



Corporate Services Price Index (CSPI)
for Business Telecommunications
The latest developments

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The experimental Corporate Services Price Index (CSPI) for business telecommunications has been developed with the aim of providing information on price movements within the industry that can be used to obtain a better estimate of the GDP (the output approach). The methodology has been kept under review and, consequently, improvements have been identified and a redeveloped Corporate Services Price Index (CSPI) for Business Telecommunications is almost ready for publication and adoption as a deflator.

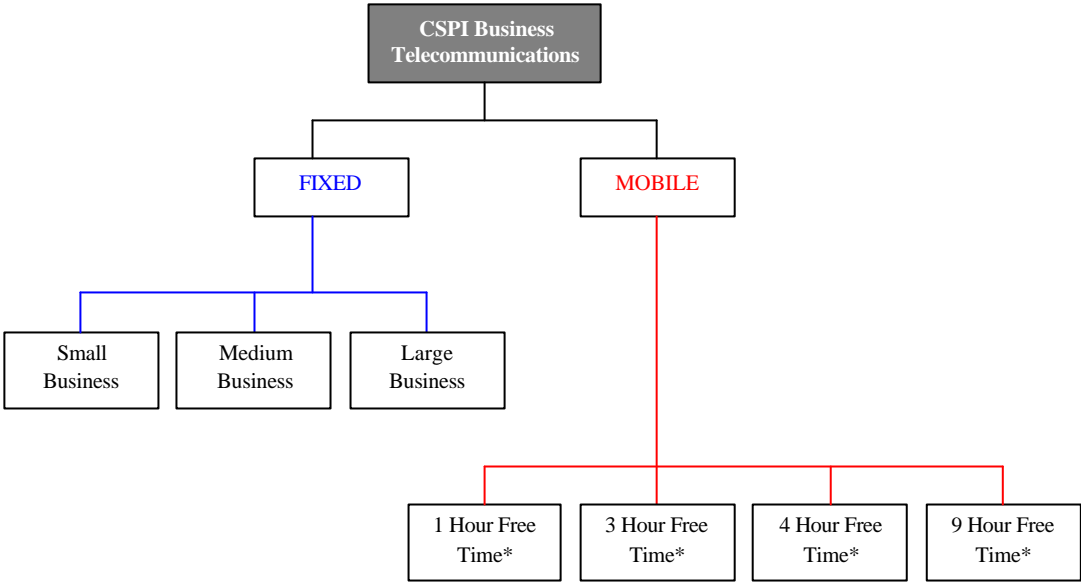
The initial approach

The ONS originally adopted the rate method in the development of the CSPI for business telecommunications. The rates were taken from Tarifica, a private telecommunication industry analysis service, for the fixed line market and from ‘What Cellphone’ magazine for the mobile market.

The method simply involves studying the changing value of rates for common services. The index was based on the set of profiles of typical customers covering a number of models with varying weight. However, the identification of the set of profiles of typical customers was in itself a major problem, which is not surprising given the fast changing nature of the sector.

Flowchart 1: CSPI Business Telecommunications - Family Tree

The rate approach



* per month

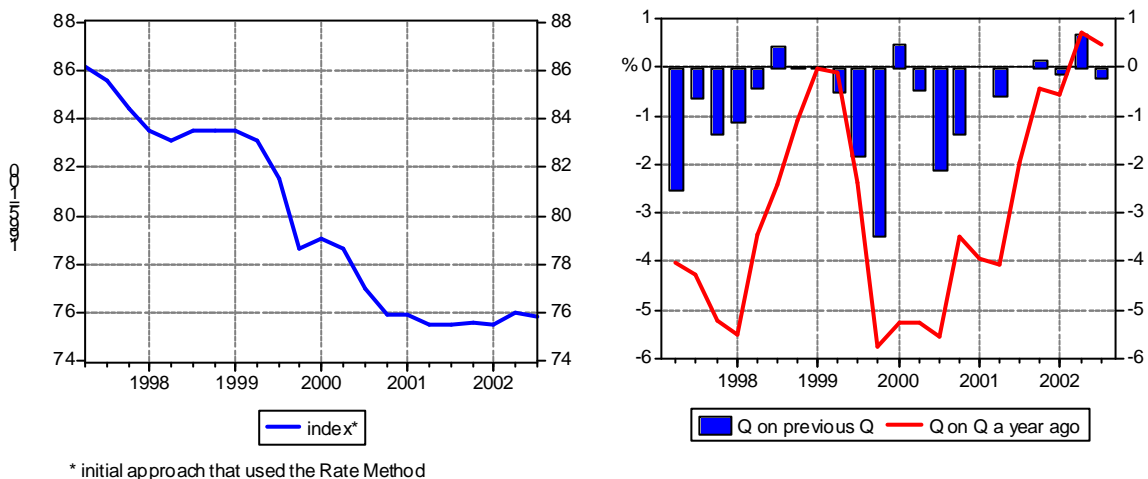
Technological innovation is a major factor that has a significant impact on the demand patterns for the telecommunications services. The initial approach excluded call charges between the fixed and the mobile markets, internet connection charges, text messaging, roaming and discounting because these were not significant or not available at the time. The methodology though was too rigid to deal with a rapidly changing

industry and to incorporate new services as they became available. Changes in demand ought to have led to changes in the weights within the index (since the weights are based on revenue) to avoid significant bias.

Another problem was discounting, in the mobile and fixed markets, since increased competition within the sector resulted in the increase in discounts offered to new customers as service providers tried to acquire greater share of the market. Increased bargaining power of the consumers (businesses) was another factor that had a significant impact on the scale of discounts being offered. Hence, the bias within the index was probably made worse by not taking sufficient account of the discounting available within the industry. Insufficient account was also taken of changes in mobile contracts and migration from one provider to another

Figure 1. shows the original published CSPI for Business Telecommunications from 1997q2 through to 2002q3.

Fig 1: CSPI Business Telecommunications
The initial approach



After consultations with Oftel it was concluded that the index appeared to be ‘too flat’, especially in the late 1990s. During that period a significant decline in the value of the index would have been expected. The implication is that the index was unlikely to represent the ‘true’ price index as it clearly fails to account for significant price changes brought about by increased competition.

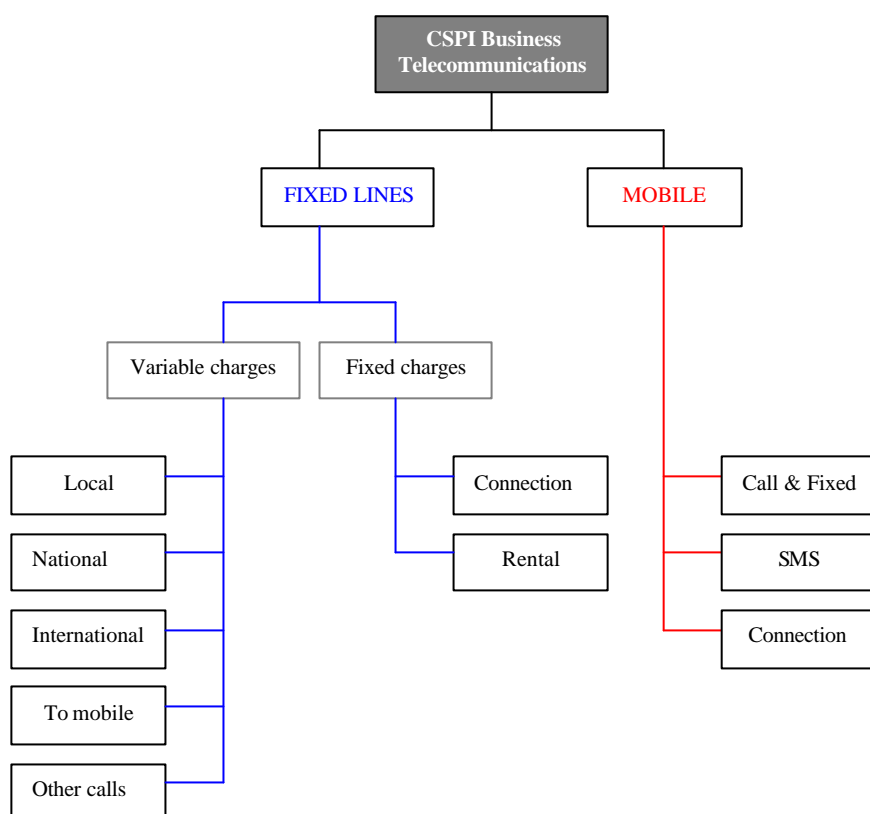
Hence, the rate method was clearly not the most appropriate approach to measure the price changes within the industrial sector characterised by significant changes in demand brought about by competition and technological innovation. Other countries’ that have employed the rate method, e.g. US and Canada, have seen similar weaknesses emerge.

The unit value approach

The ONS aims to switch to an index based on the recently developed unit value approach.¹ This approach starts at the smallest level of aggregation by obtaining a unit value defined as the ratio of revenues in pounds to volumes in minutes, for a homogenous group of products. Since the index is constructed using Laspeyre's formula, homogeneity of products is an important precondition necessary for the development of the appropriate and representative price index for business telecommunications.

Flowchart 2: CSPI Business Telecommunications - Family Tree

The Unit Value Approach



The index is constructed by aggregating sub-indices for the fixed line market and the mobile market (flowchart 2). The quarterly census data collected by Ofcom for the fixed line market is detailed enough to differentiate clearly between the variable and fixed charge components of the fixed line market. The variable charge component is disaggregated further into local, national, international, calls to mobile and other calls, while the fixed charge component level is disaggregated into connection and rental components. The mobile sub-index is disaggregated into calls, SMS and connection charge sub-components.

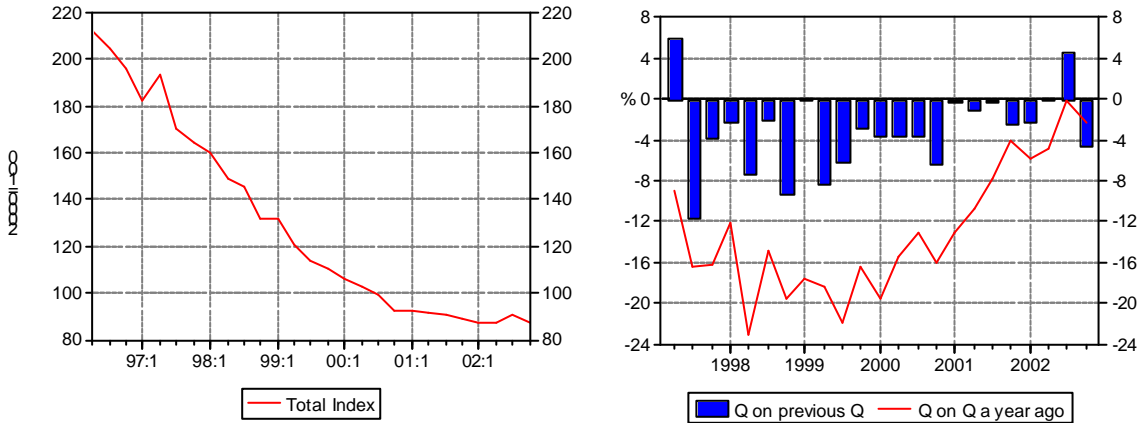
¹ See, Deuchars, G. and Moriya, K. [2001] Price Indexes for Telecommunications Services, 16th Voorburg Group Meeting, Orebro, Sweden, Sept. 2001, available at: <http://www4.statcan.ca/english/voorburg/2001%20orebro/papers/2001-016.pdf>

Disaggregation of 'products/services' has allowed us to obtain relatively homogenous groups that enable a more representative price index to be constructed than was the case with the rate method.

An average pricing approach at a detailed level of aggregation that provides us with a proxy estimate, rather than a true value, is considered to be more appropriate than the rate method, which is characterised by a large bias and difficulty in maintaining a constant quality index. The development of a 'truly representative' index for telecommunication services is seriously hampered by changes in the quality or the emergence of new products (due to frequent technological advances) that leads to changes in demand. As already mentioned, changes in demand lead to changes in weights (since weights are based on revenue), which implies that the weights used in the index following the introduction of new products become out of date. Hence, a potential problem with the unit value approach may arise in the future should we fail to augment the index to avoid the emergence of a new item bias.

The change in the quality of the existing services is not considered to be a problem with the latest approach, since our new quarterly data that comes from a census on fixed line and mobile markets provided by OfTel (Office for Telecommunications) should capture this change. Figure 2. shows the CSPI for Business Telecommunications based on the unit value approach (based on year 2000 weights).

Fig 2: CSPI Business Telecommunications (based on the unit value method)

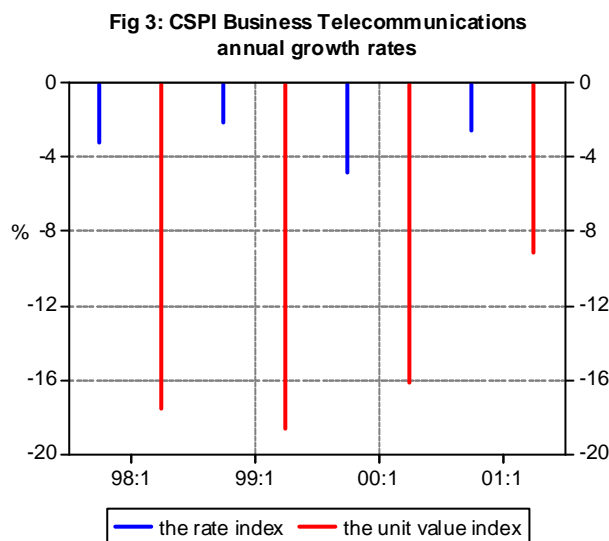


The newly developed index is much steeper than the index based on the rate method. This is in particular true for the late 1990s when we would expect some significant price decreases. There is an apparent outlier in 1997q2 caused by the increase in the unit revenue of calls to mobile and other calls. **Detailed analyses of the results using the revised approach telecommunication services are provided in Appendices A and B.**

The structure of the market at the time may be one of the factors behind this large increase in the index. The mobile market was essentially a duopoly (dominated by Vodafone and BT – almost ¾ of the subscribers market), while at the same time BT had a significant market power within the fixed line market. Hence, the increase may be due to the increase in charges by BT (or it may be entirely due to changes in accounting practice). Regardless

of the data in this early period being far less reliable than the most recent data there is a need to account for this sudden change by making further enquires with Oftel and the industry.

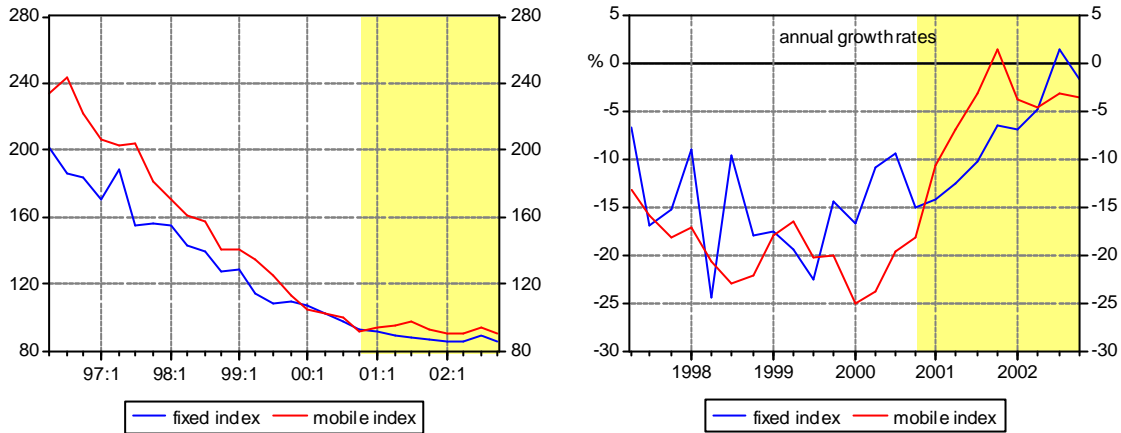
In the late 1990s deregulation of the fixed and mobile markets combined with generally favourable economic environment led to the fierce competition for ‘new’ and ‘existing’ customers. However, the index based on the rate methodology failed to account for any significant price changes. Between 1997 and 2002 the index decreased on average by just –2.5% per annum. Furthermore, between 1997 and 1999, when we would expect significant changes in the value of the index, the index decreased by just –5.2% which is considered to be on a too small scale to accurately represent the price movements for business telecommunications (figure 3).



At the same time, the index based on the unit value methodology decreased by –32.8% between 1997 and 1999 and –50.5% between 1997 and 2002 which is we feel a far better representation of the true movement of prices within the industry.

Furthermore, if we look at the growth rates of its sub-indices (figure 4), there is a significant decrease in the mobile index throughout the period. The index decreased by –54% between 1997 and 2002, with a decrease of –35.6% observed between 1997 and 1999. This should come as of no surprise, as this was the period of the intense price competition between the four major service providers.

Fig 4: CSPI Business Telecommunications (fixed & mobile sub-indices)



Over the last two years several major developments within the industry have led to a much smaller decline in the value of the index for the mobile market than was the case in the late 1990s. The price paid for the 3G licences two years ago (some £22 billion) at the height of the dotcom boom was too high. Furthermore, the financial position of the sector has been made much worse by the collapse of the ICT stock market. Thus, over the last two years, many of the telecoms companies have been left with large and increasing debts (increasing debts, since the cost of setting up the network for the 3G market is likely to run into billions of pounds). Hence, the companies were less willing to provide further significant price cuts in the last two years, than they were in the late 1990's. In addition to this, the telecoms companies have largely consolidated their positions within the market. If we look at the subscribers market share (figure 5a) in 1997 Vodafone and O2 had the dominant position in the market, however since then, competition within the industry has led to a more evenly distributed market for the mobile telephones. In addition to this, the market for the current generation of the mobile phones is near saturation point, thus there is less competition for new customers (this is not surprising since the market for new customers has shrunk to record low levels, figure 5b).

Fig 5a: Subscribers: market share, %

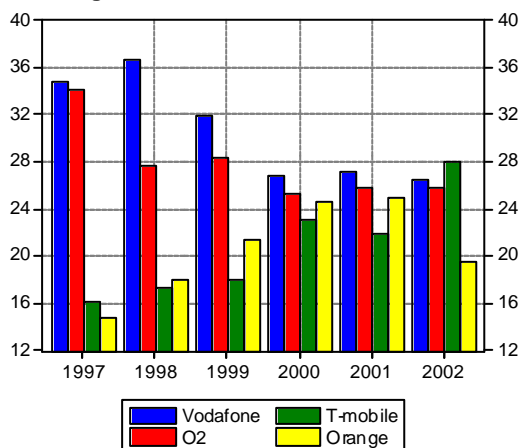
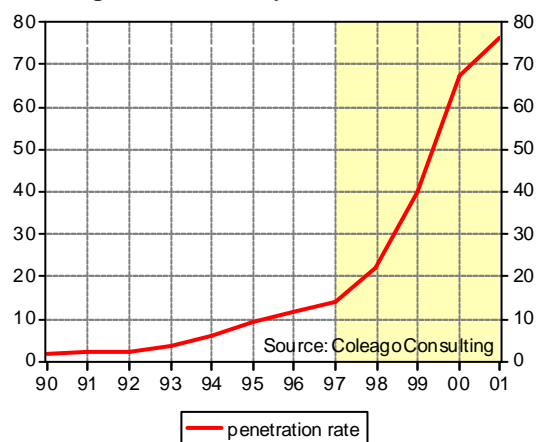


Fig 5b: UK market penetration rate, %



However, although the combination of an already saturated market for the current generation of mobile phones and mounting debts within the industry may be preventing greater price cuts for the current generation of mobile

phones, this is highly unlikely to prevent significant competition for the new 3G customers. Given the wide range of products that will be available with the latest generation of the mobile phones, there is much greater scope to increase current revenue (and profit) within the 3G market than with the current market. Thus the competition for 'new' 3G customers is likely to intensify over the next few years, while there may be much smaller price decreases for the current generation of mobile phones.

Given the small number of service providers, the mobile phone operators may be even tempted to gradually push the prices up, thus essentially forcing the customers to switch from the current generation to the new 3G type service. The extent to which this may be possible shall largely depend on the demand for the new 3G phones, the ability of providers to exert some kind of cartel behaviour and the ability of customers to maintain their bargaining power. Until recently, the market for fixed telephony in the United Kingdom was a clear example of a near monopoly (the market was almost entirely dominated by BT). Thus, the lack of any competition within the market prevented any significant price decreases. However, since the mid 1990s, the market has been characterised by the oligopolistic structure, since deregulation and technological innovation have allowed new service providers to enter the market.

Increased competition within the fixed line market over the last five years has resulted in significant price decreases (figure 4). Between 1997 and 2002, the price index has decreased by -48.5%. In fact over the last two years, we have seen greater price decreases within the fixed market than within the market for mobile phones (-13.7% in the fixed line market, as opposed to -8.6% in the market for mobile phones). This should come as no surprise to us, since it took much longer for the competition in the fixed market to take off than in the mobile market. The initial size and the market power of the BT was the major factor behind this. Furthermore, more recently, further deregulation and especially technological advances have created necessary ground for other companies from as distinct industries as retailing (such as Sainsbury's or Tesco) to move into the market.

Hence in the years to come, we are likely to witness even further significant price decreases within the fixed market.

The way forward

Given the role played by the homogeneity of products within the Laspeyres index formula, ensuring the homogeneity of products at the lowest level of aggregation is an important factor in the construction of the appropriate and representative price index for business telecommunications.

One area of concern regarding the homogeneity of the group of products is associated with the 'other' category of the fixed part of the index (flowchart 2). The importance of this group is highlighted by the fact that it accounts for almost 1/3 of the weights of the fixed index and 1/5 of the overall index. Although, this group accounts largely for the internet services, in the future it would be desirable to separate the internet group from the other products that are included in this group. At present this is not necessary, since internet calls constitute over 90% of the group. Indeed, we may argue that in the future this group should constitute a completely

separate sub-index within the overall index (just like fixed and mobile markets), however, since this is essentially fixed service, there is no need to create a completely separate sub-index.

There is a possibility to further homogenise the international calls group, as we could simply disaggregate it further into Europe1, Europe2, North America and the 'other' levels. However, over the last few years we have seen a significant price convergence between the rates for Europe1 and North America. Furthermore, Europe1 and much of Europe2 markets are going to merge next year following the expansion of the European Union eastward, while there are small price differences between Europe1 and North America, thus there is no need to further homogenise this group of products.

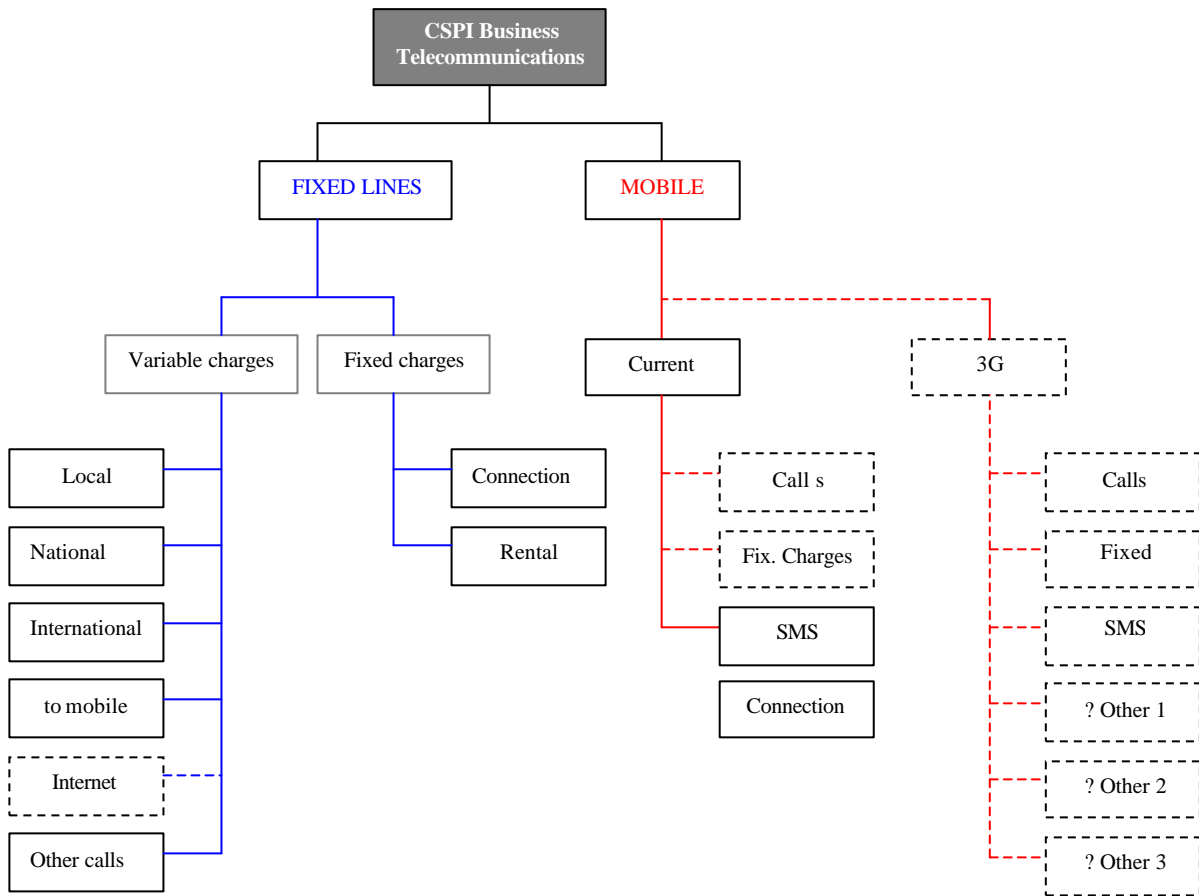
Although in this case we are effectively talking about several different markets that ought to be characterised by significant price differences, given the bargaining power of customers (especially large businesses), such price differences are relatively small and are likely to decrease even further in the years to come.

With regard to the mobile market, it would be desirable to homogenise the Calls & Fixed group by disaggregating it further into Calls and Fixed levels. The latest data from Oftel, would allow us to split the sub-index into the fixed and variable levels as it is done with the fixed line sub-index.

The emergence of the 3G mobile phones could have a considerable impact on the mobile index and the overall CSPI index for business telecommunications in the years to come. As the competition intensifies within this new market, we are increasingly likely to witness a considerable shift in demand, away from the current generation of mobile phones toward the 3G. Given the impact of a shift of demand on revenue and therefore the weights within the index, there is a danger that the weights currently used in the index may become outdated as the demand shifts from one generation of mobile phones to another. Thus, we have to augment the index for this change in demand if we are to avoid the emergence of a new item bias within the index. A possible approach would be to disaggregate the mobile index further into the current generation and the third generation service groups (flowchart 3).

Flowchart 3: CSPI Business Telecommunications - Family Tree

'The way forward'



Given the large number of services and the probability of a greater divergence in prices, it would be desirable to disaggregate the 3G sub-index into a greater number of levels than is the case with the current generation of mobile phones. However, the level of disaggregation would obviously depend on the availability of data. We would need to disaggregate calls & fixed charges into two different levels (calls and fixed), however it would be desirable to disaggregate the fixed level into connection and rental charges. Connection charging within the current generation of mobile phones has been almost entirely phased out. However, given the high costs associated with obtaining the new licence and setting up the necessary infrastructure for the 3G, it is more likely that the cost of connection will be substantial (at least in the initial phase).

A greater number of available features is going to cause considerable problems with regard to data collection. This is especially true for the internet calls, as there is a possibility of the overlap between the fixed internet calls and calls to internet made from mobile phones. Fortunately, the impact of this should be minimal (at least in the imminent future) as the major mobile providers are not involved into the fixed service provision. However, this is likely to change in the near future since there is a potential for significant profit to be made in the fixed market and since the cost of entering the market is much lower than in the case of the mobile market.

Annual Chainlinking

Given the frequent changes in technological innovation and fierce competition for new and existing customers and its impact on the demand for the telecommunications services, an important issue that needs to be resolved is associated with the rebasing of the index. As the demand changes the weights also change as it is evident from the table below that illustrates the rapid changes in annual weights in the fixed and mobile markets over the last few years.

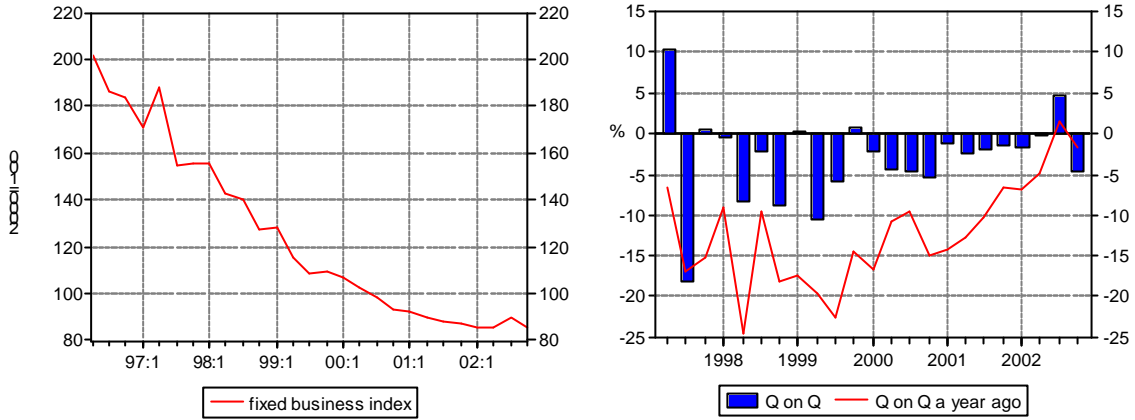
	FIXED-LINE: BUSINESS									MOBILE MARKET		
	Variable (calls)					Fixed (charges)		Total		Mobiles: all		
	Local	National	Int'l	Calls to mobiles	Other	Connection	Rental	Variable	Fixed	All calls	SMS	Connection
	1997	21.8	26.2	19.0	14.5	18.5	11.4	88.6	72.0	28.0	97.5	0.0
1998	20.1	24.9	17.1	16.1	21.7	10.5	89.5	71.7	28.3	97.5	0.0	2.5
1999	17.5	24.1	15.4	17.0	25.9	10.2	89.8	70.2	29.8	96.9	1.4	1.7
2000	15.4	21.8	13.7	18.4	30.6	9.2	90.8	69.1	30.9	92.8	6.2	0.9
2001	13.8	21.1	12.6	21.1	31.4	8.2	91.8	67.4	32.6	86.9	12.3	0.8
2002	13.2	19.9	11.9	24.8	30.2	7.4	92.6	65.1	34.9	84.6	15.0	0.4

The implication of the rapid changes in annual weights is that the current approach where we update weights every five years is clearly not appropriate. Failure to update weights more frequently would simply result in the emergence of a bias, as the index would not be capable of tracking the 'true' price changes (as it was evident with the index based on the rate method).

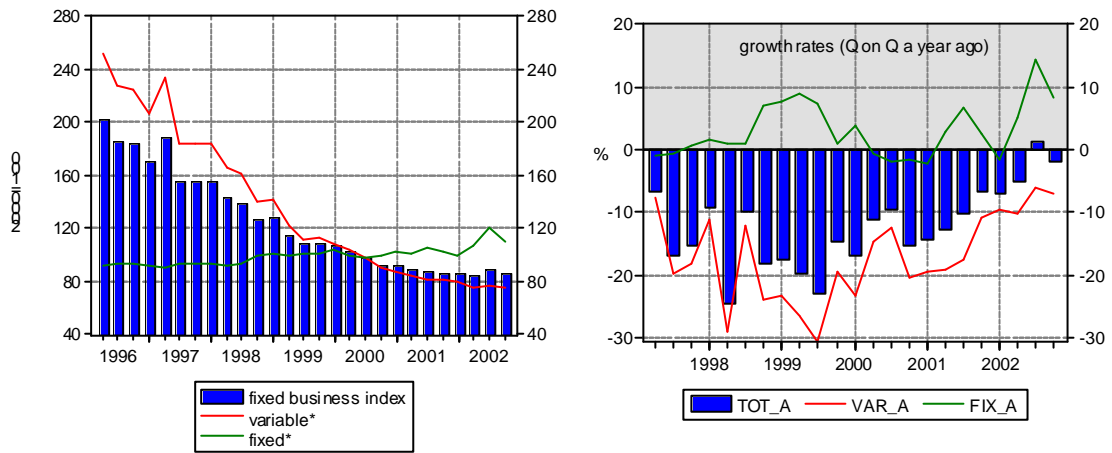
With the census data at our disposal, we have the appropriate detail to rebase every year in order to reflect the most recent developments in the industry. Hence, in order to avoid the emergence of a bias associated with the outdated weights, the appropriate approach would be to rebase every year (chainlink the index). This is despite of chainlinking being a time-consuming and complicated process, which may create a problem to our customers due to frequent revisions and the loss of additivity, not to mention possible incompatibility with other CSPIs

Appendix A: Index for Fixed Telecommunications

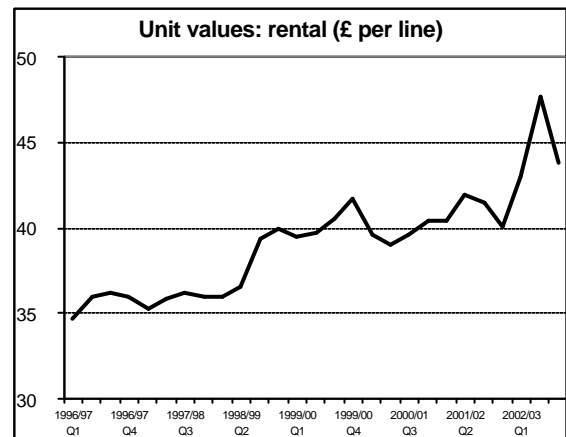
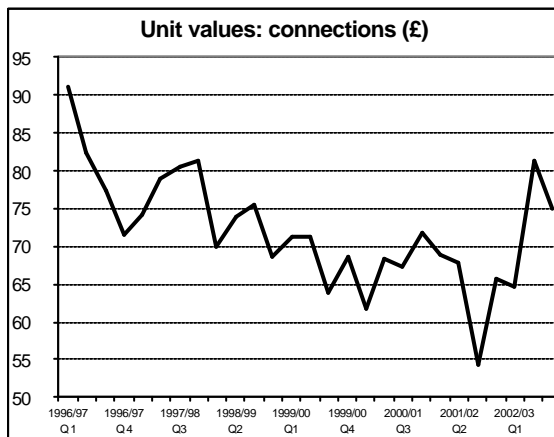
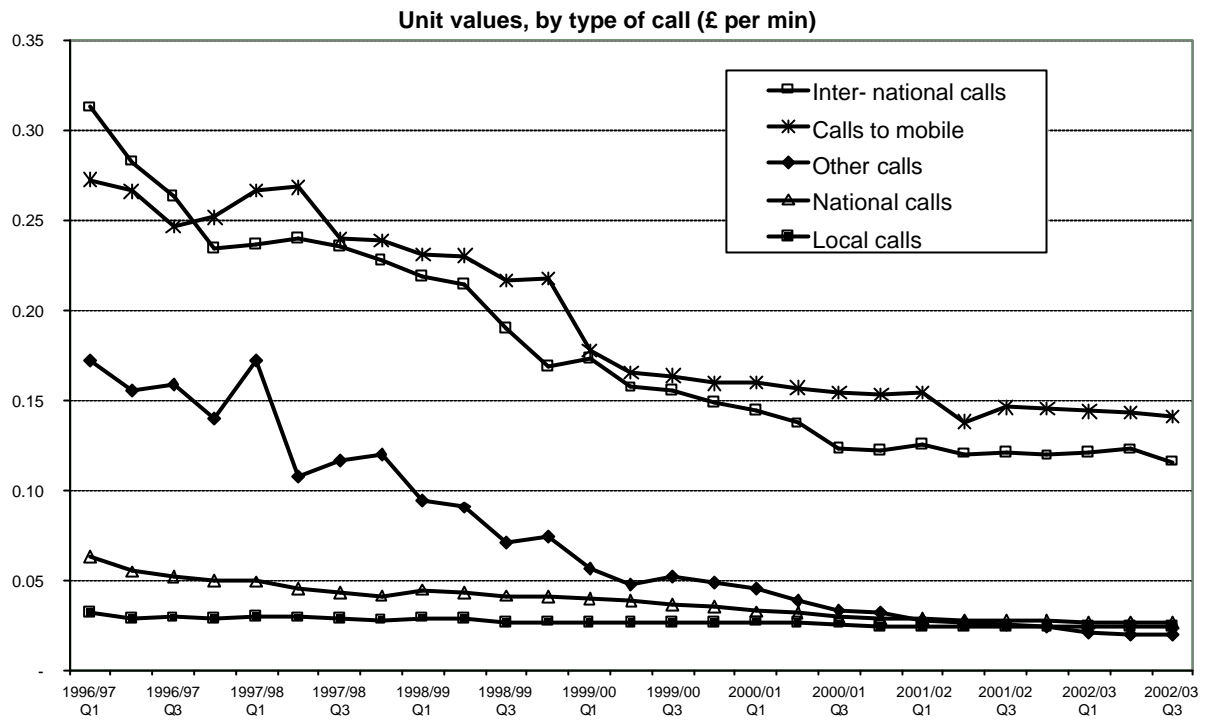
Fixed business index



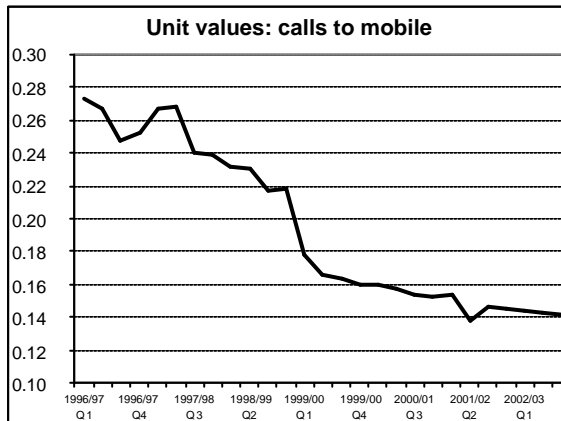
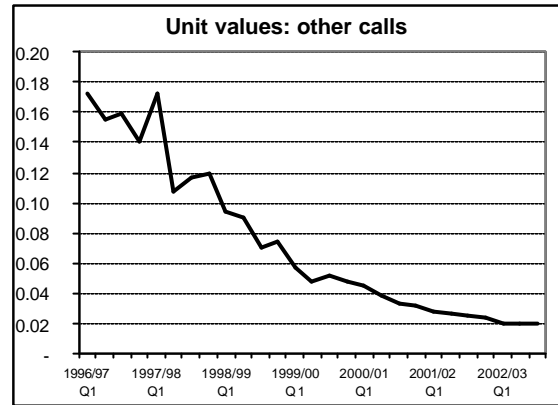
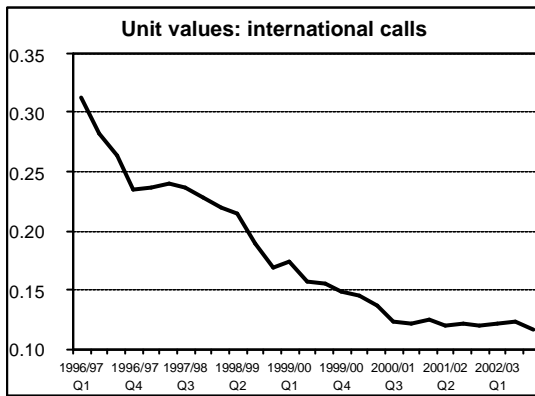
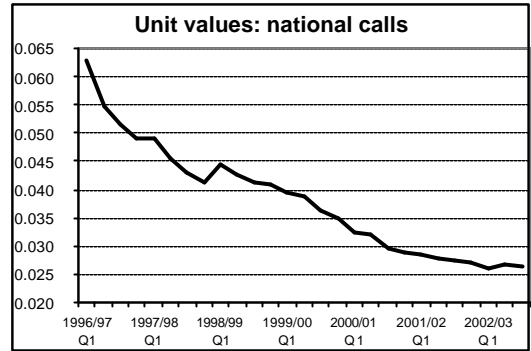
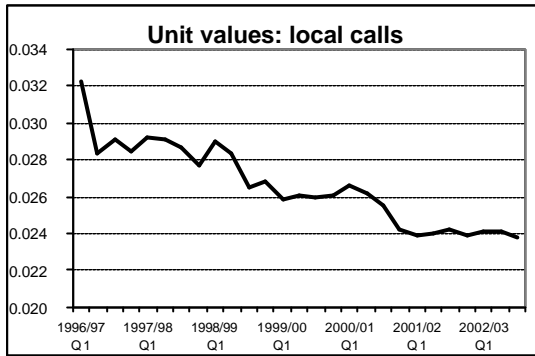
Fixed business index



Appendix A (cont)

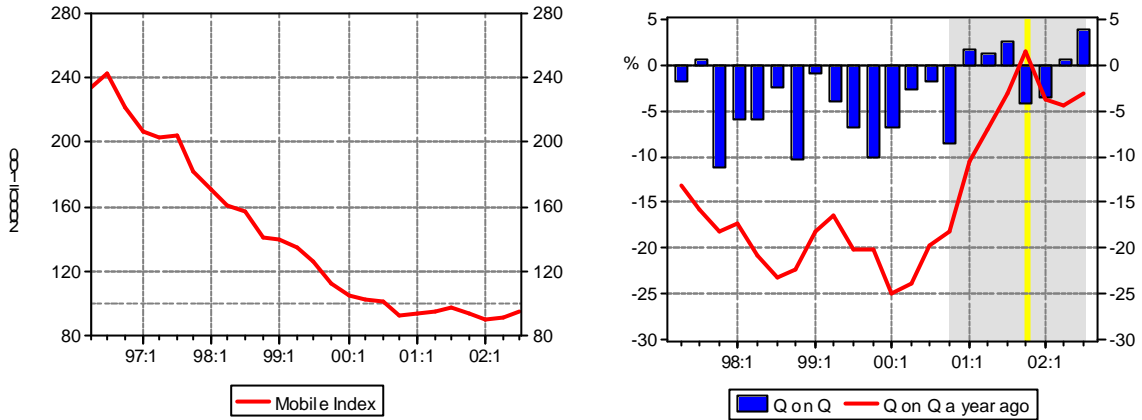


Appendix A (cont)

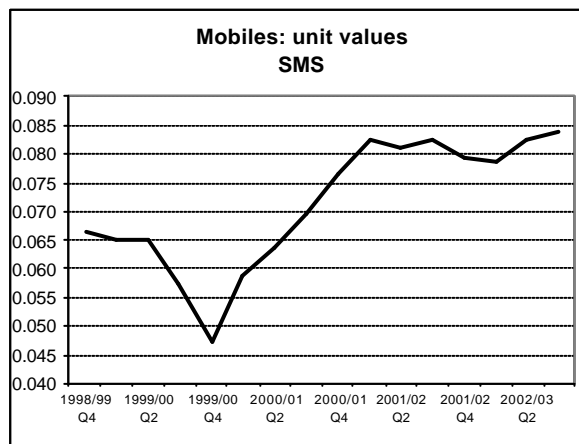
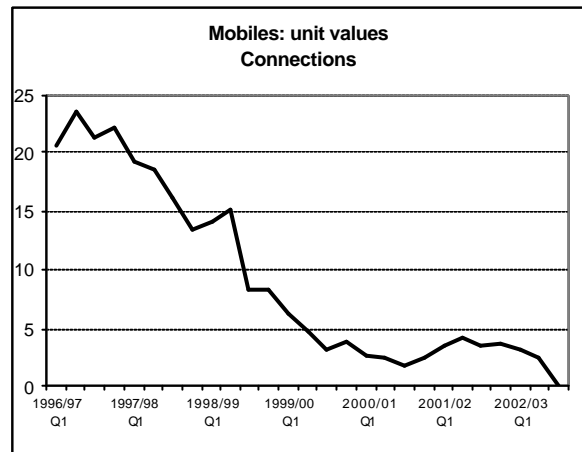
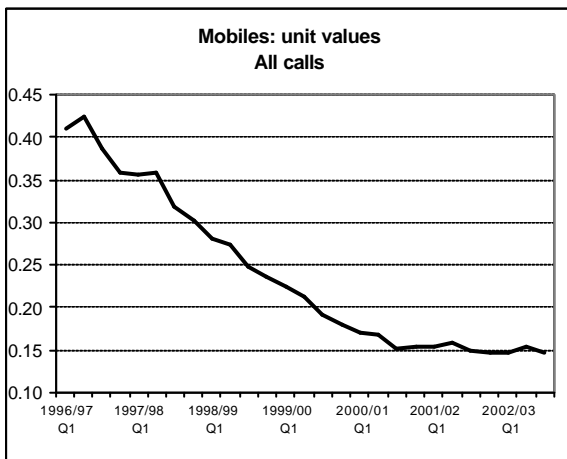


Appendix B: Index for Mobile Telecommunications

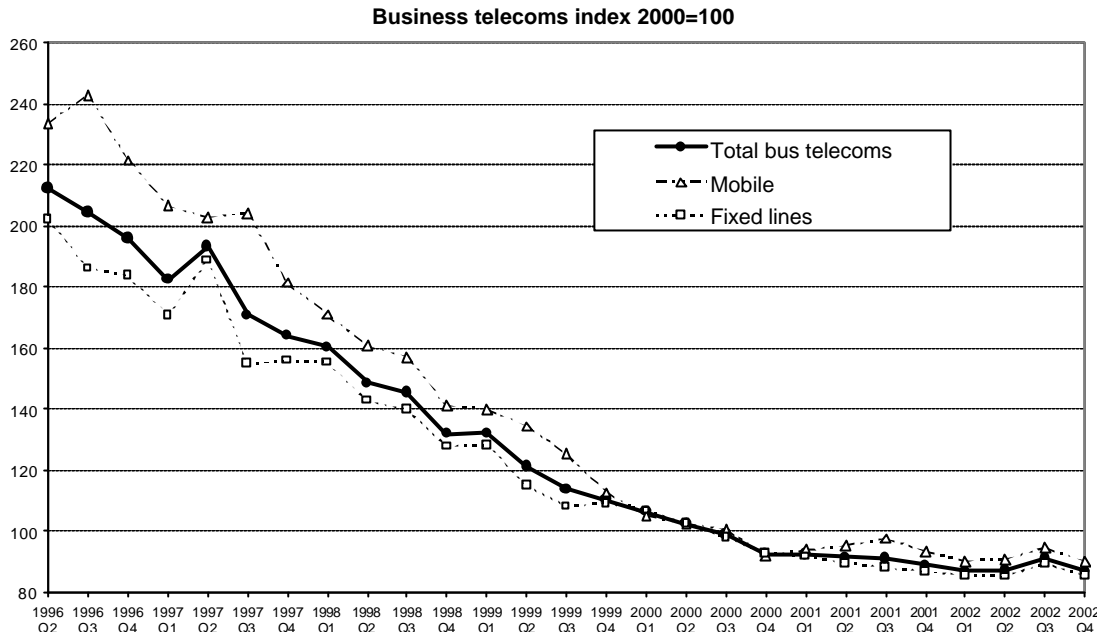
Mobile index



UNIT VALUES OF COMPONENTS



Appendix C - Overall business telecommunications CSPI



	New 2000-based CSPI (unit value method)	Old 1995-based CSPI (rate method)
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1997	177.7	86.1
1998	146.6	83.4
1999	119.3	81.7
2000	100.0	77.7
2001	90.9	75.6
2002	87.9	75.8
2003		
1996 Q1	213.1	90.1
1996 Q2	212.4	89.7
1996 Q3	204.5	89.4
1996 Q4	196.0	89.1
1997 Q1	182.4	88.3
1997 Q2	193.3	86.1
1997 Q3	170.8	85.6
1997 Q4	164.1	84.4
1998 Q1	160.4	83.5
1998 Q2	148.6	83.1
1998 Q3	145.4	83.5
1998 Q4	132.0	83.5
1999 Q1	132.0	83.5
1999 Q2	121.1	83.0
1999 Q3	113.7	81.5
1999 Q4	110.3	78.7
2000 Q1	106.3	79.1
2000 Q2	102.4	78.7
2000 Q3	98.8	77.0
2000 Q4	92.6	75.9
2001 Q1	92.4	75.9
2001 Q2	91.3	75.5
2001 Q3	91.0	75.5
2001 Q4	88.9	75.6
2002 Q1	86.9	75.5
2002 Q2	87.0	76.0
2002 Q3	90.9	75.9
2002 Q4	86.9	75.7
2003 Q1*	87.0	75.8

provisional

