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Rents in Switzerland: sampling and quality adjustment

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Abstract

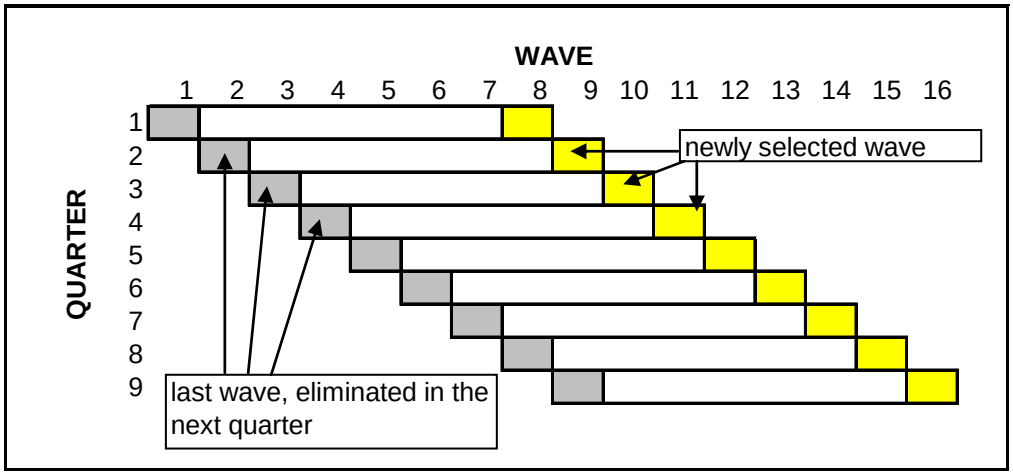
The subindex for rents is of paramount importance for the Swiss CPI, given its weight of almost 20%. Rents are collected as a random sample of 5000 entities out of the population of 2 million rented apartments. The sample is rotated by 1/8 every quarter, in order to continuously integrate new apartments as well as newly rented apartments. This article briefly introduces the current index for rent housing in Switzerland. It then looks at changes in the sampling frame which will have an important impact on the rent sample. Finally, it examines planned improvements that will allow adjustment for quality changes, which are not accounted for up to now.

1 Current rent index

With a rate of 60%, Switzerland is a country of renters (tenants). Consequently, the rent index, which is part of the Consumer Price Index (CPI), required particular attention. Housing expenditures (renters and landlords) represent 20% of total consumption expenditure in the CPI basket of goods and services. Only the evolution of rents is measured over time; the "prices" of apartments occupied by their owners are tracked according to the principle of rental equivalence.

The rent index is the only index in the consumer price statistics which is based on a simple random sample. Approximately 5000 apartments from all over Switzerland are picked at random from a database. In order to take account of the evolution of the rental market and particular the construction of new apartments, 1/8 of the sample is renewed every quarter. In fact, the rental housing stock does not remain constant over time: new buildings are built, some apartments are eliminated or transformed, apartments are subject to ageing and some are renovated. For all these reasons, it is important to renew the sample; it is the only method that makes it possible to integrate recently built apartments and recent tenancies. As figure 1 overleaf shows, an apartment remains at most two years in the sample.

Figure 1: rotation of the sample



The survey is conducted on a quarterly basis (February, May, August and November). The data collected comprise not only the rent but also the number of rooms, the surface area, the year the apartment was built and any renovations that have been carried out. Some variables are then checked and plausibilised by means of the Register of Buildings and Dwellings (RegBL/GWR). The main variables are the living space, the age of the building and the building category. This is an invaluable procedure because it allows us to complete missing variables and to improve the quality of the data collected from the renters.

The sample is stratified ex post by number of rooms and age of the apartment. Consequently, each observation is attributed to a weighted cell. The weighting by cell was calculated on the basis of renters' expenditures, determined as a result of the 2003 rent structure survey.

Table 1: ex-post stratification of rents and respective weights of each cell in %

		Age of apartment				
		0-5 years	**5-10 years**	**10-20 years**	**20+ years**	**Total**
Number of rooms	**1**	0.0442	0.1332	0.3159	3.7241	4.2174
	2	0.3363	0.8432	1.6650	10.8420	13.6865
	3	1.0825	2.0882	3.5370	25.8936	32.6013
	4	1.9577	2.7432	4.8034	23.1534	32.6577
	5	1.1870	1.2383	2.0177	8.3954	12.8384
	6	0.2569	0.2607	0.5829	2.8982	3.9987
	Total	4.8646	7.3068	12.9219	74.9067	100.0000

Within each cell, an average rent is calculated according to the geometric mean method.

$$\tilde{x}_j^t = \left(\prod_{i=1}^{n_j^t} \left(x_{ij}^t \right)^{p_i^t} \right)^{1 / \sum_i p_i^t} = \exp\left\{ \frac{\sum_{i=1}^{n_j^t} \left(p_i^t \log x_{ij}^t \right)}{\sum_{i=1}^{n_j^t} p_i^t} \right\}, x_{ij}^t \neq 0$$

where:

$\tilde{x}_j^t$	Geometric mean of rents of cell j in period t
$x_{ij}^t, i = 1, \ldots, n_j^t$	Observations (rents) collected during period t which correspond to cell j
$n_j^t, i = 1, \ldots, J$	Number of observations in period t in cell j
$p_i^t, i = 1, \ldots, N^t$	Weight of observation i in period t. This weight is calculated based on the design weight and the correction in the event of a change of renter.

This average rent is compared with that of the preceding period so as to calculate an index. Each index is then weighted by the relative importance of each cell:

$$\boldsymbol{L_j^t = \frac{\tilde{x}_j^t}{\tilde{x}_j^{t-1}} \cdot 100} \qquad \boldsymbol{L^t = \frac{\sum_j w_j L_j^t}{\sum_j w_j}, \forall j \left| n_j^t \neq 0 \right.}$$

where:

L_j^t	Index of cell j in period t compared to the preceding period (t-1)
L^t	Index of rents in period t compared with the preceding period
w_j	Weighting of cell j. These weightings add up to 100

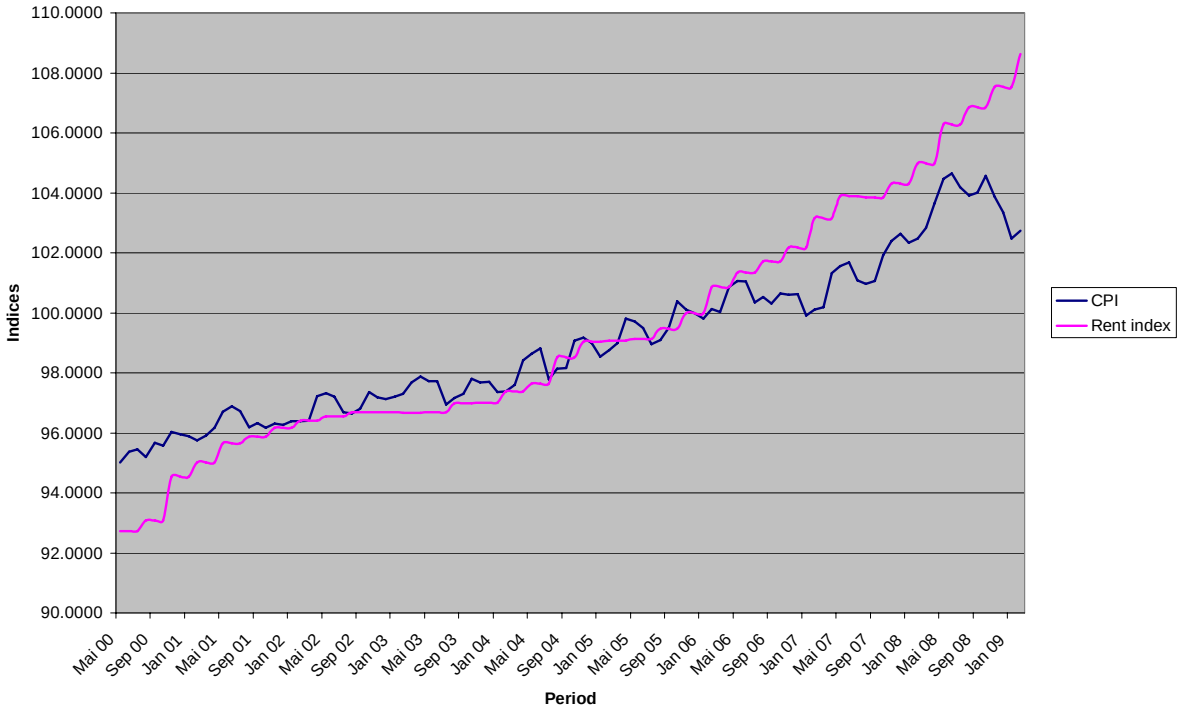
Until the end of 2005, quality adjustments were made to the rental objects on the basis of renovations. A number of points were assigned depending on the renovations: for example, a complete renovation of the kitchen was equivalent to 1.25 points; for a bathroom 1 point was assigned. If an apartment earned between 2 and 3 points in total, it was fictitiously rejuvenated and moved to a newer cell (red in table 2). If it had more than 3 points, it was moved to an even newer cell (green in table 2). Conversely, as apartments age, they were automatically moved to an older cell (black in table 2). These two operations had the following effect on a cell's average rent: they pushed the rent down in the case of renovations and up in the case of the ageing of the apartment. However, the effect on the index was surprising in the case of renovations: instead of amortising rental cost increases, taking account of renovations, i.e. of improvements in quality, boosted the increases, as the rate and intensity of renovation decreased over time.

Table 2: quality adjustments: renovations and ageing

		Age of apartment			
		0-5 years	5-10 years	10-20 years	20+ years
Number of rooms	1				
	2				
	3				
	4				
	5				
	6				

While the independent effect of ageing has been preserved, the treatment of renovations was abandoned in early 2006. In fact, the connection between renovations and the rent level is not clear cut: an internal study has shown that renovated apartments can be less expensive than non-renovated apartments of the same size and age. According to this study, renovations are not aimed at rejuvenating an apartment but rather at keeping them in sufficiently good repair to be able to continue renting them out. Consequently, since January 2006, the effect of renovations on rents has not been offset.

Chart 1: the CPI and the rent index (base December 2005=100)



The rent index is regularly in the focus of criticism in Switzerland. Accounting for a fifth of inflation, it clearly has a considerable influence on total inflation. In addition to traditional debates about the sample frame, the stratification and the calculation method, debates about quality adjustments have intensified in recent years, both with respect to the treatment of renovations and the comparison of apartments that fall outside the sample with those that fall within it. Chapter 2 below details the three main problematic points, namely the sampling, the calculation and the quality adjustments, and it presents possible solutions that will be explored in the coming months.

2 Problematic points

Before proceeding to our indicator's problematic points, it is worth recalling the fundamental goal of the rent index: its aim is neither to measure the profitability of real estate investments by institutional actors nor to measure the evolution of rents paid for new tenancies. Instead, the rent index aims to measure the evolution of net rents paid for apartments rented on a permanent basis for the purpose of residing on Swiss territory. Thus, it is first of all necessary that the sample should encompass apartments that are representative of the rental housing stock in Switzerland: recent as well as old buildings, recent as well as old tenancies, and apartments rented out by private landlords as well as those rented out by institutional landlords.
Next, it is imperative that the index should not introduce a bias, particularly not a systematic bias, either overestimating or underestimating the evolution of rents. The aggregation, the weighting and the formulas employed must be suitable for estimating the evolution of rents in the rental housing stock.

Lastly, based on the two above-named criteria, the aim is to check whether the treatment of differences in quality is appropriate to the situation or whether the lack of adjustment introduces a certain bias.

2.1 Sample drawing

The rent index is the only segment of the Swiss CPI which is based on a random sample. Once the FSO's harmonisation of registers—a project which is currently underway—is completed, the survey frame will undergo certain adjustments. The sampling frame is the information base containing the statistical units that enable us to access the desired information concerning the survey's reference population. In a sample survey, it is crucial to have a suitable sampling frame which corresponds as closely as possible to the reference population of the survey concerned.

2.1.1 Sampling frame

The sampling frame that is being used at present is mainly intended for household surveys. Therefore it does not correspond exactly to the reference population of the rent index, which is composed of apartments rented permanently for residential purposes. Nevertheless, the connection between private households and apartments is considered to be relatively close. The survey frame is composed of fixed-line telephone numbers taken from the database of emergency calls. Consequently, it includes all fixed-line telephone connections in Switzerland and thus covers all fixed-line telephone customers (private and professional) but not mobile phone customers. The proportion of households covered within this frame is estimated to be between 90% and 95%. The entries consist of the family names, first names or company names, as well as addresses and telephone numbers. A certain number of logical rules allow the FSO to distinguish with a good degree of precision households from businesses and to regroup multiple connections. To complete the information, the FSO obtains from the operators the telephone subscribers' language of correspondence.

On the basis of this frame, the telephone numbers are randomly selected according to the Bernoulli method. Corresponding names and addresses are then searched in the emergency calls database. This information serves as the basis to define an apartment to be surveyed. The survey is first conducted by screening (excluding homeowners, free apartments, business addresses and holiday homes), thereby limiting the reference population to proceed with the survey. To renew 1/8 of the sample on a quarterly basis (approximately 700 apartments), it is necessary to draw approximately 2800 telephone numbers. Losses are due on the one hand to the fact that some of the phone numbers do not connect to apartments rented permanently for residential purposes and, on the other, to non-responses.

The main alternative to the current survey frame is the Register of Buildings and Dwellings established by the FSO in 2000. As its name indicates, it includes all apartments present in the Swiss housing stock. It is, therefore, the natural source of information to draw a sample for the rent index. Its utilisation as a sampling frame has long been under discussion but has until now been prevented because of an important missing variable: the contact person for each apartment. The use of the Register of Buildings and Dwellings would have numerous advantages: on the one hand because it would correspond better to the reference population and on the other because it would provide supplementary information that would make it possible to stratify the sample.

We face a significant over-coverage due to the fact that neither the survey frame based on telephone numbers nor the Register of Buildings and Dwellings allows the elimination of apartments permanently occupied by their owners for residential purposes. This over-coverage does not compromise the precision of results as such, but it does necessitate a screening stage in order to eliminate irrelevant apartments. For the time being, there is no plan to integrate a variable to make it possible to draw a distinction between renters and owners in the Register of Buildings and Dwellings.

Stratification allows us to obtain more precise results than with a simple random sample. The basic underlying idea is to improve the allocation of the sample across sub-types of the reference population by using auxiliary information. The stratification is effective if the variables in which we take an interest have different averages in the sub-populations. The sample therefore becomes more representative (better balanced), the estimates of the total population are more precise and the estimates can be made by domain (sub-populations). Another advantage is the cost. In fact, the stratification makes it possible to define the size of each stratum, which can thus be defined within the framework of a budget allocated to the survey while maintaining a good level of precision in the results.

The main stratification variables for the rent index are the age of the building and the number of rooms. In the Register of Buildings and Dwellings, 99.9% of dwellings list a year (or period) of construction (entry for the building) and 97% provide information on the number of rooms.

A stratification between urban and rural regions would also be conceivable. It would be based on the localisation of municipalities. This stratification could be undertaken with existing means, given that the current sampling frame contains information on addresses linked to telephone numbers. Only a definition of urban and rural municipalities would have to be carried out. However, a detailed study of this stratification is necessary to determine whether it is justified (particularly whether the sub-populations created in this way have different population means). A study undertaken by the FSO in 2005 showed that such a stratification did not provide a sufficient gain in precision, which is why the idea was abandoned at the time.

We are currently carrying out an ex-post stratification. On the theoretical level, ex-post stratification yields the same results (in terms of the precision of the estimates) as ex ante stratification if and only if the number of observations in each stratum is sufficiently large. That is precisely the biggest disadvantage of ex-post stratification, because it does not make it possible to control the size of the sample in the different strata. Therefore, if some strata do not contain sufficient observations (or even any observations) one has to cope with bias problems. This is the case in certain cells in the rent index.

Consequently, because it allows an ex-ante stratification of the sample, there is an indisputable advantage to using the Register of Buildings and Dwellings. Nevertheless, the link between apartment and occupant is not assured at present. The harmonisation of registers as of 2012 will make it possible to establish this link. It is too late for the current revision of the CPI, which will go into production at the end of 2010.

In the meantime, different possibilities are being studied to benefit all the same from the information contained in the Register of Buildings and Dwellings. In particular, it would be conceivable to carry out a two-level sample drawing: first, a sample approximately 20 times larger than the current one would be drawn within the current frame. Then one would have to match the selected apartments with the register, in order to obtain the age of the building. This information is in large measure already available. The age of the building would then be used to stratify by age class, which would allow a more effective coverage of recently built apartments.

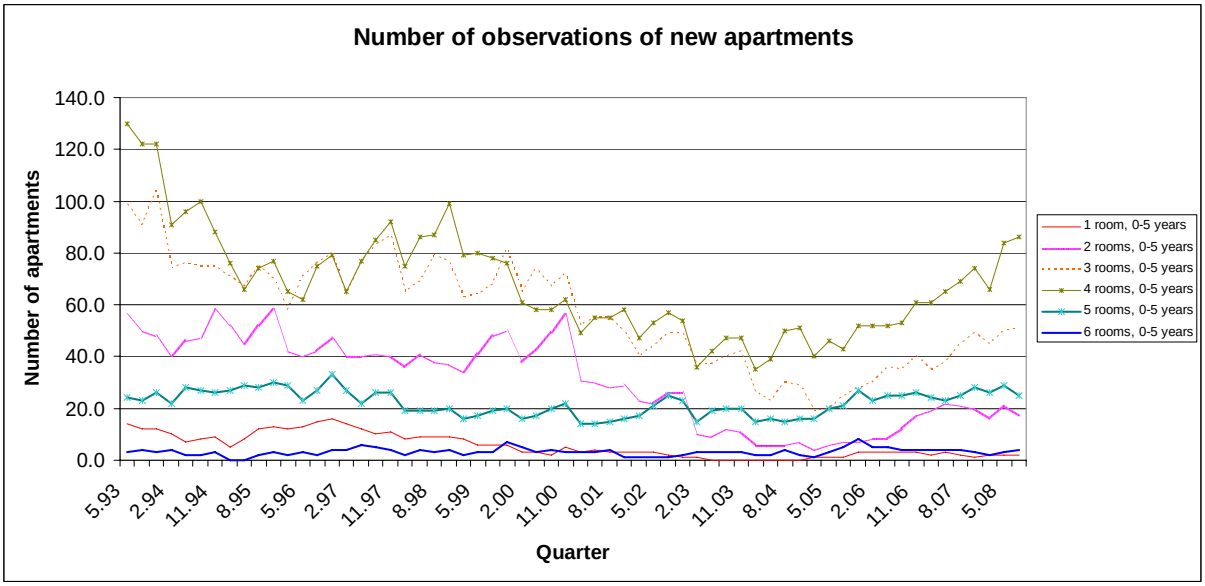
2.1.2 Sample size

Based on the results obtained for the survey frame, it will also be necessary to consider the sample size and the method of drawing the sample. The sample size has practically remained unchanged since 1993. Every quarter, a little over 5000 apartments are included in the calculation of the rent index. This number was defined on the basis of the established goal, namely to measure the evolution of rents of all apartments in Switzerland.

The number of observations by age category is relatively stable. More than 80% of the sample is composed of old apartments, built more than 20 years before the calculation of the corresponding index. This value is very close to that obtained with the 2003 rent structure survey, which estimated the proportion of apartments in this age category to be 81%.

The number of observations per cell reveals the real problem: some cells which correspond to more recent apartments are often empty or almost empty. One does not calculate an index unless one has has at least three observations in the cell for the corresponding period. In the converse case, one takes account of the entire evolution of the rent index.

Chart 2 Number of observations of new apartments



In view of the preceding, it is worth asking whether the sample ought to be enlarged or the post-stratification cells redefined.

It would be relatively simple to adapt the post-stratification cells, but this would have an influence on the comparability of analyses based on the old index. In any event, given the importance of new buildings for the evolution of the index, it is not advisable to merge the 0-5-years age category with the 6-10-years age category. The consolidation of the two youngest age categories would result in the dis-

appearance of the smallest cells but would not allow a long-term solution to the problem caused by the situation in the construction market. Furthermore, what would be the point of setting up a rotational panel that would allow us to collect the rent of new apartments only to then desist from considering their price evolution?

Increasing the size of the sample would certainly render the index more precise. But without modifying the current sample frame, the additional apartments that would be added to the sample would essentially be old apartments. As long as the sample frame does not contain information on the size of the apartments and/or the age of the apartments, such a measure will only bring few improvements. It is only once we have this information that we will be able to increase the size of the sample by focusing on a survey area in which the number of observations is too small or the dispersion particularly large.

It will also be necessary to consider the feasibility of such an increase in sample size. A first possibility would be to draw a larger sample for November 2010, for example by doubling the sample size in one fell swoop. For the November index, one would only consider the usual eighth of new apartments included for the first time in the survey. To calculate the basis, on the other hand, one would consider all apartments, including apartments recorded for the first time. However, this method has a disadvantage: it requires an intervention during a transitional period in the period apartments remain in the sample, which would influence the evolution of the index. In addition, it would be necessary to modify the wave to be eliminated. To be sure, a big index movement could be avoided thanks to the base operation; in addition, the resulting increase in the duration in the sample would have a moderating effect. Depending on its structure, the increased wave would have the effect of either driving the index up or down. At the end of the transitional period, however, the sample would return to its current composition as far as the duration apartments remain in the sample is concerned.

An alternative would be not to subject the last wave to a rotation for a period of two quarters. In this way, one would intervene in the relationship between the proportion of apartments that have just been selected and the proportion of apartments that are the subject of the follow-up survey, which would certainly affect the evolution of the index on a long-term basis. During the transitional period, the last wave would not be eliminated, which normally ought to have a moderating effect on the evolution of the index. At the same time, the duration of the tenancy in the sample would become longer on a long-term basis, which would also have a moderating effect. Such an enlargement of the sample is the simplest method from the point of view of logistics, cost and feasibility. Tests are currently being conducted to estimate the effect this measure would have had in the past.

2.2 Index calculation

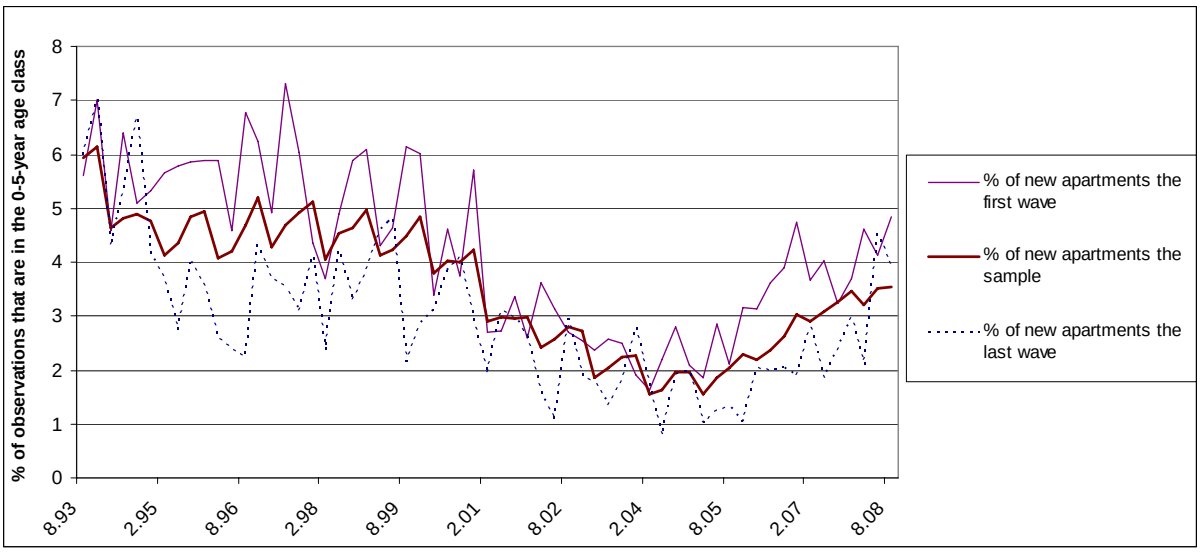
2.2.1 Rotation of the sample

As noted above, the rotating sample is an important characteristic of the cyclical survey of rents. Every quarter, one eighth of the sample is renewed by eliminating apartments added two years previously. This method mainly aims to integrate new apartments in the sample. If the sample were static, there would be a risk that sooner or later the apartments that comprise it would no longer be representative of the apartments in the reference populations. By systematically renewing the sample, we guarantee that the variables of apartments it contains do not diverge too much from the characteristics of the apartments that form the reference population. In addition to integrating new apartments, the rotating sample also makes it possible to enter apartments that have been rented again and which would otherwise be underrepresented in a static sample.

In this context, it is interesting to examine the effect of this rotation on the sample. The elimination of apartments added two years previously has an impact on the composition of apartments during the preceding period. Conversely, the addition of new apartments during the current period influences the composition of apartments during the index's current period. As for apartments that remain in the sample, they are included in the follow-up survey. Therefore, the effect of rotating the sample consists in replacing old apartments by a new random selection of apartments. This principle is applied equally in each of the 24 cells.

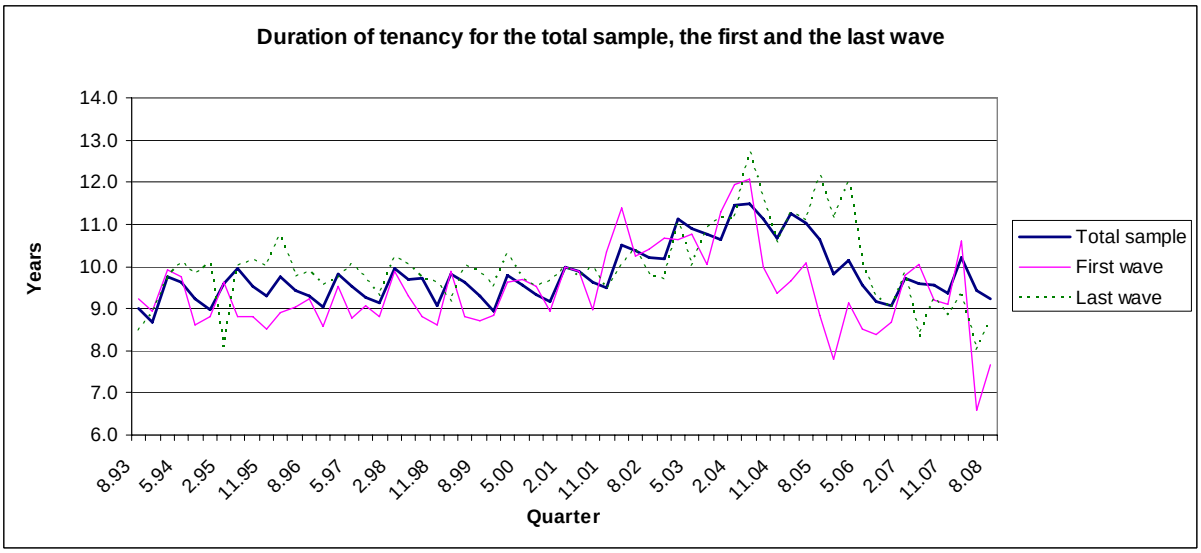
The number of newly built apartments is most of the time more significant in the first wave than in the rest of the sample. Compared to previous quarters, recent waves contain a larger proportion of apartments built in the past five years, because these new apartments could not be selected before they were built. As it now stands, the random sample is taking faithful account of the permanently rented and occupied apartment stock. It is self-evident that the newly selected wave does not only contain newly built apartments; but in fact these are more numerous than in the rest of the sample (sometimes distinctly more numerous) for most of the initial waves.

Chart 3 Proportion of 0-5-year-old apartments from the first survey and in relation to the total sample



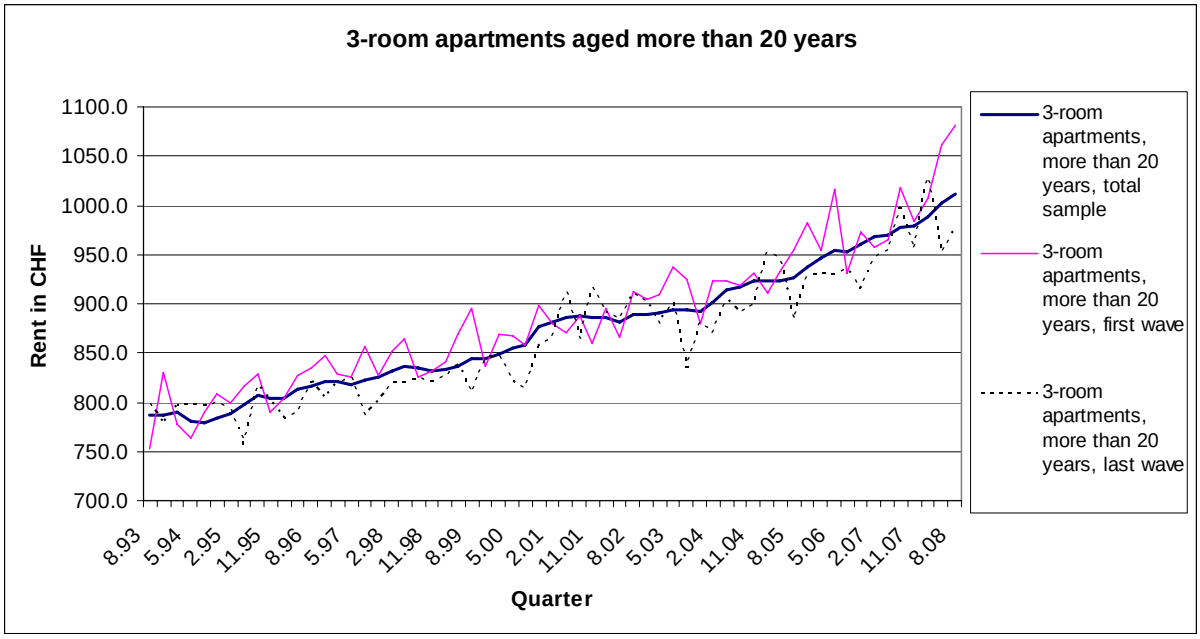
Another effect of the rotation of the sample is the duration of the tenancy (lease), which is not completely independent from the age of the building being considered. While in the first wave, the duration of a tenancy is generally much shorter than in the middle of the sample, it tends to be markedly longer in the last wave. Consequently, the rotation makes it possible to avoid an excessive increase in the average tenancy duration in the sample. Of course, every follow-up survey also includes apartments that have been rented again to new occupants (2-4% per quarter); this proportion is too small to reflect the real duration of a lease (relatively short) in the reference population. The average tenancy duration in the sample corresponds relatively well to the numbers obtained during the two structural surveys of rents conducted in 1996 and 2003.

Chart 4 Tenancy duration for the total index, the first and the last wave



Among the important results, we finally find a clear difference between the net rent of apartments included for the first time in the survey and apartments in the last wave. For most quarters and apartment categories, the net rent recorded the first time exceeds the average of corresponding apartment rents in the sample, while the average rent of the last wave is often markedly lower. This phenomenon has direct consequences for the index, because the average rent during the preceding period is most of the time below the average, while that of the current period generally exceeds the latter. Despite important differences between the quarters, the rotation of the sample has a decisive effect on the evolution of the index.

Chart 5 3-room apartments aged more than 20 years



2.2.2 Aggregation

In principle there are two ways of aggregating rents:

- either each apartment is considered to be unique (because of its characteristics: location, size, etc.) and cannot be compared to any other apartment; in this case it is advisable to record the evolution of rents in an individual way and to match the observation with the rent of the same apartment recorded before;
- or certain types of apartments are considered to be sufficiently homogenous for us to be satisfied with following their average values.

The combination of paired observations with a rotational panel poses certain problems: the question is whether it is advisable to compare apartments eliminated from the sample with those that have just been added to it (and if the answer is affirmative, to define how to proceed). In the event that the index

only contains paired observations, only the follow-up survey has an impact on the index. We find such a situation in numerous surveys conducted for the CPI: when there are changes in the product range, the price series for new articles which are no longer comparable with older ones are discontinued and a new series based on a new product item is launched. The sample remains representative and the price of the new product item feeds the index starting with the second survey. Advantage: one only compares what is comparable. We wanted to check, based on the two hypotheses outlined below, whether such a method could be applied to the field of rents:

1. First hypothesis: rents follow parallel evolutions within and outside the sample. The follow-up survey shows increases that are as high as in the first survey. No effect hinders the adaptation of rents in the sample to those outside the sample. Because new leases are under-represented in the sample, no effect would hinder the adaptation of existing rents to the development of the market. This hypothesis would seem to be very bold for a country such as ours, where leases protect renters to some degree from rent increases.

2. Second hypothesis: increases affect apartments outside the sample more than those within it. The first survey allows the inclusion of these increases in the sample. Once they are integrated in the sample, the rents rise markedly more slowly. Considering statutory regulations currently in effect, we postulate that most rent increases happen when there is a change of tenant. Evidently, this scenario is exaggerated because the initial surveys also include old leases, just as follow-up surveys include new leases (change of tenants). However, our analysis of the effect of rotation has shown that this hypothesis is not completely fanciful.

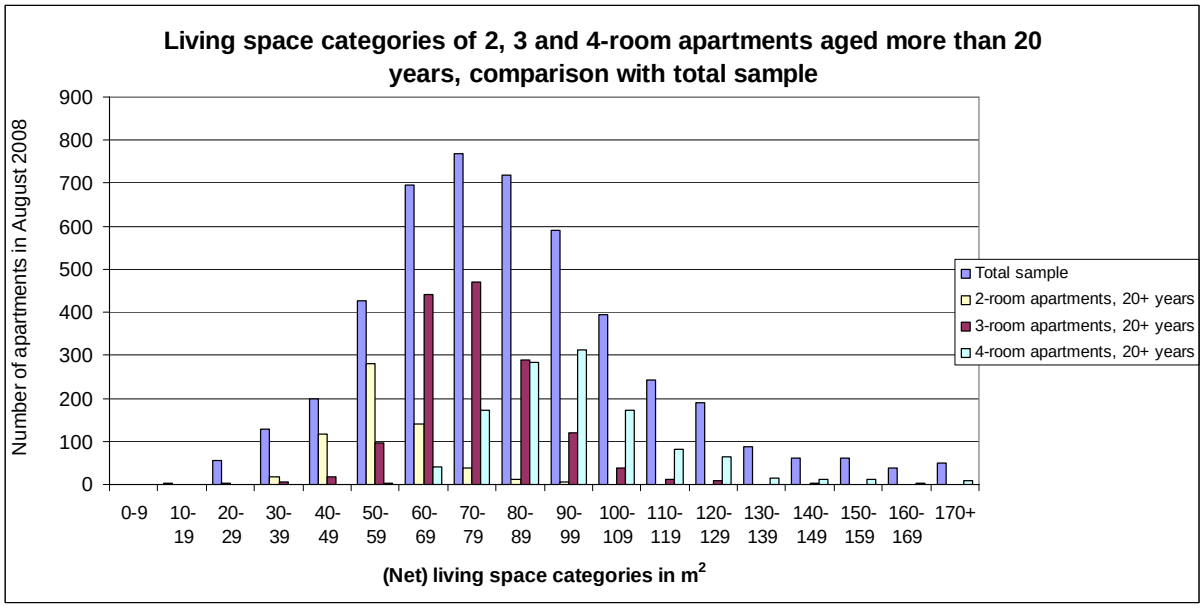
If we base ourselves on the first hypothesis, we get the same result with paired observations as with unpaired observations: it matters little whether one takes the average of relatives or the relationship between average values (insofar as we are dealing with the same pairs), because the calculations are based on the geometric mean. Thus, based on hypothesis 1, we can easily limit ourselves to paired observations. The situation would be different if the second hypothesis turned out to be true: the prices would remain more stable once they are integrated in the sample. Calculated according to the traditional method, the index grows markedly more than if paired observations are employed.

Of the two hypotheses, the second one is by far the more plausible for the domain of apartment rents. Moreover, it is widely confirmed by the data from the rent index. This means that we cannot avoid considering of the effect of the rotation in the calculation. The question here is to know how to proceed. If we want to use paired observations, we have to define a successor apartment to replace the one that is eliminated from the sample, so as not to interrupt the series. Nevertheless, this method comes up against an obstacle of size: if the number of observations kept for the new quarter is different from that for the preceding quarter, it is impossible for us to individually determine a successor for each apartment: consequently, the attribution would be arbitrary and would affect the index. Furthermore, no method - for example, the imputation of the total index to the preceding period – allows a correction of this effect insofar as it presupposes that we have an ideal housing market. The obvious conclusion is that the use of paired observations is not a valid alternative for the rent index, at least in

its current form. Such a method can only be applied in a market governed above all by competition rather than by legal measures such as those to protect tenants.

The second alternative is to enter average values over time. For this method to work, the survey fields (cells) need show a certain homogeneity over time. Experience has shown that this is difficult to obtain in the field of rents. Rents in particular present an asymmetric right-skewed distribution and several size categories overlap. Let's take the example of 2-4-room apartments. Although the zones of observation of these three categories of apartment are clearly distinct, the corresponding rent classes cut across each other to a large extent. An analysis by size category (surface area of apartment) yields a similar result. Structural surveys of rents have shown that an apartment's surface area has a definite influence on rent levels. Moreover, in the 3-room category, small apartments showed a markedly steeper rent increase from 1996 to 2003 than larger apartments. Thus, an apartment's surface area influences not only the level of rents but also their evolution.

Chart 6 Living space categories of apartments aged more than 20 years in comparison with the total sample.



In the current situation, to determine the evolution of rents, the best solution seems to be to track the evolution of average values. Consequently, we propose maintaining the aggregation method applied until now. This could still be improved at the level of the treatment of extreme values. The calculation of the index will continue to exclude rents that are located more than three interquartile ranges from the upper quartile. One could envision introducing a trimming method for such extreme cases. This measure will only have a limited effect, given the fundamental problem presented by the heterogeneity of the content of the cells. Another measure involves quality adjustments, addressed in the following section. This measure would make it possible to take better account, over the long term, of changes in the composition of apartments in the cells.

2.3 Quality adjustments

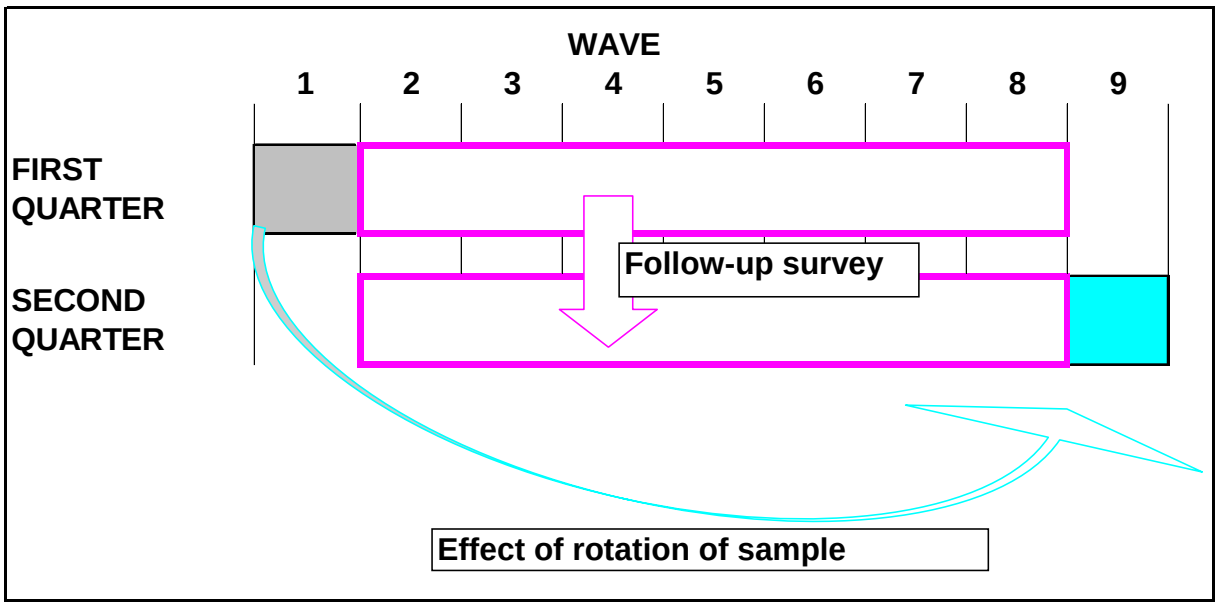
The characteristics of the apartments included in the sample change from quarter to quarter. Stratification by age and number of rooms makes it possible to establish a certain degree of homogeneity within the cells; but the other variables, which can also influence rents, are not taken into account.

In this section, we will begin by defining the domains in which some quality adjustments could be made, as well as various relevant solutions. We will then evaluate, based on the sample data, the potential impact of quality adjustments. Lastly, we will propose measures on how to proceed afterwards.

2.3.1 Field of application of quality adjustments

The rotation principle has already been clarified. Here will we therefore limit ourselves to highlighting the characteristics that may undergo qualitative change from quarter to quarter.

Figure 2 Quality adjustment and rotation of the sample



Let us first examine the follow-up survey: one finds practically no change in the sample between the apartments from the first quarter and those from the second quarter. Thus, aside from some demolitions or alterations, almost all apartments considered in the first quarter are still included in the sample in the next quarter. Variables such as the living space and other properties of the building remain in

principle unchanged. It is also unlikely that the location of the apartments would change in such a short time period. On the other hand, one can expect a marginal evolution in the tenancy duration, and also a certain number of renovations.

More important quality differences arise with the rotation of the sample: some apartments are replaced by others, controlling only two variables that influence rent prices. During the replacement, the level and evolution of the rent index can also be influenced by the tenancy duration, the surface area of the apartment, the type of building, the location and the renovations.

For these reasons, a quality adjustment concurrent with the rotation is necessary to study the effect of replacing apartments leaving the sample by newly selected ones. However, other quality adjustment methods using, for example, other estimators will need to be examined in the coming months.

2.3.2 Alternatives for the quality adjustments

The Swiss rent index took account of renovations until 2005 by artificially "rejuvenating" the apartments concerned, i.e. by transferring them to a category of more recent apartments. This system was discontinued during the 2005 revision, after an internal study cast doubt on the connection between renovations and rents.[1] A criticism made at the time was about the fact that taking account of renovations from 2000 to 2005 did not slow down the progression of the index, but did, on the contrary, reinforce it. This argument is not really decisive, given that taking account of quality differences can accelerate as well as slow down the evolution of a price index.

To date, only the United States has applied a hedonic quality adjustment method in their official rent statistics. This method was introduced in 1987 to take account of the ageing of apartments. In the rest of the world, particularly in European countries, more use is made of implicit methods and direct comparisons within stratified samples. Several countries also use methods such the option costs for concrete improvements to the quality of an apartment (e.g. installation of a new kitchen).

The method currently being utilised in Switzerland is largely based on a post stratification and a direct comparison between apartments eliminated from the sample and apartments that have just been added to it. Given that it does not take account of all the variables that exert an influence on rent prices, there is a certain potential for improvement in this field.

Two approaches seem to offer a solution to the problem: one can, on the one hand, try to improve the homogeneity of the structure of the samples by only including in them apartments that correspond to a relatively precise type. This would amount to reinforcing the stratification as it is practiced at present. In this case, a very large number of observations would be eliminated from the sample, which would become less representative.

[1] "Die Renovation der Miet- und Eigentümerwohnungen in der Schweiz 2001 -2003 " (The renovation of rental and owner-occupied apartments in Switzerland, 2001-2003) *Ergebnisse der Mietpreis-Strukturerhebung 2003* (Results of the rent structure survey). F. W. Gerheuser (2005), Politikberatung und Sozialforschung Brugg.

The other approach consists in explicitly recording quality difference and correcting them accordingly. In this context, Eurostat recommends the "hedonic adjustment" of prices. According to this method, we generate a regression equation based on a large sample which enables us to calculate theoretical rents for each newly selected apartment. The same procedure is followed for apartments eliminated from the sample. By comparing the results of the two groups, we can determine the evolution of the quality between the periods and correct the price evolution by the quality component.

2.3.3 Requirements to be met by a quality adjustment system for rents

Before contemplating a new quality adjustment method for rents, it is worth considering the requirements such a system will have to meet. Experience has shown that in a field of this importance, it is imperative to completely automate the system, because this makes it possible to significantly reduce the error rate. Moreover, rigorous computerised data entry guarantees the transparency of such a system, from start to finish of the process.

Furthermore, it is worth ensuring, in the interests of the data users, that the regression equation actually reflects the behaviour of players in the housing market. To this end, it is necessary to be able to unequivocally demonstrate the influence of different variables on the evolution of rents.

2.3.4 Evaluating the influence of quality adjustments

For many variables whose influence on net rents is known, we have analysed the evolution of the sample from 1993 to 2008. These variables are: the location (within or outside an urban agglomeration), the duration of tenancy and the surface area of the apartment. In the case of the last two variables, we have found a large degree of consistency, at least in the cells that are relatively full, which indicates that quality adjustments have a limited influence. For these two variables, the sample corresponds closely to the results from the structural surveys. Nevertheless, these analyses would need to be completed, particularly with respect to renovations and types of buildings.

2.3.5 Practical introduction of a new system

One difficulty is already apparent: the quality adjustments will exert a considerable influence, particularly in cells containing few observations. But this influence will be more a result of the effect of the sample than of the adjustments as such. Another difficulty stems from the fact that the quality has to be adjusted for a group of apartments rather than for an observation in particular.