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## Recent developments in the Swiss CPI: scanner data, telecommunications and health price collection

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### Abstract

The Swiss CPI was revised in 2005. During this revision, three issues were intensively developed. The first was the use of scanner data for price collection. The results of a test being conducted with a retail chain are expected this year and could be presented to other statistical offices. Second, the telecommunications index was improved to allow substitution between product offers, thus making for a more flexible response to changes in the market. Third, health price collection was revised for pharmaceutical products and hospital services. The new pharmaceutical products index was constructed in collaboration with the Swiss Pharmacists' Association. A test is being conducted with access to its database. The aim of this new construction is to consider generic products in a more appropriate way and to allow substitution between products, in order to better capture potential price changes.

### Keywords

Price collection, data quality, collection period, quality insurance, tariffs, medicine, substitution.

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## 1. Price collection with scanner data

### 1.1. Introduction

The Swiss Consumer Price Index CPI is a modified Laspeyres index with annual re-weighting of the basket of commodities which contains the goods and services representative of the consumption of private households. Each month, approximately 35,000 prices are collected in 11 regions throughout Switzerland. To improve data quality, much of the collection, particularly for groups of commodities with regional price structures, was outsourced in the year 2000 to an independent market research institute with professional price collectors. The latter normally register the prices directly at the retail outlets on a day of the month. In contrast, groups of commodities with uniform nationwide price structures are mostly still collected by Swiss Federal Statistical Office (SFSO) staff.

All the price information collected is, however, in principle also available in the form of scanner data. These are data recorded by major retailers when purchases are scanned by barcode readers at supermarket checkouts. Analyses of the two largest retail chains in Switzerland show that these are extremely detailed data. The wealth of information and rapid availability of the scanner data offer numerous advantages over traditional price collection. The SFSO has therefore decided to gradually replace certain components of the current price collection over the next few years with evaluation of scanner data. Productive introduction of the first scanner data for regular index calculation is planned for as early as January 2007. This paper provides a brief overview of the planned approach as well as of the expected advantages and disadvantages, using a few specific examples to pinpoint the main problems in practical implementation.

### 1.2. Aims

Scanner data are to be used in the Swiss Consumer Price Index solely to support and improve the existing price collection system. In this area, there are various priority aims, which are briefly explained below.

What is probably the main advantage of scanner data lies in the marked improvement in data quality in various respects. For instance, in the traditional system, prices are collected once a month on one (1) specific reference day. With scanner data, on the other hand, it is possible to carry out collection continuously for the first fifteen days of the month, thereby recording price changes that occur before and after the reference day of the traditional survey. In fact, all actually paid transaction prices can be registered including all special offers from all sales outlets in a retail chain throughout Switzerland. It is also planned, in the medium term, to include a larger number of items in the price collection than in the traditional survey.

A further plus with scanner data is that the representativity of the items sampled can be substantially increased. On the basis of the sales figures available, the best-selling items per elementary aggregate can be exactly pinpointed. In the traditional system, on the other hand,

the price collectors are dependent in this respect on the not always very accurate information of sales staff at retail outlets.

A further important aim is to reduce the workload of the retail chains. This applies particularly to the major retail chains in Switzerland, which have to compile in a time-consuming procedure all the prices the SFSO requires for items with a nationwide standard set price and supply them to the SFSO. In addition, the sales staff of the retail chains are regularly asked for information by price collectors, especially as regards the best-selling products and item characteristics. Using scanner data reduces the retail chains' workload. At the same time, the use of scanner data cuts some of the costs incurred in traditional price collection. The biggest potential savings can be made in connection with fresh products (food), the prices of which are collected on a regional basis by the professional price collectors of a private market research institute. However, because of the investment required to produce the software, it is not yet clear whether and to what extent savings can actually be made through the project in the long run.

### ***1.3. Gradual approach in practical implementation***

SFSO analyses to date and experience in other countries have shown that the productive introduction of scanner data into the Consumer Price Index involves a considerable number of practical problems and difficulties. For reasons of quality assurance, no attempt will therefore be made to aim for the most comprehensive possible inclusion of retail chains and product groups from the outset. A gradual approach to introducing the system is preferred and will cover aspects such as:

- the gradual inclusion of retail chains
- the gradual inclusion of product groups
- the gradual increase in the number of prices collected

Price collection using scanner data is to be first tested and optimized on the basis of one (1) retail chain and not extended to further retail chains until later. This approach means that vital experience can be gained, intensive analyses can be carried out and, hence, the risk of mistakes can be reduced before the widespread introduction of scanner data into the CPI. Some problematic product groups – above all clothing and entertainment electronics – are especially demanding for price collectors, particularly when items are replaced and the relevant quality adjustments made. For the time being, prices for these items will not therefore be collected using scanner data.

In contrast, price collection with scanner data is particularly valuable for foodstuffs. There are two reasons for this. First, Switzerland is probably in the unique position of having the two biggest retail chains holding a combined market share of some 70% in the Retail Food sector. That means that, by including "only" two companies, a considerable proportion of the population's food consumption can be shown. Second, all foodstuffs with different regional pricing (particularly fresh products) are covered by a private market research institute. The costs incurred can be avoided by the use of scanner data.

A gradual approach will also be adopted in the number of items collected per elementary aggregate. At the start, the prices of the same number of items will be collected as under the traditional system. Subsequently, the number will be gradually increased.

### ***1.4. Calculation method***

Scanner data not only contain extremely detailed information about prices and sales, they are also available practically in real time (after about 2-3 days). This basically opens up completely new perspectives. For instance, the introduction of superlative indices, hedonic

methods or weighting at item level would be conceivable. However, as price collection using scanner data already represents a major challenge in itself and, since there are virtually no resources for developing new methods at present, scanner data in the Consumer Price Index are, for the time being, to be used exclusively for improving the existing price collection system. Basically, therefore, there will be no change in the existing calculation method – there will merely be an improvement in the underlying information. In traditional collection, the price of an item charged at a particular branch on a particular reference day is compared with the price of the same item the previous month. With scanner data, on the other hand, the average transaction price (sales/quantity) paid per item throughout Switzerland in the first 15 days of the month is compared with the price in the preceding period. If the item is one where the price is set regionally (mainly fresh products), the price movement is calculated separately for each collection region.

### ***1.5. Developing price collection software***

Each month, the biggest retail chain in Switzerland compiles all the required prices for items with a nationwide standard set price for the SFSO in a time-consuming procedure and provides them in electronic form. Among other advantages, the retail chain foresees a considerable reduction in this workload through the use of scanner data for price collection. It is, therefore, prepared to invest its own resources in the development of software, which would allow the SFSO to compile and export via the Internet on a monthly basis the information it needs for the Consumer Price Index. The application would run on the retail chain's servers and *would cover every aspect of price collection*, including the following functions:

- Provision of a graphic surface for manual recoding of the retail chain's basket of commodities to the Swiss CPI (COICOP) basket of commodities
- Provision of a graphic surface for manual administration of the scanner data regularly supplied by the retail chains (above all, selection and replacement of the items for the CPI basket of commodities, etc.)
- Detailed retrieval of (average) prices, sales, item characteristics, etc. at various levels of aggregation. A photograph of each item could also be displayed.
- Implementation of automatic checking operations. The software generates warnings in the event of significant changes in sales, missing price reports, non-coherent user input, etc.
- Export of the preformatted data relevant for calculating the Consumer Price Index which can then be automatically imported into the Consumer Price Index IT platform

Developing separate software for each retail chain would not only be much too expensive, it would also lead to considerable duplication. The development of similar software in the SFSO, which would be able to analyse the pre-aggregated (raw) data supplied by *all* companies is therefore planned to allow the inclusion of all other retail chains. Unlike the software of the biggest retail chain, the SFSO application therefore has to be adaptable for use on the various data structures of the individual retail chains and has to work in local mode on a computer at the SFSO. The range of functions is, however, about the same.

### ***1.6. Recoding of baskets of commodities***

All retail chains use their own baskets of commodities with specific range structures which are not identical to the nomenclature used for the current international consumer price index, the COICOP nomenclature, also used by the Swiss CPI. The range structures and/or the baskets of commodities therefore have to be manually recoded. However, there are *no* plans

to allocate each individual item to the COICOP. Instead, the baskets of commodities will be linked to each other on an aggregated level. The retail chains' commodity basket structures are basically more detailed than the COICOP. It is therefore usually possible to clearly and fully allocate each position of the retail chain's basket of commodities to a CPI elementary aggregate (lowest aggregation level). In that way, any item newly introduced into a retail chain's range can always be automatically allocated to the CPI basket of commodities also. That means that the basket of commodities need be recoded only *once* at the start of the data collection. Adjustments are necessary only in the event of (relatively rare) changes in the range structure and/or basket of commodities structure of the CPI or of the retail chains. The amount of work can therefore be kept to a minimum, and no detailed knowledge of the items is necessary for recoding the basket of commodities.

The Swiss CPI basket of commodities structure is always recoded at the lowest aggregation level (elementary aggregate). In the retail chains' baskets of commodities, however, the aggregation level may vary depending on the position and can be freely adjusted by the user. The aim is to always keep the aggregation level in recoding for each elementary aggregate as high as possible and as low as necessary.

### ***1.7. Item sampling***

The items whose price changes are to be included in calculating the CPI are always selected at elementary aggregate level (lowest aggregation level in the CPI). For this purpose, the same selection criteria apply as under the traditional system:

- *Representativity*: For each elementary aggregate, those items are selected which are most representative of private household consumption. Representativity is measured by the sales volume of the item.
- *Permanence*: Normally, items are selected which are a permanent part of the retail chain's range (exception: seasonal items) and whose characteristics change as little as possible.
- *Composition*: The composition of the selected items for each elementary aggregate should differ, i.e., the same item will not normally, for instance, be selected in different colours

In the traditional collection system, the price collectors are dependent for item sampling on information from and the, to some extent subjective, judgements of sales staff. The inclusion of scanner data provides precise aids to decision-making, such as sales achieved or information about item availability. These aids permit a much more accurate determination of the relevant items for the CPI. Item sampling is a continuous operation which has to be undertaken anew each month because of the ongoing changes in range and consumption. The software automatically lists for each elementary aggregate in the CPI a number of the best-selling items, which the user can freely select, in decreasing order. The representativity of the individual products is thus immediately visible. For checking the minimum time items remain in a retail chain's range, the previous months' sales and the average sales of an item over the last four or six months are available to the user. The items can be added to or removed from the CPI basket of commodities at the click of a mouse.

Basically, items are replaced in the same way as in the traditional system except that the user has to carry out the operation on screen. He informs the software which item he wishes to replace and which item is to replace it and, depending on the method selected, enters the appropriate processing code. Through the selection of the processing code, the user informs the software how the item is to be replaced computationally (for instance, direct replacement, chain-linking, etc.).

In the traditional collection system, by his presence at the retail outlet, the price collector can actually pick up an item and examine it. Physical contact with the products is often an important aid to decision-making when it comes to selecting new items or finding qualitatively appropriate replacements for existing items. This possibility is, however, not available with on-screen management of the basket of commodities, and there are no sales staff to give the user additional information. It is therefore all the more important for the application to provide enough relevant information for making a decision on item sampling, such as, a brief description of the item, the amounts or weights sold and even a picture of the item. It is also apparent whether an item is a so-called "discontinued line", i.e., although it may still be selling (very) well, it is soon to be dropped from the retail chain's range.

### ***1.8. Implementing a system of automatic validation rules***

To ensure maximum representativity of the CPI basket of commodities, all items must be continually checked in respect of their sales levels. However, this involves a considerable amount of work. A series of automatic validation rules and warnings are therefore incorporated into the software. For instance, if there are significant changes in sales for any elementary aggregate, the software immediately indicates this with a warning. In such a case, the user has to analyse the situation and if necessary adjust the selection of items in the CPI basket of commodities. The composition and quality characteristics of the items cannot be judged by the software, so the user must always select and replace items manually as this procedure cannot be automated. Though the software does generate notices for the user, for quality assurance reasons, it cannot make any changes itself.

As mentioned above, to maximize the continuity of items in the CPI basket of commodities, an item will not as a rule be immediately replaced if its sales fall slightly below the level of an item not contained in the CPI basket for a short time. The software first waits a few months before generating a warning. An exception is, however, made in the case of major changes in sales when immediate action must be taken.

In addition to monitoring sales movements, various other validation rules are incorporated into the software. For instance, the application can also check to a certain extent whether the user's inputs are consistent and whether all the required data sets are available, and whether in recoding the basket of commodities all positions have been unambiguously allocated by the user (without overlaps).

### ***1.9. Chronological sequences***

This Swiss Consumer Price Index for month Y is published either at the end of the same month Y or at the beginning of the following month Y+1. To allow enough time to make a plausibility check of the results, manual monthly updating of item selection and export of the relevant data to the CPI software application must be concluded by the 18<sup>th</sup> of the month at the latest. However, as scanner data are available only after 2 to 3 days and since updating the selection of items in the CPI basket of commodities takes about a week, the collection period is in principle confined to less than 10 days per month.

This constraint is to be overcome, however, by splitting data delivery into two. The first batch of data, containing the entire scanner data recorded during the first 7 days (analysis period) of the month, is to be delivered around the 10th of the same month. These data (extrapolated over the whole month), are then used for the week-long update of item selection in the CPI basket of commodities. Only then do the retail chains deliver the second batch of data, which now contains all the data for the first 15 days (collection period) of the month. These data are then exported to the CPI software application on the basis of the updated basket of commodities and are completely incorporated into its calculation.

## ***1.10. A detailed look at some specific problem areas***

- **Price collection in the case of fresh products (food)**

Fresh products are partly sourced on a regional basis by the area units (geographic subdivisions) of the retail chains, for instance, from farmers or other businesses in the region. As a result, items may vary in quality from region to region and/or be sold in different quantities or weights. To ensure comparability of price reports is maintained all the same, fresh products therefore have to be surveyed separately for all regional area units of a retail chain. Separate management of a CPI basket of commodities for each region would however involve a considerable amount of additional costs. A different solution is therefore being tested, at least for the biggest retail chain, where a particular kind of fresh product always has the same number throughout Switzerland irrespective of regional quality differences. This makes it possible to select fresh products just once nationwide for the CPI basket of commodities despite regional differences. Export of the prices into the CPI software application and calculation of the price change are, however carried out separately for each region. This is designed to ensure that, while only one (1) basket of commodities has to be managed for Switzerland as whole, account can still be taken of qualitative and quantitative differences in the items by collection region. The drawback of this solution is that some items, which record very high regional sales, are of secondary importance at national level, are no longer listed in the software amongst the best-selling products in Switzerland and are therefore not available for selection by the user.

- **Treatment of multipacks**

The term "multipacks" refers to temporary special offers on an item (e.g. "3 for 2"), which are sold for a certain time alongside the single item. These special offers are usually packed separately and are given a different item number from the single item. For that reason, it is unfortunately not possible with scanner data to identify multipacks and single items as the same product. For price measurement in the CPI, however, multipacks up to a maximum of 3 products are regarded as a normal price reduction (in a special "3 for 2" offer, the price change, disregarding the single item still on sale, is -33.3%). The significance of multipacks in terms of sales is comparatively high in Switzerland and cannot be ignored when measuring price changes in the CPI. The user therefore has to inform the software when a multipack and a single item are the same product. The application adds up all the sales and quantities of this product (single items and multipacks combined) and divides the total sales price by the total quantity sold. The average transaction price paid per item calculated in this way is then compared with the price in the previous period. However, the user is dependent on external information to find out which single items match which multipacks. In the case of the biggest retail chain in Switzerland, this is provided by an additional SFSO user access option to the retail chain's Intranet, where all the relevant information can be consulted.

- **Treatment of seasonal items**

Because of its irregular availability, seasonal items requires separate treatment both in traditional price collection and in collection using scanner data. The Swiss CPI price collection software therefore makes provision for indicating seasonal items as such and for stipulating the specific collection months in each case. In addition, separate validation rules for monitoring sales movements are implemented for seasonal items, to prevent the software generating irrelevant warnings outside the season (when there are no sales).

### ***1.11. Drawbacks and risks of scanner data***

Unfortunately, the implementation of scanner data in the Consumer Price Index entails further drawbacks and risks besides the initial outlay. A key issue is quality assurance of the data collected. As the SFSO has absolutely no influence on the collection of the scanner data by the retail chains, any mistakes are hard to spot. It is therefore all the more important to carry out regular checks. This quality assurance covers several aspects. In the first instance, it can be assumed that (probably all) major retail chains subject the scanner data to intensive internal checks before they are supplied to the SFSO. In the SFSO itself, the data are subjected to further plausibility checks. Chief among these are comparisons with external information, such as advertising material and/or random tests at retail outlets. Furthermore, during a test phase of at least six months, the data supplied are compared with the results of the traditional collection before they are incorporated into the Consumer Price Index.

The use of scanner data also makes the SFSO dependent on the retail chains' ability and willingness to provide the monthly deliveries. Should one or more retail chains suddenly be no longer able or willing to supply its data (e.g. because of IT problems, etc.), this could have serious consequences for the production of the Index. It is therefore planned, if possible, to conclude formal contracts with all the retail chains about the supply of scanner data and to make provision for an emergency backup system if data are not supplied. Such a system could, for instance, include provision for immediate (partial) reversion to traditional collection.

A further risk lies in the fact that (apart from the two biggest retail chains) the data structures and specific characteristics of the retail chains' IT systems are not fully known. At present, it is still unclear to what extent a local software application in the SFSO can cope with these special features. It is therefore assumed that, even with extremely flexible SFSO software, some tailoring of the application to the individual retail chains will be unavoidable.

## **2. Telecommunications Index**

### ***2.1. Introduction***

The Telecommunications Index is a sub-index of the Swiss Consumer Price Index with a total weighting of 2.6%. It covers fixed-line, mobile and Internet communication services but does not include other added-value services and content, such as information numbers, ringing tones or TV subscriptions which are covered in the Leisure commodities group. Handsets too are included under another position. Since the liberalization of the telecom market in Switzerland (from 1998)<sup>1</sup>, the Index has been updated several times to reflect the current situation, and further adjustments of the legal framework in this market are expected in the years to come, especially as regards the opening up of the "last mile". Together with technological progress, these changes result in a certain need for adjustment if the Telecommunications Index is to mirror current price changes in this market. The latest adjustment of this kind was carried out as part of the revision of the 2005 CPI, and the main changes are set out in the following chapters.

### ***2.2. Specific characteristics of telecom price statistics***

The telecom services market has several specific characteristics which raise methodological problems in connection with price statistics:

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<sup>1</sup> Federal Office of Communications (OFCOM): Extract from the 10th European Union implementation report extended to include Switzerland (Bienne, 2005)

- The supplied products are quickly superseded. In the mobile telephone sector in particular, products which are no longer available to new customers are still being consumed.
- Depending on the service provider and/or the contract, use of one and the same service may be billed very differently.
- Technology is changing very fast in this field, so registering new services and changes in quality is virtually a permanent issue.
- Technological change also means that it is increasingly difficult to distinguish between the individual services which were traditionally clearly separated.

Consequently, the difficulty is not so much collecting price data proper but deciding which prices should be tracked in the first place. One of the traditional price statistics responses to such situations are representative service packages whose price can be measured over time.<sup>2</sup> The corresponding methodology has been used in the Telecommunications Index since the last revision in 2000 and has been basically retained. Each service package contains a certain number of clearly defined communications for which the prices are adjusted when rates change. A good service package satisfies the following (partially contradictory) requirements:

- The price of the service packages can be tracked over the longest possible time horizon.
- The composition of the service packages and their scope match current consumer habits.
- The quality of the products in the service packages in question remains comparable over time.
- Weighting sources can be found for the individual service packages.

The first two requirements in particular partially contradict one another. The 2005 revision aimed to bring the service packages closer to services which are currently consumed as mass products. However, it would be presumptuous to believe that the service packages which have now been defined could simply be extrapolated until 2010. If new products establish themselves on the market, certain adjustments are inevitable.

### ***2.3. Changes to the overview***

The publication of three sub-indices for fixed-line telephony, mobile telephony and Internet communication, instead of the previous single global index, has been introduced in response to a proven need on the part of users. Since 2004, the Household Budget Survey has provided results for the three types of communication, thus allowing reliable weighting.

Now, mobile and Internet communication are primarily structured according to intensity of use and no longer by provider company, as in the past. In this way, comparable products of different providers are grouped under the same positions, making for better recording of substitution effects between similar products. The customer churn rate accounts for a substantial proportion of overall customer movements. One of the revision's main aims is to make it easier to replace products hitherto taken into account.

On the basis of changes in the telecom services market, some new products have been included in the Index – primarily electronic messaging and broadband services for Internet access.

Finally, the service packages already mentioned were completely overhauled to align them as far as possible on the present behaviour of private customers. This was made possible by using official statistics (Federal Office of Communications)<sup>3</sup> as well as supplementary information from the leading provider companies. The main variables which were adapted to current customer behaviour are as follows:

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<sup>2</sup> ILO: Consumer Price Index Manual (Geneva, 2004) lists a series of different approaches which can be used for handling telecommunications services.

<sup>3</sup> OFCOM: Official telecommunications statistics (Bienne, 2004). The annual reports of service providers have also been incorporated into the definition of the variables.

- Scope of the services consumed: in mobile communications and Internet access, the level of intensity is a decisive factor in billing. Three different levels of intensity were therefore defined with the corresponding customer segments.
- Destinations: the official telecommunications statistics published cover traffic in terms of volumes by destination and for all types of customers. This makes it possible to draw certain conclusions about the destinations chosen by private customers. Moreover, the various mobile destinations are also adapted to current customer behaviour because differentiating between own and other networks is becoming increasingly important.
- Duration of calls by destination: the average call duration is very significant because of different provider billing practices. This concerns not just the average call duration by destination but also the distribution of the various call durations over calls as a whole.
- Distribution over day and week: traditionally, rates have above all reflected the time of day/time of the week in order to use networks to capacity. Even though this criterion is becoming less important in today's rate structures, the corresponding rate periods have been adjusted. In this sector, changes can occur so quickly that it is important to be able to react to them fast.
- Download capacity: In the Internet sector, three customer profiles were established on the basis of specific customer needs (one profile for dial-up, one for basic broadband use and one for intensive use)<sup>4</sup>

## 2.4. Index structure

The basic principle whereby the price of various representative service packages is tracked over time remains unchanged in the current revision. On the other hand, the index structure has undergone certain adjustments.

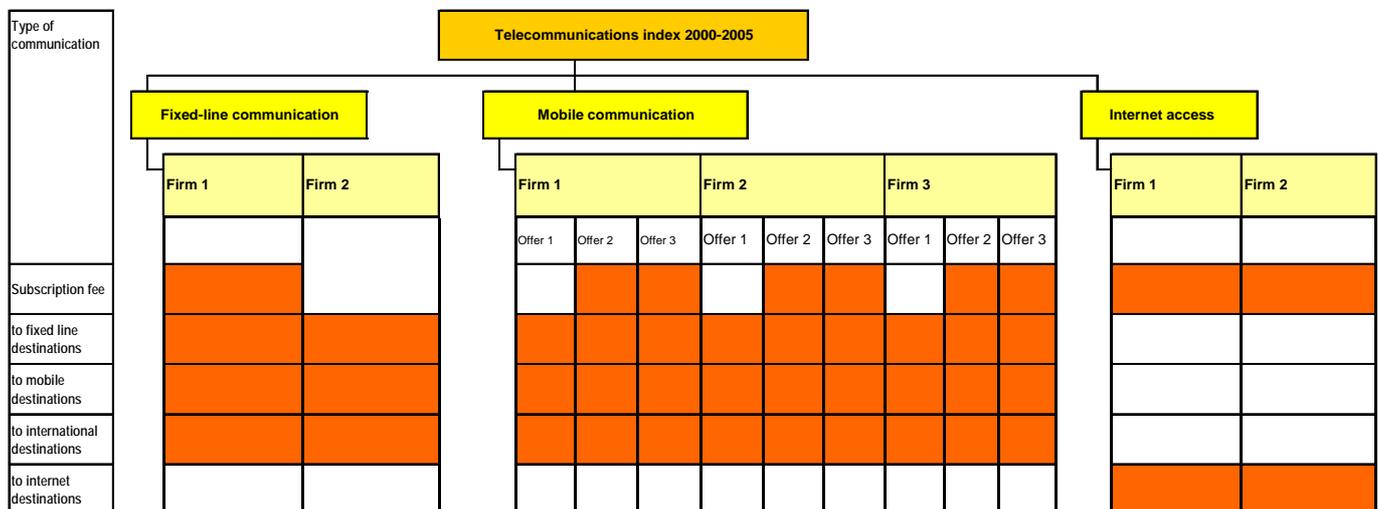


Fig. 1: Index structure Telecommunications Index 2000-2005

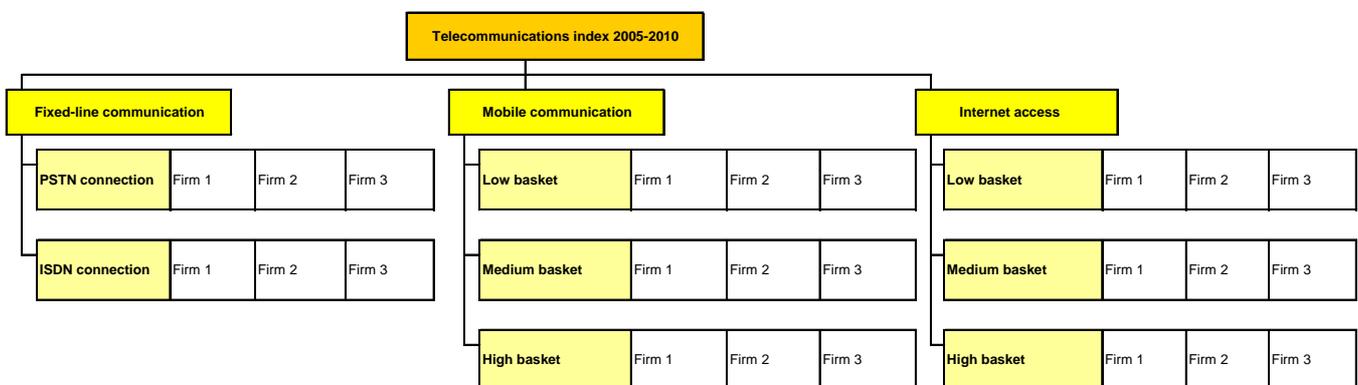
The index that recorded price changes in the sector for the national CPI between 2000 and 2005 comprised a single service package for developments in fixed-line communication, three more for mobile communication and just one for Internet access. The three mobile service packages were linked to certain products on offer to consumers and made it possible to cover consumer behaviour in the different customer segments. As Fig. 1 shows, the index was primarily structured by firm and destination until 2005.

Information from the firms involved about sales for each type of contract and destination provided a weighting source, thus making it possible to define a weight for each cell. The

<sup>4</sup> OFCOM: Broadband communications in Switzerland: taking stock of infrastructure and use (Bienne, 2005)

price collection thus provided a total cost for each cell, which was used to calculate the elementary index proper. Using the weighted arithmetic mean, the cell indices were thus aggregated to give the index of the corresponding product, firm and lastly the three major sub-indices. However, only the overall index was published.

In the new Telecommunications Index which will record price changes between 2005 and 2010, three sub-indices for fixed-line, mobile and Internet communication will be published and weighted with information from the Household Budget Survey, in line with the procedure followed for other products in the Swiss CPI. However, the sub-indices will no longer be structured mainly according to firms but by intensity of use.<sup>5</sup> Three levels of use were defined for mobile communication and the Internet, and two for fixed-line communication, the aim being to group all products that are typically used by a specific customer segment (e.g. infrequent caller baskets). Fig. 2 shows the corresponding Index architecture.



**Fig. 2: Index structure of the Telecommunications Index 2005-2010**

Intensity of use is extremely important, particularly in the mobile communication sector because the prices paid for increasing levels of use by no means increase in a linear fashion. What is more, the grouping of similar products under the same position makes it possible to gain a clearer picture of customer substitution patterns, the assumption being that customers mainly change to similar products irrespective of whether these are offered by their existing provider or by another company. Changes also occur between the different levels of intensity (customers who upgrade or downgrade), but substantial changes also take place between companies in Switzerland.<sup>6</sup> Both in the mobile communication business and in the Internet access sector, binding contracts play a crucial part. Providing subsidized handsets and the conditions these entail are a central element in the company strategies for acquiring and keeping customers. However, such contracts are generally limited to 12, or at most 24 months, after which the provider can be changed. As a general rule, customers in Switzerland have no problems taking their number with them when they change providers.

In fixed-line telephony, account was taken of two types of connection, on the one hand to properly reflect the weight of the connection charges and on the other because the forthcoming liberalization of the "last mile" could have a decisive impact on this segment expenditure in particular.<sup>7</sup>

<sup>5</sup> Teligen: OECD Telecommunications Basket definitions (Richmond, 2000) uses similar definitions for the various service packages, primarily for the purpose of international price comparisons.

<sup>6</sup> Swisscom: Facts and Figures as per 31.12.2005 (Bern, 2005)

<sup>7</sup> OFCOM: "Impact économique de l'obligation du dégroupage de la boucle locale" (Bienne, 2002) (no English version available)

Service packages are no longer weighted by destination but are put together so as to reflect private customer behaviour in the corresponding segment. One of the revision's priority aims was to define service packages independently of any products. As developments in mobile communication show, products change so fast that it is crucial to be able to replace them with others quickly – otherwise, a situation could arise where it is impossible to track any further prices. In this sector, price adjustments are triggered primarily by the market launch of new products and not by changes in rates. Prior to 2005, changes to the products used in the Index inevitably lagged behind somewhat because the weighting of the basic index depended on the sales of a specific product.

The weighting of the various levels of use is vital for the functioning of this Index, and the major providers delivered standardized information about the amounts billed to their customers to allow the appropriate weighting of two or three levels of use. The providers are surveyed annually, at least about the key variables. On the other hand, the SFSO no longer requires minutely detailed information about customer behaviour in respect of specific products. This is sensitive information that firms cannot provide without further ado.

One consequence of the new Index structure is the use of the geometric mean for aggregating comparable services. To take account of the varying importance of the firms, the appropriate price multiplication is applied to the basic index. Once the index is known for the three mobile baskets, they are aggregated to provide the mobile communication index using the weighted arithmetic mean. The fixed-line and Internet access sectors are aggregated using the same procedure.

## ***2.5. Choice of firms and products***

For the Consumer Price Index, an attempt is usually made to incorporate products which are firmly established on the market. This means that, in the first instance, account is taken of firms which hold a large market share of one of the customer segments. In the fixed-line and mobile sectors, this is not a major problem in Switzerland because the three biggest companies hold well over 90% of the total market. Market concentration is slightly less pronounced when it comes to Internet access, though the three biggest providers still cover two thirds of the total market (for private customers, the percentage is higher). Retailers are a special feature of the present market environment in Switzerland. The three mobile network operators are opening up new sales channels to gain customers. These retailers – especially the large department stores – could well establish themselves in certain segments, so it is appropriate to include them in the survey.

Choosing the products is a much bigger challenge for price statistics. In the fixed-line sector, product differentiation is not yet so developed (although over 10% of customers use specific contracts). When it comes to Internet access, the "last mile" (which is still a Swisscom monopoly) ensures a certain homogeneity, for telephone-line related products at least. In contrast, there are currently more than 40 product offers on the mobile telephony market which are changing at a faster and faster pace. In this connection, the Telecommunications Index 2005-2010 follows the principle of economic rationality. We assume that consumers always choose the optimum tariff plan. Naturally, this is not in actual fact the case. However, for reliable measurement of price changes, it is enough to assume that consumers always remain equally irrational. This assumption is plausible given that, to date, on-line comparison services have been unable to prove that any lessons have been learned in this connection. The costs generated with the various products available are calculated for all baskets, and then the product which turns out to be cheapest for the relevant service package is used for the Index. Rate changes and new products are investigated to see whether they bring about a price

reduction. If so, the product can be included in the Index under certain conditions. If not, it will definitely not be taken into account.

Further conditions are of decisive importance for realistic measurement of price changes. The only products of interest to a Consumer Price Index are those which are properly established on the market. Figures for the private customers of a certain product usually become available with a certain time lag. They are the most important pointer as to whether a product can be included or not. As a general rule, newly launched products are not incorporated into the Telecommunications Index because of the risk of measuring a price which concerns (virtually) nobody. A certain waiting period is appropriate as the only way of ensuring that a product is really established on the market. Further exclusion criteria mainly concern the general availability of the products. Preferential and reserved products (for young people, for customers of other products) are excluded, as are those which can only be consumed using a credit card or Internet access. Customers must be able to keep their existing number, and the product must be available nationwide.

The result of these restrictions on inclusion is that the products we incorporate into the Index are mainly widely available mass products. Among other things, the advantage here is that the question of quality adjustments does not arise as acutely or as frequently as for niche products. However, these questions will inevitably arise in connection with the transition to the next generation of mobile networks and with capacity changes in respect of Internet access. A precise definition and demarcation of the service whose price development is under observation is essential in this process. If completely new products are involved, we will always wait for some time until a product has achieved a certain market share before including it in the Index.<sup>8</sup>

If the above-mentioned criteria are taken into account, recording the cheapest product for each service package provides a reliable, realistic measurement of price changes, on the understanding of course that market developments are continuously monitored.

### **3. Medicines Price Index**

#### ***3.1. Background***

The Medicines Price Index was incorporated into the basket of Swiss Consumer Price Index (SPI) commodities under the "Sundry" catch-all position as part of the revision which took August 1939=100 (introduced in April 1950). Since the September 1966=100 revision, price changes for medicines have been included at a weighted level as a separate Index finding.

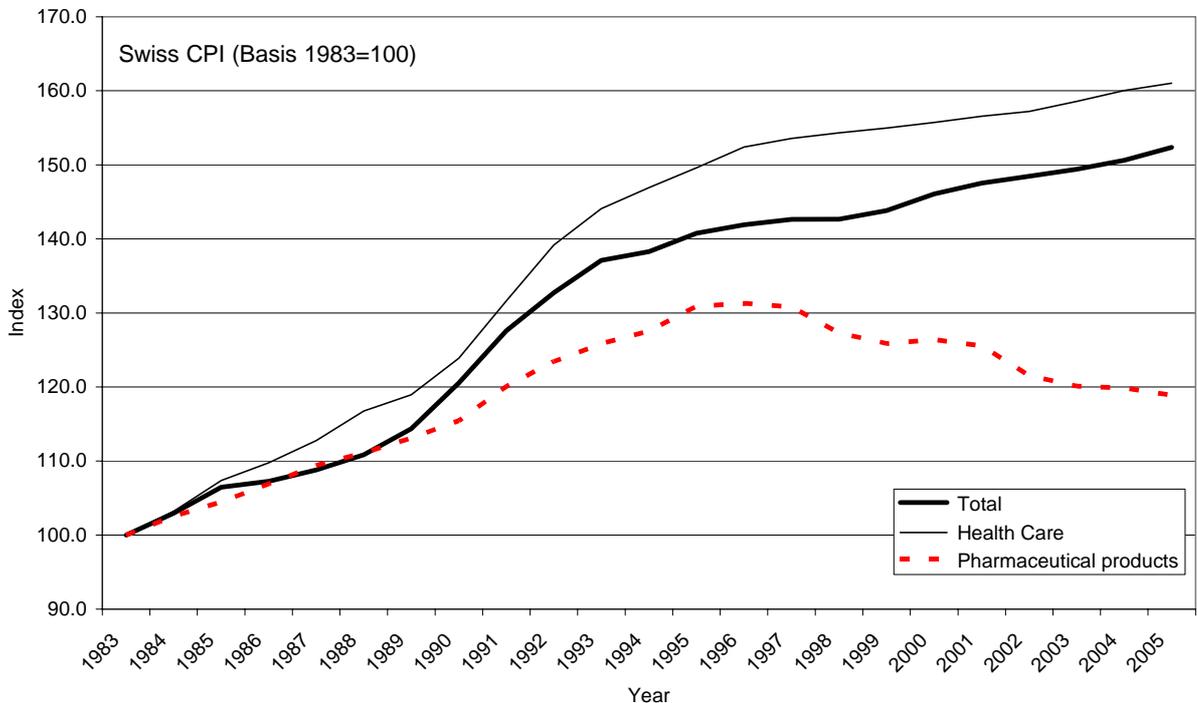
Price changes have been followed since the 1990s using some 220 best-selling product packs on the Swiss pharmaceutical market. In the past, market research data were purchased annually in order to draw up this list of "best sellers". Since the advent of the Internet, price data are collected on a quarterly basis on line from a commercial supplier of pharmaceutical data. The expenditure of private households derived from the findings of the Household Budget Survey were used for weighting the basket of commodities for the Index position concerning medicines.

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<sup>8</sup> OECD: Handbook on quality adjustment of price indexes for information and communication technology products (Paris, 2000)

### 3.2. Need for action

The previous method established a regressive movement of the Index since the mid-1990s that was in stark contrast to the hotly debated issue of cost trends in the health sector:



According to the experts, the difference the Index showed was too great to be explained solely by the increase in the volume of medicine consumption. Moreover, they argued that the introduction of expensive new products over this period was diametrically opposed to the price change. During the consultation in connection with the 2005 CPI revision, the criticism was also expressed that the existing measurement method recorded virtually price reductions only, with the result that the price movement shown by the Medicines Price Index was an underestimate.

Approximately two thirds of all revenue from medicine sales are made on products on the so-called "Speciality List" of medicines, compiled by the government, for which health insurances must pay. When such medicines are included in the List, their prices are set by the Federal Office of Public Health (FOPH) using a conciliation procedure and generally remain the same until their patent protection expires (price reduction through possible rival products). Such medicines account for the bulk of the products used to measure prices.

The previous method completely disregarded the substitution of generic medicines for original medicinal products (reduction in prices) or follow-up products (higher introductory price with renewed price protection).

Moreover, yet another factor which cannot be recorded by a price collection method tied to a specific packaging unit is that the introduction of new packaging sizes or forms of presentation can also lead to higher prices.

### 3.3. Changes to the overview

At present, a model designed to better reflect product substitution is being studied in cooperation with the Swiss Pharmacists' Association (SPA). It is based on the principle that medicines can be grouped into homogeneous groups of items – and therefore priced as standardized quality and quantity units – using their active ingredient and therapy categories. The basic data are derived from the monthly orders placed by pharmacists with pharmaceutical wholesalers. In addition to the current prices paid by the general public, the

SFSO also has quarterly sales figures at its disposal (amounts ordered over the past three months times the current prices paid by the general public). On the basis of these sales, new and representative products or packaging sizes for an existing active ingredient category can be identified as they come out and included in price calculations. Provided they meet the classification criteria, individual items can be included or eliminated at this level at any time.

In theory, it would be possible to carry out a calculation based on the whole data set. However, at over 16,000 lines, it is relatively voluminous, so it is advisable to define suitable restrictions on inclusion. The annual selection of therapy and active ingredient categories provides an initial rough demarcation. Product categories with low sales are excluded using the cumulative sales for the latest twelve months available. It proved possible in initial test calculations to cover approximately 55% of the total medicines market with one fifth of the products. The number and weighting of groups of items selected in this way (= medicines which achieve the same therapeutic effect with the same active ingredient) are kept constant throughout the year of calculation and constitute a standardized calculation cell in the calculation matrix (see Appendix 1).

An average price for each substance unit (standardized quantity of active ingredient) is identified as a "price representative" for the price calculation proper from among the item prices collected in a calculation cell on a quarterly basis. By analogy with the Consumer Price Index, the basic indices are calculated using the geometric mean and weighted with the cumulated annual sales up to the level of the index for medicines (see Appendix 2).

In Switzerland, pharmacist services are remunerated using a performance-based rate system. Instead of having a share in the margin, pharmacists are entitled to levy a set surcharge for each medicament dispensed and each case file to create even-handed incentives for dispensing expensive as well as cheaper medicines. The surcharge rates are derived from negotiations between the State, the pharmaceutical industry and health insurances. These rates are not included in the prices paid by the general public which are already recorded, so both pharmacist rates are covered by a separate sub-index and included only in the final aggregation (once again based on the corresponding annual sales) with the medical products to form the Medicines Price Index proper for the Swiss Consumer Price Index.

The model with its classification criteria and the corresponding production processes still have to be properly tested, the aim being to introduce the new Medicines Price Index in the course of 2006.

## ***Appendix 1: Calculation model for the new Medicines Price Index***

### **Some information about Switzerland's medicines market in 2005**

Switzerland's medicines market: sales of approximately 5.5 billion. CHF

17 ATC-1 therapy categories (Anatomical Therapeutic Chemical Classification: rough classification on the basis of bodily function)

95 ATC-2 therapy categories (detailed classification according to effect on bodily function)

7,600 products (= manufacturers' brands)

16,500 items (= unit packages with price)

1. Selection of the best-selling ATC-1 therapy categories: 6 out of 17 ATC-1 therapy categories (target value approx. 75% of total market sales). This selection should remain fairly stable.

<b>ATC-1</b>	<b>Market share</b>
C Cardiovascular therapy	18.9%
N Central nervous system	17.0%
A Alimentary tract and metabolism	14.8%
R Respiratory system	9.1%
M Musculo-skeletal system	7.0%
J Anti-infectives for systemic use	6.9%
Sales as a percentage of the total market	73.7%

2. Selection of the best-selling ATC-2 categories from the 6 ATC-1 categories (target value 90% of sales cover, approx. 65% of total market sales). This produces a reduction from 54 to 27 ATC-2 categories. At this level, slight shifts can be expected in individual cases.

<b>ATC-2</b>					
C01	N02	A02	R01	M01	J01
C03	N03	A06	R02	M02	J05
C05	N05	A10	R03	M05	J07
C07	N06	A11	R05		
C08	N07	A12			
C09					
C10					

3. Selection of the product groups with individual items as price representatives: this leaves over 3,000 items (approx. 55% of total market sales)
4. Formation of active ingredient categories and conversion of the active ingredient substance into one or more standard units: "homogenization" of the item groups, each price should be matched with the comparable quantity and quality in the case of identical therapeutic benefits.

5. Calculation of average prices per standard unit for each active ingredient category: If a product (= item group of a manufacturer's brand) holds more than 75 percent of sales in the category in question, the elementary index is calculated solely on the basis of this product. If the percentage is lower, an average price is calculated for the best-selling product (generally the original product) and for the generic product and/or any follow-on products. In a second step, the geometric mean of these two average prices (APs) is then established, thus taking account of substitution within the homogeneous therapy and active ingredient category (see also Appendix 2).

	Price t	Price t+1	
Original product	0.50	0.40	} = "Leader product"
Follow-on	0.75	0.75	
Generic 1	0.30	0.25	} = "Alternative products"
Generic 2		0.20	
AP leader	0.50	0.40	
AP alternative	0.47	0.33	
AP Total	0.49	0.37	

→ Average prices for each active ingredient and therapy category group.

6. Formation of the elementary indices for each active ingredient category on the basis of the average prices calculated for each active ingredient category.

→ Index for each active ingredient and therapy category group.

7. Aggregation using the appropriate sales per active ingredient category or for each ATC-2 therapy category.

→ 6 indices per therapy category at ATC-1 level.

8. Aggregation using ATC-1 sales.

→ Sub-index for medical products

9. Final aggregation of both sub-indices for medical products and for the pharmacists' rates using the corresponding annual sales.

→ Medicines Price Index

## Appendix 2: Example of an elementary index calculation

Therapy category (Anatomical Therapeutical Chemical Classification = ATC)

ATC-1: Alimentary system and metabolism

ATC-2: Antacid.Ulcer therap.Antiflat.

Active ingredient: Rantidine

Example

Product selection	Article	Packaging unit	Price per mg active ingredient		Sales	
ATC	Product group	ANR	PG	t	t+1	CHF
A02	24653 Original product	994066	20Stk	0.0150	0.0150	15'483
		974063	20Stk	0.0249	0.0230	7'652
		788187	40Stk	0.0257	0.0250	13'874
		788186	20Stk	0.0050	0.0060	4'279
		887185	60Stk	0.0067	0.0067	73'330
		878184	20Stk	0.0085	0.0085	7'005
		847450	20Stk	0.0090	0.0070	26'569
		833222	60Stk	0.0098	0.0098	101'355
		833221	120Stk	0.0125	0.0125	34'431
		699726	40Stk	0.0053	0.0053	37'064
		661616	60Stk	0.0067	0.0065	62'685
		691615	20Stk	0.0200	0.0200	18'778
		661614	5x5ml	0.0080	0.0077	4'336
<b>AP leader, usually original product (geometric mean)</b>				<b>0.0104</b>	<b>0.0102</b>	
	56562 Generic product A	217366	120Stk	0.0099	0.0099	21'287
		217364	60Stk	0.0067	0.0082	16'540
		217363	20Stk	0.0066	0.0070	10'169
		217361	20Stk	0.0054	0.0054	13'972
		217359	60Stk	0.0057	0.0061	55'947
		217357	40Stk	0.0070	0.0078	12'406
		167447	60Stk	0.0077	0.0077	6'889
	89146 Generic product B	167735	60Stk	0.0062	0.0062	49'406
		167733	40Stk	0.0064	0.0064	12'382
		167731	20Stk	0.0060	0.0065	12'307
		167729	120Stk	0.0083	0.0083	16'352
		167728	60Stk	0.0097	0.0097	16'059
		167726	20Stk	0.0099	0.0105	8'541
						115'046
	56671 Generic product C	162842	12Stk	0.0156	0.0156	31'401
		162841	6Stk	0.0127	0.0127	10'655
						42'056
	65435 Generic product D	172546	60Stk	0.0060	0.0060	17'535
		172544	40Stk	0.0070	0.0070	4'953
		172543	20Stk	0.0083	0.0083	6'402
172541		60Stk	0.0097	0.0097	9'729	
					38'619	
56730 Follow-on product	97739	12Stk	0.0255	0.0255	26'301	
<b>AP alternative, generally follow-on and generic products (GM)</b>				<b>0.0083</b>	<b>0.0085</b>	
<b>Average price (geometric mean)</b>				<b>0.0187</b>	<b>0.0187</b>	
<b>Elementary Index for A02, Active ingredient: Rantidine</b>				<b>100.0000</b>	<b>100.2775</b>	