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PRICE ELASTICITIES FOR TELECOMMUNICATIONS SERVICES WITH REFERENCE TO DEVELOPING COUNTRIES

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SUMMARY

Market price elasticities of demand for basic telecommunications services depend on a number of factors, including:

- The absolute level of tariffs
- The level and distribution of incomes
- The type of service.

These are market elasticities. In a competitive market, individual operators will experience elasticities which are higher than market elasticities.

There have been many published studies but most do not refer to developing countries. This paper, originally prepared in 1998 but unpublished until now, presents some of the results which have been obtained, summarises them and draws conclusions about what they suggest for the price elasticities in developing countries.

Typical price elasticities found in developed countries are:

- Rental -0.1 to -0.6
- Local Calls -0.1 to -0.5
- Long distance calls -0.2 to -0.5
- International calls -0.2 to -1.5

Taking the national income, network penetration and tariff structure into account, developing country elasticities are likely to be higher for residential access and local calls, and possibly for other services.

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1 RESEARCH METHOD AND SOME GENERAL FEATURES OF PRICE ELASTICITIES

1.1 Research method

This study has been carried out using desk research and some original analytical work based on available data.

1.2 Tariff Change and Revenue Change

Price elasticity is the ratio of proportionate volume change to proportionate price change. Thus, if a 5% price increase results in a 2% volume decrease, the price elasticity of demand (written as e) is:

e = -2/5 = -0.4

If the price elasticity has a value of -1, the revenue is unchanged by the tariff increase because the traffic decreases by the same proportion as the tariff increases. Price elasticities which are less than 1 in absolute value (i.e. 0>e>-1) are said to be ***low***, and revenue rises when the tariff increases. Price elasticities which are greater than 1 in absolute value will result in a fall in revenue when the tariff increases (and rise when the tariff is reduced). These are said to be ***high***.

1.3 Real and Nominal Tariff Change

Tariffs change in both nominal and real terms. At the time of a tariff change there is an increase of, say, 10% and this is the ***nominal*** increase. During the subsequent period, when telecommunications tariffs are unchanged but external prices, as measured by a Consumer Price Index, are changing, telecommunications tariffs are changing in relative terms. Thus, if external prices rise by 10% while telecommunications tariffs remain unchanged, there is a ***real*** tariff fall of 10%.

Traffic levels are generally taken to respond to real tariff changes, as well as in response to a step increase in nominal tariffs. This is consistent with the assumption that consumers are substantially free of monetary illusion (i.e. they allow for the effect of inflation in their purchase decisions). It also gives more data points when estimating price elasticities under conditions of inflation.

1.4 Long and Short Term Elasticities

The elasticities in 1.2 are ***short term*** or ***point elasticities***. They are usually estimated from time series and measure the immediate response to tariff changes. Time series analysis may miss longer term effects. The ***long term*** elasticities may be higher for several reasons:

- People take time to adapt life styles to big changes
- Over the longer period, Companies and Institutions may plan and build private networks as an alternative to the PSTN and they may have unexpired contracts to fulfil.

Time series analysis can be adapted to pick up longer term effects. Another way of allowing for them is to estimate elasticities from ***cross-section*** studies, in which a comparison is made between the tariff/traffic relationships among a group of different operators at the same point in time. Cross-section studies originated in the USA, where there are many independent operators to compare. Allowance has to be made for differences in income and other factors which may affect traffic levels, as well as tariffs.

Cross-section studies have often revealed long term elasticities which are higher that those for the short term, especially for long distance and international traffic. One is used later in this paper in section 4. The terms 'long (or short) term' and 'long (or short) run' are used interchangeably in this paper.

1.5 Individual, Market, Own-Price and Cross-elasticities

There are three types of price elasticity:

- **That for individuals**. Each person has their own demand response to changes in price. This is rarely known precisely.
- **The market elasticity**. This is the price elasticity in the market as a whole, where the demands of all the individuals are aggregated into one demand curve. Market elasticities are the ones experienced by monopolists.
- **Own-price and cross-elasticities**. Each supplier in the market experiences a response to changes in its own prices, which is its own-price elasticity and a response to changes in price by its competitors, if it has any. Monopolists have an own-price elasticity which is the same as the market elasticity and there are no cross-elasticities because there are no competitors.

In a competitive situation, own-price elasticities are generally larger than the market elasticity because consumers will switch to another supplier if one firm puts its price up. Cross-elasticities are positive, i.e. a firm experiences a traffic increase if a competitor raises its prices.

1.6 Bidirectional Elasticities

If different tariffs prevail at each end of a call, the traffic originated at one end (say Company A) may be affected by a tariff change at the other end (say Company B). This can happen:

- With international calls
- With domestic trunk calls, if different operators control each end of the call
- With all domestic calls, if different classes of user, such as business and residential, have different call tariffs.

There are two reasons for the effect:

- A price cut at the distant end (Company B) may stimulate more outbound traffic from Company B, which in turn stimulates more returned calls from Company A as a secondary effect, called ***reciprocal calling***.
- ***Call reorigination***, carried out informally or through resellers e.g. A caller in company A makes a brief call to a Company B customer and asks them to ring back, because Company B's tariff to Company A is lower than Company A's tariff to Company B.

These effects are a type of cross-elasticity and have been called cross-company elasticities by Applebe et al., who estimated them for traffic between different companies in Canada and traffic between Canada and the USA.

The reciprocal calling effect will generally be negative, i.e. a price increase at the distant end (company B) will reduce outgoing traffic from both companies.

The call reorigination (call-back) effect is positive. A price increase by Company B results in less call-back, increasing outward traffic from Company A.

Suppose that there is the same proportionate tariff increase at both ends of the route and that there is no call-back. Company A's traffic falls because of its own tariff increase and falls further because of the loss of reciprocal traffic caused by Company B's increase. The resultant elasticity is called a ***bidirectional elasticity***, following Applebe et al. It was found that such elasticities were generally higher than those where there was a tariff change at only one end of the route (called ***uni-directional*** in their study).

1.7 Elasticities Related to Price

Price elasticity is often related to the price itself, being higher for more expensive calls. Various studies have found this effect, examples being:

- Price elasticity is lower for local calls than for long distance calls.
- Price elasticity is higher for inland trunk calls over longer distances, e.g. in Canada (Applebe et al.) and Spain (Amaral)
- Price elasticity is higher for peak rate calls than for cheap rate calls
- From any one country, price elasticity tends to be higher for the more expensive international calls than for the cheaper ones
- Price elasticity estimates on international routes have tended to fall as international call prices have come down.

1.8 Business and Residential Users

Business users are often less price-sensitive than residential users, e.g. in the UK. There are three factors:

- Business users are often agents, rather than direct bill-payers. Their experience of the value of the call is more immediate than their experience of the cost.
- Residential customers usually have less money than businesses, sharpening the income effect.
- The value of calls may be rated higher by businessmen.

This is a rather speculative area. For example, the relatively heavy use of international calls by businesses reflects the nature of their commercial relationships as well as a greater ability to afford international services.

2 PUBLISHED STUDIES AND FINDINGS

A summary of published studies is given in Annex 1. They are discussed below.

2.1 Rental/Access

Several North American studies have shown that price elasticities among residential customers are highest among the youngest and poorest customers and among those who have most recently joined the telephone network. One such is given by Bodnar et al. for Canada, based on 1985 Household Income data and relating to the take-up of telephone service. The price elasticities fell from the lowest (1st) quintile of income (in Canadian $) to the highest:

Income	**Elasticity**	**Post-tax income C$**
1st Quintile	-0.026	<12270
2nd Quintile	-0.012	12270-20169

3rd Quintile	-0.006	20170-28339
4th Quintile	-0.002	28340-38509
5th Quintile	-0.0005	>38509

All these elasticities are extremely low. Separate figures show that they were lowest in the largest urban centres. The elasticities relate to an affluent country where almost every household already has telephone service.

An earlier study, carried out by Perl and using US data, showed similar effects but higher elasticities. For households with a twenty-year-old head and income of US$1,500, Perl's estimates (given in a summary by Taylor) varied from -0.173 to -0.422, three or four times the average for all age groups and income levels.

The Italian study by Cipallone & Gambardella (see Annex 1) shows a price elasticity of -0.55 for basic service.

2.2 Local Calls

Annex 1 shows that estimates of short term price elasticities are around -0.1 to -0.2 for business and residential, though there is evidence that the long term elasticity may be as high as -0.5.

2.3 Long Distance Calls

Long distance calls on residential lines have an average price elasticity of -1.08, whereas the average elasticity on business lines is (on one study only) -0.35. Other studies, in which the two types of line were not separated, averaged -0.46.

There is evidence that elasticity rises with distance, e.g. for residential calls in Spain.

Long run elasticities are often substantially higher than those found in the short term. Bidirectional elasticities are higher than simple (uni-directional) elasticities.

2.4 International Calls

The average price elasticity for the studies in Annex 1 is -0.84, within which there is a good deal of systematic variation. The Swedish figures given by Hackl and Westlund are averages. It was found that, over all but one of the six routes from Sweden which they studied, price elasticity increased between 1976 and 1991. The exception was the route to the USA, where it decreased.

Studies of traffic on other routes originating in the USA have also shown a decrease in price elasticity. One reason is likely to be the substantial fall in tariffs which has taken place with the development of competition on international services. This has been especially strong on transatlantic routes where traffic volumes are high.

2.5 Market Structure

Price elasticity featured strongly in proposals put to the FCC in the USA for various types of discounting schemes, including optional calling plans. The FCC applied a net revenue test, which required that revenue rose after a tariff cut (i.e. high price elasticity) before letting the schemes through. This is consistent with a relatively high price elasticity over long distances characteristic of long distance service in the USA, but may also reflect the effect of competition.

3 THE SITUATION IN DEVELOPING COUNTRIES

Most of the work discussed so far relates to experience in developed countries. Much of it has been prompted by North American regulatory requirements where, especially in the 1970's and 1980's, the operating companies had limits set to their return on capital. The companies had to present their regulators with estimates of the revenue generated by a tariff increase, so that the effect on profitability could be calculated, and this required estimates of the elasticity of demand with respect to price.

In the UK, where Post Office Telecommunications had its rate of return tightly regulated by the government until the establishment of the RPI-X method of price control in 1983, there was also pressure to develop estimates of price elasticity, though it was much weaker.

Research in other countries, like more recent work in North America and the UK, has continued to be influenced by regulatory requirements but it is increasingly being used by corporate planners to understand price elasticities in competitive markets.

Very little of the work so far published has related to price elasticities in low income or developing countries. There are several reasons for thinking that they may be different to those for the developed world. For example:

- The balance between incomes and telecommunications costs is different
- The proportion of business use is likely to be lower in richer countries

Service quality, including the length of waiting lists, tends to be poorer in poorer countries, suggesting a different balance of preference between quality and price.

3.1 Incomes and Telecommunications Costs

Telecommunications networks use equipment which is traded on world markets and production costs are much the same in countries of all income levels. Sales prices depend on the bargaining position of the operators, including the degree to which they have a choice of supplier. Large operators may be able to negotiate favourable terms based on a high volume of purchases. Smaller operators may also be able to do so if the manufacturer sees advantage in selling at a favourable price to expand sales, or if the home government of the manufacturer provides a subsidy. Otherwise, they may pay more than the larger operators.

Some costs may be lower in developing countries. For example, local labour costs may be lower, so that labour-intensive elements of the telecommunications infrastructure, such as ducts, may cost less and current account labour costs may be lower. Overall, though, telecommunications service will be relatively expensive when compared with average incomes. The following statistics are calculated from International Telecommunication Union (ITU) statistics for 1993:

Income Group	GDP per Head $	Tels Revenue per line $	Revenue per line as % of GDP per head
Low	390	399	102
Lower Middle	1,740	228	13
Upper Middle	4,145	604	15
High	22,605	935	4

Figures for individual countries are highly variable. They show that residential telephone bills are normally higher in developed countries but they represent a lower proportion of average family income.

An unpublished study, carried out for an African low income country in 1986, presented anecdotal evidence that price elasticities were no higher than those in Europe:

> '. . indications suggest that the demand from business users for an exchange connection is not at all sensitive to installation or rental charges. In consequence it can be assumed that the price elasticity of demand for exchange connections is approximately zero'
>
> '. . historical data on the volume of [inland] call units suggests that there was a temporary drop in traffic volume immediately after the increases in tariffs in 1983 and 1985. The drop in traffic in 1983 was about 5% and lasted only one month . . . . The drop recorded in 1985 was about 10% and lasted for three months before traffic volume returned to the pre-existing level.'
>
> 'The 1985 tariff changes effectively doubled the price of international calls. The measured level of outgoing international traffic in 1985 was 7% below the 1984 level. . . . assuming the underlying growth in demand to be 15% a year, a price elasticity of about -0.2 can be inferred for international calls.'

The higher elasticity for international calls was thought to be due the use of call-back by business users, who tended to initiate their international calls from the country that offered the cheapest rates.

3.2 The Proportion of Business Users

Telecommunications networks are usually dominated by business users in the early stages of their development. Later the balance swings towards residential use and in mature networks the number of residential lines will be much higher than the number of business lines. Since the calling rate on business lines is much higher than that on residential lines, business users may still account for around half of the total revenue.

Price elasticities tend to be lower among business users and this is a factor which would tend to reduce the price elasticity experienced with networks in the early stages of their development. The African material quoted above lends support to this.

3.3 Evidence from Service Quality

Service quality tends to be poorer in the developing countries. For example, waiting lists are often longer. There is some systematic variation, associated with revenue per line and GDP per capita, taken from ITU statistics for 1993, as above:

Income Group	**Tels Revenue per line $**	**Waiting-list (years)**
Low	399	2.5
Lower Middle	228	4.7
Upper Middle	604	2.8
High	935	0.1

The data suggests a greater price sensitivity towards paying for service improvements where revenue per line is low. This could reflect a shortage of investment capital as well as a direct effect of lower income. It would be consistent with a greater price elasticity for basic telecommunications services.

4 AN INTERNATIONAL CROSS-SECTION STUDY

In view of the paucity of direct data about price elasticities in developing countries, a cross-sectional study was carried out for a group of 40 of the 55 countries which were classified as 'Low Income' in the ITU statistics for 1993. The study used as its starting point the well-known relationship between line per 100 population and GDP per head in US$. Although the association is clear when viewed over the entire range of world income, there is a good deal of scatter for the low-income countries on their own. It was thought that some of this scatter might be due to differences in the tariff level.

4.1 Method

After a few trials it was found that the cost of:

Monthly Rental + 50 Local Calls = Monthly bill

explained a significant part of the variation, and provided a better fit than monthly rental on its own.

The full model used to estimate the relationships is:

$Y = AG^iB^j$ where

Y = Lines per 100 inhabitants

G = GDP per inhabitant in US$

B = Monthly bill in US$

This was put into logarithmic form as:

$Log(Y) = A + i \times Log(G) + j \times Log(B)$

to estimate A, i and j.

With this formulation:

i is the elasticity of demand with respect to income

j is the elasticity of demand with respect to price

There were 40 countries for which values of all the variables were available from the ITU statistics. These are detailed in Annex 2.

4.2 Results

The estimates of the income elasticity i and j were both significant, being:

i = income elasticity = 0.75 (standard error 0.20)

j = price elasticity = -0.66 (standard error 0.15)

The income elasticity is the proportionate response of Lines per 100 Inhabitants to changes in GDP per Inhabitant. The standard error is a measure of the accuracy of the estimates. Both estimates are over three times greater than their standard errors, giving well over 95% confidence that the true elasticities were significantly different from zero.

The income elasticity is in line with expectations in developed countries, and higher than that found where penetration levels are very high.

The price elasticity j, at -0.66, is a good deal higher than most estimates of the price elasticity for access and local calls which are found in the studies for developed countries. This is strong confirmation of the suggestion, found in some of the studies, than the elasticity rises as income falls.

Chart 1 shows the fitted relationship between the logarithms of Lines per 100 Inhabitants and GDP per Inhabitant. The 'predicted' line on the chart shows the trend indicated by the elasticity coefficient. For example, the level of penetration in Sri Lanka is a little higher than the predicted figure (+0.1) in logarithmic terms. The level in Mozambique is much higher (+1) and the level in Chad is much lower (-1.5).

Chart 1 GDP & Lines per inhabitant, Low Income Countries 1993

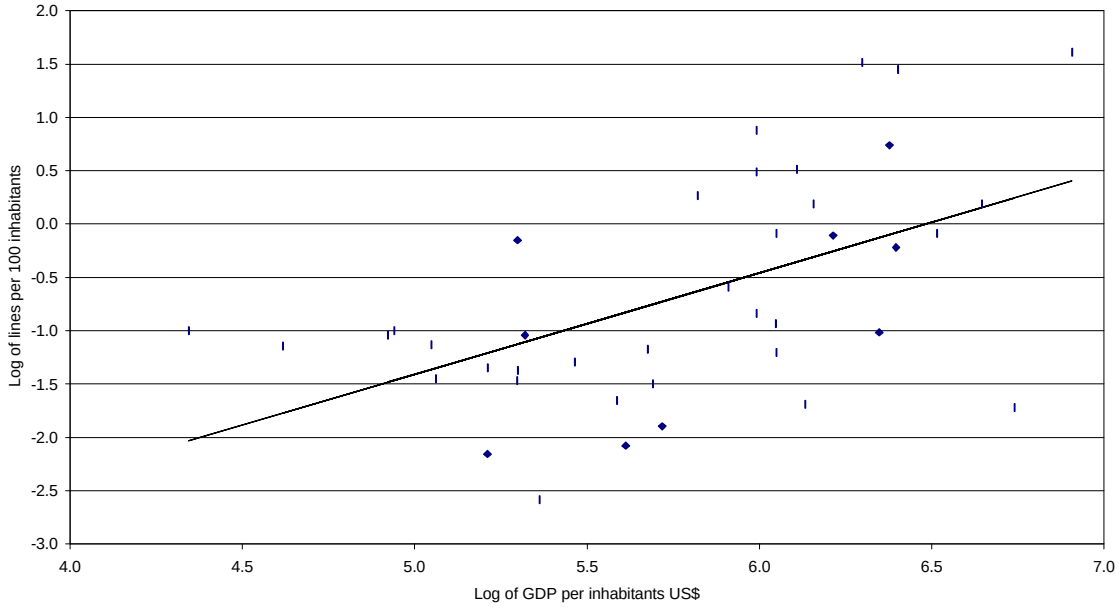

Chart 2 Residuals after GDP/Population, Low Income Countries 1993

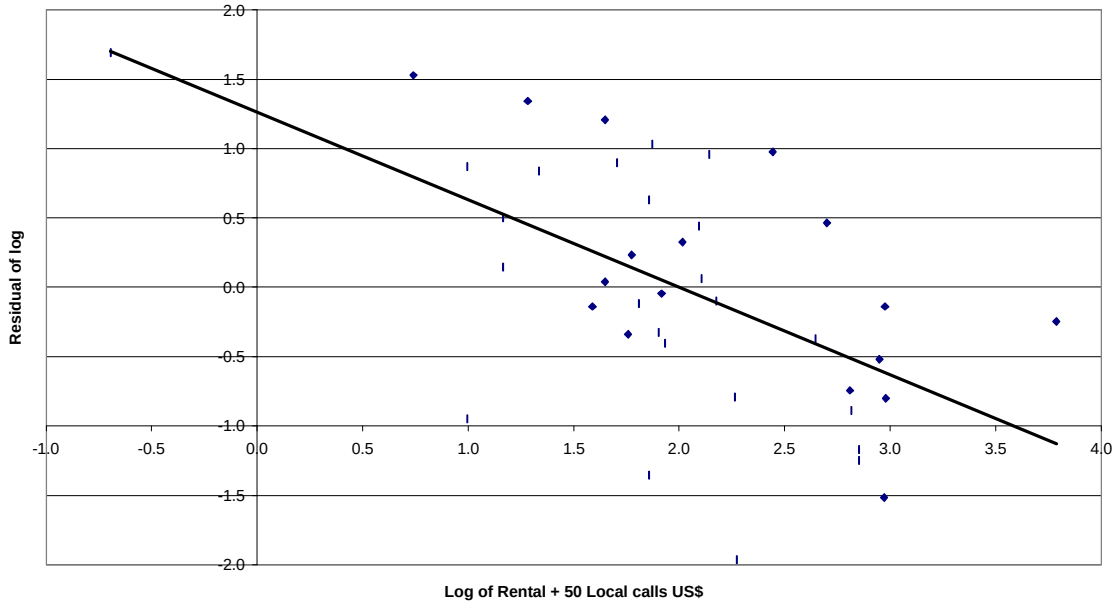

Chart 2 plots the residual errors in Chart 1 (i.e. the differences between the actual points and the trend line, using their original values) against the logarithm of the monthly bill for Residential Rental plus 50 Local Calls. This illustrates the association between the residual errors and the tariff level. High positive residuals (i.e. penetration levels higher than those predicted by the income elasticity, such as for Mozambique) are associated with low tariffs. The fitted trend line is also shown.

Most of the countries had the same rental tariff for business and residential lines. The exceptions made little difference to the result. Two other variables which might have a bearing on penetration are:

Waiting List as % of system size

Rental/(GDP per head)

No work has been done with these but their values are given in Annex 3.

The Effect of Operational Constraints on Estimates

Operational constraints may prevent a full response of traffic changes to tariff changes. Waiting Lists are an example. A lower tariff may result in a longer waiting list rather than a larger system size if new connections cannot be supplied. Short term measurements of price elasticity will then be biased downwards. Network Congestion may also damp down the response of traffic growth to tariff change.

5 CONCLUSION

In the light of this evidence and the need for further analysis, this paper contributes to the toolbox for promoting telecom affordability by outlining the data requirements for national studies of price elasticities. These would include:

Economic Data

Consumer Price Index Monthly if possible

Gross Domestic Product volume Quarterly if possible

Demographic Data

Population Annual if possible

Age distribution Annual if possible

Regional distribution

Households

Number of households Annual if possible

Customer Data

Number of business customers, analysed by business sector if possible

Number of residential customers, with some regional and other analysis

Tariffs

Tariffs for all exchange line and call types, monthly

Business Volumes

The number of business exchange lines, monthly if possible

The number of residential exchange lines, monthly if possible

The number of calls and/or call minutes for each type of call and each international tariff group, monthly if possible.

Comment: This list presents an ideal. It may be possible to work with less. The longer the run of figures, the better. At least five years is preferred.

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ANNEX 1 PRICE ELASTICITY STUDIES

Rental/Access

Reference	Date	Elasticity type	Country	Elasticity
Cipallone/Gambardella	1993	Basic Service	Italy	-0.55

Local Business Calls

Reference	Date	Elasticity type	Country	Elasticity
Amaral et al.	1995	Short term	Spain	-0.19
		Long term		-0.17
Average				-0.18

All Local Calls

Reference	Date	Elasticity type	Country	Elasticity
Cracknell	1994	Short term	UK 1946-75	-0.17
		Long term	UK 1946-75	-0.47
Davis et al.	1973		USA	-0.21
Turner (unpublished)			UK	-0.06
Average				-0.22

Long-distance Residential Calls

Reference	Date	Elasticity type	Country	Elasticity
Dobell et al.	1972	Short run	Ontario & Quebec,	-0.3
		Long run	Canada	-1.9
Khadem	1973	Short run	Trans-Canada	-1.28
		Long run	Trans-Canada	-2.58
Larsen & McCleary	1972	Long run	USA	-1.01
Perez	1993	Short haul	Spain	-0.15
		Medium haul		-0.33
		Long haul		-1.18
Rash	1972	Long run	Ontario & Quebec, Canada	-0.94
Waverman	1974	Residential revenue per phone long run	Canada	-1.16
Average				-1.08

Long-distance Business and Residential Calls

Reference	Date	Elasticity type	Country	Elasticity
Appelbe et al.	1988	Full-Rate Uni-directional	Canada	-0.21 to -0.48
		Full-Rate Bi-directional		-0.36 to -0.73
		Discount Rate Uni-directional		-0.39 to -0.49
		Discount Rate Bi-directional		-0.59 to -0.75
Deschamps	1974	Trunk	Belgium	-0.24
Gatto et al.	1988	Long run	USA	-0.72
GPO CSD Report 41	1965	Full rate trunk	UK	-0.52
GPO SBRD Report 2	1968	Cheap rate trunk	UK	-0.77
GPO SBRD Report 12	1971	All trunk	UK	-0.17
GPO SBRD Report 27	1973	All trunk	UK	-0.18
GPO SBRD Report 73	1976	Cheap rate trunk	UK	-0.096
GPO SBRD Report 89	1977	Full rate trunk	UK	-0.114
Iacono et al.	1990		Ontario & Quebec, Canada	-0.45

Larsen & McCleary	1972	Long run	USA	-0.98
Waverman		Long run	Ontario & Quebec, Canada	-1.03
		Trunk per phone, short run	Sweden	-0.29
		Trunk per phone, long run		-0.58
		Trunk per phone, short run	UK	-0.41
		Trunk per phone, long run		-0.72
Average				-0.46

Long-distance Business Calls

Reference	Date	Elasticity type	Country	Elasticity
Amaral et al.	1995	Short term	Spain	-0.34
		Long term		-0.36
Average				-0.35

International Calls

Reference	Date	Elasticity type	Country	Elasticity
Amaral et al.	1995	Short run	Spain	-0.17
Appelbe et al.	1988	Full-Rate Uni-directional	Canada-USA	-0.43 to -0.49
		Discount Rate Uni-directional		-0.45 to -0.53
Berstein et al	1977	International	Canada	-1.391
BT CPRD	1979	Short run	UK-France	-0.211
BT CPRD	1979	Long run	UK-France	-0.378
BT CPRD	1979		UK-New Zealand	-0.816
BT CPRD	1979		UK-USA	-0.936
Craver & Neckowitz	1979		UK-USA	-0.515
	1979	Minutes	UK-USA	-0.325
Drew	1973	Calls and letters	UK	-0.86
Hackl & Westlund	1995	Short run	Sweden-Denmark	-0.598
		Long run		-0.975
		Short run	Sweden-Finland	-0.302
		Long run		-0.627
		Short run	Sweden-Germany	-0.258
		Long run		-0.369
		Short run	Sweden-Norway	-0.509
		Long run		-1.178
		Short run	Sweden-UK	-0.992
		Long run		-0.978
		Short run	Sweden-USA	-0.122
		Long run		-0.961
Khadem	1977	Short run	Canada	-1
		Long run		-1.5
Kwok, Lee & Pearce	1975	Short run		-1.7
		Long run		-2.71
Lago	1970		International	-1.25
Nace	1974		Japan	-2.28
GPO SBRD Report 28	1973		UK	-0.117
Yatrakis	1972		46 nations in 1967	-1.03
Average				-0.84

Note: References in this annex are from summaries by Littlechild, Taylor and Beesley and papers by the named authors.

ANNEX 2 DATA USED IN THE ANALYSIS

Country	Lines per 100	GDP/cap $	Res rental $/month	Local call $	Res rental + 50 calls $
Bangladesh	0.23	199.7	3.8	0.04	5.8
Benin	0.39	423.1	8.6	0.21	19.1
Bhutan	0.25	200.0	42.6	0.03	44.1
Burkina Faso	0.22	295.9	6.1	0.21	16.6
Burundi	0.26	183.3	1.9	0.06	4.9
Chad	0.08	213.1	2.0	0.35	19.5
Comoros	0.80	600.0	6.6	0.26	19.6
Egypt	4.27	603.2	1.1	0.02	2.1
Gambia	1.63	400.0	3.5	0.10	8.5
Ghana	0.30	423.3	1.6	0.16	9.6
Guinea	0.18	460.3	1.9	0.09	6.4
Guinea-Bissau	0.86	200.0	3.0	0.17	11.5
Honduras	2.09	589.3	3.3	0.01	3.8
Indonesia	0.92	675.2	3.6	0.05	6.1
Lao PDR	0.19	266.7	5.7	0.28	19.7
Lesotho	0.55	368.4	5.3	0.03	6.8
Madagascar	0.27	236.2	3.7	0.06	6.7
Malawi	0.35	204.3	5.7	0.05	8.2
Maldives	5.00	1000.0	2.7	0.05	5.2
Mali	0.15	304.3	4.8	0.25	17.3
Mauritania	0.36	571.4	10.7	0.12	16.7
Mozambique	0.37	76.9	4.5	0.04	6.5
Myanmar	0.18	845.6	7.2	0.05	9.7
Nepal	0.35	137.3	3.1	0.10	8.1
Nicaragua	1.67	450.0	2.2	0.01	2.7
Niger	0.13	273.8	6.8	0.21	17.3
Nigeria	0.31	291.7	2.9	0.08	6.9
Pakistan	1.31	337.1	2.0	0.07	5.5
S Tome & Principe	2.40	400.0	2.1	0.03	3.6
Sierra Leone	0.32	155.6	1.9	0.08	5.9
Sri Lanka	0.90	500.0	1.7	0.03	3.2
Sudan	0.23	157.5	3.3	0.11	8.8
Tajikistan	4.55	543.9	0.5	0.00	0.5
Tanzania	0.32	101.1	4.9	0.03	6.4
Togo	0.43	400.0	5.1	0.18	14.1
Uganda	0.12	183.3	0.7	0.04	2.7
Vietnam	0.37	139.6	9.4	0.11	14.9
Yemen	1.21	768.7	4.2	0.02	5.2
Zambia	0.92	423.5	0.5	0.14	7.5
Zimbabwe	1.21	471.7	1.7	0.03	3.2

ANNEX 3 ADDITIONAL DATA

Country	Waiting list as % of system size	Res rental as % of GDP/cap
Afghanistan	431.0	0.0
Bangladesh	48.9	22.8
Benin	36.3	24.4
Bhutan		255.6
Burkina Faso		24.7
Burundi	32.1	12.4
Cambodia	118.6	5.2
Chad	41.3	11.3
China	9.4	0.0
Comoros	30.0	13.2
Egypt	53.7	2.2
Ethiopia	106.4	22.8
Gambia	57.7	10.5
Ghana	19.9	4.5
Guinea		5.0
Guinea-Bissau	8.1	18.0
Guyana	56.1	1.0
Haiti	50.7	0.0
Honduras	46.7	6.7
India	31.1	0.0
Indonesia	6.9	6.4
Kenya	41.0	0.0
Lao PDR	14.0	25.7
Lesotho	77.1	17.3
Madagascar	21.8	18.8
Malawi	88.7	33.5
Maldives	12.0	3.2
Mali		18.9
Mauritania	55.3	22.5
Mozambique	34.3	70.2
Myanmar		10.2
Nepal	143.5	27.1
Nicaragua	42.1	5.9
Niger	12.4	29.8
Nigeria	75.0	11.9
Pakistan	46.3	7.1
Rwanda	42.4	0.0
S Tom, & Principe	20.8	6.3
Sierra Leone	31.7	14.7
Sri Lanka	78.6	4.1
Sudan	42.8	25.1
Tajikistan	29.5	1.1
Tanzania	167.6	58.1
Togo	10.4	15.3
Uganda	12.5	4.6
Vietnam	57.7	80.8
Yemen	60.5	6.6
Zambia	87.9	1.4
Zimbabwe	77.8	4.3