

Federal Statistical Office, Wiesbaden, Germany
Irmtraud Beuerlein

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The German Consumer Price Index for Telecommunication Services: A User Profile Approach for Mobile Telephony and Internet Access

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Abstract

The paper describes the German practice of price measurement for telecommunication services after the monopolistic system was broken up. It outlines the difficulties in coping with rapid market changes, frequent new offers and complex pricing. It reports on the procedures and solutions which are feasible under conditions of limited resources.

Whereas for fixed-line telephone services the traditional approach could be maintained so far, for mobile communications and internet access a *user profile approach* has been developed which is able to cope with permanent variations of the packages offered to different types of customers.

The new price index for telecommunication services was incorporated in the German CPI in the framework of the index revision on base 1995 and has meanwhile been updated several times.

Key words: telecommunication services, fixed-line telephone services, mobile phone services, Internet access, user profile approach

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1. Initial situation

1.1 Market development

Due to the liberalisation process on the telecommunications market, which started in Germany in the 1990s, the framework conditions for price index calculation have changed radically during the last years. The monopolistic system was gradually broken up, starting in the field of data and mobile communications. The last step, leading to a complete deregulation of the telecommunications market was made early in 1998 by abolishing the network monopoly regarding voice transmission for the general public. By now, a growing number of telecommunication providers are competing with the former public monopolist.

In addition to the rearranging of the market structure, new products emerged, which first became established in the business sector before being introduced on the private mass market. New telecommunication services such as digital mobile communication, ISDN access, online and Internet services have spread significantly only in the last few years, thus becoming relevant for price monitoring on the telecommunications market.

1.2 Main purposes

The conception of a price index for telecommunication services should consider three main purposes:

- First of all, an up-to-date *subindex of the CPI* is needed to take into account the new telecommunication services purchased by households.
- Second, there is a need for *market indicators* reflecting the impact of competition on the newly liberalized market. This purpose requires the presentation of subindices for the individual market segments showing different paces of development.

- Furthermore, the System of National Accounts asks for appropriate *deflators* for the individual market segments with highly differing growth rates.

In view of the present market structures and trends as well as of the above mentioned requirements, the minimum breakdown of the price index for telecommunication services is determined as follows:

- fixed-line telephone services
 - access fees
 - local connections
 - domestic long-distance connections
 - international connections
 - connections to the mobile phone network
- mobile phone services
- Internet access

For deflation purposes a differentiation between private and business customers is necessary.

1.3 Conceptual framework

The concept of measurement traditionally applied in German price statistics is the *Laspeyres fixed base concept*. This concept aims at measuring the “pure” development of prices, with the quantity component remaining constant over the medium term. Generally, every five years a thorough index reform is carried out, updating the composition and weighting of the goods selected for price monitoring. The present base year of the CPI is 1995, the index reform on base 2000 will be achieved in 2003.

Regarding the dynamic market changes in telecommunications, the traditional approach of a “fixed basket of goods” reflecting the situation in the base year could not be maintained in this area. Without a more frequent updating the price index for telecommunication services would soon become obsolete. The informative value as a market indicator would become limited to market segments showing less drastic changes. In view of the great

public interest and in order to enhance acceptance of official price statistics, the Federal Statistical Office decided to search for pragmatic answers to the new situation.

2. Objectives

The new calculation of the price index for telecommunication services was geared to the following objectives:

- The index should take account of the situation after the complete liberalisation of the telecommunications market, i.e. coverage had to be extended to new services like mobile telephony, and major competitors of *Deutsche Telekom AG* had to be included in price monitoring.
- Due to the great public interest in the development of the telecommunications market, the index calculation should be sufficiently differentiated to well reflect price changes in an extremely dynamic and innovative market.
- The model for tracking price trends should be robust and flexible to keep the current workload for price monitoring bearable.
- The methodology applied and the assumptions made in constructing the model should be transparent to encourage discussion on the appropriateness of the approach adopted and to invite market experts to comment on how to enhance the quality of the data base for a more representative modelling.

3. Approach

3.1 The updated price index for telephone services in the fixed-line network

In fixed-line telephoning, *Deutsche Telekom AG* is still the enterprise by far dominating the market for private customers. Until the end of 1997, it was even the sole provider of fixed-line telephone services for private households. This is why the index construction for fixed-line telephony is widely based on detailed internal turnover data of this company.

3.1.1 Deriving the weights

Deutsche Telekom AG provided the Federal Statistical Office with detailed structural data on its private customer business to allow setting up the index structure. The supplied data reflect the situation of 1996. This means that they refer to the year following the large-scale price rate reform of *Deutsche Telekom AG* that took effect on 1 January 1996. Thus the new, and much more detailed, rate structure has completely been taken into account for the new index structure.

Compared with the preceding weights, some shifts have occurred. For instance, the weights of calls made within the short-distance and regional areas have increased, while long-distance and international calls have been included in the calculation with smaller weights than before. What is new in the "basket of services" is ISDN access and connections to the mobile communications network. Also, the average length of calls per type of rate has been redefined.

Chart 1 shows the index structure and the types of services selected. Altogether, the calculation is based on 880 individual prices, all with their own weights. This highly detailed calculation produces a well-founded picture of the current structure of rates on the fixed-line telephone market.

Users will certainly regret that no detailed information is given on index weights and the individual services selected which are to represent the behaviour of private telephone customers. The legal obligation of official statistics regarding *data protection* does not allow to disclose individual data without the consent of the parties concerned. This applies all the more to a highly competitive market where internal structural data of the market leader on its turnovers and the calling behaviour of its customers are very valuable for its competitors. Publishing the weighting pattern is possible only when turnover data of other companies have been included in the calculation of weights so that the weights do no longer allow to draw conclusions regarding the situation of individual companies.

Chart 1: Structure of the consumer price index for telecommunications services in the fixed-line network

Selected types of services	Number of	
	Priced items	Individual prices
Telephone access charges	6	6
One-time installation charge		
Analogue telephone access		
Installation	1	1
Taking over an existing access	1	1
ISDN access	1	1
Monthly basic charge		
Standard rate	1	1
Social rate (for pensioners, etc.)	1	1
Euro-ISDN basic access	1	1
Call charges	230	874
National	149	469
Short-distance		
from main access (analogue/ISDN) ¹	17	17
from pay-phone ¹	7	7
from cardphone ¹	7	7
Regional		
from main access (analogue/ISDN) ¹	15	75
from pay-phone ¹	5	5
from cardphone ¹	5	5
Long-distance		
from main access (analogue/ISDN) ¹		
from pay-phone ¹	34	170
from cardphone ¹	14	14
Connections to mobile communications	31	155
International		
Selected countries ¹	81	405

¹ Further divided by days of the week and times of the day

3.1.2 Calculating the index

Until December 1998, calculating the index included price data of *Deutsche Telekom AG* only. Towards the end of 1998 however, which was the first year of market deregulation, the companies which had just started operating in the area of public voice telephone services accounted for a considerable share in the total number of calls on submarkets.¹ Therefore, starting January 1999, prices of important new providers in the fixed-line network have been included for the market segment *national long-distance calls*. As customer fidelity is not very strong yet for any of the competitors, only call-by-call rates² have been included. The prices of the new telephone companies have been included in the calculation of this subindex with a total weight of 30% (*Deutsche Telekom AG*: 70%). The basis used to weight the companies is the average number of calling minutes per day as at mid-December 1998; that information was obtained from the selected telephone companies.

Starting with January 2000, price monitoring was extended to competitors in the market segments *international calls* and *connections to mobile communications*, too. The weights of the companies were derived from data on market shares based on calling minutes published in the Report 1998/1999 of the Regulatory Authority for Telecommunications and Post in December 1999. According to it the prices of the competitors obtain the following weights:

- National long distance calls	35%
- International calls	38%
- Connections to mobile communications	15%

Extending price monitoring to providers other than *Deutsche Telekom AG* means accepting the disadvantages involved when using snapshot statistics based only on quantitative data and not allowing differentiation between private and business customers.

¹ See e.g. Regulating Authority for Telecommunications and Postal Services: Annual Report, 1998.

² The call-by-call procedure allows the telephone customer to select a specific telephone company for every call by dialling first a network operator code before dialling the actual telephone number.

What would be desirable are yearly data per company on the turnovers achieved with private customers.

3.2 The new price index for mobile telephone services

In mobile communications, the initial situation faced when first calculating a price index is much more difficult than in the fixed-line context. The market regarding digital mobile telephone services has been open to competition from the very beginning. By now, four network operators and numerous service providers have been active on the market. There is a great variety of rates with frequent new offers. The market sees high growth rates.

3.2.1 Deriving the weights

It has not been possible so far to obtain data on turnovers by types of rates achieved with private customers. That information is necessary for deriving the weights and selecting the price representatives. When work started in 1997/98, the new telephone companies had no experience yet regarding cooperation with official statistics. The situation has gradually improved making them acquainted with the goals of price statistics and developing a relationship of confidence.

In view of the data shortcomings, the index construction has to be based on makeshift solutions. To set up a rough structure, data from private market research have been used. What has been taken as basic data was the market shares (in terms of number of customers) of the major providers of mobile telephone services as recorded in March 1997³. Those quantitative data, showing the number of card holders per mobile communications company, were converted into value data by means of information on the amounts of the customers' average monthly mobile telephone bills for the selected companies. The data⁴ used for this purpose were available in a breakdown by size classes of invoiced amounts so that weight factors could be derived for customer categories. With the help of those data sources, a rough weighting pattern (shown in chart 2) has been set

³ See *Plica Marktforschung Analyse: "Der Mobilfunk-Report 1997"*, p. 53.

⁴ See mobile connections survey of the periodical *connect*, published in issue 5/1998.

up which includes eight providers of mobile telephone services and distinguishes between five customer categories. For reasons of data protection, only the values of the column of totals of the matrix are shown here.

Chart 2: Rough weighting pattern of the price index for mobile telephone services

Weight factors in %

Monthly bill in DM	Mobile communications companies								Total
	1	2	3	4	5	6	7	8	
I. up to 50									9.19
II. 51 – 100									25.45
III. 101 – 150									17.68
IV. 151 – 200									10.64
V. over 200									37.04
Total									100

The data forming the basis of the pattern include both private and commercial users, so that the pattern provides a rough structure for the entire mobile telephone market. To set up the consumer price index for mobile telephone services, only categories I. to III. are used. This is done with the assumption that the large majority of the monthly amounts invoiced to private mobile communications users fall within that range.

3.2.2 Defining user profiles

As a next step, a detailed user profile was set up for each category. The user profiles were designed in a way as to take account of major price-forming factors such as the number of calls and their distribution over times of the day, the length of calls, and calls made within a network or beyond it. Definitions were drawn up after consultation with the mobile communications companies and remaining gaps were filled through assumptions. To find illustrative names for the defined user profiles, designations of types were used which had already been established in specialist publications and at the companies themselves.

The current computation of the consumer price index for mobile telephone services is based on the three user profiles shown in Chart 3. The user profiles are unchanged so far.

Chart 3: User profiles in the consumer price index for mobile telephone services
referring to one month

Specification	Unit	Rare callers	Low-level callers	Average callers
Length of calls, total	Minutes	16	42	96
Length of individual call				
Type A	Seconds	35	45	45
Type B	Seconds	65	95	115
Calls ¹	Number	20	36	72
Within network	Number	8	12	24
Beyond network	Number	12	24	48

¹ The calls are distributed over times of the day and days of the week so that it is possible to take account of changes in the delimitation between peak and low times, working day and weekend tariffs.

Due to the poor data material available, a more detailed modelling of user types was not possible. It should be attempted in the future to obtain a better empirical basis for the model. An EU regulation has now been adopted providing for compulsory response.⁵ On that basis, the Federal Statistical Office is able to make the enterprises supply internal structural data.

⁵ See Commission Regulation (EC) No 2646/98 of 9 December 1998 laying down detailed rules for the implementation of Council Regulation (EC) No. 2494/95 as regards minimum standards for the treatment of tariffs in the Harmonized Index of Consumer Prices, Official Journal of the EC, No L 335 of 10 December 1998, p. 30.

3.2.3 Selecting the rates

Suitable rates of the selected mobile telephone companies were allocated to each of those user profiles. "Suitable" in this context means that those rates were selected which were cheapest for the user type in question. This means it is assumed that consumers have complete information on the market and show economic behaviour.

The current calculation covers a total of 37 rates for the three user types. The basis for deriving the weight factors of the selected rates was the company weight per user category I to III shown in chart 2. In those cases where the companies included in price monitoring did not provide precise information on the relative importance of their individual rates, the relevant company weight was evenly distributed over the selected rates.

3.2.4 Collecting the prices

Prices are collected monthly, the reference date being the 15th day of the reference month, as usual in consumer price statistics. Price collection is based on an evaluation of the offers of the selected companies. To obtain the price material, various media are used: Price lists, press releases, Internet presentations of the telephone companies and phone queries in case of doubt. Price collection refers to the following variables:

- Monthly basic charge,
- Minimum turnover per month/free minutes included,
- Unit length/subsequent unit length,
- Call charges for calls
 - within the network,
 - to a third-party mobile communications network,
 - from mobile to fixed-line network,
 - within one's own or to another specific area code,
 - at peak or low times.

The following variables, which also have an impact on prices, have not been included for the time being, for reasons of simplification and to avoid assessment problems:

- One-time installation charge,
- Mobile telephone purchase price/phone subsidy,
- Term of contract,
- International calls,
- Contacting the mailbox,
- Quantity discounts on long calls,
- Additional services such as itemised call listing, call blocking, call diversion.

3.2.5 Calculating the index

Monthly measuring of the price changes is done in several steps:

First of all, the monthly invoiced amount is calculated for each user profile. For this purpose, individual prices are computed for each selected rate and for every call exactly defined in the model with regard to its length, its exact hour, and other variables. Despite the simplifications mentioned earlier with regard to price collection and modelling, a total of more than 1600 individual prices have to be computed. The individual prices are combined to form a monthly invoiced amount for every rate selected; this includes the monthly basic charge and a minimum turnover where applicable.

The invoiced amounts thus determined are then compared with those of the base period, i.e. with the average monthly bill obtained for any rate or its preceding versions in the base year.

These price relatives are aggregated with their weight factors to form subindices for individual user profiles and the price index for mobile telephone services. The aggregating function used here is again the Laspeyres formula as a weighted arithmetic mean of price relatives.

3.3 The new price index for Internet access

The private use of the Internet has spread considerably in the last years. At the same time, prices for internet access went down strongly. The rising significance, on the one hand, and the special price movement, on the other, led to the decision to include Internet access into price monitoring of the telecommunications market.

As in other fields of telecommunications, price index computation for Internet access faces the problem of measuring the development of tariffs, i.e. complex price systems. This requires an approach which is sufficiently flexible to cope with newly appearing price elements. This kind of flexibility is ensured by the *user profile approach* as already applied for calculating the price index for mobile telephone services.

3.3.1 Data situation

Data on the market structure, turnover figures for individual rates and information on the behavior of Internet users, or on invoiced amounts by types of customers etc. are not covered by German official statistics. Therefore the data for setting-up the price index for Internet access have to be obtained from different sources: market studies of private research institutes⁶ as well as inquiries of Internet providers. The evaluation of the collected information and its combination to a consistent system required great efforts. The share of assumptions is even greater than in the case of mobile telephony.

Although it was not possible to draw a sharp line between private and business use of the Internet, the new price index for Internet access has been designed as a consumer price index with the aim to be incorporated in the CPI and HICP starting in January 2001.

⁶ Main sources were: ARD/ZDF-Online-Studie: "Wird Online Alltagsmedium?" in Media Perspektiven 8/99; GfK Online-Monitor: 4. and 5. Untersuchungswelle, 18.8.1999 and 22.2.2000; Stiftung Warentest: "Internetprovider" in test10/99; Hannemann,U.: "Internet total" in connect 7/1999, p.14ff.

3.3.2 Defining the user profiles

The main pillars of the computation are the three user profiles presented in chart 4. They have been developed on the basis of the collected data on user behavior. The aim was to reflect a broad range of user behavior as well as the variety of pricing. By distributing the Internet link-ups over the hours of the day, the days of week and the month, it becomes possible to cope with the diversity of offers and their frequent variations. The simplifications concerning the duration of Internet use by the individual user types make the monthly calculation manageable.

Chart 4: User profiles in the consumer price index for Internet access
referring to one month

Specification	Unit	Low level user	Average user	High level user
Duration of Internet use per month, total	Hours	10	30	60
Internet link-ups for the duration of				
20 minutes	Number	-	-	10
30 minutes	Number	20	-	-
60 minutes	Number	-	30	15
70 minutes	Number	-	-	10
90 minutes	Number	-	-	20
Internet link-ups, total	Number	20	30	55
Monday-Friday:				
8.00a.m.-6.00p.m	Number	5	9	18
6.00p.m.-8.00a.m	Number	7	12	27
Weekend	Number	8	9	10

¹ The Internet link-ups are distributed over hours of the day and the days of the week so that it is possible to take account of changes in the delimitation between peak and low times, working day and weekend rates.

3.3.3 Selecting the priced items

The current price observation covers the offers of the eight most important Internet providers in Germany. The company weights are derived from the customer figures of the selected companies. In a first step, the company weights were distributed to the three user profiles according to the number of users per user category. In a second step, these quantitative weights were transferred into value weights per user type by means of the average monthly invoiced amounts of the year 2000.

The offers of the selected providers are continually checked in order to ensure that always the most attractive packages, from the viewpoint of the user type in question, are included in the calculation. The assumption is that the Internet user behaves economically. Depending on the range of offers and the weight of the selected provider, one to four rate variants are included in price monitoring. In those cases where the selected companies do not provide precise information on the relative importance of their individual rates, the company weight is evenly distributed over the selected rates.

3.3.4 Collecting the prices

Current price monitoring covers about 50 rates offered to different types of users. The price collection has so far referred to the following price-forming factors:

- monthly basic charge/subscription charge
- charge for using the telephone network,
- unit length,
- charge for building-up the connection,
- charge for being connected,
- free hours/hours included/minimum turnover,
- peak and off-peak time.

With the approach chosen, new offers like an all-inclusive flat rate or Internet access on call-by-call basis can be taken into account promptly.

3.3.5 Calculating the index

The monthly measuring of price changes for Internet access is done in the same way as for mobile telephony: First, monthly costs are computed for each selected rate by applying the exactly determined user profiles. Then, the costs of the reporting month for the user profile N purchasing the rate i of the company k are compared with the corresponding costs for the same rate or its preceding version of the base year. These cost relatives per rate are aggregated to subindices for individual user profiles and the price index for Internet access. The aggregation function used here is again the Laspeyres formula as a weighted arithmetic mean of price relatives. The weighting for the relatives per rate is obtained from the company weights.

3.4 Computing the over all price index for telecommunication services

The statistical programme in Germany does not cover the issue of what telecommunication services are demanded by households, accounting for what shares in the household budgets. What can be derived from the statistics based on family budget surveys is just the share of expenditure on all telecommunication services in the total expenditures of households. For 1995, a share of 18.57 per mill in the consumption expenditure of all private households was derived from the representative household surveys. With this weight, the price index for telecommunication services is included in the consumer price index on the basis 1995.

Information on the equipment of households with information technology was obtained from the household surveys conducted early in 1998 and 2000. According to those, households had the following telecommunication equipment in January 1998 and 2000:

... % of private households were equipped with ...		1998	2000
-	Telephone, stationary (including cordless)	96.6	96.4
-	Telephone, mobile (car telephone, mobile telephone)	9.5	29.8
-	Internet or online services	7.2	16.4

As the individual shares of expenditure on the different types of services are not available so far, the weighting pattern has to be based on these quantitative data. The assumption made at the same time is that a household's bills for phone calls in the fixed-line and mobile network as well as for Internet access show the same amounts in the base year. This requires empirical verification.

For calculating the over all price index for telecommunication services from January 1995 to December 1999, weights of 90% for making calls in the fixed-line network and of 10% for mobile communications have been derived from the 1998 sample survey.

The data of the 2000 survey led to the following weighting structure for the revised and extended price index calculation starting in January 2000:

- fixed-line telephone services	67.6%
- mobile telephone services	20.9%
- Internet access	11.5%.

4. Results

The consumer price indices for telephone services in fixed-line and mobile communications networks are available from January 1995 and for Internet access from January 2000. As already mentioned, the indices from January 1995 to December 1999 were calculated on the original base 1995. To ease medium-term comparison, they were linked with the new calculation on base 2000 starting in January 2000 (see table 1).

Comparing the index series shows considerably differing price trends for the individual market segments (see charts 5 and 6). What is particularly striking is the sharp drop in prices of *mobile telephone services*. The price trend in the fixed-line sector is characterised by countervailing tendencies (see chart 6): Price increases are recorded for *access and basic charges*, and even sharper rises are observed for *local calls*, whereas prices are falling for *international calls* and *national long-distance calls*. Until the end of 1998, price increases and decreases roughly counterbalanced each other. At the beginning of 1999 – one year after the complete liberalisation of the telecommunications market –

the price index for *fixed-line telephone services* was suddenly pushed down to a clearly lower level as the prices of national long-distance calls dropped sharply, followed by even stronger reductions for international calls. During the year 2000, price decline seems to have come to an end in this market segment. This trend is totally different from the price development for *Internet access*, where prices have fallen rapidly since early in 2000. Thus, the index series supply evidence for the significance of incorporating new telecommunication services in price index calculation.

4. Assessment

To summarise, one can say that the consumer price index for telephone services in the fixed-line network shows good quality in its level of detail. Its coverage regarding the important offers of the new competitors is highly up to date. The newly developed computation models for tracking price trends in the mobile communications as well as on the internet sector are able to cope with the wide diversity of rate variants and the fast changing offers. Despite the poor quality of the structural data and simplified model assumptions, the calculation basis is sufficiently detailed. The multi-stage structure of the computation models permit flexibility in further development. Along with an improvement of the data situation, it will be possible to gradually reduce the share of estimates, which is still rather large.

Consumer price index for telecommunication services
2000 = 100

Year Month	Total	Fixed-line telephone services						Mobile telephone services	Internet access
		Total	Access and basic charges	Fixed-line calls					
				Total	Including				
					Local calls	Long distance calls	Inter- national calls		
1996 average	127.1	117.1	90.5	137.8	80.3	216.4	236.3	236.0	
1996 average	128.9	120.9	99.5	137.6	93.1	201.0	212.8	201.3	
1997 average	124.0	118.2	99.2	133.0	93.1	185.7	212.2	157.9	
1998 average	122.4	117.4	99.8	131.0	93.6	187.6	188.8	144.0	
1999 average	108.4	104.6	100.0	108.3	99.4	110.4	159.4	114.4	
2000 average	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1995 January	127.8	117.3	90.5	138.0	80.3	216.4	238.9	246.6	
February	127.8	117.3	90.5	138.0	80.3	216.4	238.9	246.6	
March	127.8	117.3	90.5	138.0	80.3	216.4	238.9	246.6	
April	127.8	117.3	90.5	138.0	80.3	216.4	238.9	246.6	
May	127.0	117.3	90.5	138.0	80.3	216.4	238.9	231.5	
June	127.0	117.3	90.5	136.0	80.3	216.4	238.9	231.5	
July	127.0	117.3	90.5	138.0	80.3	216.4	238.9	231.5	
August	126.7	116.9	90.5	137.5	60.3	216.4	232.7	230.3	
September	126.7	116.9	90.5	137.5	60.3	216.4	232.7	230.3	
October	126.7	116.9	90.5	137.5	60.3	216.4	232.7	230.3	
November	126.7	116.9	90.5	137.5	60.3	216.4	232.7	230.3	
December	126.7	116.9	90.5	137.5	60.3	216.4	232.7	230.3	
1996 January	133.1	123.6	99.7	142.1	93.1	216.2	213.4	230.3	
February	133.1	123.6	99.7	142.1	93.1	216.2	213.4	230.3	
March	132.1	123.6	99.7	142.1	93.1	216.2	213.4	210.3	
April	131.9	123.6	99.7	142.1	93.1	216.2	213.4	206.0	
May	131.9	123.6	99.7	142.1	93.1	216.2	213.4	206.0	
June	131.9	123.6	99.7	142.1	93.1	216.2	213.4	206.0	
July	126.5	118.2	99.2	133.0	93.1	185.7	212.2	206.0	
August	126.5	118.2	99.2	133.0	93.1	185.7	212.2	206.0	
September	126.5	118.2	99.2	133.0	93.1	185.7	212.2	206.0	
October	125.3	118.2	99.2	133.0	93.1	185.7	212.2	182.4	
November	124.2	118.2	99.2	133.0	93.1	185.7	212.2	163.1	
December	124.2	118.2	99.2	133.0	93.1	185.7	212.2	163.1	
1997 January	124.2	118.2	99.2	133.0	93.1	185.7	212.2	163.1	
February	124.2	118.2	99.2	133.0	93.1	185.7	212.2	161.4	
March	124.1	118.2	99.2	133.0	93.1	185.7	212.2	160.9	
April	124.1	118.2	99.2	133.0	93.1	185.7	212.2	160.9	
May	124.1	118.2	99.2	133.0	93.1	185.7	212.2	160.9	
June	124.1	118.2	99.2	133.0	93.1	185.7	212.2	160.7	
July	124.1	118.2	99.2	133.0	93.1	185.7	212.2	160.0	
August	123.9	118.2	99.2	133.0	93.1	185.7	212.2	156.5	
September	123.7	118.2	99.2	133.0	93.1	185.7	212.2	153.1	
October	123.7	118.2	99.2	133.0	93.1	185.7	212.2	152.4	
November	123.7	118.2	99.2	133.0	93.1	185.7	212.2	152.4	
December	123.7	118.2	99.2	133.0	93.1	185.7	212.2	152.4	
1998 January	123.7	118.2	99.2	133.0	93.1	185.7	212.2	152.4	
February	123.7	118.2	99.2	133.0	93.1	185.7	212.2	152.4	
March	122.0	116.5	99.2	130.0	93.1	186.8	182.9	152.4	
April	122.8	117.4	100.0	131.0	93.7	188.1	184.3	152.2	
May	122.8	117.4	100.0	131.0	93.7	188.1	184.3	152.2	
June	122.8	117.4	100.0	131.0	93.7	188.1	184.3	152.2	
July	122.8	117.4	100.0	131.0	93.7	188.1	184.3	152.2	
August	122.8	117.4	100.0	131.0	93.7	188.1	184.3	152.2	
September	122.0	117.1	100.0	130.3	93.7	188.1	184.3	140.2	
October	121.1	117.1	100.0	130.3	93.7	188.1	184.3	124.6	
November	121.1	117.1	100.0	130.3	93.7	188.1	184.3	124.4	
December	120.8	117.1	100.0	130.3	93.7	188.1	184.3	120.1	
1999 January	110.4	106.4	100.0	111.4	93.1	125.5	182.9	120.6	
February	109.5	105.5	100.0	109.8	93.1	119.9	182.9	119.6	
March	111.1	107.2	100.0	112.8	100.6	116.0	182.9	119.2	
April	109.1	105.2	100.0	109.4	100.6	108.2	169.4	118.5	
May	108.9	105.1	100.0	109.1	100.6	107.6	169.4	113.7	
June	107.6	103.8	100.0	107.0	100.6	107.6	146.5	113.7	
July	107.5	103.7	100.0	106.7	100.6	106.7	146.5	113.7	
August	107.3	103.7	100.0	106.7	100.6	106.7	146.5	113.0	
September	107.3	103.7	100.0	106.7	100.6	106.7	146.5	110.9	
October	107.2	103.7	100.0	106.7	100.6	106.7	146.5	110.0	
November	107.2	103.7	100.0	106.7	100.6	106.7	146.5	110.2	
December	107.2	103.7	100.0	106.7	100.6	106.7	146.5	110.2	
2000 January	107.2	103.7	100.0	106.6	100.6	106.7	146.5	110.2	122.3
February	104.7	101.5	100.0	102.7	100.6	106.7	104.4	105.9	121.7
March	103.3	99.9	100.0	99.9	99.9	100.7	97.6	104.8	120.7
April	101.7	99.7	100.0	99.5	99.9	99.2	97.6	100.7	115.4
May	101.2	99.4	100.0	99.0	99.9	98.5	94.3	100.1	114.2
June	99.0	99.4	100.0	99.0	99.9	98.5	94.3	99.0	96.3
July	98.9	99.4	100.0	99.0	99.9	98.5	94.3	98.9	95.6
August	97.4	99.4	100.0	98.9	99.9	98.3	94.3	98.9	83.2
September	96.9	99.4	100.0	98.9	99.9	98.3	94.3	96.6	82.6
October	96.5	99.4	100.0	98.9	99.9	98.3	94.3	95.0	82.6
November	96.5	99.4	100.0	98.9	99.9	98.3	94.3	95.0	82.6
December	96.5	99.3	100.0	98.8	99.9	97.9	94.3	95.0	82.6
2001 January	96.3	99.3	100.0	98.7	99.9	97.9	93.1	94.0	82.6
February	96.3	99.3	100.0	98.7	99.9	97.9	93.1	93.9	82.6
March	94.5	99.3	100.0	98.7	99.9	97.9	93.1	93.9	67.2
April	93.7	99.3	100.0	98.7	99.9	97.9	93.1	90.3	67.2

Chart 5: Consumer price index for telecommunication services, 2000 = 100

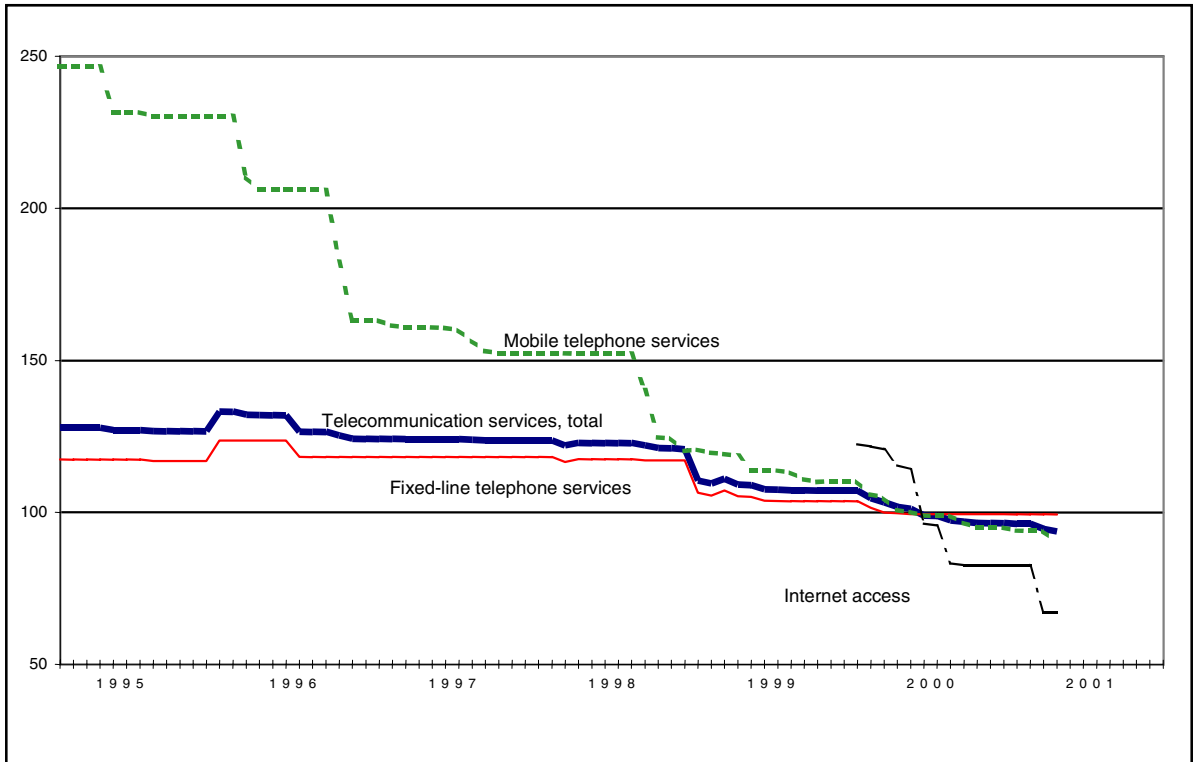


Chart 6: Consumer price index for telephone services in the fixed-line network, 2000 = 100

