3.4 ORGANIZATION

3.4.1 General Position

ENR is organizationally responsible to the Minister of Transport and Communications, through a Board of Directors.
The Ministry of Transport and Communications, in addition to Railways, also embraces Aviation, Roads and Bridges, The Rivers Authority, The National Tunnels Authority, The National Transport Institute, The Transport Planning Authority, and the Authorities of the former Ministry of Maritime, and Ministry of Communications.

The ENR Board.
The composition of the Board of ENR is stipulated in Articles 15 and 16 of Law 152 and the statutory responsibilities and authorities in Article 17.
The current constitution of the ENR Board is 15 members subdivided as set out below :

- Chairman of ENR
- The 3 Senior Vice Chairmen of ENR
- One representative of the Railway Trade Union
- Ten Governmental and Business appointments
  (NOTE: The current composition of these 10 appointments which are made by the Ministry of Transport (MOT) are 8 Governmental and 2 Business)

The broad role of the Board is to translate its objectives from Government into specific policies and plans on budgets and finance, personnel, engineering, operations, marketing and commercial and purchasing.

3.4.2 ENR Organization

The organization is headed by a Chairman who is appointed by Presidential decree. The Chairman, as part of his overall responsibilities is the key individual in liaison with the Egyptian Government and other major organizations both within Egypt and abroad.
There are 10 separate officers reporting to him and charts have been produced graphically depicting the organization as follows :

Chart 1	Overall organization
Chart 2	Executive Secretariat
Chart 3	Vice Chairman Metro
Chart 4	Information Systems and Computer Centre
Chart 5	Vice Chairman Finance
Chart 6	Vice Chairman Administration Affairs
Chart 7	Vice Chairman Construction and Projects
Chart 8	Vice Chairman Permanent Way, Signals and Telecommunications
Chart 9	Vice Chairman Operations and Commercial
Chart 10	Typical Regional Manager's Organisation
Chart 11	Vice Chairman Technical Services
Chart 12	ENR Director for Medical
Chart 13	Director for Training

Executive Secretariat
This organization consists of six separate activities that respond to the Chairman through an Under Secretary for Executive Affairs.
The individual activities are shown in Chart 2.

Vice Chairman Metro
This organization whilst still responding to the Chairman of ENR largely functions independently. It publishes its own accounts and produces a separate annual analysis of its own activities.
The organizational structure below the Vice Chairman is subdivided into two separate reporting lines which cover Maintenance and Units and a separate section that deals with Operations, Engineering and Commercial Affairs as shown in Chart 3.

Vice Chairman Finance
The organization of the Vice Chairman Finance is divided into two separate activities : The Finance organization itself and the Computer Center.
The main Computer Center is located adjacent to the main Headquarters in Cairo and is headed by a General Manager. The organization is subdivided into 4 units as shown in Chart 4.
The main Finance organization is subdivided into three principal sub - functions as shown in Chart 5.

Vice Chairman Administrative Affairs
This is what would traditionally be known as the Personnel or Human Resources organization and deals with all aspects of recruitment, movement, transfer and leavers together the administrative aspects of Buildings. More unusually it also has responsibility for certain Management Services such as Public Affairs. Responsibility for Training has not been included in this chart and it has been shown separately and dealt with later in this Section of the Report.
The organization is split into 3 separate sub - functions as shown in Chart 6.

Vice Chairman Construction and Projects
This a relatively recently agreed position, newly reporting to the Chairman recognizing the importance given to new investment projects within ENR. Formerly these activities were in the Permanent Way and Signaling organization. The organization is divided into Construction and Projects as shown in Chart 7.

Vice Chairman Permanent Way and Signaling
This is the conventional Infrastructure renewal and maintenance organization which is split between Permanent Way and Signaling and Telecommunications in the manner as shown in Chart 8.

Vice Chairman Operations and Commercial
This could be considered as one of the key parts of the ENR organization as it combines the responsibility for Train Planning, Train Running, and Marketing together with the overall responsibility for the Regional Managers. The Headquarters organization is structured as shown in Chart 9.

Zonal Managers
There are seven Zonal Managers who report organizationally to the Vice Chairman Operations

and Commercial. They also have functional responsibility to the other respective Vice Chairmen for their disciplines.

The Zonal Mangers are outbased at Cairo (Central Zone), Asyut (Mid Zone), Alexandria (Western Delta), Mansoura (North Delta), Zagazig (Eastern Delta), and Aswan (Southern Zone).
Plans are being formulated to create a further Zonal organization out of parts of the Central and Mid Zones and this would be located at Minya.
The Regions undertake direct responsibility for all the staff and activities at ground level and have a basic organizational structure that is subdivided into the several activity groups as shown in Chart 10.

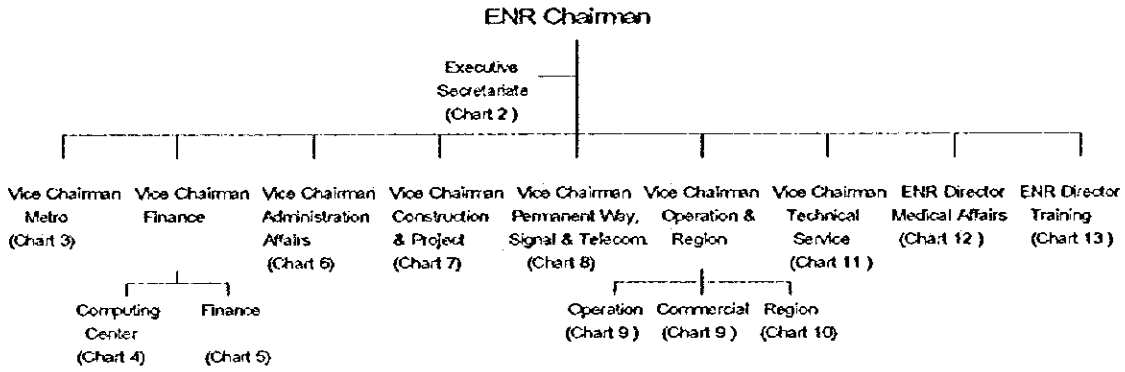
Vice Chairman Technical Affairs, Stores and Purchases
This organization is responsible for the maintenance of all Rolling Stock and the procurement of stores.
The organization is split into 3 subgroups whose broad activities are as shown in Chart 11.
Workshop Affairs handles 11 main workshops: El Wasta Workshop, El Abasaya Workshop, El Tebeen Workshop, Gabel el Zeitoon Workshop, Abu Zable Workshop, Bolak and Abu Ghats Workshop (Pass.Ches.)

Medical Affairs
This organization is headed by ENR Director for Medical Affairs and is divided into three main legs as shown in Chart 12.
The Cairo Hospital is a major medical establishment and embodies all the activities that one would expect to find in such a place.
The preventative medicine organization is structured into two groups of Lower Egypt embracing Tanta, Zagazig and Alexandria and Upper and Central Egypt covering Cairo, Luxor and Asyut.
The Clinical Medical Department contains the two smaller medical establishments at Abu Zable and Tanta together with the responsibilities for Physiotherapy and Convalescence.

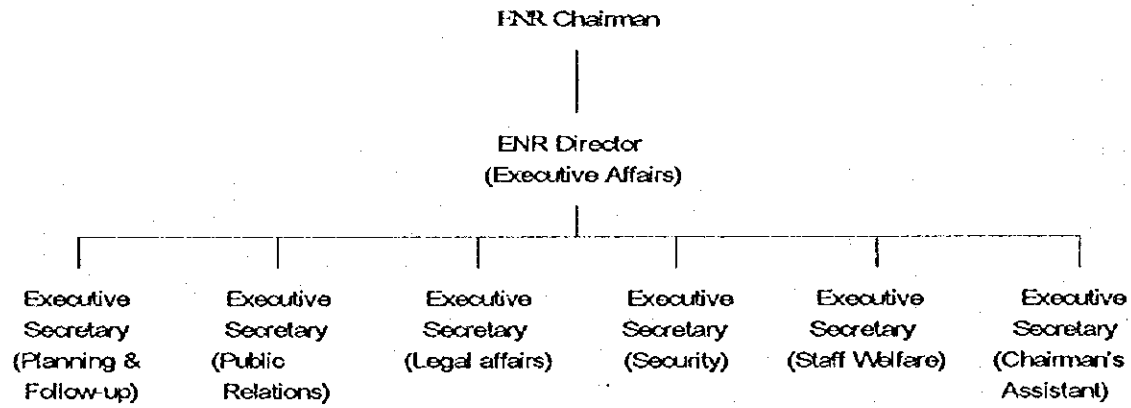
Training
This organization whose activities center around the major Training School at Wardan is subdivided into 3 groups as shown in Chart 13.

Fig. 3.4 ENR Organization Chart

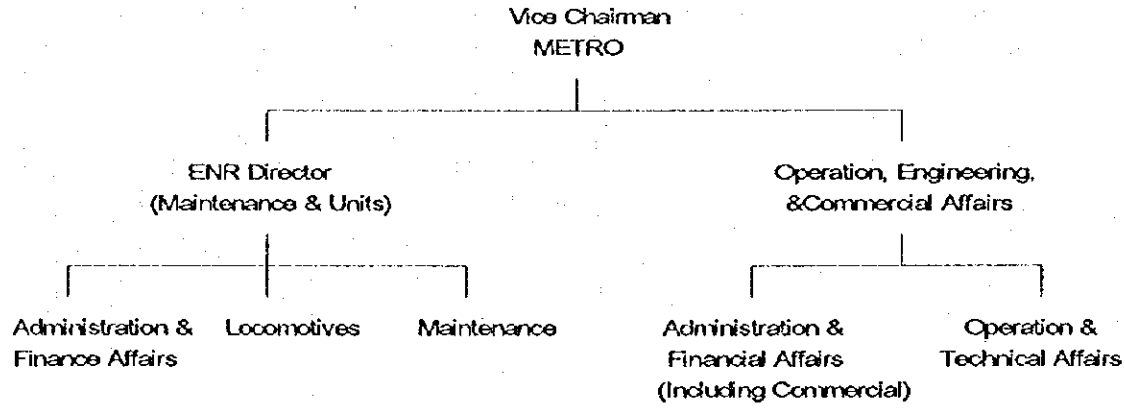
ENR ORGANIZATION CHART - CHART 1

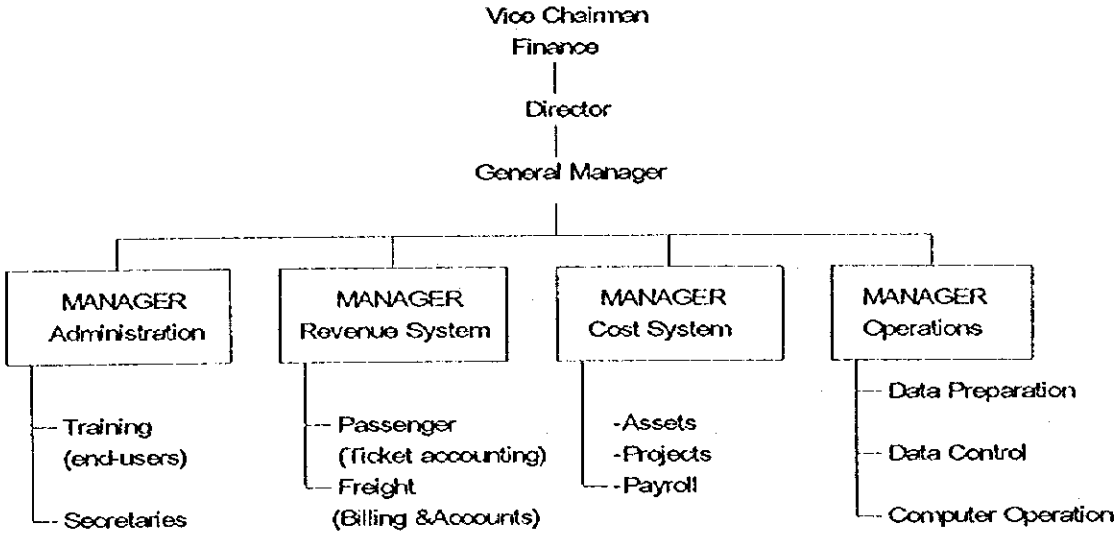


EXECUTIVE SECRETARIAT - CHART 2

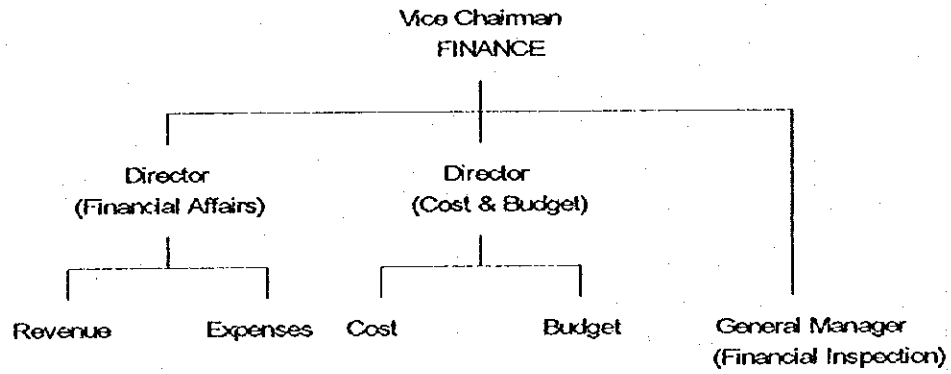


METRO - CHART 3

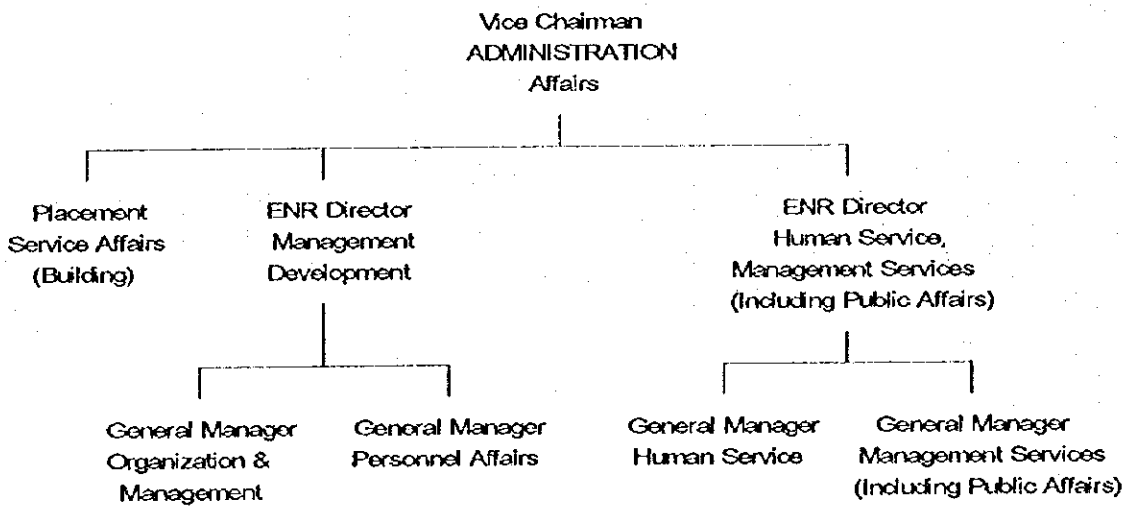




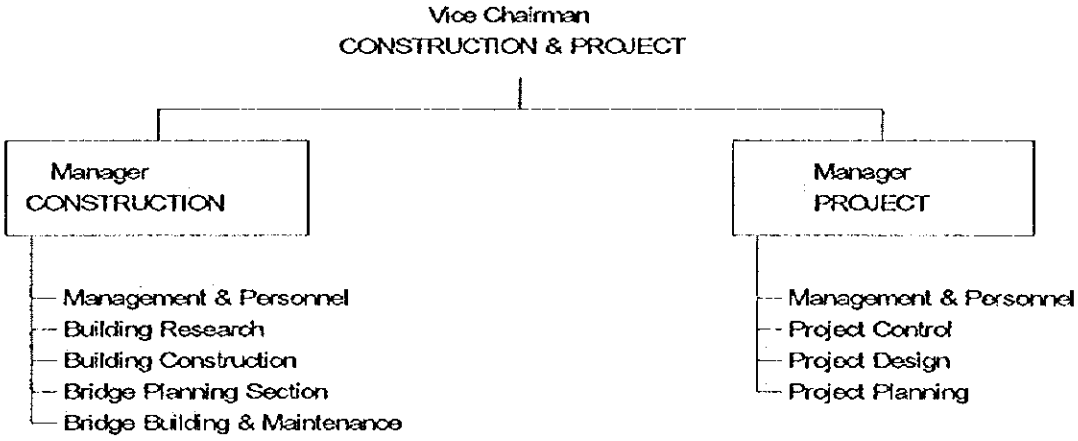
FINANCE - CHART 5



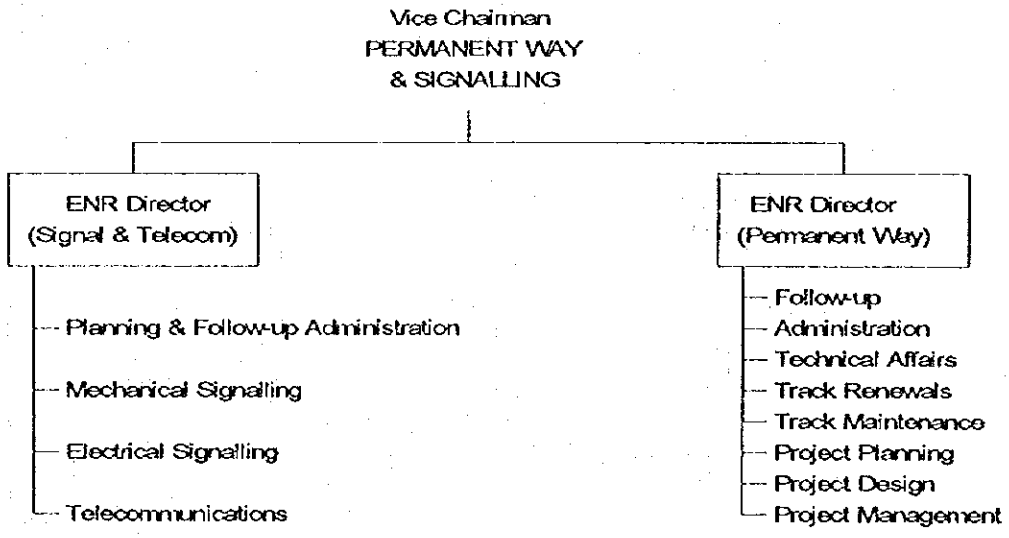
PUBLIC AFFAIRS & PERSONNEL - CHART 6



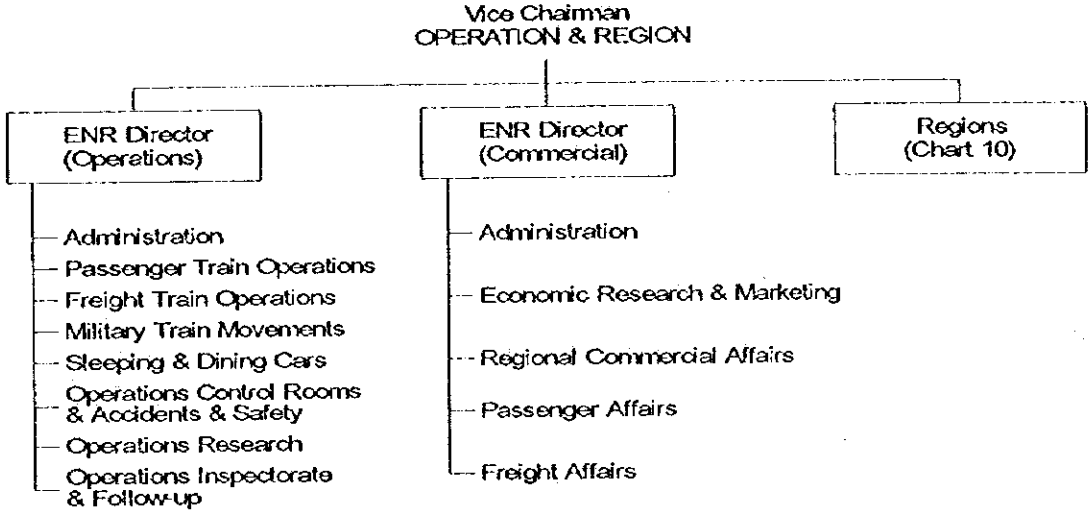
CONSTRUCTION & PROJECT - CHART 7



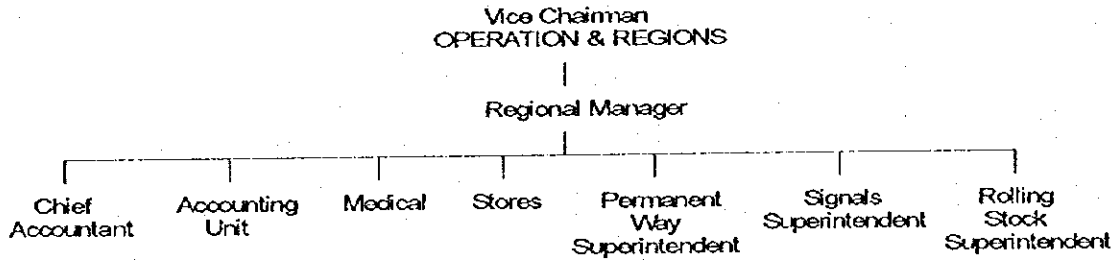
PERMANENT WAY, SIGNALLING & TELECOM - CHART 8



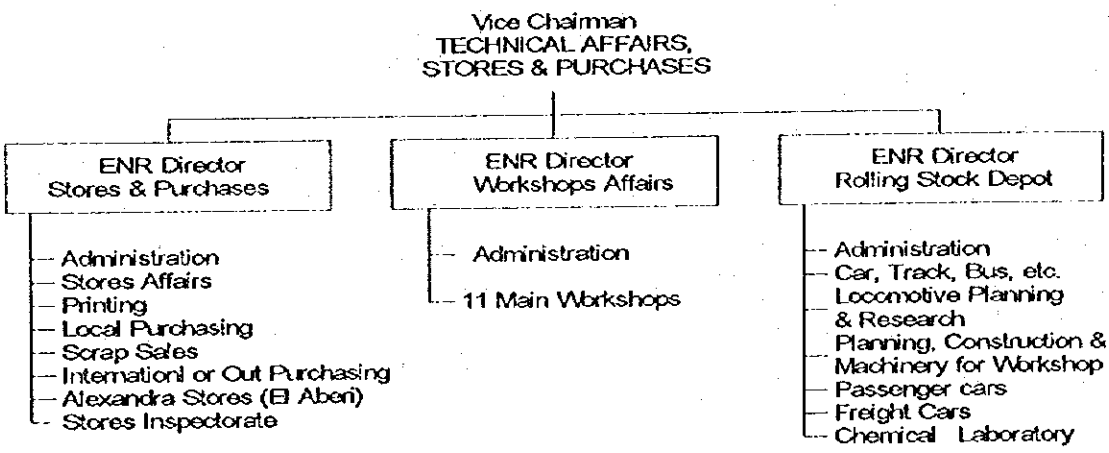
OPERATION & COMMERCIAL - CHART 9



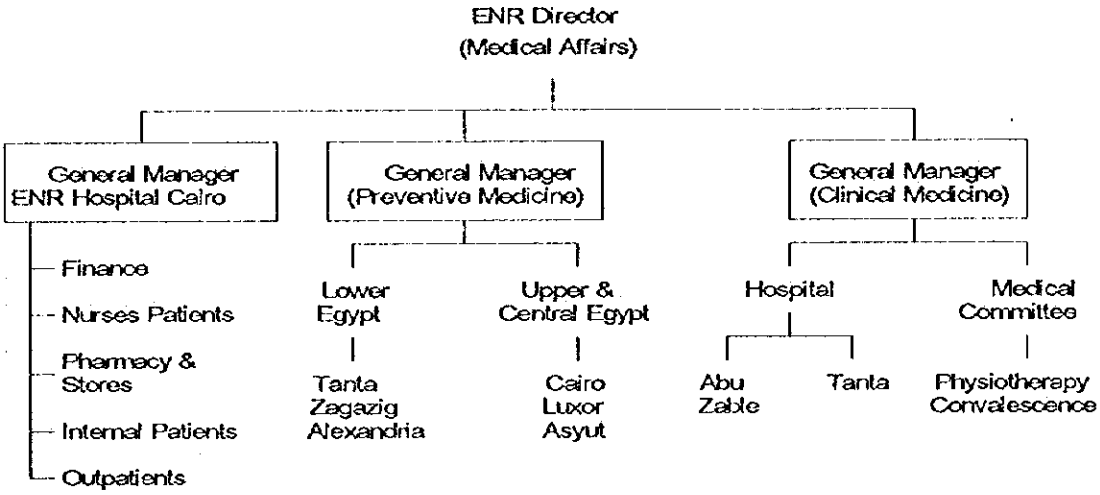
TYPICAL REGIONAL MANAGER - CHART 10



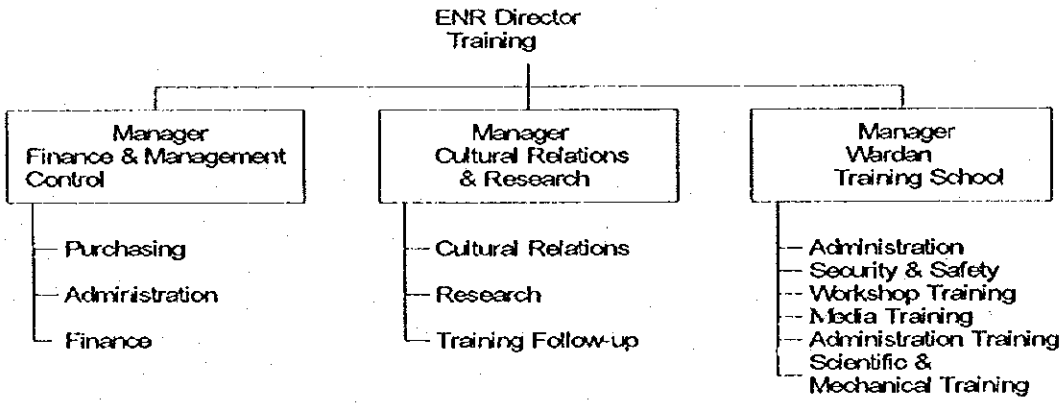
TECHNICAL AFFAIRS, STORES & PURCHASES - CHART 11



MEDICAL ORGANIZATION - CHART 12



TRAINING - CHART 13



3.5 PERSONNEL

3.5.1 Staff Numbers Against the Establishment

The number of positions actually existing within ENR is agreed each year as part of the Annual Budget Process.

Table 3.5.1 ENR Staff in Budget, 1995/96

Chairman	1
Vice Chairmen	6
Under Secretaries	21
General Managers	55
Grade 1	1,192
Grade 2	17,997
Grade 3	20,150
Grade 4	22,004
Grade 5	11,872
Grade 6	15,282
Total	88,580

Source: ENR

This represents an agreed position with the Government on both the notional establishment and also on the disposition of individual gradings within that establishment.

The number of staff actually employed by ENR is however markedly different as can be seen from the information for the past 3 years tabled below :

Table 3.5.2 Staff Working at ENR

1992/1993	71,653
1993/1994	72,890
1994/1995	74,123
1995/1996	74,015

Source: ENR

The explanation for these differences can mostly be explained by the following factors :

Staff on Military Service
Staff seconded working either abroad or elsewhere in Egypt
Staff on long term training
Women on Maternity Leave

It has not been possible to obtain any detailed data on the number of staff in each of these categories as unless they are in receipt of payment they do not appear to be held on the existing computer systems, but it is suggested that soldiers and secondees are likely to form the bulk of the numbers.

The question to be posed in this context is if their are no immediate plans to change the basis upon which staff can be absent from ENR, and the same type of numbers are likely to be involved year on year then why is it necessary to artificially inflate the establishment to cater for their eventual return.

3.5.2 Individual Staff Numbers by Department

There has been considerable difficulty in obtaining this data in the kind of detail that was envisioned in the Inception Report.

Data is available from the Computer Center by Cost Center which shows Numbers of staff by Grade related to specific Activity Groupings and this is shown below :

Table 3.5.3 Employee Numbers By Grade and Department

Organization	Vice Chair	ENR Dir.	GM	1	2	3	4	5	6	Total
GM Locomotives			3	10	38	99	154	9	84	397
Locos Chemical Labratry			1		8	23	13			45
Workshops Management					56	37	22	149	73	337
Farz Electronics Centre			1		95	342	396	810	475	2,119
Mansura Pass Coaches				1	21	96	157	158	210	643
El Sabbtai Diesel Wksp			1		117	381	206	469	329	1,503
Kom abu Radi PC Wkshp					31	73	726	561	862	2,253
Gabel el Zeitoon Wksp			1	2	72	104	255	318	174	926
Abu Zabel Wksp			1	2	115	309	300	559	677	1,963
Abu Ssaia Wksp			1	1	42	186	159	214	321	924
El Farz Wksp				1	24	114	87	245	206	677
Road Vehicle Garage					26	58	42	95	122	343
Minia Wksp				2	32	44	87	306	77	548
Tebeen Wksp				2	34	66	290	98	102	592
Abu Ghatis Diesels				14	490	669	740	994	900	3,807
Torra Diesels					22	38	19	38	24	141
Boulak Dakroor Wagons				1	43	66	71	86	82	349
Wasta Coaches					25	96	47	161	122	451
Abu Ghatis Pass Cchs			1	4	50	184	219	152	827	1,437
El Tebeen Wagons					3	14	14	7	38	76
El Hadra Wagons				1	47	159	110	354	199	870
Habari Wagons				1	38	133	94	226	167	659
Head of Zagazig Wagons				1	3	11	25	3	1	44
Zagazig Wagons				3	126	111	217	337	215	1,009
Suez Wagons				1	51	13	52	130	52	299
Ismailia Wagons					30	71	21	191	85	398
Port Said Wagons					20	26	22	108	32	208
Kantara Wagons					14	11	15	54	49	143
Head of Minia Wagons					8	17	11	2	10	48
Minia Wagons					157	134	97	298	148	834
Sohag Wagons				1	140	122	133	332	141	869
Aswan Head of Wagons				13	128	102	89	131	163	626
Luxor Wagons				1	87	305	129	241	189	952
Metro Wagons					23	17	3			43
Cairo Wksps Gen Mgt		1	4	1	27	40	47	6	20	146
Hd of Elec Dep Tanta				1	21	71	98	55	124	370
El Sabbtia Air Condg Dep				4	19	75	60	75	109	342
Abu Ghatis Air Condg Dep					59	135	79	85	98	456
El Sabbtia Elec Deps			1	23	24	34	16	24	122	244
Alexandria Hd of Elec Dept				1	12	60	40	38	55	206
Ismailia Elec Dept				1	11	22	42	69	50	195
Minia Hd of Elec Dept.				9	45	49	52	61	60	276
Aswan Elec Dept.				1	17	26	34	6	50	134
Luxor Elec Dept.				1	4	32	20	4	41	102
Metro Elec Mtce				4	65	212	443	69	96	889
Workshops Total		1	15	108	2,520	4,987	5,953	8,328	7,981	29,893

Operations Genl Mgmt		1	2	22	96	56	37	22	21	257
Tanta Movements				1	61	317	845	532	1,510	3,266
Cairo Movements HOD		1		6	386	771	1,033	763	1,303	4,263
Alexandria Movements					67	368	528	399	726	2,088
Zagazig Movements				6	110	425	566	505	952	2,564
Asyut Movements				9	217	502	558	340	790	2,416
Aswan Movements		1		3	76	234	390	273	808	1,785
Metro Operations				2	9	87	191	47	23	359
Metro Movements					2	93	177	45	5	322
Operations Total		3	2	49	1,024	2,853	4,325	2,926	6,138	17,320
Commercial Affairs GM		1	2	15	43	24	30	2	6	123
Tanta Commercial				4	51	126	249	118	53	601
Cairo Commercial Tnspt					54	116	351	179	17	717
Tebeen Commercial					1	4	5	1		11
Alexandria Commercial					19	99	204	99	30	451
Zagazig Commercial					29	74	233	116	8	460
Asyut Commercial				1	35	56	194	127	4	417
Aswan Commercial				10	34	41	101	35	10	231
Metro Comml Helwan				2	15	49	229	88		383
Metro Comml El Marg					7	37	154	50		248
Commercial Total		1	2	32	288	626	1,750	815	128	3,642
Cairo PWay Genl Mgt		1	8	14	44	165	186	45	138	601
Tanta PWay Heads						1	5	15	18	39
Tanta PWay				2	15	87	299	293	1,160	1,856
Mansoura PWay				2	7	65	144	178	855	1,251
Cairo PWay Heads				1	8	8	10	3	1	31
Cairo MISR PWay					32	166	330	194	702	1,424
Cairo Imbaba PWay				3	9	182	240	132	729	1,295
Wahat Line PWay					10	21	34	27	90	182
Alexandria PWay				1	12	79	131	128	529	880
Kabari PWay					5	42	96	45	374	562
Zagazig PWay Heads				2	10	24	25	8	6	75
Zagazig PWay					7	61	156	76	551	851
Ismailia PWay				1	13	69	107	90	609	889
Kantara PWay					10	42	76	10	13	151
Asyut PWay Heads				1	16	25	9	4	1	56
Minia PWay					11	115	315	27	462	930
Suhag PWay					19	98	195	33	402	747
Aswan PWay Heads				2	3	12	8	2	2	29
Aswan PWay				2	19	121	79	61	391	673
Luxor PWay				1	21	179	267	148	276	892
Metro PWay Helwan				1	3	18	31	18	60	131
Metro PWay El Marg		1		1	4	23	17	12	63	121
Permanent Way Total		2	8	34	278	1,603	2,760	1,549	7,432	13,666

GM Construction	1	5	3	16	71	311	296	135	543	1,381
Bridge Construction					2	39	18	18	45	122
Construction Total	1	5	3	16	73	350	314	153	588	1,503
GM Signalling	1	1	1	5	13	47	47	10	16	141
Tanta Signalling					13	53	279	41	130	516
MISR Signalling				1	12	76	205	40	69	403
Imbaba Signalling					9	42	232	32	79	394
Alexandria Signalling					9	24	168	19	92	312
Zagazig Signalling					10	18	59	17	32	136
Ismailia Signalling						11	42	7	45	105
Asyut Signalling				1	20	47	127	4	42	241
Minia Signalling					7	35	60	13	22	137
Aswan Signalling				3	6	18	78	6	26	137
Luxor Signalling					17	32	143	20	29	241
Metro Signalling Helwan				1	5	41	67	22	5	141
Metro Signalling El Marg						5	9	2	1	17
Signalling Total	1	1	1	11	121	449	1,516	233	588	2,921
Executive Secretariat	5	8	13	2	17	54	78	9	3	189
Financial Affairs	1	2	6	34	112	581	1,006	20	51	1,813
Purchases and Stores			2	6	111	134	292	86	694	1,325
Printing				1	28	111	122	124	194	580
Training					4	7	17	14		42
Administration Affairs		1	9	2	80	228	371	21	105	817
Medical Affairs		1	4	1	53	189	312	50	118	728
Tanta Zone		1		1	3	23	32			60
Alexandria Zone			2		26	3	3			34
Metro Head	1	2	2	2	4	29	46	19	22	127
Sleeping Cars Coordn				1	11	61	50	126	56	305
GRAND TOTAL	9	28	69	300	4,753	12,288	18,947	14,473	24,098	74,965

Source: ENR

3.5.3 ENR Employee Age Structure

This information has been obtained for the whole organization. This data was used to make retirement forecasts.

Table 3.5.4 ENR Employee Age Structure

Year of Birth	Employees	Year of Birth	Employees
1931	903	1955	2,230
1932	912	1956	2,151
1933	1,076	1957	2,111
1934	1,333	1958	2,121
1935	1,354	1959	2,204
1936	1,570	1960	2,421
1937	1,585	1961	2,458
1938	1,417	1962	2,684
1939	1,469	1963	2,771
1940	1,590	1964	2,559
1941	1,610	1965	2,268
1942	1,493	1966	1,854
1943	1,447	1967	1,659
1944	1,363	1968	1,469
1945	1,884	1969	1,173
1946	1,568	1970	957
1947	1,614	1971	639
1948	1,608	1972	301
1949	1,553	1973	317
1950	2,006	1974	412
1951	2,178	1975	322
1952	2,296	1976	251
1953	2,283	1977	210
1954	2,163	1978	12

Source: ENR

3.5.4 Wastage Figures

Because of the absence of a computerized Personnel system it has been difficult to obtain comprehensive staff wastage data for ENR but the following data has been produced for a 12 month period January 1, 1992 to October 31, 1993.

Table 3.5.5 ENR Staff Wastage

Retired	1,125	
Died	516	
Ill Health	129	
Early retirement 55 YEARS	138	
Early retirement	345	Law 113 (87) without loss of Pension
Resigned	138	
Total	2,264	

Source: ENR

Establishment and Actual Staff Numbers.

This issue appears to have caused some confusion in the past. The current understanding is that the Establishment for the whole of ENR is negotiated each year with the Ministry of Finance as part of the Budget process. This involves ENR making a detailed submission of its requirements each year to the MoF which will include both numbers and grades. The current figure of 88,580 represents a modest increase over the previous year. The actual number of staff employed within the system is however considerably less. The current number of employees is 74,813.

The principal difference is a large vacancy gap which we are given to understand has existed for some time. However, there are some other factors that also could distort the picture and these include :

Staff on Military Service
Staff seconded to other Countries
Retired staff not yet removed from the Payroll
Staff on Study leave
Women on Maternity leave

3.5.5 Wage Levels and Grading Structure

The basic Pay and Grading structure within ENR is contained within the following table :

Table 3.5.6 ENR Wages, December 2, 1995

Grade	Wages Per Year (Min.)	Wages Per Year (Max)	Wages Per Mth (Min)	Wages Per Mth (Max)	Enterm nnt Per Year	Promtl Allnce Per Mnth	Promn Selcn %	Time Reqrd in Grade
C'man	2880		240		2000			
Vice C'man	2670		222.5		1500		100%	
S.G.M	1860	2556	155	213+5	1000	6.25	100%	1 year
G.M.	1640	2304	137	192+5	500	6.00	100%	1 year
Gde 1	1284	2088	107	174+5	300	5.00	100%	1 year
Gde 2	960	1908	80	151+5		5.00	50%	6 yrs
Gde 3	696	1608	58	134+5		4.00	40%	8 yrs
Gde 4	540	1212	45	101+5		3.00	20%	5 yrs
Gde 5	480	929	40	77+5		2.00	10%	5 yrs
Gde 6	450	744	37.5	62+5		1.50		5 yrs

Source: ENR

Basic Pay rates are increased on an Annual basis and are subject to Governmental approval. The following table shows the levels of increase over the past 9 years.

Table 3.5.7 Pay Increase %

Year	Percentage Increase	Effective Date
1987	20%	1.7.87
1988	15%	30.6.88
1989	15%	30.6.89
1990	15%	30.6.90
1991	15%	1.6.91
1992	20%	1.7.92
1993	10%	1.7.93
1994	10%	1.7.94
1995	10%	1.7.95

Source: ENR

The application of these increases has not been applied on a cumulative basis and they have been retained as separate amounts to the basic salary, in respect of each year's award.
From 1992 the award for 1987 has been consolidated into the basic salary. This process continued in the following years.

The following table demonstrates the impact of this on a notional salary of LE 100 :

Table 3.5.8 ENR Pay Increase Result (100 Base)

Basic Salary at June 30, 1987	LE 100
1987 Pay Increase	LE 100 + 20
1988 Pay Increase	LE 100 + 20 + 15
1989 Pay Increase	LE 100 + 20 + 15 + 15
1990 Pay Increase	LE 100 + 20 + 15 + 15 +15
1991 Pay Increase	LE 100 + 20 + 15 + 15 +15 +15
1992 Pay Increase	LE 120 + 15 + 15 + 15 +15 +24
1993 Pay Increase	LE 135 + 15 + 15 + 15 +24 + 13
1994 Pay Increase	LE 150 + 15 + 15 + 24 +13 + 15
1995 Pay Increase	LE 165 + 15 + 24 + 13 +15 + 16

Source: ENR

Basic pay is supplemented by Bonus Payments that are made on the basis of the following approach :

The ENR bonus system is both complex and very important, in that it can significantly affect the total take-home pay that the individual employee receives.

The large amounts of bonus that can be on offer will tend to diminish the significance of the rather small basic salaries that apply to the various grades. All staff within ENR have the opportunity to receive bonus payments on a monthly basis, and depending upon the particular scheme, the actual payments are not subject to any limits.

Grading Structure

The Grading Structure within ENR is very formalized and there are quite detailed job profiles for each position that show the duties and responsibilities of the posts together with the educational and vocational requirements.

Some examples of Grades and Qualifications are shown below.

3.5.6 Job Profiles for Engineering and Operations

SENIOR GRADES

Engineer Grade 3

Qualifications : Background in all of the Egyptian laws and regulations appropriate to the particular discipline. B.S. of Engineering or equivalent qualification. Successful completion of at least one course relevant to the particular discipline.

Sample posts covered by this grade.

- Electrical Engineer
- Mechanical Engineer
- Construction Engineer
- Signal Engineer
- Communications Engineer
- Projects Engineer
- Permanent Way Engineer
- Movements and Operations Engineer

Head of Department Grade 2

Qualifications : As for Grade 3 plus the completion of 8 years experience in Grade 3.

Sample posts covered by this grade :

- Head of Movements Inspectorate
- Head of Communications
- Head of Experimental Laboratory
- Head of Motors and Dynamos (Boulak)
- Head of Signal Operations (Regions)

Must have been able to demonstrate managerial qualities. Ability to deal with problems. Must have completed 6 years in Grade 2.

Sample posts covered by this grade :

- Manager Technical Inspectorate
- Manager Technical Office
- Manager Industrial Security
- Manager Workshop Laboratory

3.5.7 Manual Grades

Grade 6

Qualifications	Primary School Education
	Written examination depending upon the age of the applicant. Medical examination related to the duties to be undertaken.
Sample positions covered by this grade	Assistant Laborer General
	Assistant Laborer Workshops
	Assistant Laborer Permanent Way
	Assistant Laborer Signaling
	Assistant Laborer Operations

Grade 5

Qualifications	Must have completed 5 Years in Grade 6
	Training in relation to their specific position but without examination
Sample positions covered by this grade	3rd Class Laborer Electrical
	3rd Class Laborer Mechanical
	3rd Class Laborer Painting
	3rd Class Laborer Carpentry
	3rd Class Laborer Comms. and Signaling
	3rd Class Laborer Car Driver
	3rd Class Laborer Crossing Gates
	3rd Class Laborer Lanterns

Grade 4

Qualifications	Must have completed 5 years in Grade 5
Sample Positions covered by this grade	2nd Class Laborer in all the major disciplines as briefly indicated in Grade 5
	Note that this grade exercises a limited amount of responsibility over 3rd Class Laborers

Grade 3

Qualifications	Must have completed 5 years in Grade 4. Must also have successfully completed a training course within their own discipline
Sample Positions covered by this grade	1st class Laborers in all the major disciplines as briefly indicated in Grade 5
	It should be noted that this grade exercises responsibility for other Laboring Grades

Grade 2

Qualifications	Must have completed 8 Years in Grade 3. Could be required to undertake a training course dependent upon their particular discipline.
Sample positions covered by this grade	Supervisors in all the major disciplines

3.5.8 Personnel Procedures

There is a comprehensive manual of Personnel Procedures that cover the majority of Personnel Activities. The Study Team obtained this and translated it into English.

BASIS OF THE GOVERNMENT PENSION SCHEME
The Government scheme set up under Law 79 (1.9.75) operates independently for 2 separate groups of people :

- Government Employees
- Employees of Government owned undertakings

ENR staff fall into the second category.

It is a *contributory* scheme and applies to all ENR staff; the basis of the deductions are as indicated in the following table :

Table 3.5.9 Pension Contributions

	Pensions Contribs.	Accident Insurance	Lump Sum
Employee Contribution	10%		3%
ENR Contribution	15%	1%	2%

Source: ENR

The percentages are based on the employee's basic salary and bonus payments and are deducted on a monthly basis.

Benefits paid to the employee are an annuity in retirement and a lump sum payment upon retirement.

Pensionable age within ENR is 60 years unless the individuals in Grades 4, 5 and 6 commenced their service prior to 1st May 1960 when it is 65 years of age.

The annuity is calculated on data involving the number of years in the Pension Scheme, Basic Salary, Bonus and Overtime payments and subject to the number of contributing years could amount to an annuity of 80% of basic salary and 50% of bonus and overtime payments.

Subject to a number of conditions, it is possible for staff to buy back Pension years when they would not otherwise be in a position to obtain the maximum pension.
In addition to this annuity, there would be the payment of a significant lump sum upon retirement.

3.6 MARKET STRUCTURE

3.6.1 Characteristics of Railway (Bus / Taxi) Passengers

In this section, the characteristics of railway passengers are outlined, together with the comparison to inter-city bus and taxi passengers, based on the observation results of the traffic survey conducted by the Study Team.

(1) Railway passengers

1) Trip purpose

Appendix 3.6.1 shows the distribution of trip purposes of railway passengers by railway line (by main line and branch line).

The majority of railway trip purposes are related to "work" (32%) and "school" (22%). This trend is particularly strong on branch lines (42% for "work" and 27% for "School") compared to the main line (25% work / 19% school).
Trips for "personal and social affairs" rank third (14%). This purpose is especially notable on the main line, especially the Cairo - Aswan Line.
13% of trips are for "business and official" which is the aggregate of "own business", "employer's business" and "official". "Business and official" trips are 17% of main line trips, 13% of total trips, 8% of branch line trips, and 23% of trips on the Cairo - Alexandria Line. This indicates that the Cairo - Alexandria Line is heavily used for business purposes.
The percentages of the trips for "shopping" and "recreational" are minimal. (Refer to Fig. 3.6.1.)

2) Type of job

Appendix 3.6.2 shows the distribution of type of job of railway passengers by railway line (by main line and branch line).

The majority of jobs of railway passengers are "government officials" (30%), followed by "students" (29%), "subtotal of employee" (15%) and "self-business" (11%). This trend is similar on all lines.
Note that almost 30% of passengers are "students", but 35% are students on the Cairo - Port Said Line and on branch lines in the Delta Area. This suggests that the passenger trains in the Delta Area have a larger percentage of student users. (Refer to Fig.3.6.2.)

3) Trip Purpose and type of job

Appendix 3.6.3 shows the distribution of trip purpose of railway passengers by type of job and by railway line (by main line and branch line).

On main and branch lines, a high percentage of "Self-business", "employee (secondary industry)", "employee (tertiary industry)" and "government officials" ride the trains for the purpose of "work".

In particular, a large percentage of "employee (secondary industry)" ride for the purpose of "employee's business".
Naturally, a high percentage (74%) of "students" ride the train for the purpose of "school". This percentage is high on both the main lines (71%) and branch lines (78%).

A high percentage of trips by a "housewife" are for "personal and social affairs", especially on main lines. A high percentage of "housewife" trips on branch lines are also for "shopping" (28.1%), although the share of "shopping" is only 1.5% of total trip purposes on main and branch lines.

4) Personal income

Appendix 3.6.4 shows the distribution of monthly personal income of railway passengers by main line and branch line. Income is higher on the main lines, especially the Cairo - Alexandria Line.

5) Trip purpose and service class

Appendix 3.6.5 shows the distribution of trip purposes of railway passengers by service class and by railway line (by main line and branch line).

About 60% of trips in "Second without A/C" and "Third" are for "work" and "school". This is higher than the percentages for trips in "First" and "Second with A/C". This is particularly notable on branch lines, about 70%. Trips in "Second with A/C" on branch lines show a high percentage of trips for "work".

A high percentage of trips in "First" and "Second with A/C" are for "business" and "official", but much lower percentages of trips in "Second without A/C" and "Third" are for "business" and "official". This is observed only on main lines.

6) Type of job and service class

Appendix 3.6.6 shows the distribution of jobs of railway passengers by service class and by railway line (by main line and branch line).

As a whole, the service classes of "Second without A/C" and "Third" have higher percentages of "government officials" and "students" (about 60 - 70%), with lower percentages of such passengers in "First" and "Second with A/C".

About 60% of "First" and "Second with A/C" passengers are "employees" and "government officials", but they are only 42% of passengers in "Second without A/C" and "Third".

7) Method of payment

Appendix 3.6.7 shows the distribution of method of payment of railway passengers by railway line (by main line and branch line).

Distribution of tickets are as follows : "normal ticket" 57%, "season" 39%, "conductor" 4%, and "kilometer" almost 0%.
64% of main line tickets are "normal tickets", but only 48% of branch line tickets.
48% of branch line tickets are "season" tickets, but "season" tickets are only 32% of main line tickets.

8) Method of payment and type of job

Appendix 3.6.8 shows the distribution of methods of payments from railway passengers by railway line (by main line and branch line) and by type of job.

It is notable that over 70% of students use season tickets, (over 76% of students on branch lines).

9) Dominant reason to use railway and service class

Appendix 3.6.9 shows the distribution of reasons to use the railway as the usual transport mode, by type of service class.

As a whole, the majority of reasons were "travel cost" (30%), followed by "available all times" (18%), and "safety" (17%). The reason "travel time is faster than other mode" occupies a very minimal share (1%).
By seat class, the majority of reasons for "First" and "Second with A/C" classes is "comfort", that for "Second without A/C" and "Third" classes is "travel cost".

10) Dominant reason to use railway and trip purpose

Appendix 3.6.10 shows the distribution of reasons to use the railway as the usual transport mode of railway passengers, by trip purpose.

As a whole, the dominant reason to use the railway is "travel cost", followed by "available all times", "safety" and "convenience".
"Travel cost" is the most important reason to use the train for "work", "school", "shopping" and "personal & social affairs". But "safety", followed by "comfort" are the main reasons for using the train to travel for "business", "official" and "recreation".

11) Dominant reason to use railway by line

Appendix 3.6.11 shows the distribution of reasons to use the railway as the usual transport mode, by main lines and branch lines.

"Travel time is faster than other mode" is a very uncommon reason for using the train. "Travel cost" is a more common reason on branch lines than on main lines. "Safety" and "comfort" are more common reasons on the main lines (especially Cairo - Alexandria), than on branch lines. (Refer to Fig. 3.6.3.)

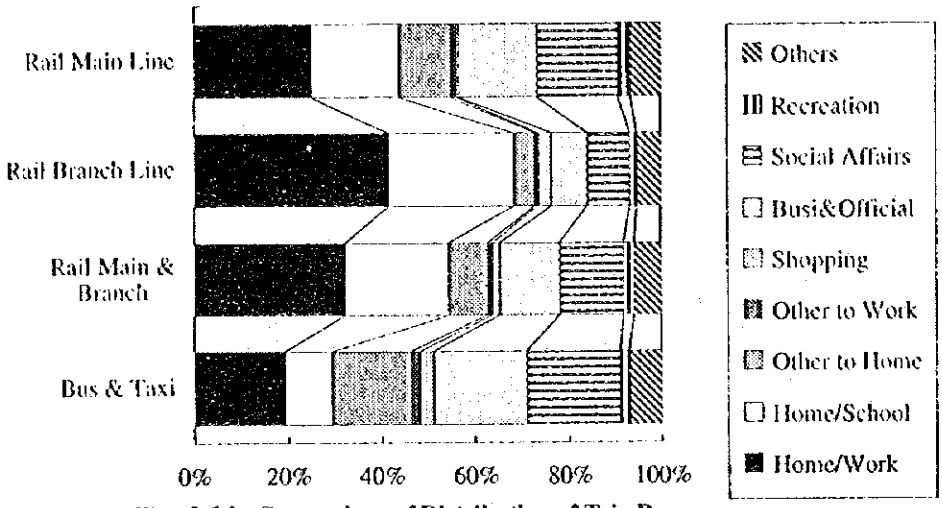


Fig. 3.6.1 Comparison of Distribution of Trip Purpose

Note : Bus & Taxi = Corridors of Cairo - Alexandria and Cairo - Aswan

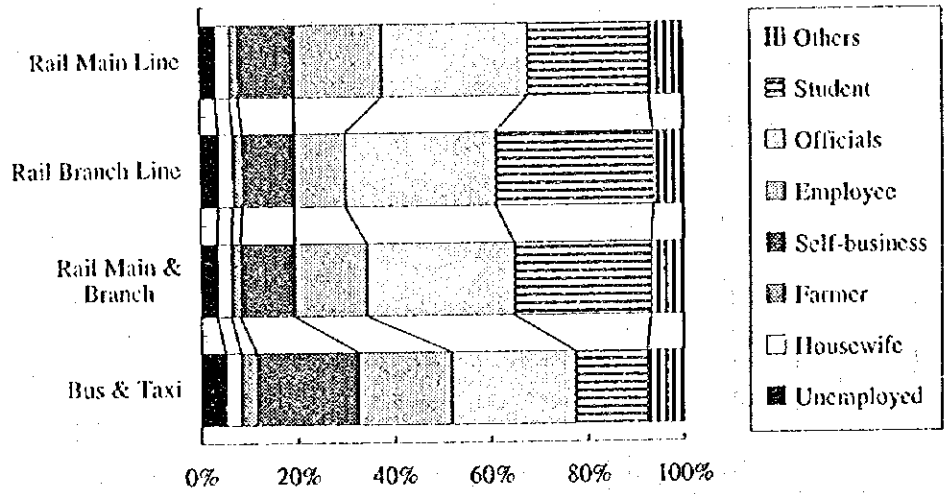


Fig. 3.6.2 Comparison of Distribution of Type of Job

Note: Bus & Taxi = corridors of Cairo - Alexandria and Cairo - Aswar

Note: Bus & Taxi = Aggregation of Cairo - Alexandria, Cairo - Aswan and Cairo - Damietta.

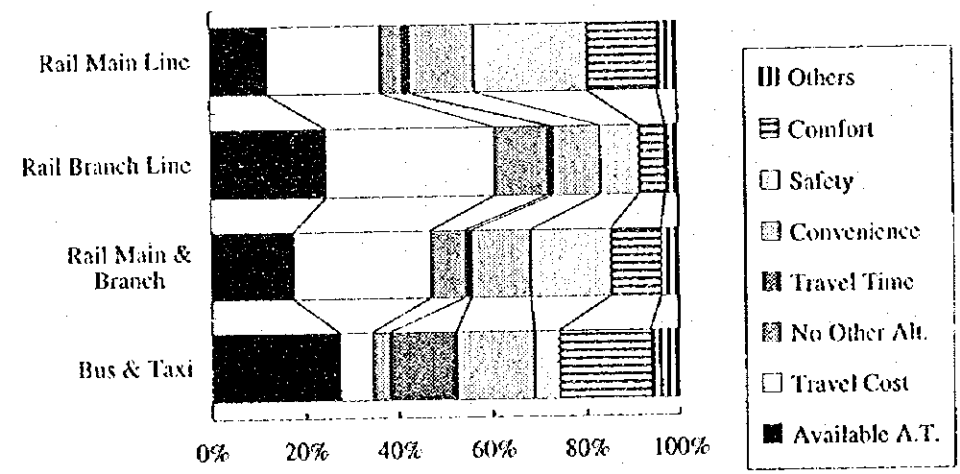


Fig. 3.6.3 Comparison of Distribution of Dominant Reason to Use Each Mode

(2) Inter-city bus / taxi passengers

1) Trip purpose

Appendix 3.6.12 shows the distribution of trip purpose of inter city bus and taxi passengers by route (Cairo - Alexandria and Cairo - Aswan).

The main trip purposes of bus and taxi passengers are "personal and social affairs" (20%), followed by "aggregate of business and official" (20%), and "work" (19%). 10% of trips are for "school". No notable difference is discernible between bus and taxi.
When comparing to railways, more railway trip purposes are for "work" and "school", while more trips of bus and taxi trips are for "business" and "personal & social affairs" (refer to Appendix 3.6.1 and Fig. 3.6.1).

2) Type of job

Appendix 3.6.13 shows the distribution of types of jobs of inter-city bus and taxi passengers by route (Cairo - Alexandria and Cairo - Aswan).

The majority of bus and taxi passengers are "government officials" (26%), followed by "self-business" (21%) and "aggregate of employee" (19%). 15% are "students".
A higher percentage of railway passengers are students, compared to bus and taxi passengers (refer to Appendix 3.6.2 and Fig. 3.6.2).

3) Trip purpose and type of job

Appendix 3.6.14 shows the distribution of trip purpose of inter-city bus and taxi passengers by type of job for the aggregation of Cairo - Alexandria and Cairo - Aswan.

In general, the distribution pattern of trip purposes by type of job for bus and taxi passengers is similar to that of railway passengers.
Naturally, a high percentage of "students" have "school" as their trip purpose (62%). A high percentage of "housewives" have a trip purpose of "personal and social affairs" (51%).

4) Personal income

Appendix 3.6.15 shows the distribution of personal monthly income of inter-city bus and taxi passengers by route (Cairo - Alexandria and Cairo - Aswan).

The distribution pattern of bus and taxi is similar.

Bus and taxi passengers on the Cairo - Alexandria corridor seem to have higher average incomes than those on the Cairo - Aswan corridor. This trend is similar to the case of railway passengers. (refer to Appendix 3.6.4)

5) Dominant reasons to use bus and inter-city taxi

Appendix 3.6.16 shows the distribution of dominant reasons to use the inter-city bus and taxi as the usual transport mode of bus and taxi passengers, by trip purpose, for aggregation of Cairo - Alexandria, Cairo - Aswan, and Cairo - Damietta.

The dominant reason to use the bus and taxi is "available all times", followed by "comfort", "convenience", and "travel time". The reason of "travel cost" is not dominant. This suggests that bus/taxi passengers value the service frequency of buses and taxis.
While common reasons for taxi passengers are "available all times" and "travel time", bus passengers report the reasons of "comfort", "travel cost", and "safety". Very few taxi passengers claim "safety" as a reason to use the taxi.
Railway passengers commonly report the advantages of "travel cost", "available all times" and "safety", while bus and taxi passengers report "available all times", "comfort" and "convenience" (refer to Appendix 3.6.10 and Fig. 3.6.3).

3.6.2 Railway Passengers' Comments for Railway Service

(1) General

This section covers the railway passengers' free comments related to ENR railway services. The interview survey of railway passengers was conducted as a part of the traffic survey which was carried out by the Study Team. In this interview survey of railway passengers, questions related to the railway services were included.

Appendixes 3.6.17 ~ 3.6.21 are summaries of the interview results, which contain the passengers' interview results for several selected passenger trains. The chosen passengers include those related to the coaches of the several service class (First A/C, Second A/C, Second and Third) in the trains on the Main and Branch Lines.

In Appendixes 3.6.17 ~ 3.6.21, the number of passengers interviewed are shown in the item of "Number of Passengers Obtained Comments". Passengers who did not answer are excluded. Since some passengers have several comments, the number of comments exceeds the number of passengers interviewed.

These tables show the distribution of comments by line category, direction, and class.

(2) Characteristics of comments

1) General

Generally, since the interviews were carried out in terms of "the passengers' free comments on the railway service" on board (within the coach of the train), the dominant comments are naturally related to "Railway Services (especially coaches)" and "Train Operation".

And, since the questions about the "fare" are already included in the other questioning items, there are not many comments related to "Fare".

2) Dominant comments

a. Related to Coach

As for "Coach", regardless of the line category and service class, the following comments are dominant:

- Improve service (To maintain in general)
- More cleaning
- Improve toilets
- Improve doors

b. Related to Train Operation

As for "Train Operation", regardless of the line category and service class, the following comments are dominant:

- Follow the schedule (Punctuality)
- More trains
- More coaches

3) Line category-wise characteristics

a. On the main line, there are several passengers who have comments of "Good Service (Reasonable) in general", but in branch lines few passengers have such comments.

b. A higher percentage of branch line comments were related to the "Train Operation", compared to main line passengers. This is especially true for the comments of "Punctuality", "More trains" and "More coaches". This suggests that the current branch line operations do not satisfy the needs of railway passengers.

c. Comments Related to Coaches

- The comments "Improve windows", "Improve seats" and "Improve lights", were more common on branch lines than on main lines. This suggests that the service level on branch lines is worse than on main lines.
- On the main line, the comments of "Improve quality of food sold in coaches" and "Food prices sold in coaches are too expensive" are notable. (Food sales are only for First A/C and Second A/C on the main line.)
- The comment of "Isolate smokers" is found on main lines, but not on branch lines.
- The comment of "Medical care" is mainly found on main lines.

d. Comments Related to Train Operation

- As mentioned above, ("Punctuality", "More trains" and "More coaches") are comments more frequent from branch line passengers than from main line passengers.
- Other common comments on branch lines are "Adjust the train schedule to meet passengers' need", "Reduce waiting time for passing train", "Double tracks", and "Faster train".

- This highlights problems of the branch line train operations, and suggests that the passengers of branch lines want a train operation service similar to that on the main line.

4) Main Line characteristics (by line and direction)

a. Cairo - Alexandria Line
In Cairo - Alexandria Line, more passengers give the comment "Good service (Reasonable) in general" than on the other main lines.

b. Cairo - Aswan Line
More passengers on the Cairo - Aswan Line request "To improve windows", "To improve toilets", "To improve water supply", and "Medical care" than on the other main lines. This probably reflects the characteristics of long distance train operation on this line.

5) Characteristics by class

The following comments by service class were made on both main and branch lines :

- The percentage of passengers reporting "Good service (reasonable) in general" is generally lower in lower classes of service (i.e. third class). The percentage requesting "To improve service (To maintain in general)" increases at lower service classes.
- The percentage requesting "More cleaning" and "To improve windows /seats / doors / lights / toilets", increases at lower service classes.
- Also, the percentage requesting "To follow the schedule (punctuality)", "More trains" and "More coaches", increases at lower service classes.
- These observations suggest that regardless of the line category of main line and branch line, the railway passengers of Second class and Third class have strong needs for a basic improvement of the general service level (coaches and train operation).
- The comments "To isolate smokers", "More telephones" and "To improve quality of foods sold in coaches" are more common in First class and Second A/C class. These comments indicate that basic needs are met, but higher service levels are requested.

This suggests that different service improvements are required for passengers of First class and Second A/C Class, if ENR wants to attract more passengers.

3.6.3 Railway Freight Customers' Opinion for Railway Freight Service

(1) General

This section covers the opinions of railway freight customers. The Study Team interviewed several railway freight customers to obtain information about freight marketing. Due to the limited survey time, a limited number of customers were interviewed.

The following is a summary of interview results.

(2) Interview results

1) Need for more suitable freight wagons

Sometimes, the freight wagons arranged for a customer are not suitable for the customer's specific needs. And although ENR has some specialized wagons for specialized commodities, there are not enough of these wagons, so not enough wagons are provided to customers.

Fortunately, interviewed customers have the opinion that if there are more suitable wagons, then they will be willing to order more freight services from the railway. This suggests that when ENR can provide proper service to freight customers, ENR can attract more freight volume.

2) Need for enough freight train operations

Some customers complain about not enough freight train operations due to a lack of locomotives. When there is no locomotive available, wagons with commodities cannot start from the customer point to the destination. As a result, the customer must ship via truck. These customers suggest that if ENR arranges more trains in accordance with customer needs, customers will increase their railway freight volume. According to the interviews, railway transport is preferable for large volume transport.

3) Need for more cleaning freight wagon

Sometimes, the interviewed customers found nails on the floor of the wagon provided. So packages of commodities are sometimes damaged or cut.
To prevent damage of packages, there should be more cleaning of wagons. Customers need good quality wagons.

4) Need to arrange wagons in accordance with customer schedules

The nature of some commodities requires that they be distributed in accordance with the end user's required schedule. However, sometimes the freight train is not on schedule. As a result, the delayed commodities do not satisfy the end user's need. The end user complains to the supplier and may change to a more reliable supplier. This change of supplier can mean a switch to truck transport. This situation reduces railway freight volume.

To prevent decreases of railway freight volume, ENR must provide freight wagons to customers on time.

3.7 TARIFF STRUCTURE AND TARIFF ANALYSIS

3.7.1 Business and Tariff

(1) Overview of transport sector

1) Privatization

A large shift towards a market economy is about to impact the entire economy of Egypt, and all industries are progressing towards privatization of public sectors, which is being simultaneously implemented to make the market mechanism function effectively. In these circumstances, the transport sectors are no exception, and their tariffs are affected by the market structure.

Railways and aviation are completely in the public sector, administered by the Ministry of Transport. But other sectors like roads and inland waterways are in both the public and private sectors. Therefore they can be called "Public Business Sectors" according to the Public Business Sector Law (1991). The public business sectors of roads and waterways are managed by holding companies administered by the Ministry of Business Sector. The transport sectors are in an intermediate stage towards the privatization, and their tariff policies vary from policies for the private sector to policies for the public sector.

2) Tariff policy and management

The tariff policy of the transport sectors depends on their status, especially the financial situation.

a. ENR

ENR has been suffering from deficits, but its cost recovery ratio (including depreciation cost) improved from 41.6% to 75.9% during 1989/90 to 1994/95. The improvement was mainly from higher tariffs and traffic volume, and government subsidy of the deficit before depreciation. Increases in operating expenditures were principally caused by the rise in general prices permitted by the Policy Committee headed by the Prime Minister during the period from 1989/90 to 1994/95. Other reasons are higher fuel prices, weaker exchange rate of Egyptian pound with foreign currencies, and wages which are obliged to follow rises in the general price level, as recommended by order of the President.

b. Other transport modes

Some public business sectors of other transport modes suffer deficits inflicted by fierce competition with public and private business sectors, but their deficits are not subsidized by the Government. They are still regulated by the Government with regard to personnel policy, tax payments, etc., but not for tariff policy. In this context, the public business sectors of other transport modes have mixed characters of public and private companies.

(a) Passengers
The cost recovery ratios of East Delta Bus Company, Upper Egypt Bus Company, and West Delta Bus Company in 1994/95 were 101.7%, 101.1% and 105.5% respectively, indicating profits, but the Middle Delta Bus Company had a large deficit with only an 80.8% cost recovery

ratio. The average cost recovery ratio of all bus companies was 98.3%, a deficit (see to Appendix 3.3.7).
But in this case, the revenue is total revenue including non operating revenue. Then if the revenue includes only operating revenue, the cost recovery ratio will be changed into 101.0% for East Delta Bus Company, 99.0% for Upper Egypt Bus Company, 104.5% for West Delta Bus Company and 79.9% for Middle Delta Bus Company (see the figures under item 4 "Average Performance/Bus Km" in Appendix 3.3.8(1)).
According to an interview with the Upper Egypt Bus Company, they suffer from a shortage of original spare parts of buses. Even if spare parts of other types of buses are procured, their quality is mixed, and they have lost money as a result. Other reasons for increases of expenditure are the higher prices of solar oil (10 PT in 1993 to 40 PT in 1996), tires, and wages. We also interviewed the East Delta Bus Company and Middle Delta Bus Company. They have similar reasons for recent increasing expenses.

(b) Freight
The cost recovery ratios of three public truck companies have changed from less than 100% to more than 100% from 1993/94 to 1994/95. They are Heavy Transport Company (101.8%), Inland Transport Company (101.0%), and Freight Transport Company (102.8%). The average cost recovery ratio of all companies is 99.4%% in 1993/94 showing still deficits.
According to interviews with the Inland Transport Company, the main reasons for higher costs are : (i) repayment of loans including interest; (ii) higher wages; (iii) higher prices for tractors, solar, and license fees after introduction of the Public Business Law in 1993, (iv) the new sales tax was 10%.
But they are trying to save operating costs by (i) remodeling old trucks, (ii) retraining their own employees. On the other hand, they are striving to increase revenues by (i) improving truck operation efficiency to encourage drivers to make trucks run more than the 160 km./day break even point; (ii) operating the custom duty to save time for handling cost and time.

The cost recovery ratios of both Inland waterway companies (Waterway Transport Company and Riverway Transport Company) were less than 100% from 1988/89 till 1994/95 (financial deficits). They seem to continue to suffer deficits today. The average cost recovery ratio of the two companies was 83.7% in 1994/95.
According to the interview with the Riverway Transport Company, the main reasons for increased costs are price rises for spare parts and motors, steel for ship building, fuel, and wages. The most fundamental and serious problem for this company is the drastic decrease of traffic volume because of the shallow river during the dry season (4 months). Its navigation falls 50% during this season and stops completely for 45 days. A minimum depth of 1.1 meters is required to navigate. They have been striving to develop a new type of boat to navigate at a minimum depth of 83 cm. They have a big shipyard and build the cruiser ships and river buses, to contribute to revenues.

(2) Performance of consumer price indexes

It is very important for tariff policy to recognize the change of tariff as part of the consumer price index (CPI). CPI of transport and communication shows an increase of about 3.9 times from 1986/87 to 1994/95. This increase is the second highest of all groups, after CPI of furniture and equipment (4.8 times). In particular, private transportation increased 5.4 times, but purchased transportation, which is assumed to include tariffs of ENR and other public transportation, increased 3.2 times, which is less than that of private transportation. The large

increases in transportation prices seem to have influenced other consumer prices and the daily lives of people (see Appendix 3.7.1 and Fig.3.7.1).

On the other hand, transport and communication is only 6.85% of the CPI. This is the second lowest category, after furniture and equipment (5.27%). The weights of private transportation and purchased transportation are 3.32% and 2.83% respectively (see Appendix 3.7. 2). But even if the weight of transport and communication is small, it is closely connected to other CPI components. Therefore, a drastic raise of tariffs should be refrained from.

(3) Tariff structure

1) Passenger

a. Railway

(a) Pricing principle
There is no distinct pricing principle for passengers versus freight. The present pricing principle of ENR seems to be based on the following three principles which are common to passenger and freight.

a) Full cost pricing principle
One of the present pricing principles of railways is the "Full Cost Pricing Principle" or " Full Cost Recovery Principle". According to this principle, the tariff level is set so that total revenues from passengers and freight will recover total costs of passengers and freight.

ENR has a railway network in the whole country (except desert areas). The conditions of supplying service and demand differ on each line, with large differences in costs and revenues. Nevertheless, ENR calculates costs and tariff levels for passengers and freight on a national basis.

During the era of monopolized transport by railway, ENR could maintain a balance of profit and loss by cross-subsidization between profitable and unprofitable lines, but cross-subsidization has begun to fail, creating deficits, as competition arose from motor transport on the expanding road network. The unified national tariff is relatively expensive on lines with high traffic density and low unit costs. The tariff is too low on lines with low traffic density and high unit costs.

If the principle of individual cost pricing is applied, tariffs will be based on cost and revenues of each line. According to data from the Financial and Budget Department of ENR, cost of Turbo/Spanish train between Cairo and Alexandria is estimated as 17,221 LE based on the following assumptions : (i) 10 coaches; (ii) 208 km route; (iii) unit weight of coach and passengers = 490.4 ton (451.4 + 39); (iv) 102 ton km; (v) unit costs are variable costs; (vi) ton/km, train/km, turbine unit/km, and wagons/trip are fixed.

Revenue of this Turbo/Spanish train is estimated as 34,050 LE on the basis of : (i) 74,569,000 LE total revenue in 1994/95; (ii) 2190 train operations (6 trains/day x 365 days). The cost recovery ratio is calculated at 1.98, showing high profitability. But this tells us that tariff/cost of this train is relatively high compared with other trains, i.e. normal and express trains for 2nd and 3rd class. It appears that Turbo/Spanish trains are cross-subsidizing other trains.

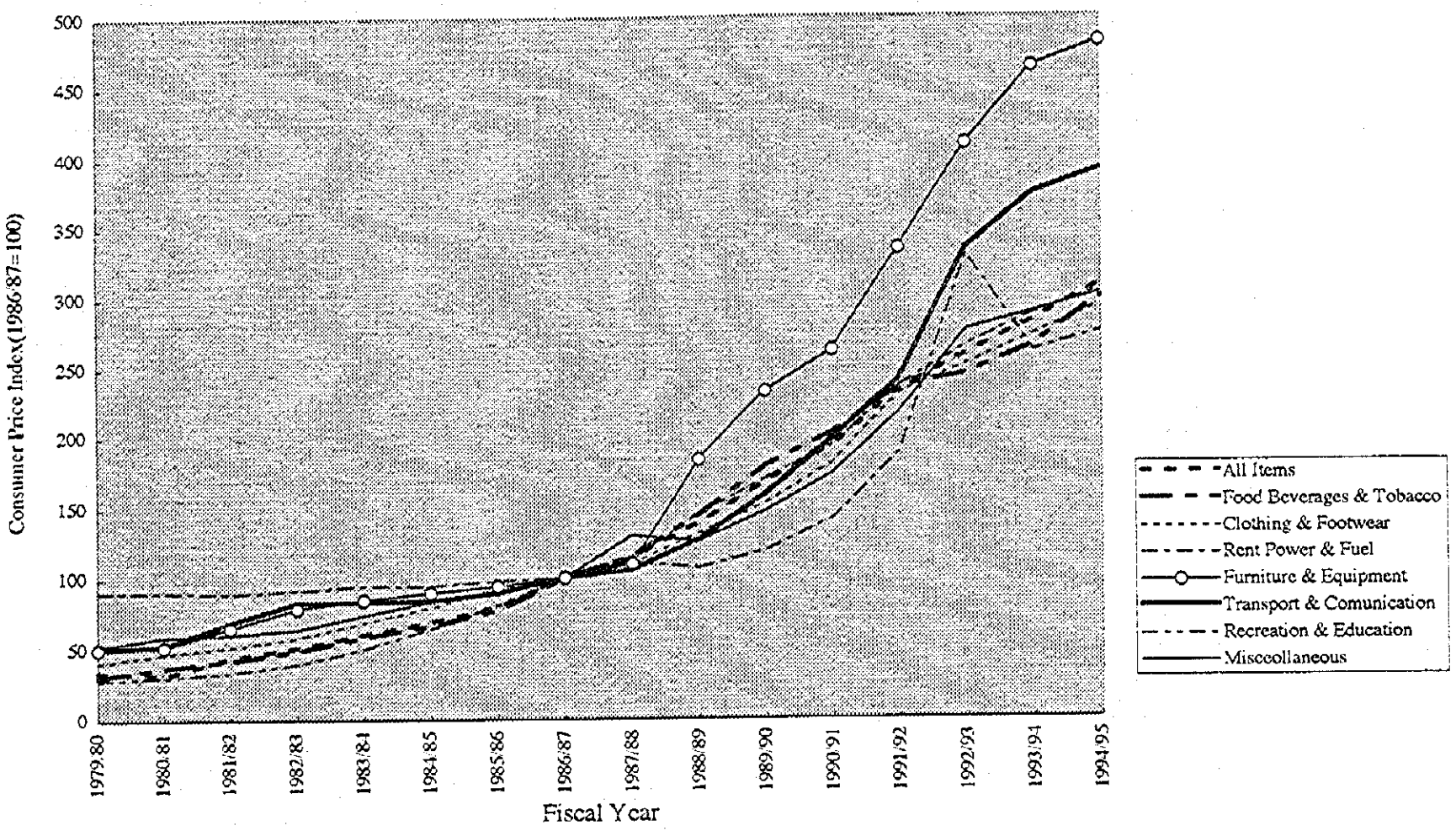


Fig. 3.7.1 Performance of Consumer Price Indexes For Main Groups of All Urban Population

b) What the traffic will bear principle

The other pricing principle of ENR can be considered to be "What the traffic will bear principle". This principle is not clearly explained in ENR regulations, but seems to be implicitly applied to the passenger tariff system.

According to this principle, tariffs will be decided by payment abilities of passengers. High income passengers are expected to bear a high tariff. But there is an important precondition that this principle is reasonable only when cost is less than tariff.

Nevertheless, actually there are many lines on which tariff seems to be lower than cost. For example, there are many low income passengers on suburban and branch lines, and their tariff level is kept low in spite costs which exceed the tariff. The deficits caused by suburban lines seems to be cross-subsidized by profitable lines with passengers in 1st class with A/C, and 2nd class with A/C. But as a whole, this practice is not appropriate for the increasingly competitive transport market.

c) Discounts for distance

Tariff per km is reduced as travel distance lengthens. Travel is categorized into some zones by category of line and by type of class. Tariff for long distance is cheaper per km than short distance travel. This is a kind of discount for long distance passengers. Details are explained in the following section.

(b) Tariff structure

ENR Passenger tariffs are classified as follows :

a) Main and branch lines

Passenger tariffs of main and branch lines are classified into (i) 1st Class, A/C (only main lines); (ii) 2nd Class (normal); (iii) 2nd Class, A/C; (iv) 3rd Class. 1st Class (normal - not AC) is not actually provided but this tariff is applied to calculation for discounting of some special passengers like soldiers. These tariffs are classified according to five ranges of distance (km): (i) 1 - 40; (ii) 41 -100; (iii) 101 - 300; (iv) 301 - 500; (v) > 500.

Tariffs per passenger km are the same from 1 km to 300 km, for each kind of tariff except 3rd Class, but tariffs differ for distances exceeding 301 km. Tariffs/km for long distances are cheaper than for short distances. This is a kind of discount for long distance passengers. Tariff of 1st Class, A/C are 7.98 PT/pass-km for distances from 1 to 40 km, which is 6.6 times of the tariff of 1.21 PT/pass-km for 3rd Class. For distances over 500 km, the 1st Class, A/C tariff is 5.31 PT/pass-km, which is 9.0 times the 3rd Class tariff (0.59 PT/pass-km). As the distance increases, the difference of tariff between 1st Class, A/C and 3rd Class increases (see Appendix 3.7.3).

b) Suburban lines

Suburban lines are classified into three categories: (i) Suburban Lines which are regionally operated on direct lines; (ii) the Urban Line between Alexandria and Abu Quir; (iii) Metro Underground between Helwan and El Marg.

Category (i) (Suburban Lines) is classified into 1st and 2nd class, but substantial tariff level is 2nd and 3rd class respectively. Tariffs of the Urban Line and Metro Underground are not categorized by class, but a unified class is applied.

Minimum tariffs of urban line and Metro underground are 30 PT per passenger, and zone tickets are issued according to the following zones :

[Urban Line]

	1 Zone	2 Zone	3 Zone	4 Zone	5 Zone
Distance	1 - 12 km	13 - 24 km	25 - 36 km	37 - 48 km	49 - 60 km
Tariff	30 PT	35 PT	40 PT	45 PT	50 PT

[Metro Underground]

	1 Zone	2 Zone	3 Zone	4 Zone	5 Zone
Zoning	9 Stations	16 Stations	22 Stations	28 Stations	33 Stations
Tariff	30 PT	50 PT	60 PT	70 PT	80 PT

c) Discount system
There are many kinds of discounted tariffs in ENR

i. Discount for marketing
There is a 25% discount for daily round trip for 1st, 2nd and 3rd Classes, and a 10% discount for monthly round trip. A 66.7% discount is given to groups of more than 50 students, foreigners, and domestic tourists. A special 50% discount is given to planned tickets and round trip tickets.

ii. Discount for social policy
A 50% discount is given to soldiers and blind people, and a 75% discount is given to handicapped old soldiers.

d) Penalties and no paying passengers
Conductors collect the tariff and penalties from passengers who get on the train without a ticket or pass. The maximum charge is 300PT, which is for 1st Class/AC on turbo trains and the like, and for express trains on the Upper Egypt line. The minimum charge is 25PT for 3rd Class. But it is very difficult for conductors to collect tariffs on crowded trains. According to interviews with ENR's Commercial Department staff, lost revenues from non-paying passengers are approximately 15% to 20% of total revenues from 2nd and 3rd Class ENR passengers. This is a very serious problem for ENR.

e) Tickets types

ENR has the following types of tickets :

i. Normal ticket
Tickets for main and branch lines are categorized by class and A/C, as mentioned above. Tickets for suburban lines are unified tickets.

ii. Seasonal ticket
Seasonal tickets are classified into three categories : (i) Direct Lines (Main/Branch Lines); (ii) Suburban Lines; (iii) Kilometer tickets.

(i) Direct lines (Main/Branch lines)
Seasonal tickets for direct lines are divided by type of job as follows: (i) workers of private sector; (ii) public sector workers and governmental officials; (iii) students. Validity periods are 1, 3, 6, 9, and 12 months. Basic tariffs are set by type of job and travel distance. The basic tariff of public sector workers, governmental officials, and students, are lower than for private sector workers. Especially, the basic tariff for students is only 0.00144PT/km for distances from 1 to 260 km, which has not changed since 1942, which is incredible.

The number of trips are set up by distance as follows.

Distance (km.)	Number of Trips/Month	Distance (km.)	Number of Trips/Month
1 ~ 15	12	71 ~ 80	7.50
16 ~ 30	12	81 ~ 90	7.00
31 ~ 40	11	91 ~ 100	6.50
41 ~ 50	10	101 ~ 110	6.25
51 ~ 60	9	111 ~	6.00
61 ~ 70	8		

We estimated average discount rates for seasonal tickets by type of job for all classes assuming : (i) 30 trips per month; (ii) average validity period is 6 months; (iii) 20 km average trip distance. The estimated average discount rates are as follows.

- Private sector workers : 73%
- Public sector workers and governmental officials : 86%
- Students : 99%

These discounts rates are abnormally high compared with other countries. Especially the discount rate of student is extremely high and is almost free.

(ii) Suburban Lines
Seasonal tickets for suburban lines are classified by type of job as follows : (i) private sector workers; (ii) public sector workers and governmental officials; (iii) students. Validity periods are 1, 3, 6, 9, and 12 months. Tariffs are set by type of job and by distance. Tariffs for students are lower than those for public sector workers and governmental officials, and private sector workers. But tariffs of private sector workers are almost the same as for public sector workers and governmental officials.
The number of trips are set at 20 trips per month for all job types, regardless of distance.
We estimated average discount rates for seasonal tickets by job type using the same assumptions as for direct lines. The estimated average discount rates are as follows.

- Private sector workers: 74%
- Public sector workers and governmental officials : 85%
- Students : 97%

These discounts rates are also abnormally high. Especially the discount rate for students is extremely high and is almost free.

iii. Kilometer ticket

The kilometer ticket is a kind of seasonal ticket, and is issued for all lines and categorized as follows :

- 2,000 km. for 3 months (1st class: 77 LE, 2nd class: 41 LE)
- 3,000 km. for 3 months (1st class: 101 LE, 2nd class: 53 LE)
- 5,000 km. for 6 months (1st class: 149 LE, 2nd class: 77 LE)
- 10,000 km. for 9 months (1st class: 264 EP, 2nd class: 134 LE)

iv. Conductor tickets

A Conductor Ticket is issued for passengers without a ticket, and includes a penalty. The amount of penalty differs by line and service level.

b. Inter-city bus

(a) Pricing principle

As mentioned above, the road transport market is almost a free market for both passenger and freight transport. Therefore, tariffs are set depending on the market price.

According to interviews at public bus companies, they are conducting strict costing for their transport by each line. If their buses cannot compete with other transport modes on a line, and do not expect to become profitable, they strive to rationalize their business by decreasing the number of buses and frequency, or they suspend bus operations for a short period. But they cannot close the lines, even if they suffer from deficits.

(b) Tariff structure

The inter-city bus is administered under the Holding Company for Transport, but the bus transport market is almost a free market. There is no fixed tariff structure like for ENR. The type of service differs by bus company, but is generally categorized into (i) Normal, (ii) Express, (iii) Deluxe, (iv) A/C, (v) A/C & Video, and (vi) High Deck. Average fares for the four public bus companies are shown in Appendix 3.7.4 ~ 3.7.7.

According to the estimated average fare per passenger km, the fare usually is cheaper for longer distances (Appendix 3.7.8 ~ 3.7.11). For example, the average fare for East Delta Bus Company for distances from 201 to 300 km is as follows :

- Normal/Express : 3.67 LE
- Deluxe : 7.10
- A/C : 8.16
- A/C & Video : 9.58
- High Deck : 12.50

The fare of high deck buses is 3.4 times of the tariff on a normal/express bus.

The average fare per pass-km. was estimated for 250 km as follows:

- Normal/Express: 1.47 PT/pass.km
- Deluxe: 2.84
- A/C : 3.26
- A/C & Video : 3.83
- High Deck : 5.00

The following figures are the tariff of ENR for distances from 101 to 300 km.

- 3rd class : 1.12 PT/pass.km
- 2nd class : 2.58

- 2nd class, A/C : 4.80
- 1st class, A/C : 7.98

Railway tariffs for low quality service like 3rd Class and 2nd Class without air condition are cheaper than similar service on buses (normal/express and deluxe). On the contrary, the tariffs of high quality service like 2nd Class A/C, and 1st Class A/C are more expensive than for similar bus service like A/C, A/C & video, and High Deck. The tariffs of suburban lines and short distances on main and branch lines is generally almost the same or cheaper than bus or taxi. Especially seasonal tickets are issued for workers and students. These tickets are substantially discounted.

c. Inter-city taxi

(a) Pricing principle
As mentioned above, the road transport market is almost a free market for both passenger and freight transport. Therefore, tariff levels are set depending on the market price. But there is an agreement on tariffs through the governorate unions, so each taxi owner cannot freely change its tariffs.

(b) Tariff structure
In the National Transport Study II in 1981, the system for pricing was established. In this system, the method of costing for vehicle operation was studied in detail. Taxi tariffs was decided on the basis of this system for costing.
There are no taxi companies in Egypt except for service between airport and city. All taxi operators belong to taxi unions. There is no fixed tariff structure like ENR. When they want to raise the tariff, the unions review the vehicle operating cost as a basis for tariffs, taking into account price rises of fuel, spare parts, driver wages, etc. The higher tariff is proposed first of all to the Governorate to which the unions belong. Then the Governorate studies and checks the rationality of the higher tariff. If the Governorate has no objection, it permits the higher tariff.
If the Governorate has some objections, it negotiates with the unions until they reach an agreement. The taxi unions can independently propose a tariff raise to the Governorate, and the Governorate and unions can negotiate without any control from the central government.

2) Freight

a. Railway

(a) Pricing principle
There are two pricing principles for ENR freight :

a) "What the traffic will bear" principle
Tariffs are decided by the principle of charging "What the traffic will bear". "What the tariff will bear" is evaluated according to the value (market price) of a commodity.
According to this principle, tariffs are set by the value of goods owned by the consignor. High value goods require higher tariffs. But there is also an important precondition that this principle is reasonable only when cost is less than tariff.

Nevertheless, on some ENR lines, tariffs seem to be lower than costs. The same kind of problems in passenger transport occur in freight transport.

According to the present freight structure, tariffs of commercially high value cargo like fresh vegetables (category 3) pay high tariffs, but are light in weight, so transport cost is cheaper than heavy and bulky cargo like stones, iron ore and so on. Tariffs of these heavy and bulky cargoes are cheaper than high valued goods but their transport costs are more expensive than high valued goods. An important exception is that tariffs of iron ore are decided based on transport cost. But as a whole, this principle is also unsuitable to the present competitive transport market.

If individual cost pricing principle is applied, tariffs will be set on the basis of individual cost and remuneration of the freight line will be clear. According to data of ENR's Financial and Budget Department, cost of freight trains is estimated as 32,520 LE for a box wagon and 32,853 LE for an open wagon, assuming (i) 250 km transport distance; (ii) 30 wagons; (iii) 1500 ton train loading capacity; (iv) 790.327 ton average train load; (v) unit weight of empty wagons are 24 tons (open wagon), 29 tons (box wagon); (vi) average empty distance for return trip is 97.1% (open), 80.35% (box); (vii) unit costs for variable and fixed costs of ton/km, train/km., locomotive/km, wagon/km, wagon/day and wagon/trip for box and open wagon are assumed. Cost for one way with loading (excluding return trip with empty wagons) is estimated as 20,260 LE for box wagon, and 19,595 LE for open wagon.

On the other hand, revenue of trains for cement is estimated at 6,475 LE, wheat at 10,330 LE, and fertilizer at 4,183 LE on the basis of data from ENR's Commercial Department, assuming : (i) 250 km; (ii) average revenue per-ton km in 1994/95 for cement (0.03277 LE), for wheat (0.05228), and for fertilizer (0.02117) in 1994/95. The cost recovery ratio is as follows.

The cost recovery ratios of all commodities for round trips including empty wagons for return trip are less than 100% and not profitable, and the ratios for one way without return trip of empty wagons are slightly better but still not profitable. It is very obvious that tariff of freight are extremely lower than cost.

	Box Wagon		Open Wagon	
	Round trip (Including Empty Wagon)	One Way (Excluding Empty Wagon	Round trip (Including Empty Wagon)	One Way (Excluding Empty Wagon)
Cement	19.9%	32.0%	19.7%	33.0%
Wheat	31.8%	51.0%	31.4%	52.7%
Fertilizer	12.9%	20.6%	12.7%	21.3%

b) Reduction by distance

Tariff/km is reduced for longer distances. Distance has three categories (km): (i) < 250; (ii) 251 ~ 500; (iii) > 500. Commodities are classified into 11 categories (3 to 13). Categories 1 and 2 were assigned to category A. Cargoes in Category A are treated as parcels for express passenger trains (see Appendix 3.7.12). Tariff/km of each category is cheaper as distance increases, and as the category level increases from A to 13. Category A cargo has is assumed to have the highest value, and category 13 the lowest value. For example, the tariffs in

category 3 for distance from 251-500 km is 43.85 milliems per ton-km which is 8.5 times the price of category 13 (5.16 milliems per ton-km). This is a significant difference (see Appendix 3.7.13)

(b) Setting current tariffs
Tariffs for each route are fixed based on the two pricing principles mentioned above, according to type of shipment and density of commodity.

a) Types of shipment
There are three types of shipment as follows.

i. Bagged Cargo
ENR has responsibility for loading and unloading, providing invoice for weight (unit weight per bag, total weight, number of bags), guarantee for cargo by ENR Police and by insurance system, and keeping cargo in warehouse.

ii. Bulky Cargo
Bulky cargo is classified into two categories.

(i) Bulky in Nature
Examples of "Bulky Cargo in Nature" are water, petroleum, sand, and wheat.

(ii) Cargo Treated as Bulky
This category of Bulky Cargo is treated as "Bulky" even if it is "bagged". This kind of cargo is loaded from a factory which has a siding facility. ENR only has responsibility for providing an empty car at the loading point and transport it to the destination station. Consignors are responsible for loading, unloading, and insurance (if desired, they may purchase insurance for their commodities from ENR). But especially cotton and fertilizer must be insured by ENR. ENR is responsible only for transport of freight of weight written on the invoice. ENR does not care whether accurate weight of cargoes written on the invoice is transported or not, even if the number of lots is written on the invoice by request of consignors.

iii. Flat Rate Cargo
A flat rate is applied to any cargoes which are transported less than 1,500 km and weigh less than 1,000 kg. The minimum tariff is 80 PT per kg-km for distances from 1 to 50 km, and weight from 1 to 50 kg. The maximum tariff is 4,200 PT (4.2 LE) per kg-km for distances from 1,450 to 1,500 km and weight from 950 to 1,000 kg.

Only limited quantities and types of commodities are transported by ENR as Flat Rate Cargo. Most of this transport has been taken over by trucks, and the Flat Rate Cargo tariff item is largely unused. This tariff item played an important role in the era when the railway dominated freight transport.

b) Density of commodity
Bagged Cargo and Bulky Cargo are categorized according to the density of a car load with capacity of 10 tons. The density of cargo per wagon is classified into four degrees: F (4 tons); G (6 tons); H (7.5 tons); and K (10 tons) (see Appendix 3.7.14). The tariff is classified by density degree and whether it is a full carload or less than a carload. The actual tariff is

decided by referring to detailed ENR regulations. A summary of the tariff calculation process is :

- identify cargo type (bagged or bulky).
- measure cargo weight.
- identify transport distance.
- identify category of cargo from 3 to 13 based on the principle of charging what the traffic will bear.
- identify degrees of cargo density from F to K.
- differentiate cargo between "car load" and "less than car load".

i. "Less than car load" density

(i) Bagged cargo
Bagged Cargo which is less than a carload has its category upgraded, usually one step (i.e. to 11 from 12). The Consignor can pay the tariff for the actual weight based on this upgraded category (i.e. 11), or it can pay the tariff of its original category (i.e. 12) based on its car load density. Consignors select the cheaper of these two tariffs.

(ii) Bulky Cargo
Commodities with less than car load density for Bulky Cargo is not upgraded then normal category is applied. The tariff is not based on actual weight but on weight of degree of car load, in other words for a full wagon. Therefore, consignors can reduce tariffs by classifying as "Bagged", not "Bulky". Tariff of Bulky Cargo is not calculated based on actual weight.

ii. Commodity of car load density

(i) Bagged Cargo
Tariffs of Bagged Cargo are fixed according to actual weight, commodity category, and weight based on car load density.

(ii) Bulky Cargo
Tariff of Bulky Cargo is fixed in the same way as for Bagged Cargo.

iii. Commodity more than car load density

(i) Bagged Cargo
Tariff of Bagged Cargo is fixed based on actual weight, commodity category, and weight based on car load density.

(ii) Bulky Cargo
Degree of car load density is set for Bulky Cargo in the same way as for Bagged Cargo. But for Bulky Cargo, tariff is always charged for a full car load, regardless of whether the car load is full or not. If a car load is not full, the consignor may end up paying more transporting as Bulky Cargo, than if classified as Bagged Cargo. A sample calculation is shown in Appendix 3.7.15 .

(c) Tariff by commodity for main routes

Appendix 3.7.16 shows the tariff for main commodities by route. Generally it can be said the average tariff/km of a long length haul is cheaper than for a short length of haul. The average tariff of phosphate is the cheapest (11.5 milliem/ton-km) with average 780 km haul, followed by crude sugar with average tariff of 16.5 milliem/ton km and average 625 km haul. The average tariff of petroleum products is 20.0 milliem/ton-km, although it has the longest average length of haul (850 km). All iron ore is transported by railway based on a contract between the consignor and ENR at a special tariff. The average tariff is 71.5 milliem/ton-km.

The highest average tariff is for wheat (74.4 milliem/ton-km) with average haul length of 195 km. Second highest is iron ore (71.5 milliem/ton-km ; 346km.). We compared the average tariff mentioned above with the average tariff calculated based on tariff tables. It must be noted that all average tariffs per ton-km and average tariff per ton based on tariff tables are considerably less than actual tariffs. This is because the actual tariffs include the following additional charges :

- Cost for treatment at station for every ten kg (7 milliems).
- Additional charges for every commodity (100%).
- Cost for processing loading and unloading for every 10 kg (600milliems).
- Fee for contract documents (180 milliems).
- Stamp and development tax for national resources (1 LE).
- Another stamp and development tax of national resources (400 milliems).
- Premium for saving funds for retired workers of ENR for every 1 ton (250 milliems) not only on rail tariff but other costs such as loading and unloading cost, charges for insurance of cargoes for damages and loss according to contracts between consignor and ENR.
- Other tax (600 milliems).

b. Truck

(a) Pricing principle

As already mentioned above, the road transport market is almost a free market for both passenger and freight. Therefore, tariffs are set according to the market price.

According to the interview at the Inland Truck Company, they are carrying out cost calculations by route and by commodity. Tariffs are decided by taking account of the transport cost. But it is recognized that they can more easily calculate costs than railways, because they do not need to consider maintenance costs for roads and it is very easy to calculate the cost of a bus or truck. On the contrary, there are many difficulties in calculating costs for railways as follows: (i) Division of variable costs for passenger and freight transport; (ii) Division of fixed costs of passenger and freight transport; (iii) Division of unit train costs into each composite wagon or coach.

(b) Tariff structure

The truck transport market is almost a free market. Tariffs are decided by contract between the truck company and consignor. Therefore, there is no fixed tariff structure. The average tariff is based on the transport cost of 65 milliems per ton-km. On the basis of this average cost, the actual tariff is decided by contract, taking account of type of goods, transport conditions like road condition, season, fuel consumption, geographic condition of delivery area, truck capacity, etc. According to the interview with Cairo Governorate Trucking

Cooperatives, they have their own tariff system. Tariff for agricultural products of the Ministry of Supply is 15 LE per ton transported less than 150 km, and 66 milliems are added for each additional kilometer exceeding 150 km. The tariff for sugar of the consignor Sugar Company controlled by the Ministry of Industry is 7 LE per ton for hauls less than 100 km, and 33 milliems added for each additional kilometer exceeding 100 km.

ENR fares are generally cheaper than truck fares. The average revenue of ENR freight in 1994/95 was 34.7 milliems per ton-km, which was cheaper than the average transport cost by truck (65 milliems per ton-km). But total ENR transport costs including storage, loading, and unloading, are not always cheaper than truck transport.

For the Inland Transport Company, the average fare/km of a long distance haul is cheaper than a short distance haul. This is similar to ENR. The average fare of metal and metal products is the cheapest as 49 milliem/ton km with the longest haul of 1,000km. Fertilizer has the lowest average fare (same as for metal and metal products) in spite of its shorter average haul of 360 km. The highest average fare is for phosphate at 90 milliem/ton-km for average hauls of only 100 km. The second highest average fare is 63 milliem/ton km for 162 km average haul. We compared the average ENR and truck fare per ton-km and per ton, calculating based on the ENR and truck fare tables. Average ENR fares (per ton-km and per ton) are much lower. The main reason for this difference is that ENR fare tables do not include terminal costs like cargo handling cost, insurance charges, etc., as already mentioned.
Traffic volume of Inland Transport Company is as follows. Major commodities transported by Inland Transport Company are iron blocks (33.7% of its ton-km and 33.8% of its tons), wheat (16.1% of ton-km and 16.2% of tons), phosphate (10.9% of ton-km and 12.6% of tons), and mixed commodities (11.4% of ton-km and 11.5% of tons). (See Appendix 3.7.17)

Comparing ENR and truck by commodity without regard of difference of zone, commodities with cheaper average ENR fare are phosphate (ENR: 11.5 milliem/ton-km; truck: 90 milliem/ton-km), sugar (ENR: 16.5 milliem/ton-km and 33.9 milliem/ton-km; truck: 51 milliem/ton-km) and fertilizer (ENR:23.1 milliem/ton-km and 20.6 milliem/ton-km; truck: 49 milliem/ton-km). On the contrary, ENR tariffs are higher for wheat (ENR: 74.4 milliem/ton-km; truck: 57 milliem/ton-km). (See Appendix 3.7.18)

The average fare/km for long hauls is usually cheaper than for shorter hauls. But it is also noticeable that the average fare of sugar from Kus to Gerga by railway (43.5 milliem/ton-km) is cheaper than the one from Alhawamdia to Upper Egypt by truck (51 milliem/ton-km), although the railway haul distance (145 km) is shorter than that of truck (450 km). This case is an exception to the normal relation between average fare and haul. There seems to be some special reasons for this case regarding transport condition including routes, transport cost, geographical condition, etc.

c. Inland waterways

(a) Pricing principle
As already mentioned above, the inland waterway transport market is mostly a free market. Therefore, its tariff level is decided by contract depending on the market price.

(b) Tariff structure

Inland waterway transport is almost a free market, with no fixed tariff structure. But taking account of the transportation characteristics of inland waterways (large capacity, slow but cheap, safe, low air pollution), inland waterways have a similar competitive situation as railways. Therefore, it seems there is not a considerable difference of tariffs between them. The average revenue of two inland waterway companies in 1994/95 was 31.5 milliems per ton-kilometer, which was slightly cheaper than for ENR (34.7 milliems/ton-km).

Comparing fares of the Riverway Transport Company with ENR for main routes and commodities, the average fare of waterway (milliems per ton-km) is considerably higher than of ENR. Especially, the fares of petroleum products on waterways for all routes are higher than that of ENR, mainly because the transport distance of waterways are shorter than that of ENR. But taking this into account, the average waterway fare is still relatively higher than the ENR tariff. For example, the fare of waterways between Asyut and Aswan is 41.9 milliems per ton-km (632 km haul). The ENR tariff between Suez and Qena is 9.4 milliems per ton-km (850 km haul). The ENR haul is 1.34 times that of waterways but the ENR fare is much cheaper (1 / 4.46) (See Appendices 3.7.16 and 3.7. 19).

(4) Tariff regulation

1) Railways

There is no special regulation by the Government with regard to tariffs for railways except for tariff revision. When ENR wants to raise its tariff, it proposes to the Ministry of Transport the percent of tariff raise. If the Minister of Transport approves the tariff raise, he will submit the tariff revision with percentage of tariff raise to the Prime Minister. If the Prime Minister approves the tariff revision, he will sign the revision and the tariff will be revised. If the Prime Minister does not approve the revision, ENR reinvestigates the percentage of tariff raise and proposes a revised percentage of tariff raise to the Ministry of Transport. After the approval of the Minister of Transport, he will submit the revised proposal to the Prime Minister to get his signature.

There was no tariff revision before 1982 for passengers, nor before 1979 for freight. But after 1989, tariffs were revised every year for both passengers and freight, except suburban lines and season tickets for students (see Appendix 3.7.20). In the past, tariffs of suburban lines and season tickets were sometimes not raised every year. Users of suburban lines are mostly commuters with low income levels. Furthermore, the tariff levels are comparable to other modes such as bus and taxi. Therefore demand elasticity to tariff of suburban lines is assumed to be high (that is to say, demand elasticity is less than -1.0). If tariffs of suburban lines are raised, passengers on the lines would change to competing modes. On the contrary, the demand elasticity to tariff level of students on the lines seems to be relatively low, but a tariff raise of their season tickets will be a big financial burden for students. So their tariff raise should be as small as possible from the view point of social welfare.

2) Road

There is no regulation at all with regard to tariff level. In the public bus companies, a proposal to raise tariffs is submitted to the Board of Directors in each company. When the Board of Directors approves the proposal, it is submitted to the Holding Company. But a tariff raise of service charges like A/C or video needs to be submitted only to the Board of Directors.

After the annual 15% tariff raise during 1990 to 1994 was permitted by the Policy Committee headed by the Prime Minister, all sectors of road transport could have raised their tariffs without annual permission by the Ministry of Transport. But they are not obliged to raise tariffs. Bus companies have raised tariffs carefully taking account of the tariffs of competitive modes on each route.

Some public bus companies have reduced tariffs on some routes to compete with other modes. Permission of the Holding Company is not necessary for tariff reduction. For example, the Upper Egypt Bus Company has raised tariffs at different rates by route and by type of service. It seems to change tariff level by observing market conditions like tariffs of other competitive modes and change of transport cost. The average annual tariff raise during 1989/90 to 1994/95 ranged from 2.13 % (normal class : Giza ~ Beni Suef) to 12.82 % (deluxe class : Helwan ~ El Menia) (see Appendix 3.7.21 ~ 3.7.22).

Truck companies seem to have also raised their tariffs. Inland Transport Company has raised tariffs in the range from 8% to 15%, by contracts with consignors from 1989/90 to 1994/95. Unlike ENR, the percentage of tariff increase is different for each commodity. The highest average raise was for iron and iron blocks, and wheat (15%). The lowest was for fertilizer (8.8%). It is heard that they strictly compare the transport cost by commodity and by route, and they have been very careful not to lose customers by excessive tariff increases (see Appendix 3.7.23).

3) Inland waterways

The inland waterway sector is in the same situation as the road transport sector. It is not obliged to raise tariffs, but has set tariffs by contracts with consignors. For example, the Riverway Transport Company has changed tariffs in different percentages by route and by commodity. The highest average tariff increase was 18.58% for clay (Aswan ~ Tebeen) as during 1989/90 to 1994/95, and the lowest increase was 6.96% for tar (El Maleh in Alexandria ~ Nag Hammady). But the tariff of molasses did not changed for these five years. It is noticeable that the tariffs of all routes of petroleum products increased more than 18 % yearly during the same period (see Appendix 3.7. 24 ~ 3.7.25).

3.7.2 Tariff Elasticity Analysis of Traffic Demand

(1) Analysis of traffic survey

The Study Team carried out a traffic survey during the period from Dec. 28, 1995 to Jan. 3, 1996. The following analysis is based on the results of this traffic survey.

1) Passengers' evaluation for service by mode

62.0% of railway passengers said ENR is "cheap", and 79.5% said it is "very safe". These percentages are the highest of all modes. On the contrary, 73.6% of bus passengers are "very satisfied" with comfort, and 69% say buses are "very safe". 74.1% of shared taxi passengers say they are "very convenient", 75.8% are "very satisfied" with comfort, and 62.8% say taxi travel time is "very short". Passenger evaluation of ENR travel time and convenience are the lowest of all modes. (see to Appendix 3.7.26 and Fig. 3.7.2 ~ 3.7.6)

We can conclude from these results of traffic survey that the ENR fare is more contestable than other modes, and its increase must be carefully carried out.

2) Affordability of tariff increase

a. Affordability of tariff increase by mode

(a) Railway

ENR passengers were asked about their maximum willingness to pay for increased tariffs (10%, 25%, 50%, 75% or 100%). 29.8% of the total number of passengers (4,984) answered "100% Up". This answer indicates that the tariff level is basically low. Especially seasonal tickets have large discounts, and some passengers do not feel the fare is a big financial burden.

On the other hand, 21.0% said they can only pay a maximum "10% increase". This means that there are many low income passengers.

21.6% said they will "Use Other Modes" if the tariff increases. This indicates that about one fifth of passengers can convert to other modes in response to any tariff increase. They are highly sensitive to the fare level. Only 3.4% said they will "Never Use Other Mode". This 3.4% has no intention to use other modes of transport, for many reasons. For example, (i) the railway has a much lower tariff than any other mode, (ii) the railway is very convenient, (iii) the railway is the only mode available to them, etc.

But we should note that the other 96.6% of passengers (including 21.6% for "Use Other Modes") have some potential to shift to other modes. For example, if the ENR tariff is raised by more than 10% (i.e. 15%) there is a possibility that 21.6% of passengers will shift to other modes. Then the demand elasticity to tariffs would be -1.44 (- 21.6/15). But 21.0% of ENR passengers also said they will use other transport if tariffs are raised by 10%. If some of these passengers also shift to other modes, the demand elasticity will increase more than 1.44 (see Appendix 3.7.27 and Fig. 3.7.7).

(b) Bus

Bus passengers were interviewed at bus terminals. Of 3,431 of passengers interviewed, 18.9% of passengers said they will switch transport modes if tariffs are raised 10% (compared to 21% of ENR passengers). 18.7% of passengers said they could pay up to 100% more (compared to 29.8% of ENR passengers). This indicates bus tariffs are higher than ENR tariffs. 34.6% of bus passengers say they "Will Use Other Modes" if tariffs are raised at all (compared to 21.6% of ENR passengers). This indicates bus passengers are relatively more sensitive to tariff increases than ENR passengers. (see Appendix 3.7.27 and Figure 3.7.7)

(c) Shared taxi

Shared taxi passengers were interviewed at taxi terminals. Of 3,584 of interviews, 20.5% said they can pay up to 10% more (compared to ENR: 21% and bus: 18.9%). 18.8% said they can pay up to 100% more (compared to ENR: 29.8% and bus: 18.7%). This indicates that shared taxi tariffs are higher than ENR tariffs, and about the same as bus tariffs. 29.1% said they will switch modes if tariffs are raised (compared to ENR: 21.6% and bus: 34.6%). This indicates that shared taxi passengers are more sensitive to tariff raises than railway passengers (see Appendix 3.7.27 and Fig. 3.7.7).

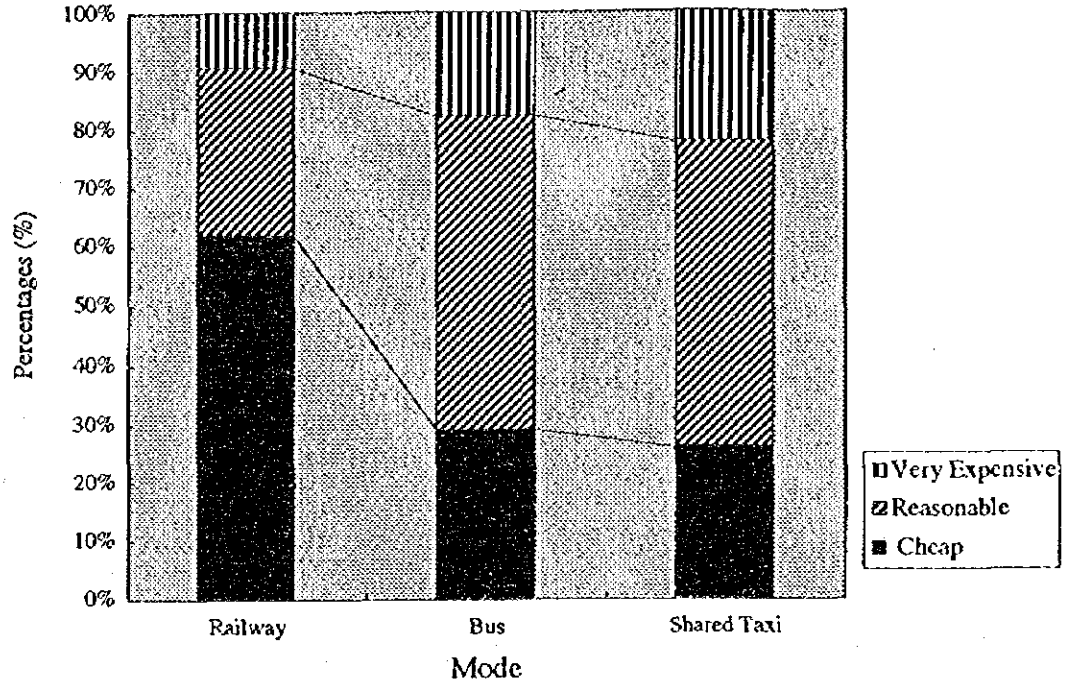


Fig. 3.7.2 Evaluation for Service Characteristics by Mode (Travel Cost)

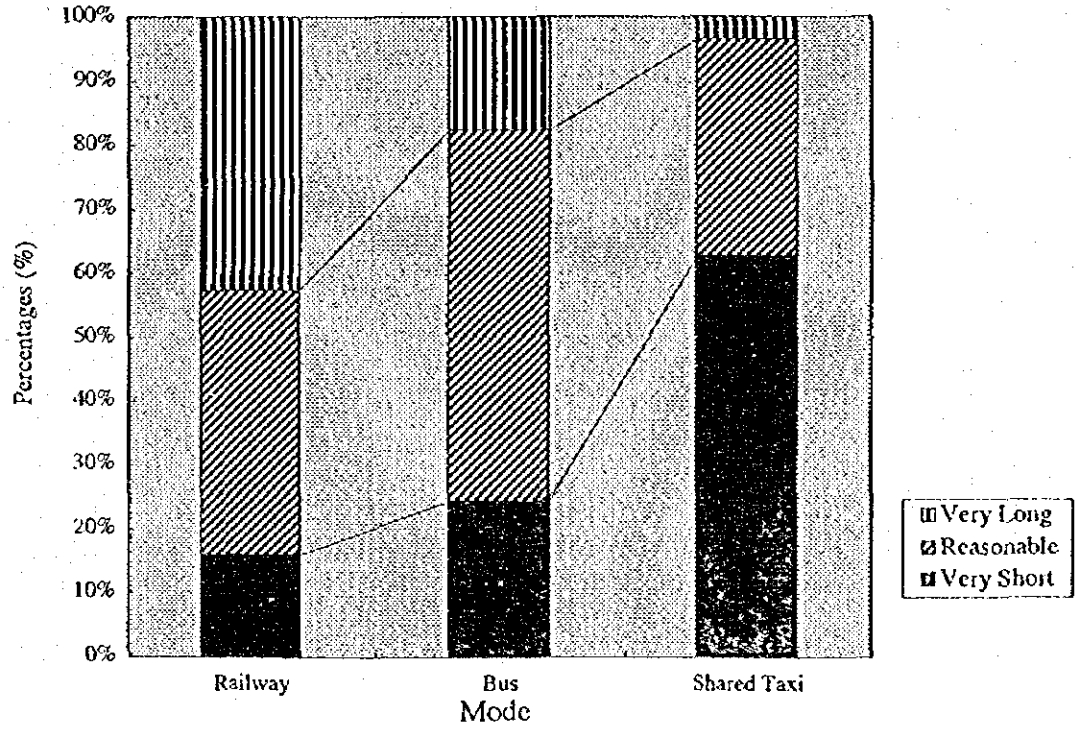


Fig. 3.7.3 Evaluation for Service Characteristics by Mode (Travel Time)

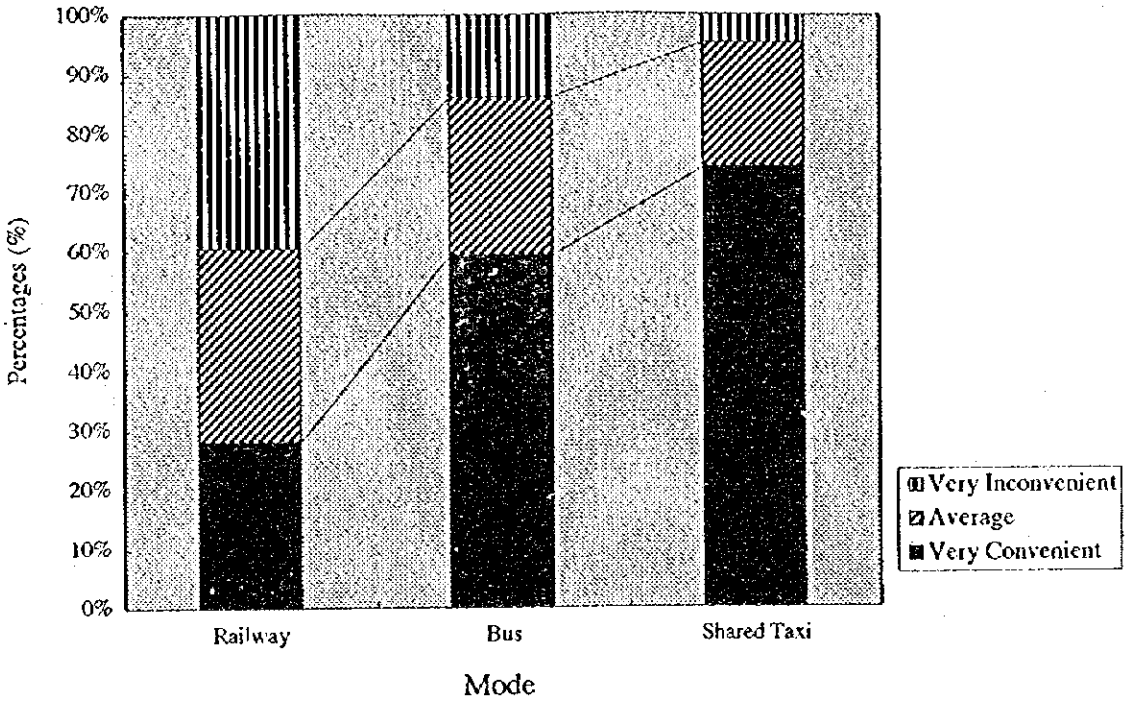


Fig. 3.7.4 Evaluation for Service Characteristics by Mode (Convenience of Frequency)

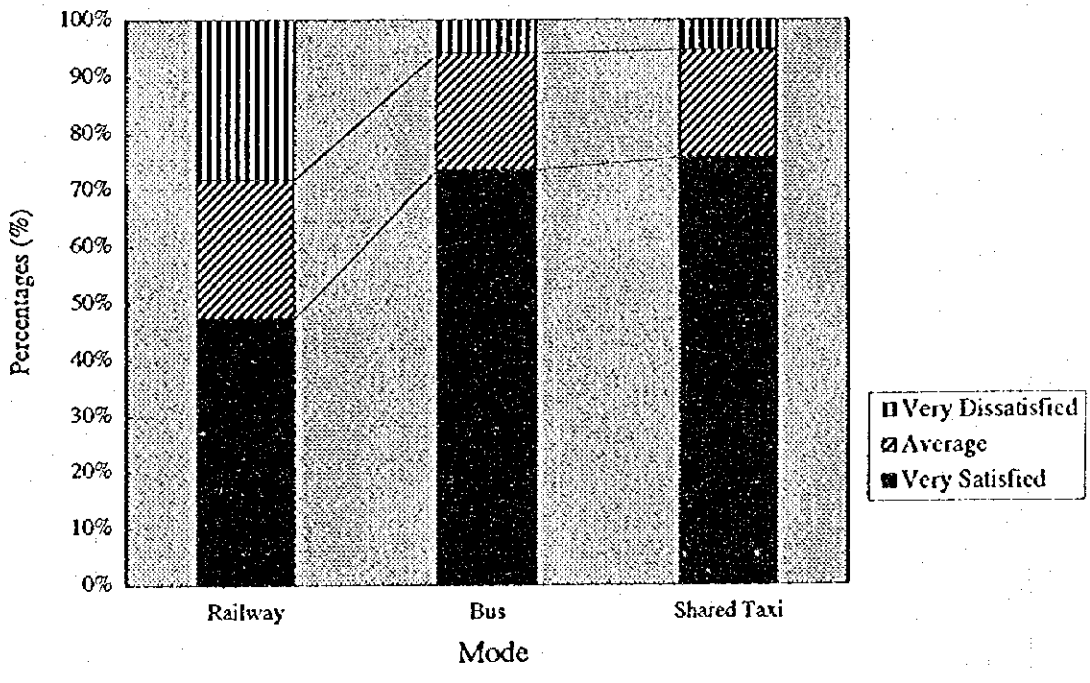


Fig. 3.7.5 Evaluation for Service Characteristics by Mode (Comfortableness)

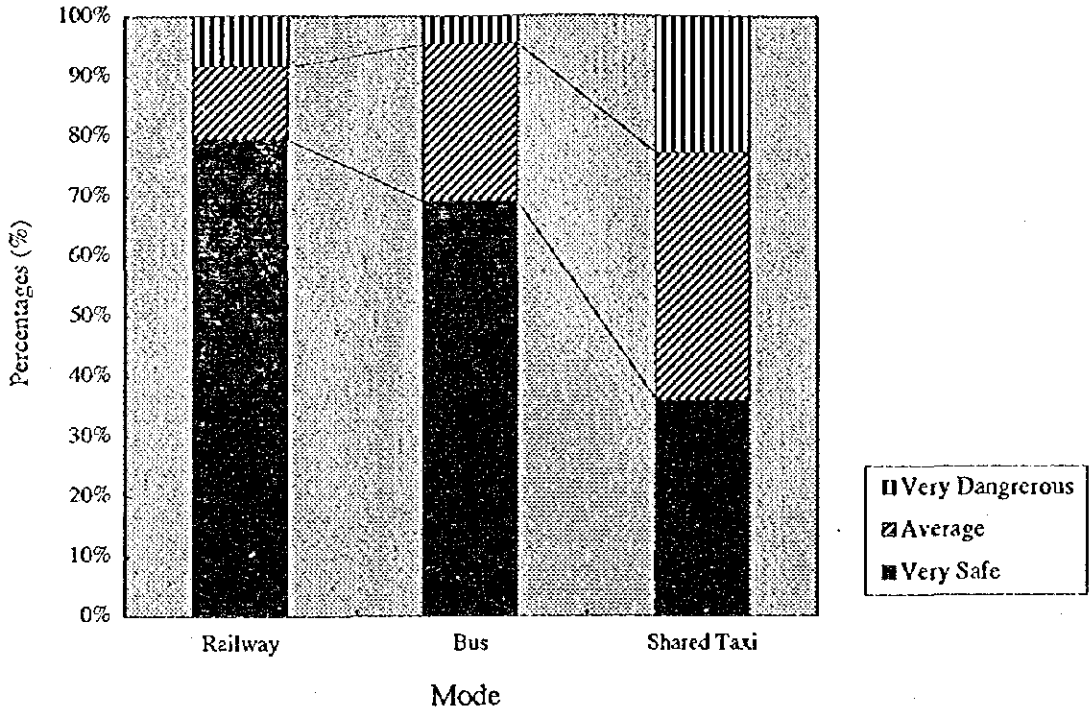


Fig. 3.7.6 Evaluation for Service Characteristics by Mode (Safety)

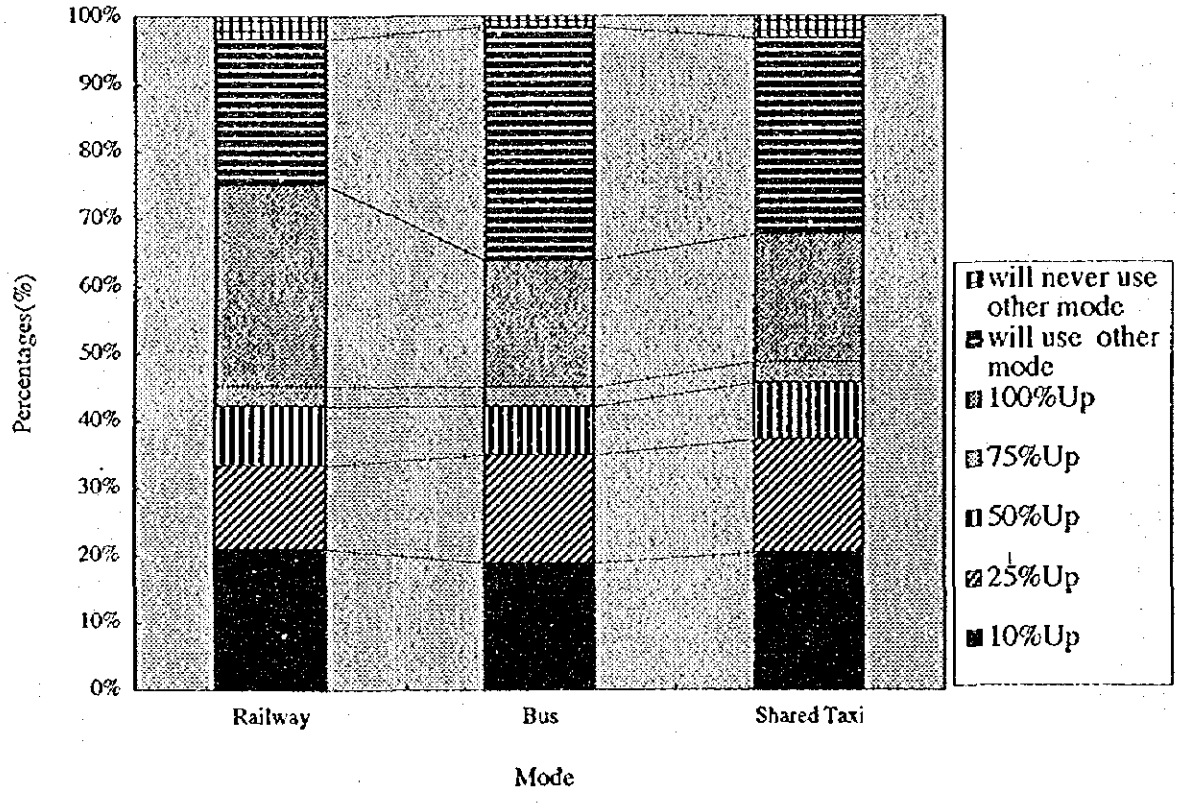


Fig. 3.7.7 Affordability forTariff Raise by Mode

b. Affordability of tariff increase by type of service

(a) Railway
The percentages were calculated for each level of tariff raise by type of service for ENR passengers. The following characteristics are found in comparison with other types of service :

- Relatively more passengers in 3rd class and 2nd class A/C are only willing to pay a small tariff increase.
- Relatively more passengers in 2nd class and 1st A/C class are willing to pay a large tariff increase.
- Relatively more passengers in 2nd and 3rd class are sensitive to any tariff raise at all. (see Appendix 3.7.28)

(b) Bus
The percentages were calculated for each level of tariff raise by type of service for bus passengers. The following characteristics are found in comparison with other types of service :

- Relatively more passengers in express and ordinary are only willing to pay a small tariff increase.
- Relatively more passengers in express and ordinary are willing to pay a large tariff increase.
- Relatively more passengers in deluxe and ordinary are sensitive to any tariff raise at all. (see Appendix 3.7.29)

c. Affordability for tariff increase by personal income

(a) Railway
The percentages were calculated for each level of tariff raise ratio by personal income per month for railway passengers. Judging from these results, the following must be noted in comparison with other levels of income :

- Relatively more low income passengers are only willing to pay a small tariff increase.
- Relatively more high income passengers are willing to pay a large tariff increase.
- Relatively more medium income passengers are sensitive to any tariff raise at all. (see Appendix 3.7.30).

(b) Bus
Judging from the result with regard to bus passengers, the following must be noted in comparison with other levels of income:

- Relatively more of highest and lowest income passengers are only willing to pay a small tariff increase. It is notable that especially passengers with the highest income level are only willing to pay a small tariff increase, although the sample is small.
- Relatively more high income passengers are willing to pay a large tariff increase.
- Relatively more low and medium income passengers are sensitive to any tariff raise at all. (see Appendix 3.7.31).

(c) Shared taxi
The following must be noted with regard to shared taxi passengers in comparison with other levels of income:

- Relatively more low and middle income passengers are only willing to pay a small tariff increase.
- Relatively more high and highest income passengers are willing to pay a large tariff increase. It is especially notable that 41.9% of the highest income shared taxi passengers are willing to pay 100% more. This is the highest percentage of all modes.
- Relatively more of low and lowest income passengers are sensitive to any tariff raise at all.

(see Appendix 3.7.32)

d. Affordability of tariff increase by method of payment

(a) Railway

From the survey answers for maximum willingness to pay for tariff raise by method of payment for railway passengers, the following characteristics are pointed out in comparison with other methods of payment:

- Relatively more conductor ticket passengers are only willing to pay a small tariff increase.
- Relatively more season ticket passengers are willing to pay only a small tariff increase, or can pay a large tariff increase. This means that season ticket passengers include both low and high income passengers.
- Relatively more cash and kilometer ticket passengers are sensitive to any tariff raise at all. This shows that if tariffs rise, ENR revenue from cash and kilometer tickets will decrease. (see Appendix 3.7.33)

(b) Bus

From the survey answers for maximum willingness to pay for tariff raise by type of payment for bus passengers, the following characteristics are pointed out in comparison with other methods of payment:

- Relatively more conductor ticket passengers are only willing to pay a small tariff increase.
- Relatively more season ticket passengers are willing to pay a large tariff increase.
- Relatively more cash and seasonal ticket passengers are sensitive to any tariff raise at all. This shows that if tariffs rise, ENR revenue from cash and kilometer tickets will decrease. (see Appendix 3.7.34)

e. Affordability for tariff raise by trip purpose

(a) Railway

The result of answers for maximum willingness to pay for tariff raise by trip purpose for railway passengers is characterized as follows in comparison with other trip purposes:

- Relatively more recreational and business passengers are only willing to pay a small tariff increase.
- Relatively more work and school commuters can pay a large tariff increase.
- Relatively more business and commuter passengers are sensitive to any tariff raise at all. (see Appendix 3.7.35)

(b) Bus

The answers of bus passengers are outlined as follows in comparison with other trip purposes :

- Relatively more business and school commuters are only willing to pay a small tariff increase.

- Relatively more "personal business" and shopping commuters can pay a large tariff increase.
- Relatively more business, personal business, and government passengers are sensitive to any tariff raise at all.
  (see Appendix 3.7.36)

(c) Shared taxi
The answers of shared taxi passengers is characterized as follows in comparison with other trip purposes:

- Relatively more business and personal and social affairs passengers are only willing to pay a small tariff increase.
- Relatively more work and school commuters can pay a large tariff increase. This suggests also that they pay a very low tariff, because most of their methods of payment are seasonal tickets.
- Relatively more leisure and official passengers are sensitive to any tariff raise at all.
  (see Appendix 3.7.37).

f. Affordability of tariff raise by type of job

(a) Railway
From the result of answers for maximum willingness to pay for tariff raise, the following is pointed out in comparison with other types of job:

- Relatively more housewife, farmer, and fisherman passengers are only willing to pay a small tariff increase.
- Relatively more students and government officials can pay a large tariff increase. This suggests also that they pay a very low tariff, because most of their methods of payment are cheap seasonal tickets.
- Relatively more unemployed and personal business passengers are sensitive to any tariff raise at all.
  (see Appendix 3.7.38).

(b) Bus
The answers of bus passengers is as follows in comparison with other types of job:

- Relatively more farmer and fisherman passengers are only willing to pay a small tariff increase.
- Relatively more housewives and personal business passengers can pay a large tariff increase. This suggests also that they pay a very low tariff, because most of their methods of payment are cheap seasonal tickets.
- Relatively more employees, government and private sector employees, and personal business passengers are sensitive to any tariff raise at all. Most industrial employees, government officials and self-business are sensitive to tariff raise. This suggests that the income level of these types of jobs is relatively low
  (see Appendix 3.7.39)

(c) Shared taxi
The answers of shared taxi passengers are shown as follows in comparison with other types of job:

- Relatively more unemployed, housewife and service employee passengers are only willing to pay a small tariff increase.
- Relatively more students, service employee, and personal business passengers can pay a large tariff increase. This suggests also that they pay a very low tariff, because most of their methods of payment are cheap seasonal tickets.
- Relatively more industrial and government employees are sensitive to any tariff raise at all. Most of secondary employee, government officials and self-business are sensitive to tariff raise. This suggests that the income level of these types of jobs is relatively low (see Appendix 3.7.40)

g. Affordability for tariff raise by line category and by personal income
(Appendix 3.7. 41 (1))

The characteristics of main line passengers are as follows:
- Relatively more passengers with incomes from 100 - 700 LE can pay for a large tariff increase.
- Relatively more passengers with incomes over 700 LE can pay for the largest tariff increases.

The characteristics of branch line passengers are as follows:
- Relatively more passengers of all income levels can pay for a larger percentage tariff increase than main line passengers. This result is unexpected, because the personal income level of branch lines is lower than for main lines.

h. Affordability of tariff raise by line category and by type of service
(Appendix 3.7. 42 (1))

Willingness to pay by type of service on main lines are characterized as follows:
- Relatively more 3rd class passengers are prepared to pay for either a small or large tariff raise.
- 2nd class, 2nd A/C and 1st A/C passengers are relatively more able to a large tariff raise.

Willingness to pay by type of service on branch lines are characterized as follows:
- Most classes except unified class are equally prepared to pay for a large tariff raise, especially 2nd class passengers.
- Degree of willingness to pay for high level of tariff raise of branch lines is higher than the one of main lines.

i. Affordability of tariff raise by line
(Appendix 3.7. 43 (1&2))

Main characteristics of willingness to pay for tariff increases by line (main lines) are as follows:
- Relatively more passengers on Cairo - Alexandria line are willing to pay for a large tariff increase.

- Relatively more passengers on Cairo - Alexandria - Port Said line are also willing to pay for a large tariff increase.
- Relatively more passengers on Cairo - Aswan line are only willing to pay for a small tariff increase.

Main characteristics of willingness to pay for tariff increases by line (branch lines) are as follows:

- Relatively more passengers on many lines are willing to pay a large tariff increase. Especially passengers on Metobis - Besily line, Benha - Mgamr line, and Salhia - Abu Kebir line are willing to pay for a large tariff increase.
- Relatively more passengers on a few lines like Cairo - Tanta, Cairo - Etbarod, and Meno - Kzaiat are only willing to pay for a small tariff increase.
- About 51% of passengers on Cairo - Tanta line are willing to pay only a 10 % tariff increase. This percentile is considerably higher than the average of all lines (21%). On the contrary, only 8 % of this line's passengers are willing to pay a 100% tariff increase. This percentile is much smaller than the average for all lines (30%).

(2) Actual relation of traffic volume to tariff rise

1) Passenger

a. Relation of tariff raise to traffic volume

(a) Excluding Metro

During the past seven years from 1988/89 to 1994/95, the annual average percentage increase of tariffs has not been very different for each class. They range from 20% to 23%. But the weighted average percentage of tariff increase shows big differences for each class. 16.1% of total tariff increases came from 3rd class (the highest), followed by 2nd class at 3.5%, 1st A/C class at 1.9%, and 2nd A/C class at 1.2%. The weighted average percentage of all classes is 22.7% (see Appendix 3.7.44).

On the other hand, the annual average increase of passenger km was 6.0%. The elasticity of passenger traffic demand to tariffs is calculated at 0.26 (= 6.0/22.7). The elasticity value is not negative but positive which means that traffic demand has increased in spite of tariff increases, except in 1988/89, when the number of passengers decreased by 1.9% from previous year. The following reasons can be considered :

- Increase of user ability to pay, by increased GDP per capita
- Increased service quality
- Higher ratio of tariff increases of other transport modes
- No decrease of railway traffic demand because tariff was initially very low
- Monopolized market by ENR where there is no other transport means

(b) Metro

There is no available data for percentages of tariff increases. A percentage assumed in this study was 25% in 1993/94. The average percentage tariff increase was 8.3%. On the other hand, the annual average of passenger km was 5.4%. The elasticity of passenger traffic demand to tariffs is calculated as 0.65 (= 5.4/8.3). The elasticity value is also positive in spite of tariff raise. The same kinds of reasons for it as mentioned above can be considered (see Appendix 3.7.45).

The elasticity of "ENR excluding Metro" is lower than for Metro only.

b. Relation of average tariff raise to traffic demand

(a) Excluding Metro
The average tariff is calculated by dividing total revenue by passenger-km. This value is influenced by tariff increase, length of haul, and other factors. The average tariff increase does not always coincide with the percentage increase of normal tariffs. Annual average ratio of average tariff increase was 11.5%, which is lower than the annual average percentage of normal tariff increase (22.7%). The main reasons for this are considered to be as follows:

- Total revenue as a basis of calculating the average tariff includes not only revenue from normal tickets (1st class to 3rd class) which had tariff increases, but also revenues from suburban lines, seasonal tickets and kilometer tickets, whose tariffs have not been raised every year.
- Passenger kilometers include all kinds of passengers. In other words, the revenue includes revenue from passengers whose tariffs have not increased.
- Average length of travel has increased (61.2 km in 1988/89 to 71.4 km in 1994/95).

Overall passenger elasticity was 0.52 (= 6.0/11.5) which was higher than the 0.26 elasticity of normal tariff increase. This is caused by lower demand elasticity for average tariffs than elasticity for normal tariffs. Both elasticities are positive. The reasons for higher overall elasticity seems to be the same as the above reasons for different tariff increases (see Appendix 3.7.44).

(b) Metro
The annual average increase of average Metro tariff from 1991/92 to 1994/95 was 7.5%. Data before 1991/92 was excluded because it was considered to be unusually high. The elasticity value is calculated at 0.72 (= 5.4/7.5). This value is also positive, apparently for similar reasons as for the positive elasticity of tariff increases excluding Metro mentioned above. The elasticity of "ENR excluding Metro" is also lower than the one of Metro (see Appendix 3.7.45).

2) Freight

a. Relation of tariff increase to traffic volume
The annual average percentage increase of tariffs for freight was 19.9%, and the annual average increase of ton-km was 4.6%. The elasticity of freight traffic demand to tariffs is calculated at 0.23 (= 4.6/19.9). The elasticity of freight traffic demand was also positive in spite of tariff increases. But actually both tonnage and ton-km decreased only in 1988/89 by 1.6% for tonnage and 5.8% for ton km. The reasons for this seems to be the same as for the elasticity of tariffs with regard to passengers mentioned above (see Appendix 3.7.44).

b. Relation of average tariff increase to traffic demand
The annual average increase of average tariffs was 18.4%. The elasticity is calculated at 0.25 (= 4.6/18.4). This value is also positive, apparently for the same reasons as mentioned above for positive tariff increase elasticity.

The difference between the elasticity of tariff and average tariff (19.9%) is not as large as that of passengers (18.4%) because :

- Tariffs of all commodities have not increased the same as for passengers.
- Revenues primarily resulted from tariff increases.
- The average length of haul has increased (304 km in 1988/89 to 333 km in 1994/95).

(3) Statistical analysis

Regression analysis was conduced for estimating the traffic demand elasticity of tariffs for ENR excluding Metro.

1) Passenger

a. Observed period

- Railway : 1985/1986 to 1994/95 (10 years)
- Bus : 1988/89 to 1994/95 (7 years)

b. Variables

For regression analysis for passengers, the following variables were selected.

(a) Explained variable

- PTKM: Passenger-Km of Railway (Million km)

(b) Explanatory variables

- RTARIF: Average Fare of Railway (LE/pass.km)
  This variable is converted to real values, adjusting for changes in CPI (consumer price index:1987/88=100.0).
- BTARIF: Average Fare of Bus (LE/pass.km)
  This variable is also changed to real value by CPI.
- RBTARIF: Relative Fare of Railway to Bus
  This variable is the ratio of average fare of train to average fare of bus.
- BRTARIF: Relative Fare of Bus to Railway
  This variable is the ratio of average fare of bus to average fare train bus.
- GDP: Gross Domestic Product in real price (Millions)
- GDPPC: GDP per capita (LE/capita)
- TREND: 1~10 (1985/86 = 1)

c. Elasticity model

Many combinations of the explanatory variables mentioned above for the regression analysis were tried to estimate coefficients or parameters of an elasticity model as follows:

$$Y = a_0 X_1^{a_1} X_2^{a_2} \bullet\bullet\bullet\bullet X_n^{a_n}$$

The parameters of "$a_0, a_1, a_2, \bullet\bullet\bullet, a_n$"are considered to be elasticity of traffic demand to fare. Elasticity is derived from the following formula:

$\varepsilon = (dY / Y) / (dX / X)$ ε = elasticity

Elasticity indicates the ratio of changed rates of two variables. If fares increase 10% and traffic volume decrease 5%, the elasticity (ε) is - 0.5 (= -0.05/0.10).

The procedure of estimates of elasticity is as follows:

- All variables were transformed to natural logarithmic values.
- Linear regression analysis was conducted for these transformed variables.

The estimates of elasticity are shown for 14 regression models in Appendix 3.7.46. The most highly applicable models are selected by taking account of the following items :

- Sign (+/-) :
  The sign of elasticity of average fare of railway, "RTARIF", must be negative. Because if fare of railway rises, traffic volume of railway should decrease. On the other hand, the sign of elasticity of average fare of bus "BTARIF" must be positive, because if the fare of bus increases, traffic volume of railway should increase.
- Standard errors of parameters for stability of parameters.
- T-test by t-values for credibility of parameters.
- Correlation of coefficients "R" for statistical strength of relation between observed values and estimated values for explained variables.
- Coefficients of determination "R^2" for the degree of explanation of regression model to explained value.
- Correspondence to the actual transport situation.
  Even if the model has high accuracy from view point of statistics, the model can not be applied if it does not reflect the actual situation.

The most highly applicable models are considered to be No.1, No. 9 and No.10. The elasticities of these models are as follows:

Model No.1

- RTARIF: - 0.65421
  This means that if fare of railway increases 10%, traffic volume of railway will decrease 6.5%.
- BTARIF: 0.27808
  This value is cross elasticity value of railway traffic demand to average fare of bus. This means that if fare of bus increases 10%, traffic volume of railway will increase 2.8%.
- GDPPC: 0.87468
  This means that if GDPPC per capita increases 10%, traffic volume of railway will increase 8.7%.
- TREND: 0.22647

In this model, GDPPC has the highest degree of contribution to traffic volume of ENR and "RTARIF" has the second highest contribution. GDPPC depends on GDP and population. If the growth rate of GDP is higher than that of population, GDPPC will increase and the traffic volume of ENR will increase corresponding to its elasticity.

Model No. 9

- RBTARIF: -0.86498
  This means that if the relative fare of railway to bus increases 10%, traffic volume of railway will decrease 8.6%. The relative fare of railway to bus is the ratio of average railway fare to average fare of bus. A 10% increase of relative fare has large effect. It

is clear that the sensitivity of passenger traffic volume of railway to the relative fare to bus is higher than its sensitivity to the average fare of railway. Because the elasticity value of relative fare of -0.86498 is bigger than that of the average fare of -0.65421 in absolute value.

- GDPPC: 3.93634
  This means that if GDP per capita increases 10%, traffic volume of railway will increase 3.96%. This elasticity is also higher than that of GDPPC in model No.1. In this model, GDPPC has the highest contribution to traffic volume of ENR. The elasticities of model No. 10 are almost the same as of model No. 9, so its explanation will be summarized.

d. Sensitivity analysis

Sensitivity analysis of passenger traffic demand to tariffs is conducted for Model No. 9, with the highest applicability by changing the tariff raise ratio. The result of analysis is shown in the Appendix 3.7.47. On the other hand, sensitivity analysis is carried out for revenues by changing the fare increase percentage for the same model. See Appendix 3.7.48.

2) Freight

a. Observed period

- Railway: 1985/1986 to 1994/95 (10 years)
- Truck: 1988/89 to 1993/94 (6 years)
- Inland Waterways: 1988/89 to 1993/94 (6 years)

b. Variables

For regression analysis for freight, the following variables were selected.

(a) Explained variable

- TONKM: Ton Km. of Railway (Millions)

(b) Explanatory variables

- RTARIF: Average Fare of Railway (LE/ton km)
  This variable is changed to real value by CPI (consumer price index: 1987/88 = 100).
- TTARIF: Average Fare of Trucks (LE/ton km)
  This variable is also changed to real value by CPI.
- WTARIF: Average Fare of Inland Waterways (LE/ton km)
  This variable is also converted to real value by CPI.
- RTTARIF: Relative Fare of Railway to Truck
  This variable is the ratio of average fare of railway to average fare of truck.
- TRTARIF: Relative Fare of Truck to Railway
  This variable is the ratio of average fare of truck to average fare of railway.
- RWTARIF: Relative Fare of Railway to Inland Waterways
  This variable is the ratio of average fare of railway to average fare of inland waterways.
- WRTARIF: Relative Fare of inland Waterways to railway
  This variable is the ratio of average fare of inland waterways to average fare of railway.
- PROD: Produced Volume (1,000 ton)
- TREND: 1~10 (1985/86=1)

c. Elasticity model

Many combinations of the explanatory variables described above for the regression analysis were tried to estimate coefficients or parameters of the elasticity model. The elasticity values were estimated by the same procedure as for passengers. The estimated elasticities are shown for 19 regression models in Appendix 3.7.49. The most highly applicable models are selected by taking account of the same items as for passengers.

There are three models which satisfy the sign (+/-) condition from No. 1 to No. 7. Models No.3, No.5, and No. 7 satisfy the sign condition. Model No. 3 does not include the variable of "WTARIF" as the average fare of inland waterways. Model No. 5 does not also include the variable of "RTARIF" which is the average fare of truck. Models 5 & 7 are incomplete, so their applicability is low. But model No. 7 includes the variables of average fare of all competitive modes.

The models from No. 9 to No. 17 include the variables of the relative average fare of between two modes. The models from No. 9 to No. 13 satisfy the sign condition (+/-) but do not include the variables of average fare of all modes, so their applicability is low. Model No. 7 is model considered the most applicable of all the models. The elasticity values of model No. 7 are as follows :

Model No.7

- RTARIF: - 0.01786
- TTARIF: 0.10228
- WTARIF: 0.40025
- PROD: 1.23210

In this model, PROD has the highest degree of contribution to increase freight traffic volume of ENR. This means that if produced volume increases 10%, freight traffic volume increases 12.3%. On the other hand, the elasticity value of "RTARIF" is minus 0.01786. This means that even if the fare of ENR freight ENR increases 10%, traffic volume decreases only 0.18%, so total revenue increases 8.2% (= 10% - 1.8%), assuming the fares of other modes do not increase. The elasticities of other modes are 0.10228 for "TTARIF", and 0.40025 for "WTARIF".

These elasticities are called "Cross Elasticity". They indicate the degree of diverted traffic from other modes to ENR when the fares of other modes increase. Therefore, when the fares of all modes increase simultaneously, traffic volume of ENR will increase because the cross elasticity values of other modes are higher than that of ENR in absolute value. It should be noted that sensitivity of ENR to the fare of waterways is higher than that of trucks, compared with cross elasticity values of each other.

Furthermore, it seems that the costs for loading and unloading in waterways transport are higher than in ENR. Even in case of the equivalence of these costs for both modes, ENR continues to be more attractive because of its cheaper fare, shorter travel time, etc.

d. Sensitivity analysis

Sensitivity analysis of freight traffic demand to fare was also conducted by changing the fare increase ratio for Model No. 7 (which is considered to be the most applicable). It is assumed that fares of trucks and waterways are increased the same percentage. The result of analysis is shown in Appendix 3.7.50. On the other hand, sensitivity analysis of freight revenue to tariff

was also conducted by changing the fare increase percentage for the same model. It is also assumed that the fare increase percentages of other modes are the same. The result of analysis is shown in Appendix 3.7.51.

3.7.3 Strategic Tariff Policy

(1) Before and after privatization

1) Tariff policy until privatization

Until privatization of ENR, ENR must strive to balance profit and loss but it is difficult to raise tariffs easily because privatization of other public transport like bus taxi and truck will be realized earlier than for ENR. Private companies will freely enter the market and fierce tariff wars will appear. Under these circumstances, ENR must strive to save costs more than before and will increase tariffs at a minimum pace. Moderate regulation may be necessary to restrain excessive competition by dumping of tariff.

2) Tariff policy after privatization

It is difficult to predict when ENR will be privatized, after profit and loss will be balanced. But after privatization of ENR, most public transport sectors may have already been privatized. At this moment, the market economy of transport will be realized overwhelmingly, and ENR must fight against fierce competition with other modes by itself without receiving subsidy from the Government.

A more market oriented policy and more effective management will be required of ENR. Competition from other modes will be more drastic than before privatization of ENR. Rationalization of every aspect including train operation, maintenance, and administration will be necessary. In this situation, tariff policy should be more sophisticated on the basis of individual costing and smaller segmentation of market. But moderate control by the Government will be continued as long as the price war continues.

(2) Basic strategies

1) Setting up market segmentation

For the purpose of decision for contestable tariff level, setting up market segmentation on the basis of market condition is indispensable.

a. Passenger
The passenger transport market should be segmented based on the following categories of service :

- Main Lines
- Branch Lines
- Suburban Lines
- Urban line
- Metro Underground

These services will be segmented into the market in which the price mechanism can function and the market in which price mechanism can not function. Furthermore, the market in which price mechanism can function will be divided into competitive market and monopolistic market.

(a) Market with price mechanism
a) Competitive market
In the passenger transport market, ENR competes with inter-city bus and taxi regarding level of service. Particularly ENR 1st A/C, 2nd, and 2nd A/C compete with buses having service of express, A/C, deluxe, A/C and video. On the other hand, short distance transport by normal and express trains of 2nd and 3rd class on main lines, branch lines and suburban lines is competing with taxi and bus. Most of passengers of train are commuters and students who have season tickets with large discounts.

b) Monopolistic market
It is rather difficult to find a market monopolized by ENR. Detailed study will be needed on the basis of traffic survey results conducted by the study team. Even if there are some lines monopolized by ENR, they are very limited areas or lines where ENR is the only means of transport.

(b) Market without price mechanism
The price mechanism will not completely function in the transport service for social policies such as discounts for soldiers and students. Other modes cannot fully compete with these services of ENR.

b. Freight
The freight transport market should be segmented by commodity and by line.
These services will be segmented into the market in which price mechanism can function and the market in which price mechanism can not function. Furthermore, the market in which price mechanism can function will also be divided into competitive markets and a monopolistic markets.

(a) Markets with price mechanism
a) Competitive market
Railway is competing with truck and inland waterways for petroleum, coal and coke, sugar, edible oil and fat, and with truck for sugar cane, fiber crops and beverages (potable water).

b) Monopolistic market
Phosphate is mostly monopolized by railway and iron ore is completely monopolized by railway.

(b) Market without price mechanism
The price mechanism will not work for ENR transport of commodities and military goods which are transported only by ENR because these services are carried out by national policy.

2) Promotion of cost reduction and saving

In a market economy, cost reduction and saving is more strongly required than tariff increase to improve finances. Tools for reduction of variable costs are listed as follows :

- Improvement of Load Factor
- Long Fleet

One advantage of a railway is its capacity of transporting a large number of passengers or freight. To utilize this advantage at a maximum, the number of coaches or wagons forming one train should be suitably increased according to traffic demand.

- Promotion Efficiency of Train Operation
- Introduction of Specified Trains (Unit Train for Freight)
- Introduction of Low Cost Coaches and Wagons

3) Establishment of individual costing system by line

An individual costing system is indispensable to know the financial status of each line and to be used for rational tariff decisions. There are many varieties of individual costing systems such as by coach/wagon, by train, and by line. Costing by line is very important for estimating profitability by line.

4) Establishment of individual revenue calculation system by line

Individual revenue calculation is indispensable to know contribution of each line to the financial improvement of ENR as a whole. There are many varieties of individual revenue calculation system such as by class, by train, and by line. Calculation of revenue by line is especially important for estimating profitability by line.

5) Equalization of paying cost of transport

a. Low fares
The average fares of ENR is one of the lowest in the world.

(a) Passenger fare
The average passenger fare of Egypt is the world's lowest, followed by South Korea. This becomes more clear by comparison of adjusted average passenger fare.
The adjusted average passenger fare is derived by a formula:

(the average passenger fare) ÷ (the relative ratio of average passenger fare to GNP)

The relative ratio of average passenger fare to GNP is also calculated by a formula:

[the average passenger fare ratio to Egypt(= 1.000)] ÷ [GNP per capita ratio to Egypt(= 1.000)].

As a result, the adjusted average passenger fare ratio to Egypt (= 1.000) is same as that of the relative ratio of average passenger fare to GNP.

The average passenger fares of most countries are higher than those of the adjusted average passenger fares. This means that the actual average fare is relatively higher than that of Egypt in relation to GNP. In other words, GNP per capita ratio to Egypt of most of the countries is lower than average passenger fare ratio to Egypt. This shows that the average passenger fare of Egypt is very low in comparison with GNP per capita, except in very few countries such as South Korea, Belarussia, Mexico, Italy, and Austria (see Appendix 3.7.52, and Figure 3.7.8).

The average passenger fare evaluated by PPP (Purchasing Power Parity) of Egypt is the lowest in the world, followed by Belarussia and Indonesia. The same performance can be observed for the adjusted average passenger fare evaluated by PPP. The average passenger fare of

Egypt evaluated by PPP is extremely low in comparison with GNP per capita, which is also evaluated by, PPP. Only a few countries have higher PPP tariffs: Belarussia; Mexico; Italy; and Austria (see Appendix 3.7.53 and Figure 3.7.9)

(b) Freight fare
ENR's average freight fare is also second lowest in the world, after China. But the average freight fares of 29 countries (out of 70 countries) are higher than their adjusted average freight fares. This means that the average fare of these countries are higher than that of Egypt in relation to GNP. In other words, GNP per capita ratio to Egypt of these 29 countries is lower than the average passenger fare ratio to Egypt. This shows that the average freight fare of Egypt is 30th in comparison with GNP per capita in the world.

On the other hand, the average freight fares of the other 40 countries are lower than their adjusted average freight fares. This means that the average fares of these 40 countries are relatively lower than that of Egypt in relation to GNP (see Appendix 3.7.54 and Figure 3.7.10).

The average freight fare evaluated by PPP (Purchasing Power Parity) of Egypt is 45th out of 70 countries. The average freight fares of 25 countries are higher than their adjusted average freight fares. This means that the actual average fare of these countries are relatively higher than that of Egypt in relation to GNP. In other words, GNP per capita ratio to Egypt of these 25 countries is lower than the average passenger fare ratio to Egypt. The average freight fare of Egypt is said to be 45th in comparison with GNP per capita in the world (see Appendix 3.7.55 and Figure 3.7.11).

From comparison of fares in the world as mentioned above, it can be briefly summarized as follows :

- The average passenger fare of Egypt is extremely low, including fares relative to PPP and GDP.
- The average freight fare of Egypt is extremely low when comparing actual level, but is slightly higher than the world median relative to PPP and GDP.

b. Payment by beneficiaries
It is easily imagined that one of the main reasons of financial deficits of ENR is its low fares mentioned above. Deficits except depreciation are now subsidized by the Government. Thus all operation costs of transport are not paid by users as beneficiaries of railway service. Some of these costs are paid to the Government by Egyptians as taxes. From the viewpoint of equality of paying cost, all of operation costs must be paid by users as beneficiaries in principle. If so, ENR tariffs should be increased significantly.

At the same time, it is indispensable to strive to save cost, especially fixed costs such as for personnel and infrastructure maintenance. Reduction of fixed costs will avoid drastic tariff increases, and prepare ENR for competition with other modes.

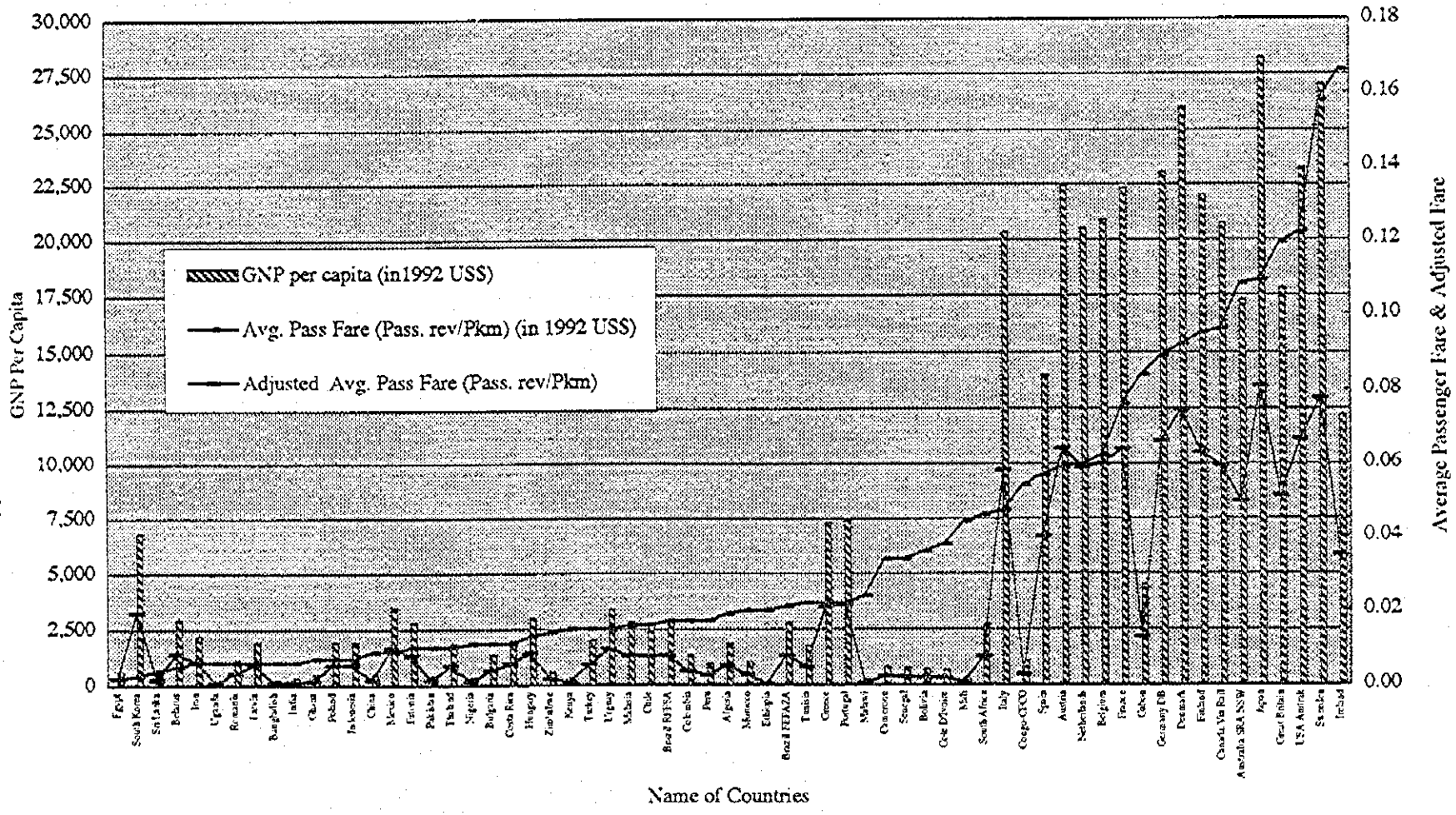


Fig. 3.7.S GNP Per Capita and Average Passenger Fare by Country

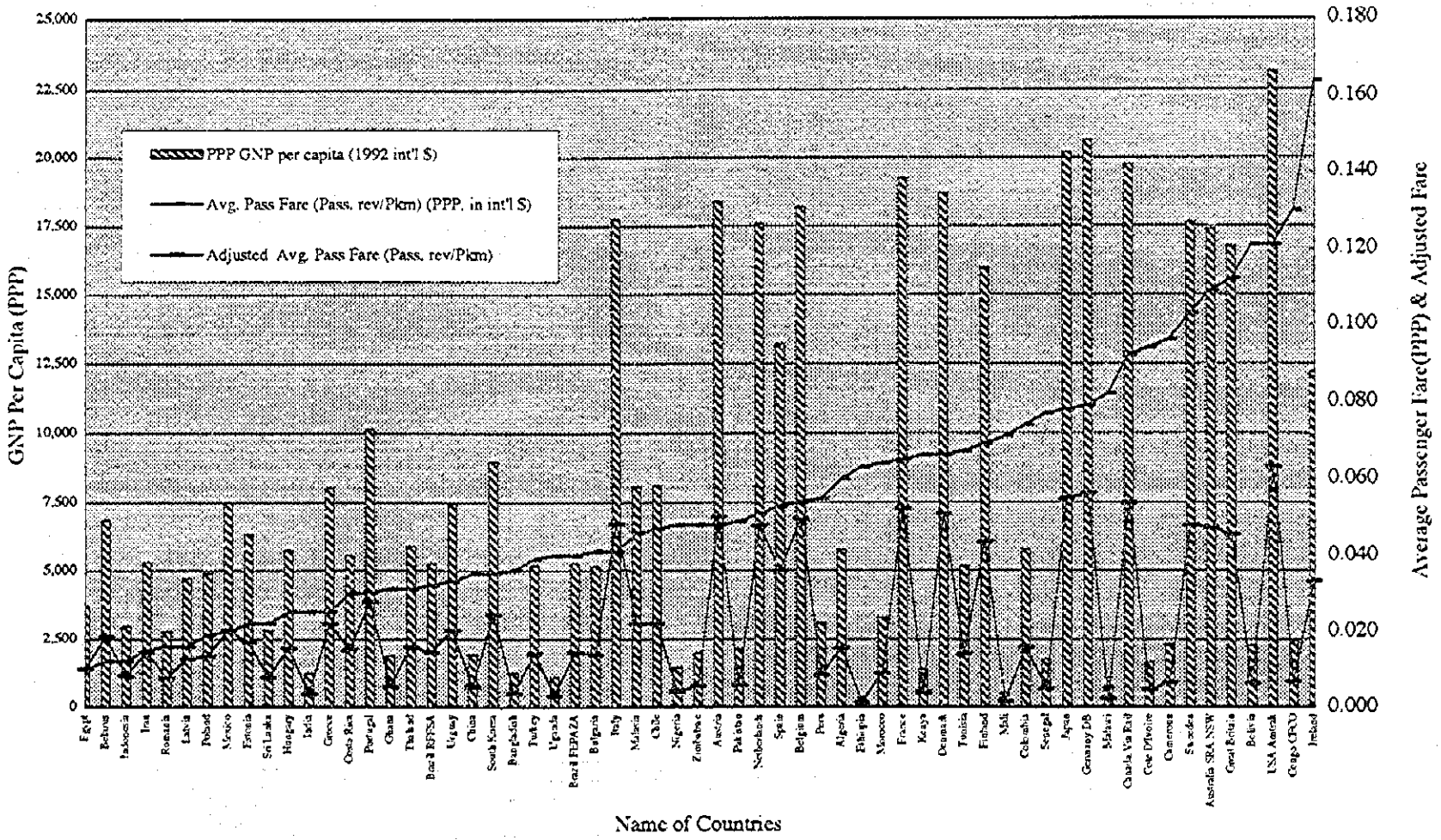


Fig. 3.7.9 GNP Per Capita (PPP) and Average Passenger Fare in PPP by Country

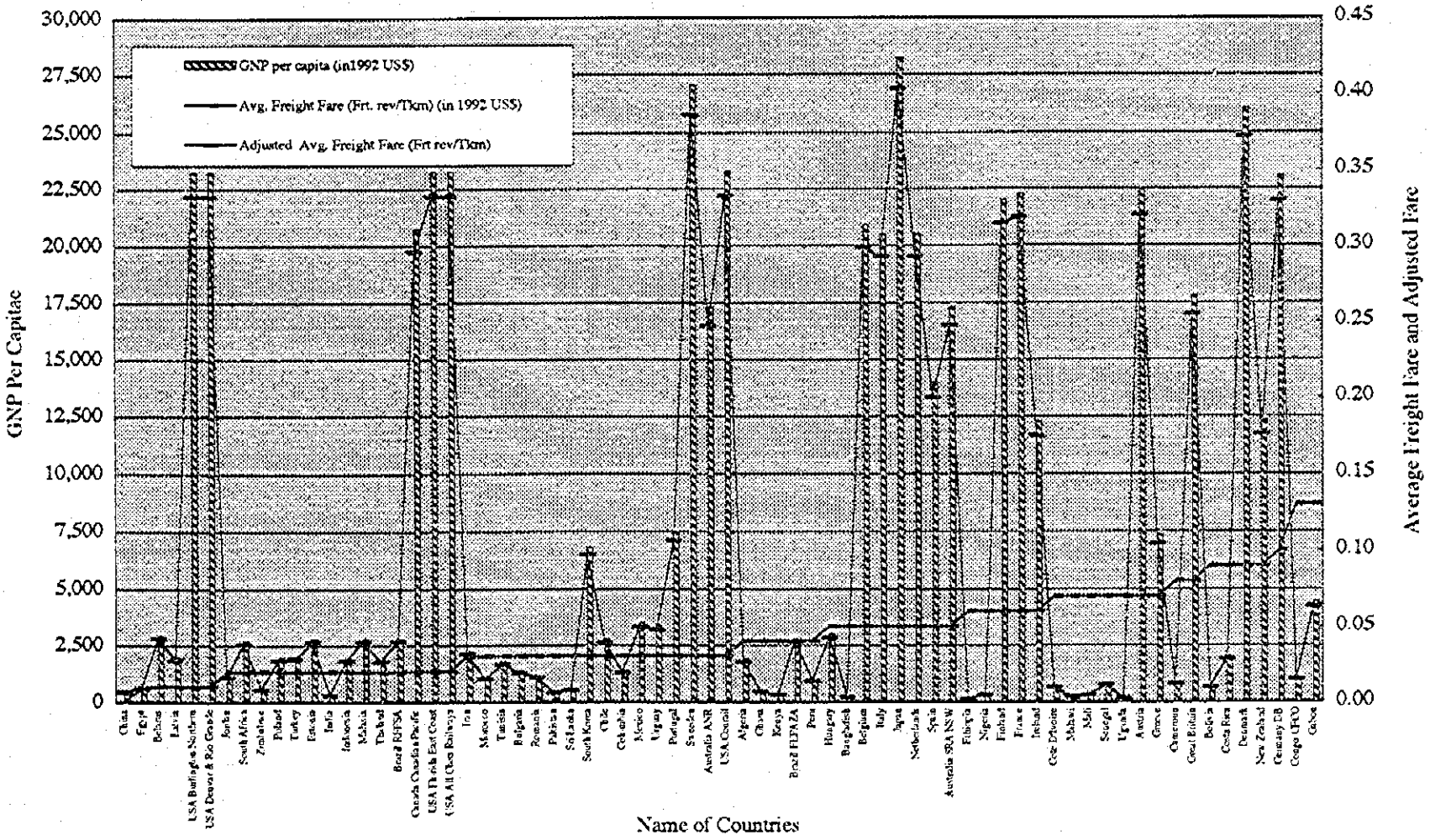


Fig. 3.7.10 GNP Per Capita and Average Freight Fare By Country

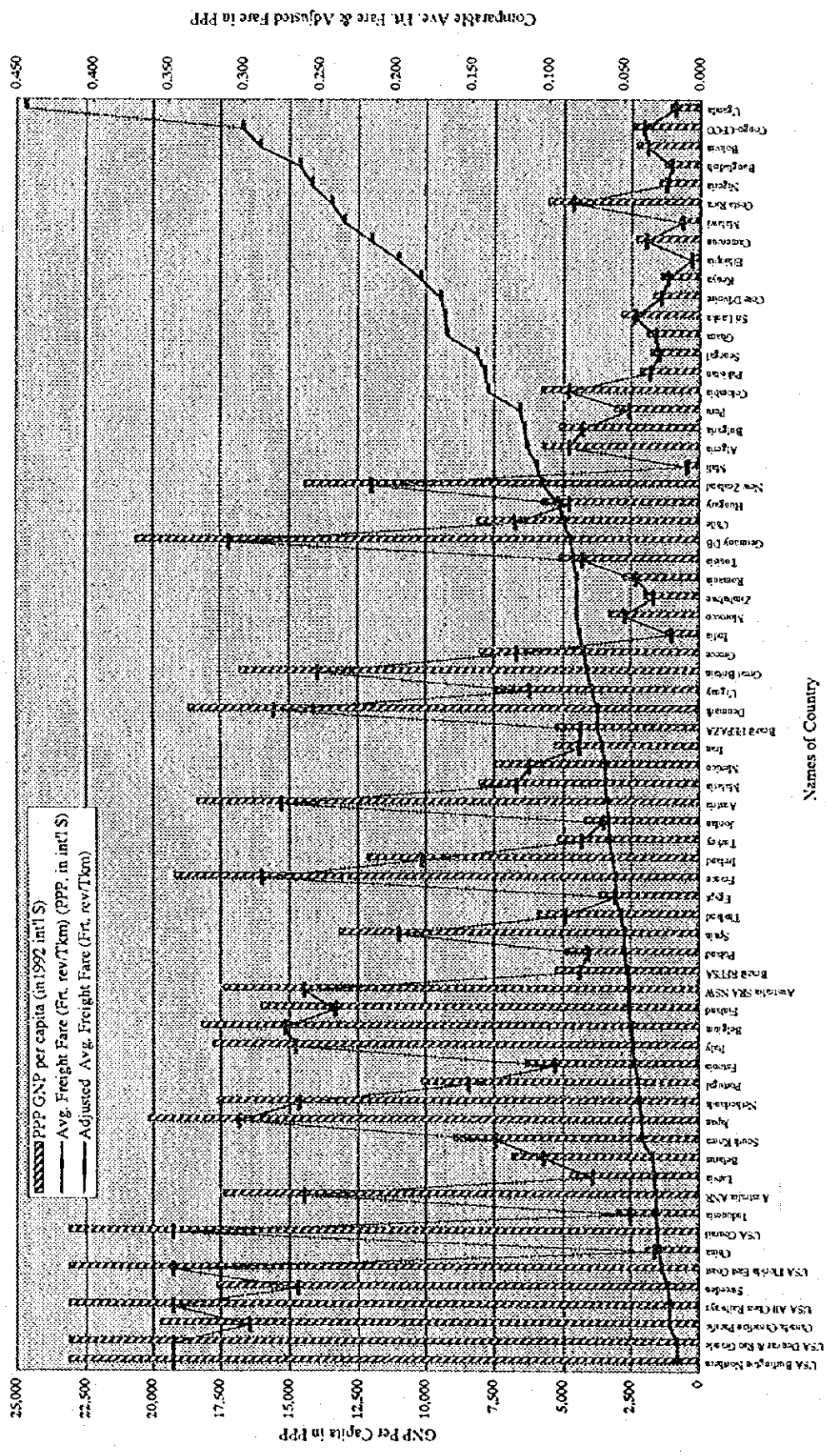


Fig. 3.7.11 GNP Per Capita and Average Freight Fare in PPP by Country