A FORECASTING APPROACH
FOR AN EVALUATION OF
TELEVISION SET SECTOR IN TURKEY

by

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ABSTRACT

The government and corporate planners are facing sets
of problem in identifying the promising industries,
their market potential, future demand potential and future
competitiveness.

The purpose of this study is to investigate the television
set sector in Turkey and evaluate future demand potential
and future competitiveness of Turkish television sets.

Chapter one gives some basic concepts about the product.
Chapter two examines the past history of the sector in
the world as well as production and demand figures of
TV sets in Turkey. Chapter three studies Turkish export
and import figures for TV sets. Chapter four examines
the demand prospects in Turkey by approaching the subject
with cross sectional tools as well as domestic variables
and domestic TV set demand functions. Demand figures
until 1991 are estimated in this chapter. Chapter five
is a detailed analysis of the cost of a Turkish TV set
produced under the licence of a foreign company in case
of acceptance of agreed EEC custom duties of ANKARA
agreement. Chapter six summarizes the findings of the
study and states the conclusions and implications.

We conclude that although future TV set market in Turkey will be sufficient for the exploitation of the full capacity of the existing manufacturers, the sector will face serious threats in the future because of production technology and expected competition with the imported TV sets.

ÖZET

Devlet ve özel sektör planlamacıları, umut veren sektörlerin seçiminde, bu sektörlerin pazar potansiyelleri ve gelecekteki rekabet güçlerine karar verebilme konularında çeşitli güçlüklerle karşılaşmaktadırlar.

Bu çalışmanın amacı Türkiye'deki Televizyon Sektörünü değerlendirmek ve gelecekteki pazar potansiyelini ve rekabet durumunu gözler önüne sermektir.

Birinci bölümde, Televizyon Sanayii konusunda bazı kavramlar verilmiştir. İkinci bölüm, sektörün dünyadaki tarihsel gelişimini ve Türkiye'deki durumunu incelemektedir. Üçüncü bölüm Türkiye'nin Televizyon ihracatı ve ithalatını incelemektedir. Dördüncü bölümde gelecekteki talepler hakkında kesitleme analizi ve Türkiye için talep tahmin fonsiyonları kullanılarak tahminler yapılmaktadır. Beşinci bölüm Türk televizyonlarının, Ankara Anlaşması ve Katma Protokol'ce belirlenen AET gümrük pozisyonlarının kabul edilmesi halindeki rekabet gücünü incelemektedir. Altıncı bölümde sonuçlar ve öneriler belirtilmiştir.

Bu çalışmada, Türkiye'de gelecekteki televizyon pazarı, mevcut yerli üreticilerin kapasitelerini kullanabilmeleri için yeteri derecede doyurucu olmasına rağmen, üretim teknikleri yönünden yerli üreticiyi birçok tehlikelerin beklediği ve ithal televizyonlar ile rekabetin artacağı kanaatine varılmıştır.

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LIST OF ABBREVIATIONS

EEC : European Economic Council

SIS : State Institute of Statistics (Devlet İstatistik
Enstitüsü)

GNP : Gross National Product

TV : Television

SPO : State Planning Organization (Devlet Planlama
Teşkilatı)

IDB : Industrial Development Bank (Sınaî Kalkınma Bankası)

CHAPTER I

INTRODUCTION

1.1 Purpose of the study

The world economy is going through a period in which
there is international competition. In recent years, new
economic policies have been adapted to cope with prevailing
economic problems of Turkey such as inflation and balance
of payment deficit. In the attempt of integration of
domestic industry to the world markets, expanding exports
is taken to be a national goal to finance the economic
development, and various incentives were granted by the
state to improve export operations and to increase export
revenues. The real figure for Turkey's 1986 exports was
eight billion dollars against a targeted figure of ten
billion dollars. But in spite of the latest trend, Turkey
managed to increase her exports gradually over the figure
of 1980.

Import figures which directly effect balance of payments,
were also directed by new policies. The import regime for
1984 which was published on December 29th 1983 contained
a subtle, but quite significant change of emphasis: the
hitherto traditional pattern of drawing a distinction
between liberated and subject to licence lists, (with
everything being consigned to the category of Forbidden),

has been replaced by everything being free, with the expectation of a short list of subject to licence items.

The government planners are facing sets of serious problems in identifying promising industries and in designing appropriate export incentives and import custom duty systems to aid investments and growth in the right industries. On the other hand, corporate planners are deciding to invest in the right field with the appropriate capacities according to the market potential, incentives and custom duties.

After 1980, the Turkish Television Set Industy was subject to quite big investments. The appearance of the coloured television channel in 1982 as well as the existence of a quite large replacement demand encouraged the investors to produce coloured TV Sets. On the other hand, Turkish TV Set Industry which is an assembly line type of production, is effected by the import regime while influencing the import and balance of payment figures by its high proportion of imported components.

Taking all these aspects into consideration, the potential of Turkish TV set Industry has been chosen as the target of analysis of this thesis. The study will be helpful for the government planners as well as corporate planners

in solving the above mentioned problems. So, the purpose

of this study is to investigate the television set sector

in Turkey and evaluate future demand potential and future

competitiveness of Turkish television sets.

1.2 Content and Procedure

This study aims to form a basis for an investigation of
TV set industry for the future.

Chapter one includes an introduction to the subject,
content and procedure of the study and, methodology and
definitions of key terms. Chapter two examines the past
history of sector in the world markets, increases and
decreases in the values of sales and production as well as
production and demand figures of TV sets in Turkey. Chapter
three Studies Turkish export and import figures for TV
sets. Chapter four examines the demand prospects in Turkey
by approaching the subject with cross sectional tools
as well as domestic variables and domestic TV set demand
functions. Demand figures until 1991 are estimated in
this chapter. Chapter five is a detailed analysis of the
cost of a Turkish TV set produced under the licence of a
foreign company in case of acceptance of agreed EEC custom
duties of ANKARA agreement and additional protocol signed
on November 1970. Chapter six summarizes the findings
of the study and states the conclusions and implications.

1.3 Methodology

Literature about the Turkish TV Set Industry is very scarce. Most of the available ones have practically lost their relevancy to the present situation. A study of TV industry was performed in 1977 by the Turkish, Industrial Development Bank. Although 1977 TV set industries data is not up-to-date, world production and demand data corresponds to recent years of Turkish TV set Industry and, constitute a comparison base and a source of the needed data for a cross sectional analysis. In the study, statistical data are gathered from secondary sources such as, State Institute of Statistics (SIS), Industrial Production Statistics of Turkey; State Institute of Statistics (SIS), Foreign Trade Statistics of Turkey. Custom positions are gathered from State Planning Organization (SPO), Custom Positions in the frame of Turkey-EEC relations, for 1986.

After assessing world and Turkish TV set Industry, to have handy tool of demand forecasting for managerial planning purposes, a model of demand function is developed. Each variable that will be influential on the demand amounts was tested to see their explanatory powers.

After determining market potential for the future, another
analysis on the cost of a Turkish TV set produced under
the licence of a foreign company in case of acceptance
of agreed EEC custom duties, was performed. This analysis
is a competitiveness measure which will help the managerial
planner in sharing the estimated future market potential.

1.4 Definition of Key Terms

In this section, the definitions of terms such as, penetration rate, accumulated TV sets, free of charge import will be accentuated.

Penetration rate is defined as the quantity of the items subject to research (in workable conditions) per hundred households. Penetration rate is accepted as a critical variable in determining market potential since the need of one household is limited. For our TV set research case, it is accepted that penetration rate will rarely reach 200 which means an average of two TV sets per house.

Accumulated TV sets is defined as the quantity of TV sets in workable condition in a given region or country. All the sets aged over the economical life of the product are accepted as out of work and not included in the accumulation. Accumulated TV sets is accepted as a critical variable for our analysis since it is used for determining market potential and market saturation point.

Free of charge import of TV sets is defined as TV sets imported free of charge by the permission of the Custom Organization. However in this case, free of charge import of TV sets will accentuate TV sets bought by our workers staying in a foreign country and imported to Turkey.

CHAPTER II

TV SET PRODUCTION AND PENETRATION

IN THE WORLD MARKETS AND IN TURKEY

2.1 USA, Japan and West Europe Markets

The history of TV telecast began by an experimental telecast
from the Empire State Building in 1932. The first official
network television broadcast in the States took place in
February 1940. Wide consumption of TV sets began in 1946
in the same country. The penetration rates in the USA
are given in Table 1. Black and White TV sets penetration
rate has reached its peak point in 1964. At that year,
the penetration rate of black and white sets was 113
percent. Coloured television mass production began in
1957 in the States with 75.000 TV sets per year. At that
year, the coloured TV sets sales percentage over the total
sales was only 1 percent (See Table 2). The sales of coloured TV sets
reached 57 percent in 1975. At the same year, coloured TV set penetration
rate reached 88 percent. (IDB, Television Study, 1977, Pages 67-69).

The penetration rates in JAPAN are also represented in
table 1. Black and white penetration rates have reached
their peak point in 1969, 5 years later than the State
market where Black and white penetration rate was 119
percent. In Japan, coloured TV set sales began in 1960

with 1000 TV sets per year and reached 5,5 millions per year in 1975. At that year, the coloured TV sale percentage over the total sales reached 81 percent. At the same year coloured TV set penetration rate reached 118 percent. (IDB, Television Study, 1977, pages 70-71). A quick comparison of the penetration rates of USA and Japan will prove that Japanese Market was a more penetrable market for the coloured TV sets.

The penetration rates in West Europe are represented in Table 1 also. The peak point for the black and white TV sets penetration rates was reached in 1972 by 74,1 percent. Coloured TV mass production began in 1967. At that year, coloured TV set sales were 146.000 sets. The coloured TV sets sales reached 6,935 millions sets per year in 1975. At that year the percentage of coloured TV set sales over the total sales was 49 percent. At the same year coloured TV set penetration rate reached 24,2 percent. (IDB, Television Study, 1977, pages 57,60)

In Turkey, penetration of black and white TV sets production began in 1967 and penetration of coloured TV sets in 1982. In the year 1982, black and white and coloured TV consumption were equal. As seen in tables 1 and 2, the same periods happened in USA, in 1968, in Japan in 1969

and in West Europe in 1975 where consumption quantities of black and white and coloured TV sets were equal.

Turkish TV sets market structure and developments will be studied in details in the next section.

TABLE 1

Penetration rates of TV sets in different countries

Years	USA				JAPAN				WEST EUROPE			
	B&W	Col.	Total	Col.%	B&W	Col.	Total	Col.%	B&W	Col.	Total	Col.%
1955	77	–	77	–	5	–	5	–	7,8	–	7,8	–
1956	86	–	86	–	6	–	6	–	10,3	–	10,3	–
1957	93	0,3	93,3	0,3	10	–	10	–	13,4	–	13,4	–
1958	97	0,5	97,5	0,5	15	–	15	–	18,0	–	18,0	–
1959	101	0,7	101,7	0,7	28	–	28	–	23,1	–	23,1	–
1960	104	0,9	104,9	0,9	43	–	43	–	27,9	–	27,9	–
1961	106	1,1	107,1	1	63	–	63	–	32,9	–	32,9	–
1962	109	1,8	110,8	2	80	–	80	–	38,0	–	38,0	–
1963	112	3,0	115	3	94	–	94	–	43,5	–	43,5	–
1964	113	5,0	118	4	103	–	103	–	49,0	–	49,0	–
1965	112	10	122	8	107	–	107	–	54,1	–	54,1	–
1966	110	17	127	13	113	1	114	0,9	58,7	–	58,7	–
1967	106	26	132	20	117	5	122	4	62,6	0,1	62,7	0,2
1968	102	34	136	25	118	12	130	9	66,2	0,6	66,8	0,9
1969	99	42	141	30	119	25	144	17	69,4	1,3	70,7	2
1970	96	49	145	34	113	41	154	27	72,2	2,7	74,9	4
1971	94	58	152	38	103	61	164	37	73,7	5,1	78,9	6
1972	94	66	160	41	93	80	173	46	74,1	8,8	82,9	11
1973	93	76	169	45	83	98	181	54	73,6	13,9	87,5	16
1974	91	83	174	48	73	109	182	60	72,5	19,0	91,5	21
1975	88	88	176	50	65	118	183	65	71,1	24,2	95,3	25

Source: IDB, Television Study, 1977, Pages 57,67 and70

TABLE 2

Sales of TV Sets in different countries (1000 Units)

	USA				JAPAN				WEST EUROPE			
Years	B&W	Col.	Total	Col.%	B&W	Col	Total	Col.%	B&W	Col.	Total	Col.%
1955	7420	–	7420	–	110	–	110	–	2063	–	2063	–
1956	6795	–	6795	–	270	–	270	–	2747	–	2747	–
1957	6550	75	6625	1	550	–	550	–	3525	–	3525	–
1958	5110	90	5200	2	1090	–	1090	–	4824	–	4824	–
1959	5750	100	5850	2	2600	–	2600	–	6177	–	6177	–
1960	5975	125	6070	2	3500	1	3501	–	6087	–	6087	–
1961	5830	170	6000	3	4500	4	4504	–	6416	–	6416	–
1962	6345	395	6740	6	4500	5	4505	0,1	6636	–	6636	–
1963	6970	770	7740	10	4200	5	4205	0,1	7275	–	7275	–
1964	7940	1410	9350	15	3800	40	3840	1,0	8184	–	8184	–
1965	8300	2640	10940	24	2900	50	2950	2	8545	–	8545	–
1966	7480	4650	12130	38	3400	230	3630	6	7944	–	7944	–
1967	6000	5485	11485	48	3600	840	4440	19	7556	146	7702	2
1968	6830	5970	12800	47	3600	1880	5480	34	8447	470	8917	5
1969	6890	6010	12900	47	3800	3700	7500	49	8535	878	9413	9
1970	6800	5400	12200	44	2450	4750	7200	66	8775	1576	10351	15
1971	7600	7100	14700	48	1650	5900	7550	78	8740	2807	11547	24
1972	8200	8400	16600	51	1450	6300	7750	81	8569	4312	12881	33
1973	7000	9270	16270	57	1400	6500	7900	82	8266	6128	14394	43
1974	6250	7900	14150	56	1250	5000	6250	80	7940	6550	14490	45
1975	6000	8000	14000	57	1250	5500	6750	81	7175	6935	14110	49

Source: IDB, Television Study, 1977, Pages 60,68 and 71

2.2 Domestic market

In Turkey, the production of black and white Tv set began
in 1968 by 1500 TV sets per year. The TV set production
since 1968 are shawn in Table 3. There are continuously
high rate of yearly increases in the manufacturing quantities
between the year 1968 and 1975. During those years, the
average rate of increase was reaching 100 percent per year.
Black and white TV set production reached 389.000 TV sets
per year in 1974 and 660.000 TV sets per year in 1975.
On the other hand, those increases slow down after 1975.
In 1976, the yearly production was 683.000 TV sets per
year and yearly increase was 3 percent. In 1977, the
production was 740.000 and yearly increase was 8 percent.
After 1977, the production began to drop and reached 326.000
TV sets per year in 1980.

The production of coloured TV sets began in 1982. At that
year yearly production was 92646 coloured TV sets. At the
same year 287.635 black and white sets were produced.
1983, 1984 and 1985 showed big jumbs in production. In
1983, 366.148 coloured TV sets were produced. At that
year, the production of black and white sets dropped to
160311 TV sets. In 1985 coloured TV set production reached
1.111.640 sets and black and white continued its exponential
declining and dropped to 31.430 sets per year. Increasing
trend of coloured TV sets stopped in 1986. At that year the
production quantity of coloured TV sets dropped to 921.368
sets per year

TABLE 3

Television sets production in Turkey

Years	Black & White	Coloured	Total	Yearly increases % Black & White	Coloured	Total
1968	1.500	–	1.500	–	–	–
1969	2.500	–	2.500	67	–	67
1970	–	–	–	–	–	–
1971	32.000	–	32.000	–	–	–
1972	68.000	–	68.000	113	–	113
1973	160.000	–	160.000	135	–	135
1974	389.000	–	389.000	143	–	143
1975	660.000	–	660.000	70	–	70
1976	683.000	–	683.000	3	–	3
1977	740.000	–	740.000	8	–	8
1978	566.000	–	566.000	-24	–	-24
1979	380.000	–	380.000	-33	–	-33
1980	326.000	–	326.000	-14	–	-14
1981	351.000	–	351.000	8	–	8
1982	287.635	92.646	380.281	-18	–	8
1983	160.811	366.148	526.959	-44	295	39
1984	78.868	843.696	922.564	-51	130	75
1985	31.430	1.111.640	1.143.070	-60	32	24
1986	10.156	921.368	931.524	-68	-17	-19

Source: SIS, Manufacturing Industries, Employment–Production
Expectation, from 1972 through 1986

As seen in Table 3, the production of TV sets dates back
not more than nineteen years. In spite of this, during
those years, most of the demand has been met by domestic
production. After 1977, the production and demand of black
and white TV set declined for various reasons. The underlyi
reasons of this event were that black and white TV sets
have reached a saturation point as well as some other
economical reasons such as increases in bank interest
rate. Those reasons will be observed and functionalized in
details in the next chapters. The appearance of coloured
TV sets began with the official decision for coloured
telecast in 1982. The decision was related to the idea of

integration of the domestic industry to the world markets ar
of creating a vitality in the production sector. The
manufacturers have pursued a license_acquisition program.
Themanufacturer did not develop any new products but simply
acquired the existing ones. They have imported all the
critical components and assembled in their own facilities.
They have also decreased the percentage of the imported
components as long as the main manufacturer and signed
license agreement permit. However, since the development
techniques of the TV sets were highly complex obliging
the engagement of big investments, it is difficult to reach
the quality level of the foreign brands by using higher
domestic portion. As a result of these facts, the domestic

manufacturers constructed changeable and flexible productio

lines where the investments for the factory buildings were

much more than those of machines and equipments of the

assembly type of production line. They were expecting to

have a market share created by the replacement demand for

coloured TV sets. Five million of black and white TV set

owners were expected to change their sets in five to six

years. A quick calculation will show that they were expectin

to share approximately 1 million of replacement demand

per year. Regular TV demand of the new families had to be

added on the replacement demand to obtain the total demand.

In spite of this, the economical life of coloured TV sets

was less than that of black and white TV sets. This would

guarantee a stable demand at the end of the seventh year.

As expected, coloured TV sets demand has reached a saturati

point latest 1985 and the market did not allow the

exploitation of the full capacity. The price competition

reached such a point that small producers could not survive

Coloured Tv set production commencing at the begining of

1982, was spread over thirteen companies. This quantity

decreased to ten at the begining of 1985 and still showing

a tendency to decrease. The firms making TV sets and their

production quantities in 1983, 1984 and 1985 are shown

in Table 4.

The replacement demand of the high income groups has been already finished latest 1984. The production and sale increases of 1985 were created by forcing the existing demand potential and many TV set producers shifted to the medium and low income groups and began to sell below their cost and to shift to the installment sales. In those conditions, group of companies having diverse production of household durables, could force the agencies to sell their product. They could also have the power of supporting financial burden of installment sales and they could accept even big losses for keeping constant their market shares.

TABLE   4

Television producers in Turkey and their production quantities.

Firms	Brands	1983		1984		1985	
		Coloured	B&W	Coloured	B&W	Coloured	B&W
Telra	Profilo, Saba, Telra	87593	23405	181145	9902	169562	4045
Beko	Beko, Hitachi, Nortmende	61479	39144	173142	34069	285712	14728
Meta	Shaublorenz, ITI Gertz	33285	10953	108909	2644	203582	14
Cihan	Grundig	46847	28661	118109	9736	137155	12643
Philips	Philips	34739	17763	76041	5923	73128	-
IES	Sanyo, IES Körting	27365	1	41368	2186	32556	-
Altron	Blaupunkt, NEC	23179	9475	51046	5735	56675	-
Nevtron	Siemens, Nevtron- Saba	32099	5568	62045	4000	60839	-
Uğurgül	AGA	6502	6792	1800	979	-	-
Yücel	Thomson	4312	-	18087	-	15282	-
Biremek	Biremek	500	-	745	17	-	-
Vestel	Vestel Ferguson	-	-	8831	-	71853	-
Milteknik	Liweopta	-	-	-	-	5496	-

Source: SIS, Industrial Production Statistics of Turkey, 1983, 1984 and 1985

CHAPTER III

TURKISH EXPORT AND IMPORT
TRENDS OF TV SETS

The Turkish economy has implemented the policy of import substitution for a long period to help the domestic industry develop. In many fields of Turkish manufacturing sector, many products proved that they reached a considerable level of competitiveness by showing an increasing export trend. Export activities were also supported by the export incentives which created a vitality after 1980 and the result of export oriented policies has been observed.

However, Turkish TV set industry export quantities did not follow this general trend and did not reach considerably high amounts. The main reason of this event is that Turkish TV set industry is based on assembly line production producing under the licence of foreign brands. The foreign manufacturers do not permit the licencees to leave their domestic market and to export, and this application is always added to the licence agreement as a restrictive item. In the absence of such restriction, indirect restriction appears by selling TV components in such price that the licencee would lose its competitiveness in the international market and remain only in the domestic one. However, it is

rarely accepted by the foreign manufacturer who is satisfied by the components profit margin, that the licencee could export by using trade mark according to an agreement between itself and the main manufacturer.

Table 5 shows the export figures since 1978. Ordinary sequence of export quantities showed better performance after 1980. However, after 1981 a gradual decrease was observed. This gradual decrease stopped after 1984. In 1981, the amount of exports was 4 percent of the total production. This amount dropped to 0,5 percent at the end of 1984. This lower percentage figure is caused by the increase of the total production quanties and total domestic consumption as well as the gradual decrease of export quantities. However this trend of the domestic market has reached a maturity state in 1985 which forced the local manufacturer to export more. TV set export of 1985 showed an increase of 157 percent and reached $ 1.655.950.

TABLE ·5

Turkey TV set export

Years	Export in US Dollars	% change over the previous year
1978	1.868.051	-
1979	1.291.948	-31
1980	1.121.211	-13
1981	2.527.929	125
1982	1.100.000	-56
1983	952.931	-13
1984	644.300	-32
1985	1.655.950	157

Source: Gathered from SIS, Foreign Trade Statistics of
Turkey, 1978 to 1985

A country based analysis of 1984 showed that the main customers of Turkish TV sets are Italy, West Germany, Sweden and North Cyprus. (See Table 6)

Italy, the leading importer of Turkish TV sets has imported 44 percent of the total TV set export and reached a quantity of 1990 TV sets in 1984. This quantity corresponds to 0,22 percent of the total TV set production of Turkey. Sweden has 17 percent of Turkish export market share. This quantity corresponds to 0,08 percent of the total TV set production. North Cyprus is following by 416 TV sets corresponding to 9 percent of the total Turkish TV set export and 0,05 percent of the total TV set production.

A country based analysis for 1984 showed that the main county which exports TV sets to Turkey was West Germany. The dominant quantity of the import was free of charge type of import made by the Turkish workers. Germany has exported $414471 of TV sets to Turkey. This quantity consists 48 percent of the total Turkish TV set imports and 0,22 percent of the total TV set production in Turkey. Many European countries are following West Germany by small amounts of export. England and Belgium-Luxemburg have reached an amount of $183551 and $146240 respectively. A small portion of imports from these countries are free of charge. (See table 7)

TABLE 6

Turkey TV Set Exports according to the Countries

	1983		1984	
	Export Quantity (Units)	Export Quantity (US Dollars)	Export Quantity (Units)	Export Quantity (US Dollars)
West Germany	6136	659.228	1366	178.230
Cyprus	–	–	416	129.132
Sweden	1002	244.890	750	182.940
Switzerland	200	48.813	–	–
Italy	–	–	1990	153.999
TOTAL	7338	952.931	4522	644.301

Source: SIS, Foreign Trade Statistics of Turkey, 1983 and 1984

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TABLE 7

Turkey TV Set Import according to the Countries for 1984

	Import in US Dollars	Free of charge import in USD	TOTAL in US Dollars
Germany	85.332	329.139	414.471
Austria	–	5.355	5.355
Belgium–Luxemburg	145.334	906	146.240
U.S.A	25.584	345	25.929
Denmank	–	347	347
France	–	423	423
Holland	–	7.299	7.299
England	182.043	1.508	183.551
Sweden	4.075	958	5.033
Switzerland	–	1.453	1.453
Italy	–	793	793
Japan	2.167	12.485	14.652
Canada	–	315	315
Portugal	44.912	–	44.912
Singapur	20.776	–	20.776
TOTAL	510.227	361.333	871.549

Source: SIS, Foreign Trade Statistics of Turkey 1984, Ankara
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CHAPTER IV

A MODEL FOR ESTIMATING DOMESTIC

DEMAND OF TV SETS

In Turkey, the production of black and white TV sets ᵇ⸌
began in 1968. However, as described in the previous
chapters, the production of coloured TV sets dates back
not more than 5 years. This is the reason demand
forecasting for coloured TV sets poses special difficulties
for an healthy regression analysis. To overcome these
difficulties, we will approach the demand determination
by using the demand analysis in different countries and
by assessing Turkish black and white TV set demand.

Searching the necessary literature on West countries
demand, the most convenient one for our specific case
was found in IDB, Television Study, 1977.

4.1 Cross Sectional Analysis

As seen in the previous chapters, year 1982 of Turkish TV set Industry where consumption quantities of black and white and coloured TV sets were equal, corresponds to 1968 of States, 1969 of Japan and 1975 of West Europe. A cross sectional analysis of West Europe for the year 1972 could be a guideline for the demand forecasting of Turkish TV sets.

The relations between GNP per capita and total TV set demand per capita as well as the relations between GNP per capita and accumulated TV sets per capita were studied in different European Countries for the year 1972 and a regression analysis was performed. (IDB, Television Study, 1977 pages 27-30)

Accumulated TV sets per capita was found by adding the supply per capita over the years and subtracting TV sets which were economically out of work. For the calculations, statistical average TV life data are used and all the sets aged over the average life were supposed to be out of work.

The function summarizing the relation between TV set demand per capita and GNP per capita is:

$$\ln Y = 3,7391 - 1096,0738/X \qquad \text{(Equation 1)}$$

Y = Demand per capita (1000 persons)

X = GNP per capita in US Dollars

$R^2 = 0,8464$

The function, summarizing the relation between accumulated TV set per capita and GNP per capita is:

$$\ln Y = 6,2225 - 1878,3099/X \qquad \text{(Equation 2)}$$

Y = Accumulated TV per capita (1000 persons)

X = GNP per capita in US Dollars

$R = 0,9216$

Source: IDB, Television Study, 1977, pages 27-30

TABLE 8

Cross Sectional Analysis Data for TV Set Demand

per capita in West Europe for the year 1972

	GNP per capita (US Dollars)	Real figure for TV Sets Demand per capita (Units per 1000 pers)	Regression figure for TV Sets Demand per capita (Units per 1000 pers)
Sweden	5084	50	34
Denmark	4219	30	32
West Germany	4203	52	32
Norvey	3872	24	32
France	3809	32	32
Belgium	3645	30	31
Netherland	3473	43	31
Finland	2888	22	29
Austria	2721	22	28
Italy	2157	26	25
Irland	1835	18	23
Greece	1377	15	19
Spain	1317	19	18
Portugal	997	14	14
Turkey	444	4	4

Source: IDB, Television Study, 1977, page 82

TABLE 9

Cross Sectional Analysis Data for The Accumulated TV

Sets per capita in West Europe for the year 1972

	GNP per capita (US Dollars)	Real fiure for accumulated TV Sets per Capita (Units per 1000 pers)	Regression figure for accumulated TV Sets per Capita (Units per 1000 pers)	Average TV Life (Years)
Sweden	5084	391	348	11,7
Denmark	4219	336	323	14,0
West Germany	4203	354	322	10,1
Norvey	3872	250	310	13,4
France	3809	271	308	10,4
Belgium	3645	293	301	12,7
Netherland	3473	297	293	7,5
Finland	2888	270	263	14,0
Austria	2721	242	253	12,1
Italy	2157	275	211	12,5
Irland	1835	190	181	11,2
Greece	1377	55	129	11,0
Spain	1317	178	121	13,1
Portugal	997	106	77	10,1
Turkey	444	7	7	13,0

Source: IDB, Television Study, 1977 pages 72 and 85

Table 10 represents the real figures of Turkish TV demand
and estimated figures found by using equation 1. Estimated
figures between 1975 and 1978 are acceptable. However after
1978, the gap between estimated and real figures increases
although GNP per capita shows small deviations. This gap
could be explained by another domestic factor. The interest
rate in Turkey was constant during the years 1975, 1976
and 1977, and jumped after 1978 which probably caused a
decrease of TV consumption. From the point of view of the
purchasers, it would be preferable to profit from the high
interest rate instead of spending money for the consumer
durables. After 1983 an increase in the real figures was
observed. This deviation could be explained by the
appearance of coloured TV sets in Turkey.

The deviations between the real figures and estimated ones
might have originated from the unstable structure of Turkish
market relative to Western European markets. This unstability
of the Turkish market structure will make it necessary
for us to look for some other independent variables for
a domestic market estimation, other than GNP per capita.

TABLE 10

Comparaison of the real and regression figures for Turkey

Years	GNP per capita (US Dollars)	Real Figure for TV Set Demand (Units)	Regression Figure for TV Set Demand (Units)
1975	936	660.000	520.000
1976	1040	683.000	600.330
1977	1172	740.000	689.560
1978	1258	566.000	750.460
1979	1346	380.000	810.960
1980	1313	326.000	810.957
1981	1305	351.000	823.660
1982	1163	380.281	758.740
1983	1077	526.959	718.180
1984	1026	922.564	696.780
1985	1063	1.143.070	738.150

Source: Calculated using equation 1

4.2 Domestic Demand Functions

The first analysis is performed for the years 1975 through 1982. Domestic production between those years are assumed to be equal to the demand.

Demand per capita is represented by index Y_1 accepting 1971 as the base year. Total demand is equal to the black and white demand since coloured TV appeared after 1982. Y_1, the demand index is calculated by dividing the total demand by 32000 which is the demand of the year 1971 and also by dividing by the population of the related year. Found index is multiplied by 10 millions and finally resulted index is the total demand index for 10 million persons accepting 1971 as the base year.

As we have pointed out in the previous analysis, the interest rate is the sole independent variable for this function. Interest rate is represented by index I accepting 1971 as the base year. I, the interest index is calculated by dividing six months interest rates declared by the Central Bank by 7 which is the interest rate of the base year 1971. However, between 1978 and 1980 the weighted averages of the bank interest rate and banker interest rate are used.

$Y_1 = 6,049858 - 0,5380861$ I   (Equation 3)

$R^2 = 0,8987616$

Values for Y_1 and I are presented in Table 11

TABLE 11

Data for the Demand Function for Black and White TV Sets

Years	Interest Rate %	Interest Index I
1975	9	1,286
1976	9	1,286
1977	9	1,286
1978	35	5,000
1979	45	6,429
1980	40	5,714
1981	45	6,429
1982	50	7,143

Population (10 millions)	Total Demand (Units)	Total Demand Index Y_1	Regression Figures for Index Y_1	Difference %
4,0078	660.000	5,1461	5,3579	4,1
4,0915	683.000	5,2166	5,3579	2,7
4,1768	740.000	5,5360	5,3579	-3,2
4,2640	566.000	4,1480	3,3594	-19,0
4,3530	380.000	2,7280	2,5905	-5,1
4,4438	326.000	2,2920	2,9752	29,8
4,5366	351.000	2,4180	2,5905	7,1
4,6293	380.281	2,5671	2,2063	-14,1

Source: SIS, Statistical Year book of Turkey 1983, November 1983 page, 21

A revised analysis is performed for the years 1975 trough 1982 by revising demand data. New total demand values are calculated by adding import values, subtracting export values and replaced sets accepting an average life of 13 years. Y_1', revised demand index is calculated by dividing the revised total demand by 32000 which is the demand of the base year 1971 and also by dividing by the population of the related year. Found index is multiplied by 10 millions and finally resulted index Y_1' is the revised total demand index for 10 million persons accepting 1971 as the base year.

After 1982, after the appearance of coloured TV sets, a similar revision can not be performed since a special custom tariff number is not used for the coloured TV sets in SIS, Foreign Trade Stastics of Turkey, and it is impossible to use exact import and export values for coloured TV sets. However, during those years total export and import values are negligeable because of the high performance of the domestic TV set market

Below, revised demand function is stated

$Y_1' = 6,2006881 - 0,5642084$ I   (Equation 4)

$R^2 = 0,9084467$

Values for Y_1' and I are presented in Table 12

TABLE 12

Data for the Revised Demand Function for

Black and White TV Sets

Years	Interest Index I	Revised Total Demand (Units)	Revised Total Demand Index Y_1'
1975	1,286	683.600	5,3301
1976	1,286	692.170	5,2866
1977	1,286	760.000	5,6862
1978	5,000	567.500	4,1591
1979	6,429	380.750	2,7334
1980	5,714	327.000	2,2997
1981	6,429	353.200	2,4335
1982	7,143	380.281	2,5671

Source: Calculated

Black and white TV set demand showed a decline after the appearance of coloured TV sets in 1982. The decline is shown on the graph (See chart 1) and exponential relation of the black and white TV set demand with the years is clearly observed. Black and white demand per capita is represented by index Y_2 accepting 1971 as the base year. Y_2 is calculated by dividing, black and white demand by 32000 which is the demand of the base year 1971 and also by dividing by the population of the related year. Found index is multiplied by 10 millions and finally resulted index Y_2 is the black and white demand index for 10 million persons accepting 1971 as the base year.

Time is accepted as an independent variable and represented by t where t=o in 1982, t=1 in 1983...etc. and below function is obtained

$$Y_2 = 2,3188515 \times e^{-0.852515t} \qquad \text{(Equation 5)}$$
$$R^2 = 0,98343$$

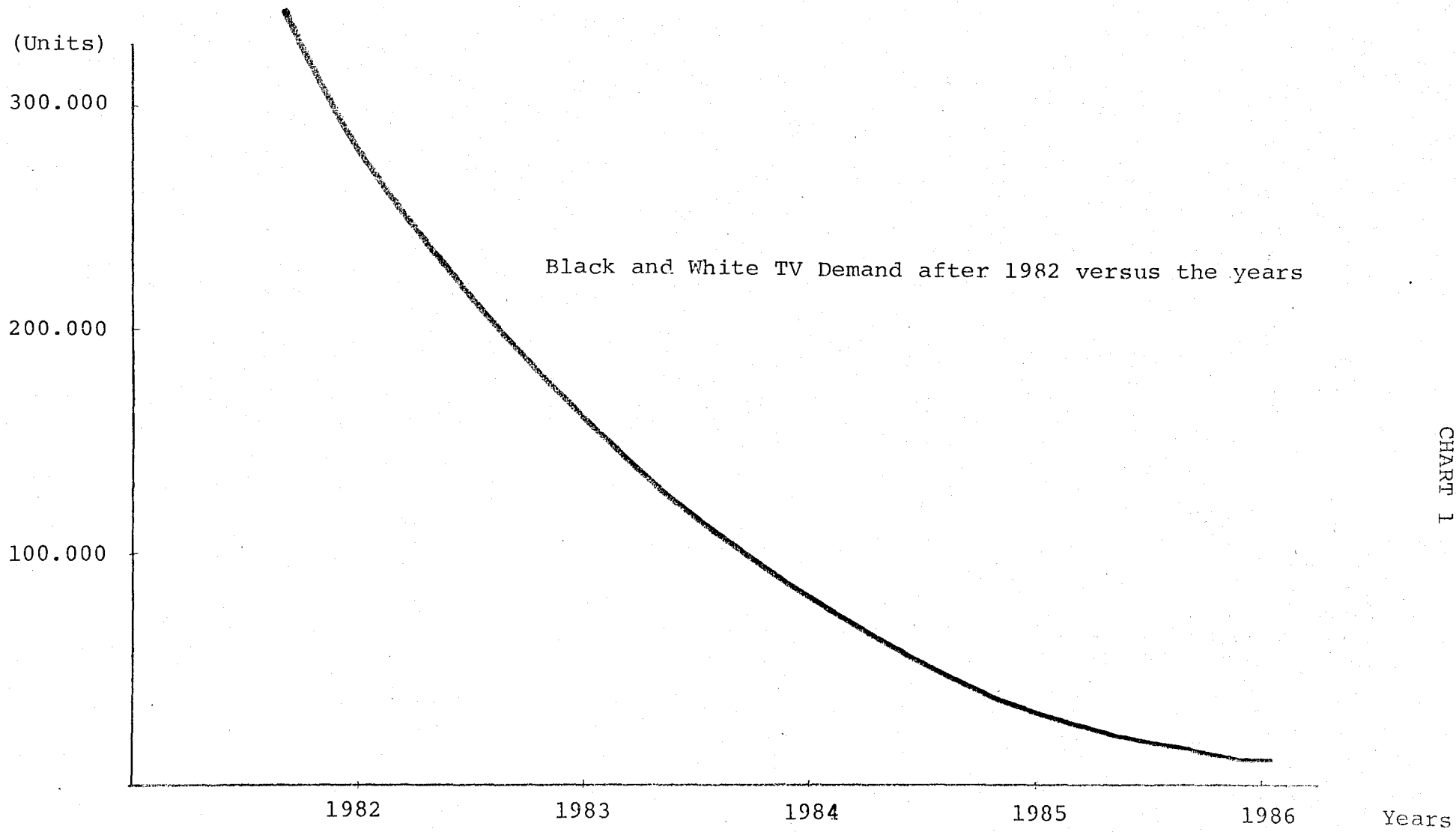Values for Y_2 are presented at Table 13

Black and White TV Demand after 1982 versus the years

CHART 1

TABLE   13

Demand Function Data for Black and White TV Sets after 1982

Years	Black and White Demand (Units)	Black and White Demand Index	Regression figure for Demand Index	Difference %
1982	287.635	1,9417	2,3189	+19,4
1983	160.811	1,0636	0,9886	− 7,0
1984	78.868	0,5111	0,4215	−17,5
1985	31.430	0,1996	0,1797	−10,0
1986	10.156	0,0631	0,0766	+21,4

Source: Calculated

As calculated in the previous analysis, the appearance of
the coloured TV sets has to be represented by a third
variable. Variable considered convenient for our analysis
is z which represents accumulated coloured TV sets over the
total accumulated sets. By the introduction of this new
variable, deviations and jumps can be easly explained.
Deviations will disappear in case z approachs to 1 which
means than all black and whith TV sets will be replaced
by the coloured TV sets.

Y_3 isthedifferential demand per capita index accepting 1971
asthe baseyear. Y_3 is the difference between the total deman
per capitaindex and Y_1 found from the equation$\stackrel{\frown}{\ }$. Total deman
per capita index is found by dividing total demand by 32000
which isthe demand of the base year 1971 and also by dividin
by thepopulation of the related year. Found index is multipl
by 10 millions and finally resulted index is the total deman
index for10 million persons accepting 1971 as the base year.
Differential demand per capita index is calculated by subtra
Y_1 foundfrom the equation 3, from the total demand Index.
The purposeof this differential analysis is to reveal the
relationship between the demand deviations and introduction
coloured TV sets.

Independent variable z is calculated by dividing total accumulated coloured sets reported at the middle of the related year over the total accumulated sets. Total accumulated sets are the values calculated by adding production quantities to import quantities, and subtracting export quantities and replaced sets accepting an average life of 13 years for the black and white TV sets and 8 years for the coloured ones.

$$Y_3 = 8,6358764x \; z^{0.719444} \qquad \text{(Equation 6)}$$
$$R^2 = 0,8846873$$

$$Y_1 + Y_3 = \text{Total Index}$$

$$z = \frac{\dfrac{Y}{2} + A}{B}$$

Y= Coloured TV demand for the year t+1 subject to research

A= Accumulated coloured TV sets at the end of the year t

B= Total accumulated TV sets reported at the end of the year t

Y_3 and z values are reported in Table 14

It should be noted that regression data Y_3 is calculated by subtracting y1, regression results of the equation 3 from the real data for the total demand index. For z data, Y which is coloured TV Demand for the year t+1, the year subject to research, is accepted to be the real coloured TV demand data. However, for the future prospection Y will be replaced by the coloured TV demand of the year t since the coloured TV demand of the year t+1 is subject to research

TABLE 14

Differential Demand Function Data for TV

Sets after 1982

Years	Accumulated Total Sets (Units)	Accumulated Coloured Sets (Units)	z
1982	4.641.000	46.323	0,009981
1983	5.006.000	275.270	0,005507
1984	5.479.000	880.642	0,160730
1935	6.260.000	1.858.310	0,296855
1986	7.175.000	2.874.814	0,400671

Years	Total Demand (Units)	Total Index	Y_1	Y_3
1982	380.281	2,56708	2,206309	0,360771
1983	526.959	3,48521	2,821341	0,663877
1984	922.564	5,97887	2,590502	3,388370
1985	1.143.070	7,25887	2,360201	4,898676
1986	931.524	5,79098	2,744395	3,165454

Source: Calculated

Future Estimations of Turkish TV Demand

Based on the Regression Analysis

While one purpose of regression analysis is to determine the variables explaining an event, the other purpose is to make inferences for the future. The latter use of regression analysis is more difficult than the former because one can not fully assure that the regression function which fits the past data will also be appropriate over the wider range of the independent variables.[1] We encounter another difficulty when we try to estimate the dependent variable because we need the estimated values of independent variables. So two kinds of errors, one coming from the function and the other coming from the estimated values of independent variables, will enter the analysis.

In Turkish economy, between 1982 and 1986 a period of new policies was sovereign. In the attempt of integration of domestic industry to the world markets, expanding exports is taken to be a national goal to regulate balance of payment and to cope with inflation. Therefore we will assume that interest rate will follow its continuous downword trend.

[1] Neter, John and Wasserman, William, Applied Linear Statistical Model, Homewood, Illinois, Richard D. Irwin, Inc, 1974 page 350

Six month interest rate beeing 48 percent at the begining of
1986, dropped to 45 percent at May 1th 1986, to 41 percent
at November 30th 1986, and to 39 percent at the begining of
1987 which encouraged us for a continuous downword estimation.
1987 average of six month interest rate is estimated as 36
percent and 1991 average of six month interest as 28 percent.

Between the years 1982 and 1986 black and white TV demand
dropped from 287.000 to 10.000 sets. We have estimated that
demand of the year 1987 will be 7900 sets and will continue
its exponential downword trend. 1991 demand figure for black
and white TV sets has been estimated as 197 (See table 15).
Coloured TV set demand, will continue its upword trend and
reach in 1987, 1,387680 sets and in 1988, 1.599.370 set per
year. Further estimations for coloured TV set demand will
show that the demand of the year 1991 will be stabilized
around 2 millions sets per year.

In our demand estimation, interest rate and accumulated TV
set ratio, s are assumed to be the sole independent variables
effecting the demand. In spite of this, many other political
decisions will be effective on the future demand. However,
it is impossible to incorporate those factors in our
regression analysis.

TABLE 15

Future Prospects by using equations 3,5 and 6

Years	Interest rate %	I	Y_1	Demand from Eq.3 (units)	Y_2	B W Demand (units)	Accumulated Tot.Sets (units)	Accumulated Col. Sets (units)	β	Y_3	Demand from Eq.6 (units)	Total Demand (units)	Coloured Demand (units)
1987	36	5,143	3,283	539.500	0,0481	7903	7.663.000	3.796.182	0,49539	5,2100	856.090	1.395.590	1.387.687
1988	34	4,857	3,436	576.700	0,0226	3793	8.375.000	5.183.869	0,61897	6,1154	1.026.466	1.603.166	1.599.373
1989	32	4,571	3,590	615.500	0,0106	1817	9.286.000	6.787.035	0,73088	6,8921	1.181.702	1.797.202	1.795.385
1990	30	4,286	3,744	655.700	0,0050	876	10.323.200	8.582.420	0,83137	7,5614	1.324.326	1.980.026	1.979.150
1991	28	4,000	3,898	697.400	0,0011	197	11.644.580	10.561.570	0,90699	8,0501	1.440.247	2.137.647	2.137.450

Source : calculated

CHAPTER V

COMPETITIVENESS   ANALYSIS OF TURKISH TV SETS

IN CASE OF ACCEPTANCE OF EEC CUSTOM DUTIES

According to the Ankara Agreement between Turkey and EEC
and Additional Protocol of November 1970, Turkey has accepted
to decrease gradually custom duties in 12 and 22 year periods
and to use EEC conventional custom duties.

Turkey did not succeed to decrease custom duties forseeen
according to the agreement between Turkey and EEC and has to
perform her accumulated responsibilities and to decrease
custom duties. SPO of Turkey, at the begining of September
1986 has asked the preponderant manufacturing firms of
Turkey for their detailed cost analysis and organized many
meetings comprising every sector separately. The purpose of
those meetings and data gathering was to decide which sector
was ready for the new custom duties and for the international
competition and, to give the appropriate support to the
weaker and promising industries. However, since present
domestic competition is also important, SPO has promised
for keeping confidential those given data. Our below analysis
is the one which SOP planners intended to perform for the
TV set Sector.

TV sets manufacturing industry being an assembly line type of production will be effected by the deviations in custom duties. Column 3 of Table 16 shows the cost percentages for every imported component of a German licenced TV set producer Every component is described by its own custom tariff numbers at column 1 of the same table. The total cost accepted to be hundred, a detailed analysis has been performed and the new costs have been found according to the future decreases in custom duties and according to the accumulated EEC responsibilities of Turkey. Expected new cost of every component is represented at the column 7 of Table 16. The main assumption of the analysis was that the producers will still import the same components and the domestic ones would still be supplied by the domestic firms. The analysis was applied for TV sets produced under the German licence and appropriate custom positions have been used for this country. Those custom duties data are gathered from SPO, Custom Positions in the frame of Turkey-EEC relations, August 1986.

With the present imported components, the result of a detailed analysis proved that the German Licenced TV set cost will reach 97,3 units according to the agreed custom duties, considering the present cost as a base of 100 units. However the cost of a completely imported set will drop to 71,4 units accepting the present cost of a completely imported set as a base of 100 units.

Those figures show that the cost of the German Licenced

TV set will decrease by 2,7 percent. However, the cost of

a completely imported set will decrease by 28,6 percent.

TABLE 16

Cost Analysis of coloured TV set produced in

Turkey under the German licence

column nos:		1	2	3	4	5	6	7
	Description	Custom Tariff Nos	Cost % in imported portion	Cost % in Total	EEC Custom Duties %	EEC Privileged Custom Duties %	Future Custom Duties %	Final Cost
1	Picture tube	85.21.31	52	3,045	16	8	0	28,195
2	Diod-cheeps-crytal-filter	85.21.83	9,51	5,57	16	—	0	4,802
3	Ferrite	85.01.99	0,20	0,12	45	18	30	0,132
4	Resistances	85.19.71	1,53	0,9	31,5	18	21	0,923
5	Dry type capacitors	85.18.11	6,12	3,58	31,5	9	21	3,974
6	Cables	85.18.14	4,05	2,37	31,5	9	21	2,631
7	Fuses	85.19.11	0,06	0,035	40	16	0	0,030
8	Springs	73.35.10	0,03	0,118	36	—	0	0,013
9	Coils	85.01.88	3,63	2,13	45	16,2	30	2,383
10	Transistors	85.21.82	3,19	1,87	28	8	0	1,731
11	Isolators	85.25.42	0,0018	0,0011	40	—	0	0,001
12	Cables	85.23.27	1,71	1,00	45	—	30	0,897
13	Other feeting	85.19.95	0,048	0,03	45	22,5	30	0,032
14	Connector	85.28.00	1,22	0,71	45	—	30	0,637
15	Secam Modulator	85.19.99	6,05	3,54	45	22,5	30	3,757
16	Coil for tuner	85.01.81	0,67	0,28	45	16,2	30	0,313
17	Ferrite for tuner	85.01.99	0,028	0,016	45	18	30	0,018
18	Resistance for tuner	85.19.71	0,13	0,08	31,5	18	21	0,082
19	Diod, cheeps for tuner	85.21.83	2,69	1,57	16	—	0	1,353
20	Transistor for tuner	85.21.82	1,14	0,67	28	8	0	0,620
21	Crystal filter fortuner	85.21.85	0,82	0,48	16	—	0	0,414
22	Drycapacitor for tuner	85.18.11	0,95	0,56	31,5	9	21	0,622
23	Capacitor for tuner	85.18.21	0,04	0,02	36	9	24	0,023
24	E.capacitor for tuner	85.18.14	0,09	0,053	31,5	9	21	0,059
25	Cable for control panel	85.29.27	0,75	0,47	45	—	30	0,421
26	Circuit breaker for control panel	85.19.45	3,2	1,87	45	18	0	1,585
27	Diodand trasistor for control panel	85.21.83	0,13	0,076	28	8	0	0,070
	TOTAL		99,78	58,46				55,72
	Complete set	85.15.41	100	100	48	40	0	71,43

Source: SPO, Custom Positions in the frame of Turkey-EEC relations, 1986.

CHAPTER VI

CONCLUSIONS AND IMPLICATIONS

As described in the previous chapters, Turkish TV set Demand will follow up its upward trend and will be sufficient to allow the exploitation of the full capacity. However estimated demand of 1987 which is 1.387.000 units is valid only if the firms support low income groups by installment sales. Small producers which could not support financial burden of : installment sales could not survive. The market was spread over ten domestic manufacturers at the end of 1986 and the quantity of manufacturers will show a tendency to decrease.

Turkish industry is used to the comforts of operating in a domestic sellers market in the past and it has been protected by means of high custom duties, quotas etc. So, export business is a real opportunity for any firm operating in the industry for "to see and face a dynamic competitive and productive level to develop more suitable products to meet the needs of customers".[2] Operating in export market, firm will gain experience and more easily gather information about the competitors and their products. However, Turkish TV set export quantities did not follow up this general trend and did not reach considerably high levels. The main reason of

[2] Kozlu, Cem M, International Marketing, T.I.S.B No: 234, Ankara 1982, page 5

this event is that Turkish TV industry is based on assembly line type of production producing under the licence of foreign brands and we estimate that will remain as licencee for the near future since the development techniques of TV sets are highly complex obliging the engagement of big investments and since it is very difficult to reach the quality level of foreign brands without a licence agreement. Generally, it can be said that in Turkish firms the Research and Development activities are not comparable to most European firms. Continuing the production by the help of licenors and their know-how will bring in future some disadvantages because the production technology will soon fall behind the international level of the competitors. Additionally, licencors will not share the profits of export markets with their licencees and will not permit their licencees to export without their control. Hence more attention must be given to research and development activities for producing internationally competitive sets without licence agreement.

Turkish TV set manufacturers having serious problems in exporting are facing serious future threats in sharing domestic market in case of complete acceptance of EEC custom duties. Our previous analysis shows that the cost of German Licenced TV set will decrease approximately 2 percent with the new custom positions. However, the cost of completely

imported set will decrease 29 percent which means that Turkey will be a preponderant market for the foreign manufacturers. Additionally, Liquid Crystal Displays or Tubeless TV sets, a completely new technology is offered by four major brands, Casio-Citizen-Epson and Seiko and their estimates of sales this year vary from 350.000 (Casio) to more than 2.000.000 (Citizen). Obviously in medium run, Turkish producers will be obliged to shift to those new technologies and create new replacement demands.

However new advanced technologies will be supported by new licence agreements which will prevent larger export scale of TV sets. The additional problem faced by the domestic manufacturers is that new technologies will keep the imported component cost high which will be a serious threat for the domestic competition. The threat will be more critical in case of entrance into force of the new custom duties. Additional to 29 percent cheeper imported TV sets, costs and prices of the domestic manufacturers will stay under the control of licencors, since new technologies require high percentage of imported components.

As a result, Turkish TV industry must give more attention to research and development activities and must produce internationally competitive sets without licence agreement. In the long run, domestic producers will keep their satis factory domestic market share and enlarge their export scales only if they get rid of the control of their licencor.

In conclusion, we state that this study will reach its purpose if it has identified market potential and future competitiveness of TV Set Sector and has given some guidelines to the government and corporate planners.

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