

## Ensuring affordability of basic service in Phare countries

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## 1 Introduction

This paper examines the problems of maintaining affordability of telephone service in the Phare countries during a period of rapid tariff rebalancing. The paper is organised as follows:

- We outline three different approaches that have been taken to assessing affordability of basic telephone service in the EU and elsewhere.
- Some concrete experience of preferential tariff schemes is offered in the form of a short history of BT's low-user tariffs in the UK, in parallel with the difficult question of who should be eligible for them. We abstract from such experience (both in the UK and elsewhere) to offer some guidelines on points for consideration when designing preferential tariffs.
- Based on a theoretical model, we consider the implications for affordability of income distribution within the Phare countries.
- Lastly, we highlight key relevant features of the current situation of the Phare countries and make some general suggestions for how they might best use the available techniques to address foreseeable challenges.

## 2 Affordability of basic telecoms

Everyone understands the idea of affordability, but it is nonetheless a difficult term to define. This is because people have differing needs and priorities over how best to use limited budgets. Also, behaviour does not always match a perception of affordability – we do not buy everything that we want and can afford, and we sometimes do buy items that we feel we cannot afford. This section discusses three approaches that have been applied to giving the term a useful meaning in the telecoms context:

- Within the EU, most countries have defined affordable prices in terms of prices prevailing at the time of liberalisation.
- An ITU study has examined affordability in the context of income distribution and the percentage of their income which consumers are prepared to devote to telephone service.
- Various field surveys of less affluent market segments in affluent societies have asked consumers themselves what are the most important elements of affordability.

### 2.1 EU approaches: evolution of the status quo

The EU has included in its definition of universal telephone service the notion of affordability, but has left the precise meaning of this term to be defined at national level.

During 1998 the European consumers' organisation, BEUC, carried out a survey of the implementation of EU universal service legislation in member states. Their report<sup>1</sup> includes a 20-page chapter reproducing all the national provisions in some detail. The overall results of the survey were:

- 12 countries (all but Ireland, the UK and Greece) were found to have included the principle of affordability in national legislation
- 6 of these countries (Austria, Belgium, Denmark, France, Germany and Portugal) had introduced specific criteria to define the term

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<sup>1</sup> Universal service in telecommunications: European consumers' rights to telecommunications services, by Katrin Schwaren and Alma Palazzi, BEUC/341/98, November 1998

- only one of these 6 (Denmark) had considered consumers' needs when formulating these criteria
- two of the 6 (Germany and Austria) had static definitions of affordability, namely specific price levels actually prevailing at 1/1/98. Three (Belgium, France and Portugal) had dynamic definitions, based on some price level prevailing during 1997 updated to reflect inflation

The main relevant provisions of the Danish legislation are:

- the average residential consumer's real bill should fall by x% a year (x initially taking the value 4)
- the average low-user residential consumer's real bill should fall by y% a year (y initially taking the value 1). Here low users refer to at most the lowest-usage 15% of residential consumers
- during the years 1998-2000, no residential consumer's real bill may rise on an annual basis by more than DKK 50 (~€7) a quarter, at constant usage levels (taking 1997 as base<sup>2</sup>)
- from 2000 onwards, the values of x and y will be fixed so as to reflect international best practice for price developments for residential users generally and for low users, while at the same time avoiding any marked imbalance between the costs of fulfilling the Universal Service Obligation and the associated revenues

## 2.2 The ITU approach: a percentage of income

The other main approach to affordability that has been used in the telecoms context is looking at the percentage of income that people are prepared to spend on telecoms. Typically in affluent societies they spend in the region of 1% to 2% of income, but in less affluent societies this figure may be higher. A South African study used a criterion of 5% of income to determine penetration targets, and the ITU adopted this threshold in their 1998 report on universal access<sup>3</sup>. In this report, the notional annual average charge for telephone service of \$103 (~€99) is used (based on the median of a sample of actual residential charges, which are assumed to recoup only 40% of operating costs). The assumptions lead to requiring a household income of \$2060 (~€1980) a year to afford service.

A comparison in the same report with figures for private consumption income per household leads to a suggestion that current household penetration levels in the Phare countries, as elsewhere, are well below those that theoretically could afford service<sup>4</sup>. The report comments that these countries (along with those of Central Asia) come closest to achieving theoretically affordable penetration levels, because of the historic factors of low tariffs and relatively equitable income distribution<sup>5</sup>. In section 4 below we adapt this approach and modify its assumptions for more detailed application to the Phare countries.

## 2.3 Consumer research

The idea of affordability of telephone service has also been explored in field research among low-income consumers in a number of affluent societies. The findings are naturally expressed in "operational" rather than theoretical terms. Broadly similar results have arisen from available studies carried out in Australia, Canada, the United Kingdom and the United States:

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<sup>2</sup> Information received from TeleDanmark in March 1999 was that checking of all consumers' bills had revealed 47 that had exceeded this limit. All were individually refunded.

<sup>3</sup> World Telecommunication Development Report: Universal Access. ITU, 1998. See especially chapter 2, Pricing Access.

<sup>4</sup> In fact on this argument, most of the Phare countries included in the calculation cited in footnote 3 above could afford 100% household penetration. Only Lithuania and Romania come in lower, at a 70% ceiling, and Latvia at 80%. (Albania, Bulgaria, Estonia and FYROM are not covered in this study).

<sup>5</sup> These theoretically affordable penetration levels are plainly open to question. It may well be that the "affordability threshold" of 5% of income is too high. However the study described aimed to set upper bounds for network size at current income levels.

- lump-sum installation charges, security deposits, and the need to pay off earlier outstanding debts (often enlarged by reconnection fees), are all major barriers to connection
- rentals are often perceived as too high, while relatively few complain of the level of call charges
- quarterly and even monthly bills are perceived as too infrequent and therefore too big a “lump” at one time. Frequent payment facilities are helpful, as is the ability to spread any unexpectedly large bill over an acceptable period
- some people welcome the idea of voluntary access restrictions so that they can prevent unauthorised use of their phone, or block certain types of call; however no outgoing service at all would be “a pub without any beer”
- some people would welcome a credit limit, or indeed full prepayment, which would set an absolute bound on their possible bill
- a “free call allowance”, while welcome in principle, presents serious practical difficulties of knowing when the allowance is used up
- fully itemised billing would be widely popular.

### **3 Preferential tariffs – experience and design**

The Phare countries have a variety of preferential tariff schemes, mostly for disadvantaged groups such as the elderly or disabled, which are summarised in the Annex to this paper. The EU’s Monitoring Reports on Universal Service have summarised such schemes from all countries of the EU. This section goes in greater depth into experience gained in the UK, since the history there is long and varied. After presenting a short history of BT’s light user tariffs, we consider the issue of eligibility and offer some guidelines for the design of preferential tariff schemes.

#### **3.1 A short history of BT’s low-user tariffs**

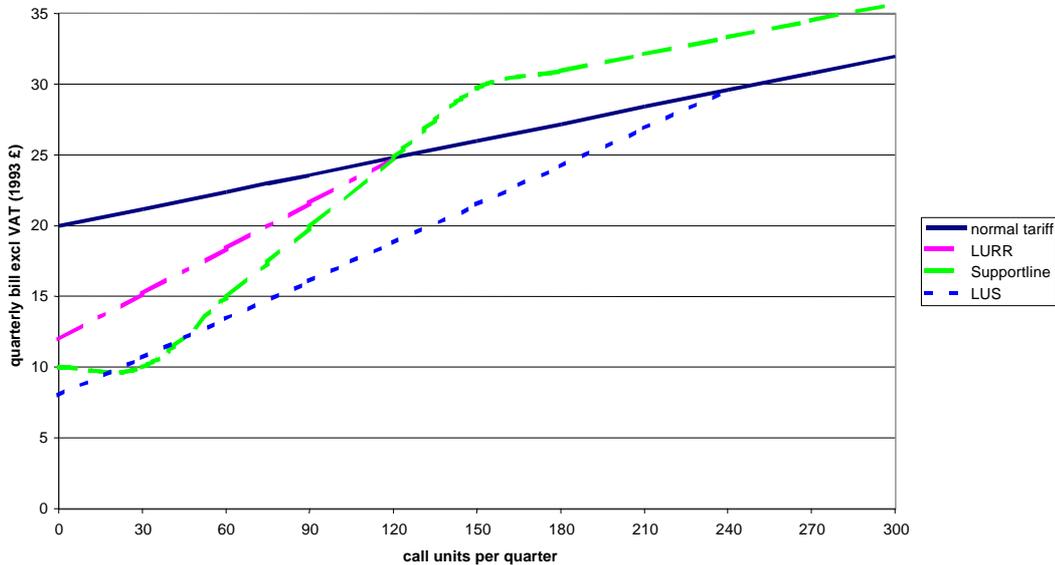
Since liberalisation of the UK telecommunications market in the early 1980s, a series of special tariffs for low users has been offered to BT customers . Figure 1 illustrates some of their key features.

1. The first "low-user rental rebate" (LURR) was introduced voluntarily by BT in early 1983. BT was already foreseeing the likelihood of rebalancing and its impact on low users, and introduced this tariff as a convenient way of showing its consideration for low users, many of whom were elderly. The tariff was expressed as a rebate of 3.0p per "unused unit" below 100 units a quarter (the unit charge then being 4.4p)<sup>6</sup>. This was equivalent to a reduced rental offset by a higher unit charge up to the usage limit. The maximum saving was £3.00 a quarter, or about 21% of then current line rentals, and the effective unit charge for low users (up to the limit) was 1.7 times the normal unit charge. The rebate accrued automatically to any residential line which used less than the limit.

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<sup>6</sup> All tariffs mentioned here exclude VAT.

**Figure 1** BT low user schemes

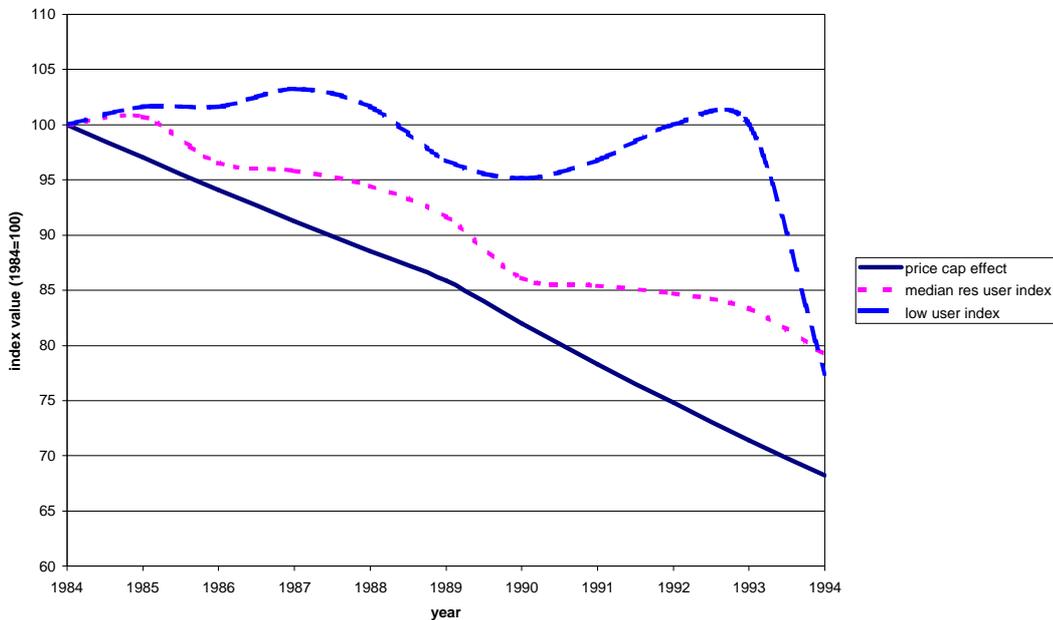


2. In late 1983 the limit for savings was raised to 120 units a quarter, at which level it remained for the next decade. From this time until after the 1991 Duopoly Review, the form of the tariff remained unchanged, the exact amount of the rebate being updated with each annual tariff revision. Inflation and rebalancing led to erosion of the relative position of subscribers on the low-user rebate scheme. In keeping with the RPI – x price cap, on average, real bills were falling (and high users were making large real savings). However, low users’ real bills remained static or in some cases even rose<sup>7</sup>. Figure 2 illustrates.
3. In 1989, the regulator Oftel required that the tariff should henceforth provide a rental of not more than 60% of the normal residential rental. This change was in recognition of the by now cumulatively harsh impact of rebalancing on low users (annual rental increases having been capped at RPI+2)<sup>8</sup>. The amount of the rebate was therefore increased from 3.6p to 5.2p per unit (greater than the unit charge itself, which was again 4.4p). This meant that the maximum saving rose from 31% to 41% of line rental. Correspondingly the unit charge for low users rose from 1.7 times normal to 2.2 times normal rate. This presented quite a strong disincentive to making calls.
4. The Duopoly Review negotiations with BT led to a new "SupportLine" tariff being offered from late 1991. This set a maximum of 50% of current standard rental (with increases up to 1993 capped at RPI) and included 30 free units, but with the next 90 units charged at a higher rate to reach the same level as the standard tariff at 120 units, and thereafter exceed it – see Figure 1. This new tariff for the first time was not applied automatically but had to be opted-in to by eligible customers (i.e. single-line residential low users – see below). The higher unit rate continued between 120 and 150 units in order to create a disincentive to opting-in by people near the 120 unit boundary. As the transition at 30 units between free and expensive calls could not be signalled to users, this was not a popular feature. In addition, users felt that the higher unit rate above 120 units was punishing them for accidental or occasional heavier use.

<sup>7</sup> Because the usage threshold remained fixed in unit terms but the volume of use allowed for a unit went down, some users near the threshold lost their entitlement to the rebate without changing their usage.

<sup>8</sup> The overall price control at the time was RPI-3%. This meant that over 4 years the average real bill fell by 11.5% while the lowest user’s real bill rose by 8%. Of course high users’ real bills fell by much more than the average.

**Figure 2 Relative prices for BT's low users, 1984-1994**



5. The 1992 review of BT's price control resulted in the light user scheme (LUS) that has prevailed since 1994. Through Guidelines attached to BT's licence, Oftel requires BT to offer a light-user tariff providing a maximum saving of about 60% of the current line rental. Savings are intended to accrue to the 20% of customers with lowest use. This was initially expressed in terms of units (usage under 240 units per quarter (on single-line residential installations)). In later years, as BT moved from unit charging to per-second charging, the 240 units have been translated into their cash equivalent of around £10.80 per quarter. Opting-in (in modified form) is retained but the "penalty" for use above the limit is abolished.
6. BT's November 1999 tariff revision is the first since 1994 that has started to depart from this pattern. The usage limit has been raised to £12.00 a quarter and the rebate reduced from 1.27p per penny to 1.21 pence per penny. This still results in a "rental" (charge at zero usage) of under 40% of the standard rental (the reduced rate is now around £9.00). The reason for this change is that BT's standard residential rental now includes a free usage element, initially set at £1.80 a quarter.
7. The future of the light user scheme is now under review. Since Oftel's 1997 Statement on Universal Service, two special tariff packages have been planned for low users and those on low incomes:
  - The Residential Limited Service Scheme (RLSS – marketed as InContact) is essentially an incoming-calls-only scheme. (Calls to the emergency services, BT Customer Service, and to customers offering BT's Ring Me Free capability are however permitted). As the rental, at £9.25 a quarter, is very similar to the Light User Scheme rental, it is really only attractive to people who want to be certain they cannot run up a phone bill and to achieve this are prepared to forgo making any calls. This service has been operational since mid-1998 and has acquired some 30,000 subscribers (around 10% of Oftel's target).
  - The Limited Outgoing Calls Scheme (LOCS) is planned to supplement the RLSS by enabling subscribers to make outgoing calls of their choice using prepaid card technology. Access will be through a single access code which confines users to BT's own service. This service is currently under field trial and its tariffs have not yet been finalised. High call charges are however to be expected (say around 15p per minute for national calls) to offset the low rental.

Once the LOCS is operational, it is likely that Oftel will no longer require the Light User Scheme, and that BT will phase it out by transferring customers to other tariff packages.

### **3.2 Eligibility for BT's low-user tariffs**

The intention behind low-user tariffs has been to protect those who really cannot afford a normal phone bill. The fundamental problem is that this class does not coincide with actual low usage:

- Many lightly used lines are second lines, in holiday homes, additional to a mobile, or for some other reason not much used although their subscriber is not financially constrained.
- Conversely, low incomes do not automatically imply a low need for telephone usage. They do however usually point to a need for control over the bill, with a preference for more frequent payment of smaller amounts.

Since 1988 the main thrust of Oftel's attitude towards low-user tariffs has been the need to target them properly. Of the 4 million customers estimated to receive the Low User Rebate in any one quarter, only 1 million were seen as "proper" recipients. (Most of the rest had usage near the limit and only occasionally dipped below it; a minority fell into one of the excluded categories discussed below).

While BT agrees with the principle of targeting, it has been reluctant to introduce eligibility criteria that might involve it in discriminating between customers, as this would be both costly and risky. The categories of line excluded (by user self-certification) from SupportLine were:

- business, ISDN or switchboard lines
- second lines (whether at the same or another address)
- burglar alarm lines
- incoming calls only
- payphone lines
- lines used for indirect Mercury access

Take-up of this scheme was disappointingly low (under 40% of those hoped for).

Managing the transition from the Low User Rebate and SupportLine to the Light User Scheme was a delicate matter. The procedure was that BT would identify from its records all customers that it believed were eligible and had used under 240 units in 3 of the last 4 quarters, and write to them (separately from the bill) explaining the scheme and inviting them to join.

Ongoing procedures are that:

- any eligible customer who expects his usage to be under the relevant limit for 3 quarters out of the next 4 may ask to join the scheme
- each customer must return a signed declaration that they are eligible in order to benefit from the scheme
- once a customer is on the scheme, he will remain on indefinitely unless his usage is over the limit for 3 successive quarters

The excluded categories are almost the same for the Light User Scheme as for SupportLine, the main differences being:

- incoming calls only lines now qualify, so long as the customer is not in debt to BT

- having a second line at a different address for the use of a relative no longer disqualifies the user of the first line from the scheme
- anyone who has a line provided by any company other than BT, at any address, is disqualified.

The aim in designing the new RLSS and LOCS schemes has been that they should be self-limiting, i.e. that they will not be attractive to anyone who does not really need them, and that therefore elaborate eligibility criteria will not be required.

### 3.3 Design of preferential tariff schemes

The following list of considerations to be borne in mind when designing preferential tariff schemes draws on experience in the UK and elsewhere.

1 The aim of the scheme must be clear. Common options include:

- demonstrating social support for certain deserving groups, e.g. the elderly or war victims
- keeping low-income users on the network in the face of higher rentals
- growing the network: this means both attracting new subscribers (often with low incomes) and enabling marginal users to remain connected though changing circumstances (e.g. spells of unemployment)

In the Phare context, the market segments addressed by the second and third of these aims are likely to be very substantial. It may therefore be inappropriate to try to achieve these aims through preferential tariffs<sup>9</sup>. We discuss appropriate measures to achieve these aims later in this paper.

2 From the aim of the scheme it should be clear whether the telco can be left to design and implement the scheme itself, or whether regulatory intervention is necessary. The latter can take many forms, including:

- Requiring a scheme with specific aims to be introduced
- Requiring the recruitment and retention on the network of x thousand people of certain kinds by a given date
- Specifying the actual tariff in varying degrees of detail.

3 Tariff packages as such must be seen in the context of all relevant terms and conditions, including:

- Any requirement for deposits or substantial initial payments. These invariably present problems for those with low incomes and should be avoided if at all possible
- Billing and payment mechanisms. People on low incomes usually prefer small frequent payments, and may be willing to pay more overall to achieve this. It is important to offer the widest possible range of payment methods, including payment in cash at convenient local outlets which avoid the need for travelling.
- Bill control. Those on low incomes (along with many others) often prefer to avoid running up bills on credit. They prefer to pay as they go, confident of avoiding debt. Where this is not possible they may want to be able to specify a bill cap (an amount that their call bill will not exceed without notification and agreement) and/or to bar certain types of expensive calls, e.g. international or premium rate. Fully itemised billing may be of special value to those with very limited resources.

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<sup>9</sup> “Preferential tariffs” have not been defined, but common sense suggests that they cannot be applicable to more than a small minority of customers.

4 The tariff should be defined in a way that will ensure its continued utility for a period, in the face of inflation, price control and changes in other tariffs. It may, for example, be defined:

- In absolute terms, e.g. €x per month rental and €y per call minute, with a provision for change with inflation (RPI + or - z)
- Relative to general tariffs, e.g. x% of standard rental and call charges not to exceed the standard by more than y% (but here difficulties can arise with tariff proliferation, when it is no longer clear which is the standard tariff)
- Relative to some income standard, e.g. x% of the minimum hourly wage or benefit level.

5 Eligibility for the tariff must clearly be defined primarily in order to achieve the scheme's objectives, but at the same time should be as simple as possible to administer and police. There is always a tension between the two desired goals of achieving high take-up by intended beneficiaries and avoiding take-up by others, especially while minimising administrative overheads, and policy decisions should clarify the balance that is wanted here. Whether the scheme is "opt-in" or "opt-out" for those eligible is a particularly sensitive decision.

6 Particularly if the decision is for "opt-in", good and well-targeted publicity is obviously essential for high take-up. Presentation of the tariff will also be important – if the tone of the publicity is perceived as condescending, or if too much form-filling is required, then some potential subscribers may be deterred.

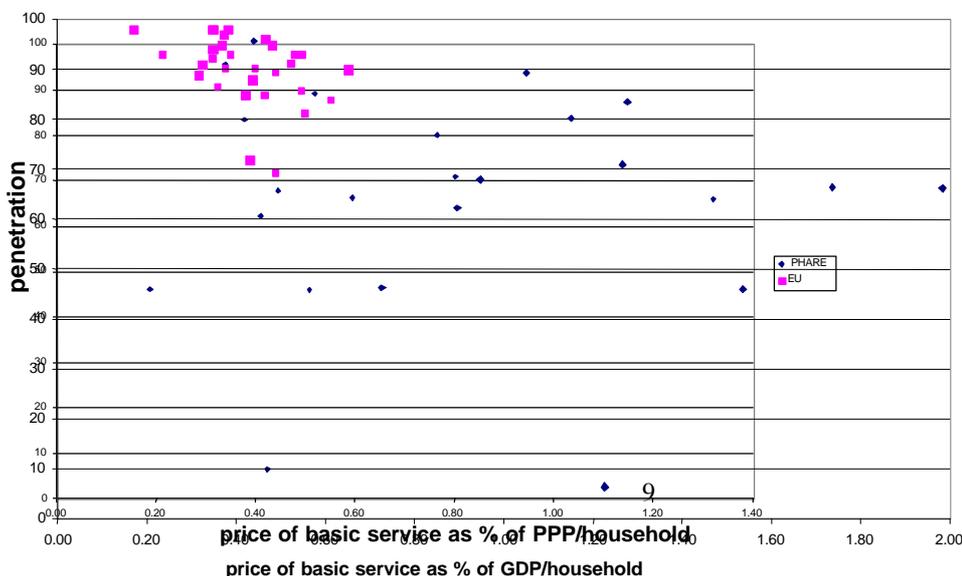
7 If eligibility criteria include some usage threshold, then this too must be defined so as to ensure its continued utility. Options include:

- A fixed volume of calls e.g. x minutes of national calls per month (possibly growing at y% per year)
- A fixed money allowance e.g. €x worth of calls per month (possibly growing at y% per year)
- A fixed number of call units per month (if these are still used) – which depending on what is included in a unit may turn out equivalent to either of the above, or some combination thereof
- Any of the above related to users as a whole or some subset, e.g. the usage or expenditure represented by the lowest x% of residential users

8 If the tariff varies with usage, e.g. if an initial allowance is free and then usage is paid for, or if the call charge rises or falls at certain thresholds, then the question arises of how users are to be made aware when the tariff changes.

## 4 Affordability in the Phare countries

### 4.1 Affordability at current prices



### Figure 3 Comparison of price of basic service as % of PPP per household and GDP per household

In Figure 3 we compare the current price of a basic service basket<sup>10</sup> as a percentage of average GDP (lower chart) and average PPP<sup>11</sup> (upper chart), plotted against residential telephone penetration<sup>12</sup>.

We see that:

- The price of the basket as a percentage of PPP per household is clustered quite closely around the value 0.4% for both Phare and EU countries, almost irrespective of current household penetration. The values for Phare countries are much more scattered than those for EU countries, however.
- The price of the basket as a percentage of GDP per household displays a linear tendency, with Phare countries having significantly higher values than EU countries (and again much more scattered values). The values for EU countries again are quite closely clustered around the value 0.4%.

The meaning of these patterns is not obvious. However one reading is that a basic service price somewhere in the region of 0.4% of PPP/GDP represents a “natural” level, or widespread perception, of acceptability in the context of national incomes<sup>13</sup>. A much higher price for the basic service basket would seem to entail a penalty of lower household penetration. It would appear that raising the basic service price in Phare countries by a large factor could have significant adverse consequences for household penetration. We explore this possibility further below.

#### 4.2 An approach to future affordability based on income distribution

In this section we introduce a variant of the ITU approach to affordability discussed above and apply it to the Phare countries.

The basis of this approach is to assume that households cannot afford telephone service if the annual price of basic service<sup>14</sup> exceeds a given percentage of their annual income<sup>15</sup>. National household expenditure surveys indicate that on average households spend 1% to 2% of their income on telecoms service. Our illustrative calculations below use an assumed threshold telecoms expenditure of 1.5% of income<sup>16</sup>.

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<sup>10</sup> For comparisons of current prices, we use a simple basket consisting of one tenth of the installation charge, one year’s residential rental and 500 local calls (each of 2 minutes at peak rate), assumed to be representative of a low user. Prices are as supplied to the current project.

<sup>11</sup> PPP means purchasing power parity, a measure of income which takes account of prevailing prices. PPPs are closer together than GDPs, because high income economies normally have high prices, and low income economies normally have low prices.

<sup>12</sup> In most cases, residential lines per 100 households is used as a proxy for residential penetration.

<sup>13</sup> This would be consistent with our assumption below of 1.5% of threshold household income being an acceptable threshold level for affordability of basic service, in countries where the bulk of non-telephone households have below national average income. This is broadly true in the countries participating in this project, except Albania. For example, if we were looking to increase household telephone penetration from a level of 80%, i.e. into the lowest 20% of households when ranked by income, we would be addressing incomes of 46% of the mean in Estonia and of 66% of the mean in the Slovak Republic. At 20% penetration, however, we would be looking at incomes of 146% and 131% of the mean, respectively.

<sup>14</sup> Measured here by one year’s rental. Ideally some calls would be added, but in the absence of cost and usage data this would be a spurious attempt at refinement.

<sup>15</sup> Some of the calculations also assume that all households which can afford telephone service subscribe to it. Waiting lists are of course significant in many of the Phare countries. This leads to an understatement of the “affordability gap” discussed below.

<sup>16</sup> The results are significantly affected by the exact size of this percentage. Any attempt to apply this approach for practical purposes within a country should use local survey data to estimate as accurately as possible the percentage of household income which is spent on telecoms service by a marginal subscriber (one who can just afford to be on the phone)..

We mainly use World Bank data on income levels and income distribution<sup>17</sup>. We work on the assumption that the shape<sup>18</sup> of each country's income distribution remains fixed, while the mean increases with economic growth.

Figure 4 below reproduces the World Bank income distribution data for the Phare and EU countries. The data show the percentage of national income<sup>19</sup> accruing to the lowest and highest deciles<sup>20</sup> and to each quintile in the population<sup>21</sup>. From these it is straightforward to draw Lorenz curves<sup>22</sup>, as illustrated in Figure 5. For clarity we just show the averages plus the two extreme curves in the Phare range, which are the Slovak Republic, being the most equal<sup>23</sup> and Estonia, the least equal.

**Figure 4 World Bank income distribution data for Phare and EU countries**

	Survey year	Gini index	Fitted alpha	1 <sup>st</sup> 10%	1 <sup>st</sup> 20%	2 <sup>nd</sup> 20%	3 <sup>rd</sup> 20%	4 <sup>th</sup> 20%	10 <sup>th</sup> 10%
Austria	1987	23.1	5.5	4.4	10.4	14.8	18.5	22.9	19.3
Belgium	1992	25.0	4.8	3.7	9.5	14.6	18.4	23.0	20.2
Denmark	1992	24.7	4.9	3.6	9.6	14.9	18.3	22.7	20.5
Finland	1991	25.6	4.6	4.2	10.0	14.2	17.6	22.3	21.6
France	1989	32.7	2.8	2.5	7.2	12.7	17.1	22.8	24.9
Germany	1989	28.1	3.7	3.7	9.0	13.5	17.5	22.9	22.6
Ireland	1987	35.9	2.3	2.5	6.7	11.6	16.4	22.4	27.4
Italy	1991	31.2	3.1	2.9	7.6	12.9	17.3	23.2	23.7
Netherlands	1991	31.5	3.0	2.9	8.0	13.0	16.7	22.5	24.7
Spain	1990	32.5	2.9	2.8	7.5	12.6	17.0	22.6	25.2
Sweden	1992	25.0	4.8	3.7	9.6	14.5	18.1	23.2	20.1
UK	1986	32.6	2.8	2.4	7.1	12.8	17.2	23.1	24.7
Average EU		29.0	3.6	3.3	8.5	13.5	17.5	22.8	22.9
Bulgaria	1992	30.8	3.3	3.3	8.3	13.0	17.0	22.3	24.7
Czech Rep	1993	26.6	4.3	4.6	10.5	13.9	16.9	21.3	23.5
Estonia	1995	35.4	2.4	2.2	6.2	12.0	17.0	23.1	26.2
Hungary	1993	27.9	3.9	4.1	9.7	13.9	16.9	21.4	24.0

<sup>17</sup> Taken from *Entering the 21<sup>st</sup> century: World Development Report 1999/2000*. Income distribution data are taken from surveys carried out in various years, and are not available for Albania or for FYROM. More recent Estonian data provided directly to this study were compared with the World Bank data; the resulting Lorenz curves were practically identical.

<sup>18</sup> As summarised by its Gini index, or by the corresponding value of  $\alpha$  in the gamma distributions that we use for modelling (see below).

<sup>19</sup> Or, more often, expenditure (since this is easier to measure in surveys). We use the two terms interchangeably here.

<sup>20</sup> Decile=10%, quintile=20% of a population ranked in order (here, of income or expenditure) – so the bottom decile is the poorest 10% of the population.

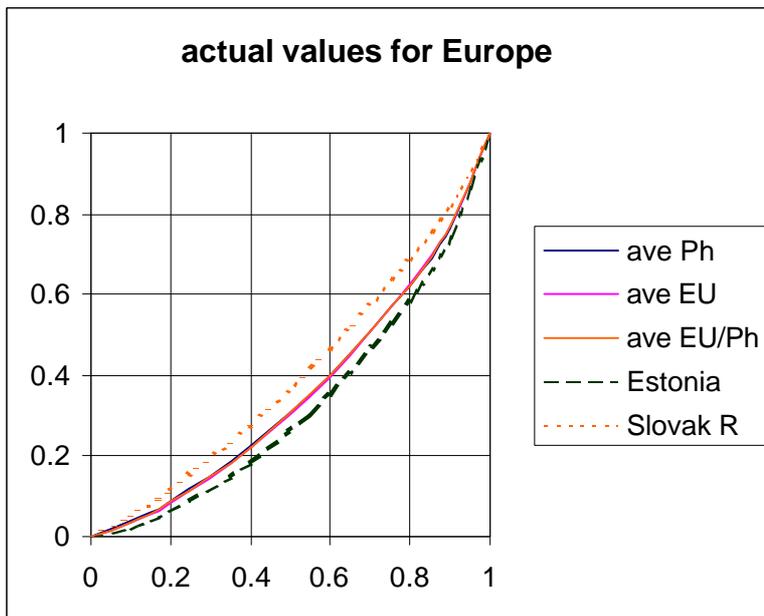
<sup>21</sup> A further assumption is that household size is constant within each country throughout the income range. The data are normally based on household surveys, and we convert between this and GDP per capita or GNP per capita bases by a straight household size multiplier. Actual data, where available, could suggest using different household sizes at different income levels.

<sup>22</sup> The Lorenz curve plots the cumulative % of income as y against the cumulative % of population having up to that income as x. The Gini index is the area between the Lorenz curve and the straight line joining the opposite corners, as a fraction of the total area below the straight line. It measures the degree of inequality in income distribution within a country. A Gini index of 0 would mean complete equality (everyone gets the same income) and a Gini index of 100% would mean complete inequality (one person gets everything and everyone else gets nothing). Real Gini indexes of course are between 0 and 100%, with higher values meaning less equality.

<sup>23</sup> In fact, the Slovak Republic distribution seems to be the most equal not just in Europe but in the world.

Latvia	1995	28.5	3.8	3.3	8.3	13.8	18.0	22.9	22.4
Lithuania	1993	33.6	2.7	3.4	8.1	12.3	16.2	21.3	28.0
Poland	1992	27.2	4.2	4.0	9.3	13.8	17.7	22.6	22.1
Romania	1994	28.2	3.7	3.7	8.9	13.6	17.6	22.6	22.7
Slovak Rep	1992	19.5	6.4	5.1	11.9	15.8	18.8	22.2	18.2
Slovenia	1993	29.2	3.6	4.0	9.3	13.3	16.9	21.9	24.5
Average Phare		28.7	3.6	3.8	9.1	13.5	17.3	22.2	23.6

**Figure 5 Empirical Lorenz curves**



We observe that by world standards<sup>24</sup> these data are rather homogeneous, and in particular that there are no significant differences between the Phare group and the EU group – in fact the two averages are very close together. We further observe that Lorenz curves derived from standard gamma probability distribution functions<sup>25</sup> can be chosen to fit these empirical Lorenz curves rather closely by appropriate choice of  $\hat{a}$ <sup>26</sup>. Our modelling henceforth relies on this family of curves<sup>27</sup>.

Our modelling also requires further inputs:

<sup>24</sup> Gini indexes often occur in the range 50 to 60 in Latin America, and in the range 40 to 50 in Africa and the CIS.

<sup>25</sup>  $\tilde{A}(x, \hat{a}, \hat{a}) = ((x/\hat{a})^{\hat{a}-1})\exp(-x/\hat{a})$  (normalised so that the area under the curve is 100%)

<sup>26</sup> If drawn on Figure 2, the Lorenz curve derived from the gamma distribution with  $\hat{a}=3.6$  would be indistinguishable by eye from the three “average” curves which are overlaid in the middle.  $\hat{a}$  is found by dividing the mean of the distribution (i.e. average household income) by  $\hat{a}$ .

<sup>27</sup> The decision to use these curves was heavily influenced by computational convenience (the gammadist function and variants on it are built into Excel 5). If income is  $t$ , the cumulative percentage of population with an income of up to  $t$  is taken straight from the fitted gamma distribution. The cumulative distribution of income corresponds to another gamma distribution with  $\hat{a}$  replaced by  $\hat{a}+1$  (the effect of multiplying by  $t$ ), so it is easily calculated from the original  $t$ . The fit of the gamma distributions seems adequate for the current purpose. Again, local data could point to fitting data with a different curve.

- The actual cost in each country of providing a domestic fixed line for a year. In the absence of cost data we assume a round figure of €200 . Where local cost data are available a better estimate should be substituted.
- Household size. Data supplied to this study have been used for the Phare and EU countries<sup>28</sup>.

Figures 6 and 7 show our findings.

**Figure 6A Cost-based rentals: affordability in the EU**

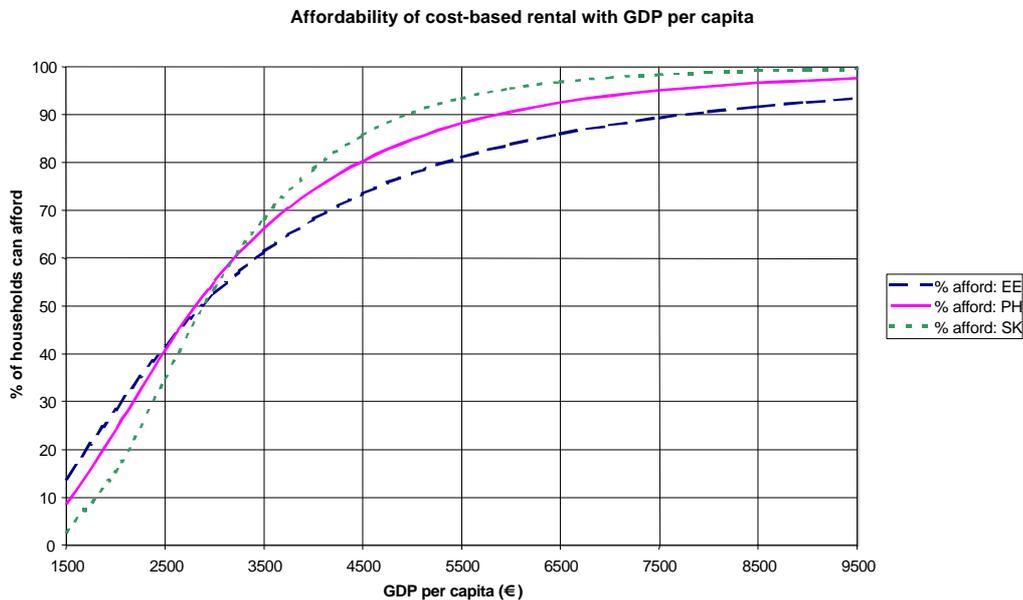
	Actual household penetration (%)	% that could afford rental at cost	Gap %
Belgium	83	100	-16
Denmark	100	100	0
Finland	88	99	-11
France	100	96	-4
Ireland	69	94	-25
Italy	91	96	-6
Netherlands	93	96	-2
Spain	95	94	1
Sweden	100	99	-1
UK	96	95	1

**Figure 6B Cost-based rentals: affordability in Phare countries**

	Actual household penetration (%)	% that could afford rental at cost	Gap %
Albania	6	0	6
Bulgaria	65	0	65
Czech Rep	47	45	2
Estonia	56	13	43
Hungary	56	31	25
Latvia	66	4	62
Lithuania	65	7	58
Macedonia	60	0	59
Poland	42	26	15
Romania	39	0	38
Slovak Rep	49	22	26
Slovenia	91	87	4

<sup>28</sup>The tendency for household size to shrink as national income increases may be modelled by a reduction of 0.05 household members per €1,000 increase in per capita GNP, an approximation which gives a good fit over a wide range of countries including all of Europe. The “average” curve in Figure 6 uses this approximation with a household size of 4 at zero income.

**Figure 7** Percentage of households able to afford cost-based rental as GDP rises



Figures 6A and 6B compare current household penetration with the percentage of households theoretically able to afford a cost-based rental on our assumptions. We see that in all of the EU countries, the percentage theoretically able to afford service at cost-based rentals, on the assumptions made here, is close to or exceeds actual penetration. But in the Phare countries, the position is reversed: the percentage theoretically able to afford service at cost-based rentals, on the assumptions made here, is lower than actual penetration, in some cases much lower.

Most of the Phare countries appear to face a significant “affordability gap” if they move towards cost-based rentals faster than national income growth permits. Figure 7 illustrates the effect of income growth for the two “extreme” countries of Estonia and the Slovak Republic, together with the Phare average. Clearly, closing some of these gaps through national income growth alone would take several years or even decades of sustained economic performance.

## 5 Implications for the Phare countries

### 5.1 Universal service strategy for the Phare countries

This final section aims to pull together the implications of the preceding sections for the Phare countries. Policies prevailing within the EU may be inapplicable to Phare countries, for a variety of reasons. Phare countries have some particular difficulties:

- most incumbent monopolies in EU countries addressed the mass market stage of their network rollout with rentals and local call charges held artificially below cost, financed by internal cross-subsidies from long-distance and international calls. Their Phare counterparts will be unable to enjoy such a luxury without impeding their countries’ chances of EU accession
- the extent of tariff rebalancing required is great in most of the Phare countries. In particular, rentals may need to rise by a significant factor if they are to approach cost recovery
- recent economic upheavals have led to loss of real income and insecurity about future prospects for many if not most households

- given the above and a possible diminution in income equality, current levels of household telephone penetration may be unsustainably high

But they also have some advantages over their EU neighbours:

- the current relatively high household penetration may be seen as a long term strength instead of a problem, if means can be found to retain existing subscribers
- higher average household sizes (2.91 for Phare vs. 2.53 for EU) make it easier to achieve higher household penetration at given income levels
- new technology and modern billing systems provide them with much greater flexibility in addressing these challenges than has typically been used in the EU.

This study proposes that the Phare countries should address the challenges of affordability within the context of an overall universal service strategy which will cater for the following special market segments, of which we discuss the first three in some detail below:

- specific groups regarded as especially needy and/or deserving, e.g. the elderly or disabled;
- existing users who through low use and low income are likely to suffer significantly as a result of rebalancing;
- potential new users whose income is such that they will be deterred from joining the network by fully rebalanced tariffs;
- people who will not be able to afford to join the network for a long time, and will therefore be customers for public (shared) network access;
- public institutions such as schools and health centres, whose connection to the network (and very probably to the Internet) would be of wide benefit ;
- rural locations which are unusually expensive to serve.

The last three of these segments are outside the scope of this paper; however, it is vital that all these be addressed in a co-ordinated way. In particular, public access (e.g. payphones) should be provided in sufficient numbers and in the right locations to serve those who will not have a phone at home for a long time. This policy is commercially sound as well as in keeping with public goals of universal network access. Payphone provision will grow the habit of telephone use and eventually grow the network.

It is also worth noting that EU regulations do permit the public funding of universal service goals. However only closely defined basic services may be funded through the telecoms industry, and this must be done in a fair and transparent way.

## **5.2 “Social support” packages**

Currently, most preferential tariff packages offered in Phare countries are of the “social support” variety – intended to demonstrate society’s appreciation of the sufferings or services of particular groups. Providing these may or may not be perceived as in the telco’s commercial interest (depending on the number and profile of beneficiaries and the telco’s public relations strategy).

Packages of this type have often been around for a while and may not have been thoroughly thought through in the first place<sup>29</sup>. If these are to continue in coming years, and to fulfil their intended purpose, then they will need to be redefined and redesigned, using the guidelines suggested in section 3, so as to:

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<sup>29</sup> For example, they may have been introduced as a hasty response to perceived political requirements.

- capture in today's money terms the particular features that it is desired to offer each group (e.g. very low rental, or a certain volume of cheap local calls)
- relate this to an appropriate index to achieve continuing affordability. The index should probably represent income rather than prices, and must be relevant to the group in question, e.g. social security benefit levels

At the same time it may be desirable to re-examine and rationalise eligibility for these packages.

If the telco declines to finance these packages, then the subsidies involved should properly be borne by the State. They could become rather large if the speed of rebalancing outstrips that of raising benefit levels. The burden could however be reduced by falling membership of certain groups, to which entry is now low or closed and whose members are aging.

### 5.3 “Commercial” packages for existing and new subscribers

Two new aims appear for future commercial special tariff packages. These are packages which telcos are likely to see as in their long-term commercial interest to provide, and which therefore should not require state funding:

- to retain existing low-user subscribers on the network in the face of rebalancing<sup>30</sup>. Since their lines are already in place, and they receive calls, it is very likely to be commercially worthwhile to price services to such subscribers in a way which retains their custom, even if their use continues to be low. The prices for rental and calls should be high enough for the relevant revenues, including revenue from incoming calls, to cover the avoidable costs of these subscribers. As much of the line cost is sunk investment, the avoidable cost will be relatively low, and restricting the low-user tariff to existing subscribers need not be construed as undue discrimination.
- to grow the network further, to include an increasing proportion of low-income and low-usage subscribers (as those with relatively high incomes and/or high usage are more likely to be connected already). As these are new lines, caution is needed here to avoid incurring costs in excess of revenues if prices are set at apparently affordable levels. As a start this network expansion should use existing spare network capacity, but some new investment is likely to be inevitable, thus incurring new costs.

Different approaches are needed to meet these two aims.

To retain existing subscribers, the simplest approach is to impose price caps at various usage levels. For a limited initial period, assuming a desire to rebalance rapidly overall, they might for example be:

- median residential subscriber: inflation
- lower quartile residential subscriber: inflation + 5% a year
- lowest decile residential subscriber: inflation + 10% a year

(where inflation is measured by a suitable index of consumer prices)

and leave it to the telco to devise what tariffs it will to meet these constraints. Some form of light user scheme(s), trading lower rentals for higher call charges, would probably emerge<sup>31</sup>. Once rebalancing has been achieved, the new scheme would be included in an overall price cap so its subscribers would benefit like everyone else from future productivity improvements.

<sup>30</sup> High user subscribers may also be experiencing economic problems; however tariff rebalancing will automatically work to their advantage, so we do not consider them further here.

<sup>31</sup> Light user schemes that are tied to “standard” tariffs (e.g. 50% of standard rental) of course increase by the same annual percentage as the relevant standard tariff. To a significant degree their benefit is presentational – the focus being on what is saved rather than on what is spent.

To grow the network further, it is undesirable to offer below-cost installation or rental charges. But new subscribers could be attracted by a mixture of such features as:

- ability to spread installation charge over (say) 3 years<sup>32</sup>;
- known monthly payment including a “free” call allowance, with a voice announcement advising on remaining credit;
- option of outgoing calls barred once call credit exhausted;
- ability to “top up” calling allowance by paying small sums in advance, using payment methods chosen by and convenient to the user;
- full itemised account of all calls.

Local market research into this segment is strongly advised to enable optimal packages to be designed.

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<sup>32</sup> Suitable provisions would be needed for handling part-paid installation charges in the case of moving or default during the period.

## Annex Concessionary tariff schemes in the participating PHARE countries

This table is based on information supplied by participants in the course of the PHARE project in 1999.

Country	Concessionary schemes targeted towards customers with disabilities	Concessionary schemes targeted towards customers in deserving groups	Concessionary schemes targeted towards low income customers	Are the costs refunded by Government?	Plans for new concessionary schemes
Albania	An unclear law on the blind should in theory provide some concession. However this has not been implemented.	None	None		The PSTN tariff has not changed for 6 years. Concessionary tariffs for customers with special needs are being discussed as part of proposed new tariff.
Bulgaria	Disabled (BTC asks to see a Health Ministry certificate) - rental 500 leva (instead of 2520 or 2880 leva, depending on number of lines on the exchange), including 100 free pulses. For 101-180 pulses, 10 leva each; above 180 pulses, 46 leva each.	Social & health institutions (on a list issued by the Ministry of Social Welfare) -rental of 1000 leva (instead of 6480 or 11040 leva, depending on number of lines on the exchange), which includes 5000 pulses. Pulse price above 5000 pulses is 46 leva.	Rental about 50% lower. First 80 pulses 10 leva each, then 60 leva each (cf usual residential tariff of first 80 pulses at 12 leva, then 55.2 leva). Take-up is about 2% of residential subscribers.	No	Reduced rental and higher call charges for some customers.
Czech Republic	Disabled people and members of the Union of Fighters for Freedom pay CZK525 installation, vs CZK3333, plus VAT		None		None
Estonia	None	None	None		New packages are under consideration
Hungary	None	None	None		None
Latvia	1. 1st and 2nd (permanent) category invalids are entitled to a 100% discount on installation 2. 1st category invalids and	None	None	No	None

Country	Concessionary schemes targeted towards customers with disabilities	Concessionary schemes targeted towards customers in deserving groups	Concessionary schemes targeted towards low income customers	Are the costs refunded by Government?	Plans for new concessionary schemes
	<p>persons using text telephones and associations of invalids are entitled to a 75% discount on the monthly rental of telephone line</p> <p>3. 1st category invalids and textphone users receive a 20% discount on local calls.</p> <p>Coverage is about 1.4% of residential customers.</p>				
Lithuania	<p>Since 1999, all residential customers are entitled to 2 free hours of local calls per month, one of which is included in the periodic rental. The Government subsidises four hours of free local calls (in addition to the one hour provided by Lietuvos Telekomas) for disabled, retired people, deportees, political prisoners, families with disabled children, and victims of the events of 13 January.</p>		<p>Lietuvos Telekomas provides a lower monthly subscription fee for retired people: Lt 6.0 (Lt 4.2 over 80 years of age) instead of the usual Lt 13.</p>	<p>Lietuvos Telekomas pays for the first hour of free local calls per month for all residential customers. The Government pays for the second hour for all residential customers (for 4 additional hours in the case of preferential tariffs). 50% of the lower monthly subscriptions for retired people is funded by the Government (60% in the case of disabled people). Lietuvos Telekomas does not regard itself as providing any preferential tariffs.</p>	None

Country	Concessionary schemes targeted towards customers with disabilities	Concessionary schemes targeted towards customers in deserving groups	Concessionary schemes targeted towards low income customers	Are the costs refunded by Government?	Plans for new concessionary schemes
FYR of Macedonia	<ul style="list-style-type: none"> <li>▪ <b>Disabled (handicapped) people</b></li> <li>▪ War invalids</li> <li>▪ Working invalids</li> </ul> <p>These classes of customers have the following concessions:  - 50 % discount on monthly rental, and  - 150 additional free pulses.  The concessions cover about 0.5% of households.</p>	None	None	The Government covers the costs of the schemes.	None, although the whole PSTN tariff is under review.
Poland	<p>TP S.A. funds a 50% discount on installation and monthly rental for disabled people</p> <p>The Ministry of Health and TP S.A. jointly fund Cardiophone for people with heart problems</p>	<p>The Government funds a 50% discount on monthly rental plus 20 free units for former freedom fighters</p>		The Government jointly funds Cardiophones, but does not reimburse TP S.A. for the cost of the installation and rental concessions to disabled consumers. It funds the concession to former freedom fighters.	None
Romania	<p>1 Disabled persons needing special protection (in accordance with agreement between State Secretariat for Handicapped Persons and Romtelecom)</p> <p>The concession is free monthly rental (including 100 free pulses, as with the normal tariff) plus another 100 pulses</p>	<p>2 War veterans and war widows</p> <p>3 Persons persecuted for political reasons by the dictatorship installed on 6 March 1945</p> <p>The concession is free monthly rental (including 100 free pulses, as with the normal tariff). For over 100 pulses the</p>	None	<p>1: Paid by National Fund for Risk and Accident (funded by 1% tax on salaries; donations; and subsidies from central budget if first 2 components insufficient)</p> <p>2 and 3: Paid from state budget, social protection budget or local budgets within</p>	The Romanian authorities do not see why should the schemes be expanded.

Country	Concessionary schemes targeted towards customers with disabilities	Concessionary schemes targeted towards customers in deserving groups	Concessionary schemes targeted towards low income customers	Are the costs refunded by Government?	Plans for new concessionary schemes
	free, or plus another 400 pulses free for blind persons. For over 200 pulses or 500 pulses respectively per month, the normal pulse tariff applies.	normal pulse tariff applies.		amounts approved by Ministry of National Defence, Ministry of Labour and Social Protection, Ministry of Interior and Romtelecom	
Slovak Republic	Disabled people (the blind, and those who are not mobile without assistance of other people)	<ul style="list-style-type: none"> <li>▪ War veterans and their widows</li> <li>▪ People who have been rehabilitated (people convicted in the previous era who are now considered to have been unfairly punished)</li> <li>▪ People who were illegally taken to Soviet Union</li> <li>▪ Members of War working camps</li> </ul>	None	The Government is committed to reimbursing the costs to Slovak Telecom but has not paid for 3 years.	Slovak Telecom would be reluctant to widen the existing schemes, but might introduce its own scheme(s) for commercial reasons.
	<p>These classes of customers have the following concessions:</p> <ul style="list-style-type: none"> <li>▪ installation fee: SKK1230 instead of SKK4920 (incl. VAT)</li> <li>▪ monthly fee: SKK0 instead of SKK86.10 (incl. VAT)</li> </ul> <p>The concessions cover less than 10% of residential customers.</p>				
Slovenia	None	None	None		None