenarios are possible under the model.

(i) GB is increasing, i.e. $\dot{d}/d > 0$

Table: 6.7 show D, Y in million of dollars and d . During the period $\dot{d}/d > 0$.
In fact;

TABLE: 6.7

EXTERNAL DEBT (D) AND GDP (Y)
(In Millions of Dollars)

	D	Y	d=D/Y
1978	14.719.2	2.499.0	0.280
1980	19.520.4	6.916.9	0.343
1981	19.668.6	7.666.0	0.341
1982	20.240.8	3.032.3	0.382
1983	20.691.9	1.147.7	0.405
1984	20.469.6	9.667.5	0.452
1985	26.123.4	2.701.5	0.496
1986	31.228.	8.831.8	0.531

$\dot{d} = 0.08$ during 1978-86 (Table: 1.7). Taking interest rate 7 and growth rate at 5% for 1986 we calculate.

$$NDS/Y = [0.07 - 0.05 - (0.08/0.531)] (0.531) = -0.069$$

This ratio just reflects the fact that in 1980's there was a positive net inflow of external capital to the tune of 6.9% of GDP and the negative magnitude of needed surplus just equals to it.

Suppose in the future, say in the next 5 years \dot{d} changes in the same fashion; then

$$d = (1.08)^5 (0.531) = 0.78$$

and the needed surplus becomes

$$NDS/Y = [0.07 - 0.05 - (0.08/0.78)] (0.78) = -0.0644$$

In this manner d increases and becomes arbitrarily large and default eventually becomes a virtual certainty. Incidentally this value of d in 1991 compares favorably with $D_t/Q_t = 0.825$ of Scenario-VII.

- (ii) if $\dot{d} = 0$, then
 - $\dot{d} = d(\delta - S - g) = 0$
 - $\delta = S + g$

In this case the debt is rolled over and new borrowings occur at the rate of gD , i.e. in the same rate as GDP increases. Then,

$$NDS/Y = (i - g)d = (0.07 - 0.05)0.531 = 0.0106$$

That is the needed surplus is only 1% of GDP. A 5% GDP growth allows this surplus achieved easily. Lower growth rates might make it difficult. Note that for Turkey in 1980's $\delta = 0.09$, and hence

$$\delta = \delta + g = 0.09 + 0.05 = 0.14$$

(iii) When $\delta = S$, then no net borrowing occurs and only principal repayments (amortization) is rescheduled.

$$\dot{d}/d = -g \text{ and } NDS/Y = id$$

$$NDS/Y = id = (0.07)(0.531) = 0.037$$

In such a case the surplus needed rises to 3.7% of GDP! A debt service of this magnitude is very difficult to materialize. This clearly demonstrates that Turkey's debt is on the high side and continuing borrowing under the circumstances is the only way out.

(iv) If no gross borrowing at all takes place (i.e. $\dot{Y}=0$) then life becomes impossible. Because then

$$\dot{d}/d = -(\delta + g)$$

$$NDS/Y = (i + \delta)d = (0.07 + 0.09)0.531 = 0.085$$

In other words 8.5% of GDP is required each year to service the existing debt. This is quite a task, if not impossible. Higher real interest rates (than 7% nominal calculated for Turkish debt of 1980's on the average) will make things worse. This could be brought about by a rise in nominal interest rates or by a decline in the rate of dollar inflation (especially in respect of dollar prices of tradable goods).

APPENDIX TO CHAPTER: VI

Let NF_t stand for the net flow of total external debt. Writing BOP identity

$$(1) NF_t = M_t - X_t + iD_{t-1} - I_t^d - F_t + \Delta R_t$$

where M_t = Imports

X_t = Exports

iD_{t-1} = Interest payments on the external debt

I_t^d = Direct foreign investment

F_t = Other capital inflow

ΔR_t = Change in international reserves

Showing trend values by overbars we write

$$(2) \overline{NF}_t = \overline{M}_t - \overline{X}_t + \overline{iD}_{t-1} - \overline{I}_t^d - \overline{F}_t + \overline{\Delta R}_t$$

As we don't have adequate price data, imports and exports can not be decomposed to include price variables. Imports however will be broken down into consumer goods, raw material, fuel and capital goods imports.

In lieu of hypothetical values for the real exports and real imports and price variables, trends or expected values (from regression estimates) are referred in the analysis of debt accumulation. Hence deviations from trend or expected values are obtained by deducting eq (2) from eq (1), assuming.

$$\Delta R_t = \overline{\Delta R}_t$$

$$I_t^d = \overline{I}_t^d$$

$$\overline{F}_t = 0$$

Then,

$$\begin{aligned}
 (3) \quad \overline{NF_t - NF_t} &= \overline{M_t - M_t} \\
 &\quad - (\overline{X_t - X_t}) \\
 &\quad + (i - \bar{i}) \overline{D_{t-1}} + i (\overline{D_{t-1} - I_{t-1}}) \\
 &\quad + \overline{F_t}
 \end{aligned}$$

This equation provides a framework for measuring the relative contributions of external and internal factors to deviations of indebtedness from trend ($\overline{NF_t - NF_t}$).