Households' inflation opinions – a tale of two surveys

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From the late 1970s up to the end of 2001, households' perspectives on current and future price developments were surveyed by Statistics Sweden (SCB, the Swedish acronym). As of 2002 the survey has been taken over by Growth from Knowledge (GfK), an international market research company. Before the changeover, in November and December 2001, GfK undertook surveys alongside SCB's regular surveys. Despite nearly identical questions, the average inflation perceptions and expectations were considerably higher according to GfK. Our examination of the responses shows that a part of the discrepancies is due to different ways of handling responses implying that prices were "about the same": GfK probed such responders to be more precise. Moreover, GfK picked up a greater proportion of low-income households, with higher inflation perceptions and expectations. These two factors account for up to a third of the discrepancy between SCB's and GfK's results. The remaining discrepancy comes mainly from GfK's surveys having more responders who believe in virtual price stability, that is, unchanged prices.

The authors wish to thank Jesper Hansson, Staffan Viotti, Kerstin Wallmark and Klas-Göran Warginger for comments and helpful suggestions, Ylva Hedén for STATA assistance, Anita Olsson-Malmberg of Statistics Sweden and Richard Hansson of Growth from Knowledge for data and answers to queries about the surveys, and Petter Lundberg of Statistics Sweden for information about the distribution of household income.

The survey – past and present

A survey called *Hushållens inköpsplaner* (HIP, Households' purchasing plans) has been undertaken in Sweden ever since 1973. The survey, collected quarterly up to 1992 and monthly since then, asks households for their opinions about both their own and Sweden's economic development. Other questions relate more directly to households' purchasing plans, for example whether they intend to buy (or exchange) a car or a house in the coming two years. From 1979, when responsibility for the survey was transferred to *Konjunkturinstitutet* (KI, the National Institute of Economic Research), households have been asked for their perspectives

on current and future price developments.[1] One reason for including these questions was to assess whether the price controls in the 1970s were having the desired effect.[2]

Since 1979 the HIP survey contains questions about current and future price developments.

Inflation expectations of the type that the HIP survey is intended to measure also play an important role in Sweden's present monetary policy regime. Since 1993 the Riksbank targets CPI inflation at an annual rate of 2 per cent (with a tolerance interval around this level of ±1 percentage point). Due to the time lag in the transmission of monetary policy, decisions are based on forecasts of the future path of inflation and other factors.[3] For the forecast of future wage outcomes, which in turn affects the inflation forecast, one of the determinants is inflation expectations. Consequently, the Riksbank continuously follows the development of inflation expectations and publishes it regularly in the Inflation Report.

The survey was conducted by SCB until it was taken over by GfK in January 2002.

From 1973 to 2001 the survey was conducted by Statistics Sweden (SCB, the Swedish acronym). In 2002 it was taken over by Growth from Knowledge (GfK)[4]. To be able to study whether the two procedures yielded similar results, surveys in November and December 2001 were carried out by both SCB and GfK. Their pictures of households' inflation expectations are presented in Figure 1 together with the actual rate of inflation.

Figure 1. Households' inflation expectations and CPI inflation, 1979-2005
Per cent

Note. To facilitate comparisions, the inflation expectations have been shifted 12 months into the future so that they coincide with the actual rate of inflation to which they refer.

Sources: GfK and Statistics Sweden.

1 The questions about price developments were also included in the first survey of 1978.
2 See the account in Jonung (1981), footnote 7.
3 For an account of how the Riksbank works to fulfil the inflation target, see Heikensten (1999) and Heikensten & Vredin (2002).
4 GfK is an international market research company.

TABLE 1. HOUSEHOLDS' INFLATION OPINIONS ACCORDING TO GFK'S AND SCB'S SURVEYS
PER CENT AND PERCENTAGE POINTS

	GfK	SCB	Difference
Perceived inflation			
November 2001	3.32	2.04	1.28***
December 2001	3.40	2.44	0.96***
Expected inflation			
November 2001	4.53	2.03	2.50***
December 2001	3.49	1.93	1.56***

Note. *** denotes significance at the 1 per cent level. The standard error in the difference is calculated on the assumption that the two measurements are mutually independent.

Sources: GfK, SCB and own calculations.

Perceived and expected inflation are higher in GfK's surveys than in SCB's.

It will be seen from Figure 1 and Table 1 that both inflation perceptions and expectations are higher in GfK's surveys than in SCB's. The discrepancies are statistically significant, which means that the explanation for them cannot be that the samples for the two surveys happen to be composed differently in terms of inflation opinions.[5]

Thus, although the two surveys refer to the same months, their results differ significantly. Moreover, the measured discrepancies are economically significant because for monetary policy, the implications of future inflation being expected to be 3.5 per cent may be entirely different from those of expectations around 2 per cent.

This article aims to clarify why the two surveys yield such different results. One conceivable explanation is that the surveys differ in their representativity; another is that they differ in the treatment of responses from households that believe that prices are (will be) about the same as twelve months ago (twelve months ahead). How much of the difference can we understand and explain retrospectively and, if we cannot understand it all, is there some way of adjusting the series so that they are comparable over time?

A description of the survey

Inflation perceptions measure households' impressions of prices today compared with prices a year ago.

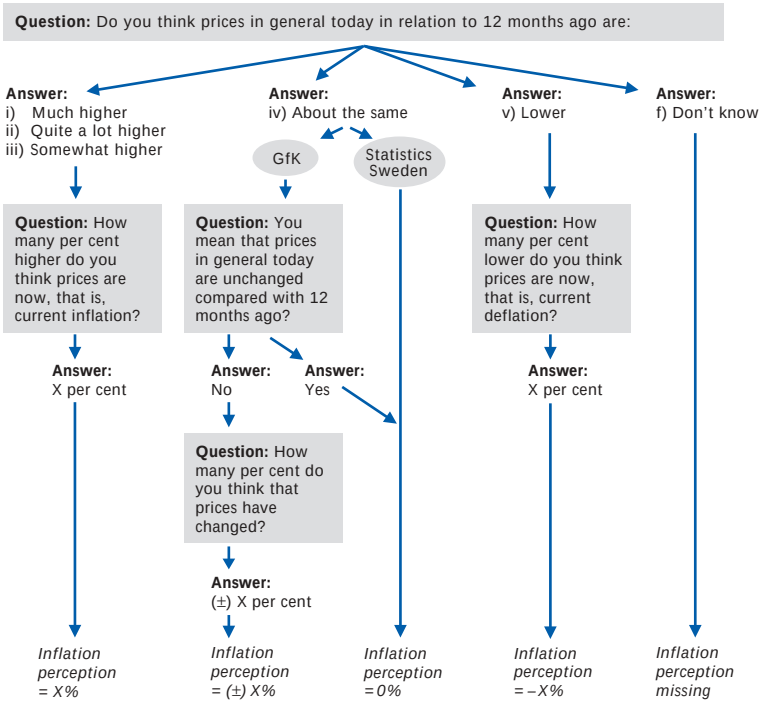
The two surveys use almost identical questionnaires. This account therefore applies to them both unless stated otherwise.[6] The questionnaire includes two categories of questions about price developments.[7] One of them is designed to measure how households see prices today in relation to prices a year ago, that is, their perceived inflation. Figure 2 presents a chart of the questions about households' inflation perceptions.

[5] The term inflation opinions is used here as an umbrella term for both perceived and expected inflation.

[6] Some of the questions have been changed over the years; this account refers in the first place to the questions used from October 1995 onwards.

[7] GfK's surveys have three categories; the third concerns prices two years ahead and is not considered here.

Figure 2. Chart of the questions about households' inflation perceptions



First the respondent is asked to assess what has happened to prices in general over the past twelve months in qualitative terms. This involves a choice between whether prices in general today are *much higher, quite a lot higher, somewhat higher, about the same* or *lower* than twelve months ago. Then the respondent is asked to state how many per cent higher or lower he/she considers that prices are today compared with twelve months ago.

Inflation expectations measure how households believe prices will change in the coming year.

The other category is designed to measure how households believe prices will change in the coming year, that is, their inflation expectations. This is likewise done first in qualitative terms: the respondent is asked whether in the coming twelve months prices in general will *rise at a faster rate, rise at the same rate, rise at a slower rate, be largely unchanged or fall somewhat*.[8] Then the respondent is asked to state how many per cent higher or lower he/she considers that prices will be in twelve months time compared with today.

The questionnaire also includes a number of background items, such as questions about age, gender, income and region. A stratified sampling

[8] These alternatives are offered to the 52 per cent or so whose response to the question about perceived inflation implies that prices today are higher than twelve months ago. The 48 per cent or so who respond that prices today are either *about the same* or *lower* are offered the alternatives *rise*, *be largely unchanged* or *fall* when asked about expected inflation.

procedure is used, which involves dividing the population (individuals aged 16–84 years)[9] into a number of strata in terms of age, gender and region. A random sample of individuals is then drawn from each stratum. To make the sample representative of the population in terms of age, gender and region, inflation opinions are calculated as weighted averages of the different responses. For example, if the sample includes too few men, the responses of all men are weighted upwards to match the population's gender structure.

The sample is stratified for age, gender and region.

The chief difference between the two surveys lies in the sampling procedure. SCB drew individuals from the Register of the Total Population (RTB), phoned the selected persons and tried to get as many as possible to respond. During 2000 and 2001, responses were obtained from approximately 1,400 persons (out of a sample of about 2,100) for each monthly survey. GfK, on the other hand, phones to a random selection of telephone numbers and persists until responses have been obtained from 1,500 persons.

Inflation expectations and socioeconomic factors

Inflation opinions are liable to differ between households in different socioeconomic groups. Jonung (1981) and Bryan & Venkatu (2001a and 2001b), for example, have shown that men usually hold lower inflation opinions than women do and that assessments of inflation vary inversely with income. So if more women or more low-income households respond to GfK's surveys than was the case in SCB's surveys, that could help to explain why inflation is considered to be higher on average in GfK's surveys. Table 2 shows how inflation opinions have varied with socioeconomic factors in GfK's surveys since November 2001.

Table 2 presents each socioeconomic group's inflation perception in the first column and the group's inflation expectation in the second column. On average in this period, men, for instance, perceived inflation to be 2.15 per cent and expected it would be 2.25 per cent, while the corresponding figures for women are 3.16 and 3.23 per cent. The results for different groups in terms of income, education and so on are also shown. CPI inflation in this period averaged 1.93 per cent and underlying (UND1X) inflation 2.21 per cent, that is, somewhat below the averages for most of the groups in the table.[10]

The results in Table 2 largely confirm earlier studies. In keeping with Bryan & Venkatu (2001a), who studied inflation opinions among U.S.

[9] SCB has no upper age limit for the survey population.

[10] UND1X inflation is measured as CPI inflation excluding house mortgage interest expenditure and direct effects of changes in indirect taxes and subsidies.

TABLE 2. HOUSEHOLDS' INFLATION OPINIONS FROM NOVEMBER 2001 TO MAY 2004, DECOMPOSED BY SOCIOECONOMIC FACTORS FROM GFK'S SURVEY DATA
PER CENT

Socioeconomic factor	Perceived inflation	Expected inflation	Proportion in survey	Weighted proportion	Proportion in population
Total	2.64	2.72	100	100	100
Gender					
Male	2.15	2.25	47.9	49.5	49.5 a)
Female	3.16	3.23	52.1	50.5	50.5 a)
Marital status					
Single	2.72	2.79	38.9	39.2	34.3 b)
Married/cohabiting	2.55	2.67	56.3	56.0	65.7 b)
Other type of household	3.08	2.81	4.9	4.8	–
Children in household					
No	2.59	2.68	69.9	70.2	69.0 b)
Yes	2.70	2.81	30.1	29.8	31.0 b)
Education					
Basic	3.22	3.07	18.6	19.4	25.5 c)
Upper secondary	2.91	2.96	41.8	41.7	46.0 c)
Tertiary	2.08	2.31	39.5	38.8	28.6 c)
Annual income					
Up to 180,000 SEK	3.44	3.18	21.6	22.1	33.2 d)
180,001–285,000 SEK	2.85	2.89	27.9	28.0	23.6 d)
285,001–440,000 SEK	2.30	2.54	25.6	25.2	21.6 d)
More than 440,000 SEK	1.87	2.19	24.9	24.7	21.4 d)
Age					
16–24	3.03	3.13	13.4	13.6	13.3 a)
25–34	2.16	2.43	19.2	18.1	17.2 a)
35–49	2.51	2.70	25.8	25.8	26.1 a)
50–64	2.54	2.70	24.8	23.2	24.4 a)
65–84	3.17	2.80	16.9	19.4	19.0 a)
Region					
Götaland	2.39	2.64	47.5	47.1	48.0 a)
Svealand	2.34	2.70	19.6	19.7	18.4 a)
Norrland	2.29	2.66	13.8	14.2	13.0 a)
Stockholm	2.23	2.40	19.2	19.1	20.6 a)
Work					
Employed	2.35	2.58	62.2	60.5	60.8 e)
Unemployed	3.11	3.30	3.5	3.4	2.5 e)
Not in labour force	3.12	2.92	34.3	36.1	36.7 e)
Housing					
Rented	3.03	3.01	34.1	33.9	41.5 f)
Tenant owned	2.35	2.51	18.1	18.2	17.5 f)
Detached, semidetached	2.48	2.60	47.5	47.6	41.0 f)
Other type	3.49	3.42	0.3	0.3	–

Note. a) SCB's demographic data (*Befolkningsstatistik år 2001*), b) SCB's living standard surveys (*Undersökningarna av levnadsförhållanden, 2000–2000*), c) SCB's education register (*Befolkningens utbildning, version 2004-01-01*), d) SCB's household financial data (*Hushållens ekonomi, 2001*), e) calculated from SCB's labour force and demographic data (*AKU och Befolkningsstatistik år 2001*); the proportions in the table are calculated in relation to the total population aged 16–84 years, f) SCB's housing and rent survey (*Bostads- och hyresundersökningen 2000*).

Sources: GfK, SCB and own calculations.

Inflation opinions are lower among male, more-educated and high-income respondents than among female, less-educated and low-income groups.

households, we find that in Sweden, too, inflation opinions are lower among male, more-educated and high-income respondents than among female, less-educated and low-income groups. We likewise find a U-shaped relationship between inflation opinions and age: the picture of inflation is highest in the youngest group (16–24 years), lowest among those aged 25–34 years and then rises with age. We also find higher inflation opinions among single compared with married persons.

A look at some additional socioeconomic factors shows that inflation opinions are higher in households with children, among those with no gainful employment and those who rent their homes compared with households without children, the employed and home-owners. We can also note that inflation opinions do not differ appreciably between the regions.[11]

The third column in Table 2 shows the composition of the different categories. For example, men made up 47.9 per cent and women 52.1 per cent of those who answered the questionnaire. The fourth column lists the weighted proportions, that is, the proportion in each socioeconomic group when this has been weighted to make it representative in terms of gender, age and region. To take the same example, the weighted proportions are 49.5 per cent men and 50.5 per cent women. The actual proportion in the population, derived from other sources, is given in the fifth column; it will be seen that these figures were, in fact, precisely 49.5 per cent men and 50.5 per cent women. Thus, too few men were selected to participate in the survey and their responses were therefore weighted upwards to make them more representative of the population's gender structure. There is also relatively good agreement between the survey and the population in the structures by age and region – the two factors that, together with gender, are used for stratification. The agreement is less good for education and income; the proportions in the survey are too small for basic education only and for low income.

Some of these socioeconomic factors may, of course, be correlated. People with a tertiary education, for example, tend to have a higher income than those with only an upper secondary education, just as women tend to have lower incomes than men. In order to separate the different socioeconomic factors and to quantify effects of differences between the two surveys in terms of socioeconomic structures, the following regression-equation was estimated:

$$\pi_{i,t} = \alpha + \sum_j \beta_j D_j + \varepsilon_{i,t}, \qquad (1)$$

where $\pi_{i,t}$ is the perceived and expected inflation, respectively, of individual i in period t and D_j is a set of dummy variables for each socioeconomic

[11] The question why inflation opinions may differ between socioeconomic groups is discussed by Bryan & Venkatu (2001a). A common hypothesis is that different groups actually do experience inflation differently because their patterns of consumption differ. Empirical data suggest, however, that the surveyed differences in inflation opinions are considerably greater than the actual differences in inflation between the groups; see e.g. Kokoski (2000). For this article, the causes of the differences in inflation opinions are of no consequence; it suffices to note that such differences exist.

TABLE 3. HOUSEHOLDS' INFLATION OPINIONS FROM NOVEMBER 2001 TO MAY 2004 AS A FUNCTION OF SOCIOECONOMIC FACTORS FROM GFK'S SURVEY DATA
PERCENTAGE POINTS

	Perceived inflation	Expected inflation
Constant	2.90***	3.08***
Gender	*[F=206.89***]*	*[F=303.73***]*
Male	r	r
Female	0.84***	0.91***
Marital status	*[F=34.64***]*	*[F=11.00***]*
Single	r	r
Married/cohabiting	0.47***	0.23***
Children in household	*[F=38.70***]*	*[F=11.40***]*
No	r	r
Yes	0.51***	0.25***
Education	*[F=65.80***]*	*[F=57.29***]*
Basic	r	r
Upper secondary	– 0.02	– 0.07
Tertiary	– 0.67***	– 0.62***
Annual income	*[F=46.22***]*	*[F=21.04***]*
Up to 180,000 SEK	r	r
180,001–285,000 SEK	– 0.53***	– 0.23**
285,001–440,000 SEK	– 1.12***	– 0.54***
More than 440,000 SEK	– 1.46***	– 0.79***
Age	*[F=15.94***]*	*[F=6.71***]*
16–24	r	r
25–34	– 0.19	– 0.37***
35–49	0.20	– 0.10
50–64	0.46***	0.00
65–84	0.54***	– 0.18
Work	*[F=0.83]*	*[F=1.00]*
Employed	r	r
Unemployed	0.14	0.26
Not in labour force	0.12	0.00
Housing	*[F=17.38***]*	*[F=9.76***]*
Rented	r	r
Tenant owned	– 0.54***	– 0.36***
Detached, semidetached	– 0.46***	– 0.33***
Other	– 0.15	0.45
R^2	0.03	0.02

Note. r denotes the response that is the category's reference group. The value of F from the test that all dummy variables in a category are zero is given in squared brackets; *, ** and *** denote significance at the 10-. 5- and 1 per cent level, respectively.

Sources: GfK and own calculations.

factor (e.g. one dummy variable for gender and three for income).[12] The results are given in Table 3.

The first column in the table shows the results of estimations with inflation perceptions as the dependent variable, while the second column does the same with inflation expectations as the dependent variable. The constant denotes the reference individual (a single man with no children, a basic education, an annual income of less than 180,000 SEK, aged 16–24 years, in work and living in a rented dwelling), whose inflation perceptions

[12] In formal terms, this means that the equation is estimated as a pooled panel; put more simply, we ignore the fact that the observations refer to different points in time and treat them as though they had all been measured on the same occasion.

averaged 2.90 per cent and whose inflation expectations averaged 3.08 per cent during the period. The coefficients on the dummy variable for gender indicates that the average inflation perception and expectation of a woman with the same background as this man is 0.84 and 0.91 percentage points higher, that is, 3.74 and 3.99 per cent, respectively. Together with gender, the greatest significant differences in inflation opinions can be found between income groups. All else equal, an individual in the highest income group perceives and expects inflation on average as being 1.46 and 0.79 percentage points lower than an individual in the lowest income group.

Taken separately, most of the dummy variables differ significantly from zero. A test of whether the coefficients for every dummy variable in a particular category are zero shows that all but one of the socioeconomic factors are significant. The exception is *work*, where there is no significant difference in either perceived or expected inflation between the employed, the unemployed and persons outside the labour force.[13]

All else equal, inflation opinions differ most between income groups and between men and women.

Having established how inflation opinions vary with socioeconomic factors, we can use the results to gauge the extent to which the discrepancy between the two surveys can be explained by differences in socioeconomic structures. As mentioned earlier, the largest significant differences in inflation opinions are between income groups and between men and women. GfK and SCB both stratify for gender, so the survey discrepancy cannot be attributed to differences in the gender structure. We can therefore concentrate on the effects of differences between the two surveys in the structure of income (see Table 4).

TABLE 4. EFFECTS OF DIFFERENCES BETWEEN THE TWO SURVEYS IN THE STRUCTURE OF INCOME
PER CENT AND PERCENTAGE POINTS

Income	Proportion, GfK	Proportion, SCB	Contribution to perception	Contribution to expectation
Up to 180,000 SEK	22.1	16.1	0.00	0.00
180,001–285,000 SEK	28.0	23.1	0.03	0.01
285,001–440,000 SEK	25.2	31.6	–0.07	–0.03
More than 440,000 SEK	24.7	29.2	–0.07	–0.04
Total	100.0	100.0	–0.11	–0.06

Note. The income groups are somewhat lower in SCB's survey, so these figures represent an upper limit to the effects of differences in the structure of income.

Sources: GfK, SCB and own calculations.

[13] We have excluded *region* as an explanatory variable in the regression because when *region* was included, inflation opinions did not vary systematically between the regions. Moreover, as data on *region* were not available for either November 2001 or for the period January 2002–January 2003, excluding *region* enabled us to use considerably more observations in the regression.

The first two columns in Table 4 show the proportions of the four income groups in GfK's and SCB's survey, respectively, in 2001.[14] The third and fourth columns show how the differences in the structure of income affect inflation perceptions and expectations, respectively. These effects are calculated as the difference in the proportion multiplied by the relevant coefficient from Table 3.

Differences in income structure can explain only a negligible part of the discrepancy between GfK's and SCB's inflation opinions.

These figures show that the proportion of low-income individuals (with higher inflation opinions) is larger in GfK's surveys than in SCB's. However, the bottom line shows that the effect of the differences in the structure of income is rather small. If GfK's income structure had matched SCB's, both perceived and expected inflation would have been about 0.1 percentage point lower on average than GfK's survey actually measured.[15] So, differences in income structure are not particularly important when it comes to explaining why the two surveys produced such different results in November and December 2001.

Are prices unchanged or just about the same?

Responses to the effect that prices are "about the same" are treated differently in the two surveys; GfK probes respondents to get more precise responses.

Another difference between the two surveys is more technical. As shown in Figure 2, the surveys differ as regards respondents who consider that prices today are *about the same* as twelve months ago.[16] In SCB's surveys, respondents choosing this alternative are automatically assigned an inflation perception of 0 per cent, whereas GfK probes these respondents and reserves 0 per cent for those who then also consider that prices today are unchanged from twelve months ago.[17] Those who do not consider that prices have been unchanged are asked to state by how much they have changed. GfK but not SCB also uses a similar probing procedure about inflation expectations.

To assess the quantitative effect of probing on inflation opinions, GfK's responses can be re-coded so that all respondents who consider that prices today are *about the same* as a year ago are assigned an inflation perception of 0 per cent. It is not possible, however, to tell exactly

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[14] The income groups in SCB's surveys in 2001 were: up to 160,000 SEK, 160,001–265,000 SEK, 265,001–420,000 SEK and more than 420,000 SEK. As these income groups are somewhat lower than those used by GfK, the calculations should be seen as indicating an upper bound to the effect of different income structures.

[15] An alternative approach is to post-stratify the responses, that is, create a new set of weights so that the surveys have a more similar income structure. We did that and obtained much the same quantitative result, that is, when GfK's survey was post-stratified to match SCB's income structure, average inflation opinions were not quite 0.1 percentage point lower.

[16] With respect to inflation expectations, probing is used on respondents who chose the alternative that prices will be *largely unchanged*. To simplify this account, in the context of inflation expectations we use *about the same* as a synonym for *largely unchanged*.

[17] The probing is intended to distinguish those who believe that prices today are *about the same* as twelve months ago, e.g. that they are 1 per cent higher today, from those who believe that prices today are *unchanged*.

what the response about expected inflation would have been if GfK had used SCB's method because the questions about expected inflation are put after those on perceived inflation. Consequently, a responder may have already been probed about perceived inflation and this in itself may influence the choice of alternative when it comes to expected inflation. We therefore try to arrive at an upper and a lower bound to the effects.

The effects of probing can be studied by applying SCB's method to GfK's surveys.

The lower bound is determined by re-coding all respondents who consider that prices twelve months ahead will be *about the same* as today and assigning them to 0 per cent expected inflation (as we did for perceived inflation). The lower bound accordingly answers the question: "Given that there is probing about perceived inflation, what would expected inflation have been without probing about this?"

To get some idea of the upper bound to the combined effects of probing on inflation expectations, we start from the lower bound and also re-code the respondents who chose *no* when probed about perceived inflation and assign them an inflation expectation of 0 per cent. The notion behind this additional adjustment can be illustrated with the following example. Assume that an individual believes that prices today are 1 per cent higher than a year ago and will be another 1 per cent higher a year ahead. Assume also that this individual thinks that a price increase of 1 per cent is so small that prices are about the same. When asked about prices today, perhaps this person chooses the alternative *about the same* but responds to the probing by stating that prices are not unchanged but 1 per cent higher. When asked about future prices, the person – aware that the response *about the same* will result in a probing to which the response will be *no* – may then chose the alternative *rise at the same rate*. Thus, the existence of probing about perceived inflation may influence the choice of response to the qualitative question about expected inflation. The upper bound aims to eliminate this effect of probing by assigning 0 per cent expected inflation even to respondents who consider that prices today are *about the same* as a year ago but nevertheless qualify their inflation perception with a percentage. The upper bound is accordingly intended to answer the question: "What would inflation expectations have been if there had been no probing at all?" The results of these re-codings to adjust for the effects of probing are shown in Table 5.

Probing raises GfK's perceived inflation by around 0.1 and expected inflation by up to 0.4 percentage points.

The first two columns reproduce the original inflation opinions from Table 1. The third column gives the results when respondents are re-coded so that a perception and an expectation, respectively, of 0 per cent inflation is assigned to those who consider that prices are and will be *about the same*. The fourth column gives the upper bound to the effects of probing on inflation expectations. Thus, probing those who consider that prices today are *about the same* as a year ago tends to raise per-

TABLE 5. INFLATION OPINIONS ACCORDING TO GFK'S AND SCB'S SURVEYS, BEFORE AND AFTER RECODING
PER CENT

	GfK	SCB	GfK, lower bound	GfK, upper bound
Perceived inflation				
November 2001	3.32	2.04	3.23 (–0.09)	
December 2001	3.40	2.44	3.28 (–0.12)	
Expected inflation				
November 2001	4.53	2.03	4.51 (–0.02)	4.36 (–0.18)
December 2001	3.49	1.93	3.19 (–0.30)	3.11 (–0.38)

Note. The difference from GfK's reported figures in column 1 is given in parentheses. There is no lower or upper bound for perceived inflation; the actual affect is shown here.

Sources: GfK, SCB and own calculations.

ceived inflation by around 0.1 percentage point. For those who consider that prices twelve months ahead will be *about the same* as today, the probing on expectations raises expected inflation by up to 0.3 percentage points, while the combined effects of probing on perceptions and expectations raises expected inflation by up to 0.4 percentage points.

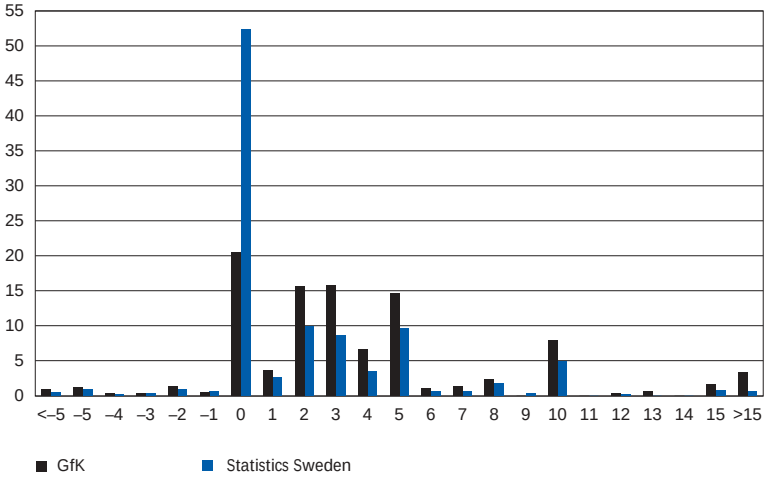
Of the two explanations, it seems that the introduction of probing is the main reason why the results of the two surveys differ so much. A point worth noting is that SCB used a similar probing procedure from October 1995 to October 2000. However, considerably fewer respondents in SCB's surveys chose the *no* alternative to the supplementary questions. This alternative was admittedly chosen by half of the respondents in November 1995 but the proportion then fell rapidly, so that from February 1996 the *no* response was used by fewer than 10 persons a month. This was, in fact, why SCB stopped probing the respondents. Perhaps it takes some time for the interviewers to learn the best way of putting the questions. In the next section we take a closer look at such learning effects.

Learning by the interviewers

Between them, the differences in socioeconomic structure and the effects of probing accordingly explain up to 0.5 percentage points of the total discrepancy between the two surveys' inflation opinions. While this is not a negligible fraction of the total discrepancy, the greater part remains unexplained. We cannot explain why the discrepancy arose but some progress can be made by trying to understand how the discrepancy shows up in the responses. For example, is the proportion of "extreme responses", such as expectations of over 15 per cent inflation, larger in GfK's surveys? If so, we can study whether this proportion declines over time, which could be an indication that the interviewers have improved their ability to obtain reasonable responses. Or does the discrepancy come

mainly from SCB's surveys having more 0 per cent responses? In that case we can create a series that is comparable over time by adjusting for the differences in the proportion of zero responses. Figure 3 shows the distribution of households' inflation expectations in November and December 2001.

Figure 3. Distribution of inflation expectations, November-December 2001
Per cent



Note. Responses in decimals have been rounded to the nearest whole number.

Sources: GfK, Statistics Sweden and own calculations.

There are two bars for each expected rate of inflation in Figure 3; the black bar represents the proportion that chose that rate in GfK's surveys and the blue bar the proportion in SCB's surveys. It will be seen that SCB's surveys have a considerably larger proportion of respondents who expect 0 per cent inflation, while the corollary of this is the higher proportions that expect some other rate in GfK's surveys. Besides the difference in the proportion of households expecting 0 per cent inflation, the discrepancy between the two surveys may have to do with the difference in the proportion of households expecting over 15 per cent inflation.

The remaining difference mainly comes from GfK's surveys having a considerably smaller proportion of individuals who expect 0 per cent inflation.

Table 6 therefore presents average inflation expectations just for the households that foresee a positive rate of inflation as well as for those that expect inflation to be between 0 and 15 per cent.

The first and third columns show the average inflation opinions of those who believe in a positive rate of inflation according to GfK and SCB, respectively, while the second and fourth columns do likewise for those who believe in inflation between 0 and 15 per cent.

When we confine the study to the households that perceive a positive rate of inflation, the discrepancy in perceived inflation accordingly

Table 6. Averages for the individuals whose responses in November–December 2001 were above 0 per cent and between 0 and 15 per cent, respectively
Per cent

	GfK>0	0<GfK≤15	SCB>0	0<SCB≤15
Perceived inflation				
November 2001	6.59	5.15	6.02	5.27
December 2001	6.45	5.04	6.57	5.64
Expected inflation				
November 2001	5.89	4.91	4.71	4.47
December 2001	5.23	4.29	4.89	4.56

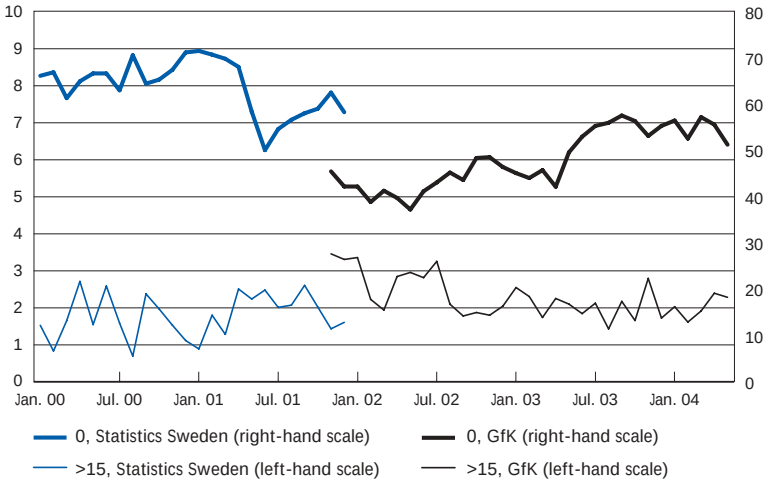
Sources: GfK, SCB and own calculations.

shrinks from aggregate figures of 1.28 and 0.96 percentage points in November and December 2001, respectively, to 0.57 and –0.12 percentage points. When we also exclude extreme responses in the form of perceived inflation above 15 per cent, the inflation perceptions in GfK's surveys are actually lower than in SCB's (0.12 and 0.60 percentage points lower).

For respondents with opinions between 0 and 15 per cent, the inflation opinions in the two surveys are approximately the same.

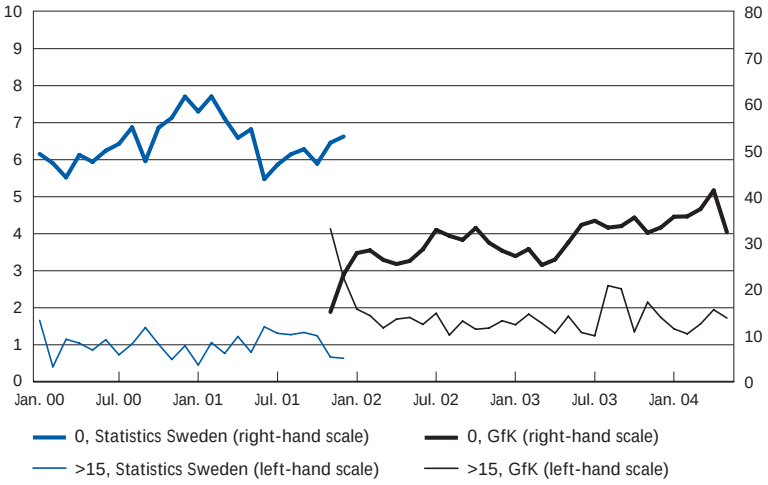
For expected inflation, the aggregated discrepancies between the surveys were 2.50 and 1.56 percentage points. These figures shrink to 1.18 and 0.34 percentage points when we include only those respondents who foresee a positive rate of inflation. When we also ignore households who believe inflation will exceed 15 per cent, GfK gives an expected rate of inflation that is 0.44 percentage points higher than SCB in November and 0.27 percentage points lower in December. So the differences in the proportions of zero responses and of responses above 15 per cent are important for understanding why the surveys give such different results. A picture of these proportions over time is presented in Figures 4 and 5.

Figure 4. Proportion of persons who perceive inflation as 0 and at least 15 per cent in the two surveys, January 2000-May 2004
Per cent



Sources: GfK, Statistics Sweden and own calculations.

Figure 5. Proportion of persons who expect inflation to be 0 and at least 15 per cent in the two surveys, January 2000-May 2004
Per cent



Sources: GfK, Statistics Sweden and own calculations.

For perceived inflation in Figure 4, the major difference is thus that SCB has a considerably larger proportion of zero responses. When GfK takes over the survey, the proportion of households that perceive 0 per cent inflation drops from around 60 to just over 40 per cent; after that the proportion rises over time to levels in line with SCB's surveys towards the end of the period. Another difference is the larger proportion of responses over 15 per cent when GfK takes over but this discrepancy is considerably smaller and disappears relatively soon.

For expected inflation, the proportion for over 15 per cent inflation is almost 4 percentage points larger for GfK in November but then decreases relatively quickly and is already down around 2 per cent in January 2002. The latter figure is about 1 percentage point higher than the average for SCB's earlier surveys. The high level to start with and the subsequent decline may be a sign that it takes time for the interviewers to learn how to get households to express reasonable inflation expectations. On the other hand, GfK has consistently had a considerably smaller proportion of zero responses; the level has admittedly risen over time but is currently just under 40 per cent. In SCB's surveys the proportion of zero responses rose sharply when the Riksbank introduced an inflation target and then remained around 50 per cent.[18]

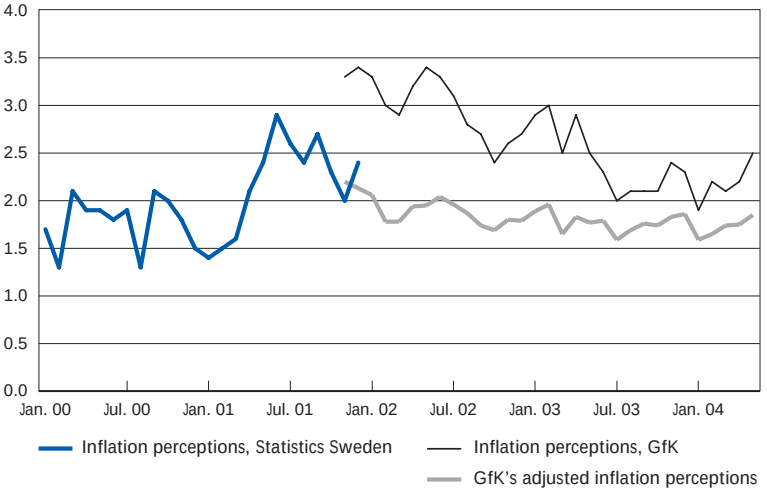
All in all, the most important difference between SCB's and GfK's series seems to be that GfK picks up a considerably smaller proportion of

[18] Bryan & Palmqvist (2004) discuss why so many households expect stable prices when an inflation target is introduced.

Consistent time series can be created by adjusting GfK's series so that the proportion of households with 0 per cent inflation opinions is the same as in SCB's.

individuals with 0 per cent inflation opinions. But this is only partly because GfK has reintroduced probing. We do not know the full explanation but by controlling for the differences in the proportion of zero responses, we can create a series that is consistent over time. When GfK's surveys are "corrected" so that the proportion of respondents who perceive 0 per cent inflation is around 64 per cent (the average level in SCB's surveys in 2000–01), the two surveys give inflation perceptions that are more or less consistent. Similarly, GfK's inflation expectations can be "corrected" so that the proportion of 0 per cent expectations is 52 per cent. These adjusted series are presented in Figures 6 and 7.

Figure 6. Original and adjusted inflation perceptions, January 2000-May 2004
Per cent



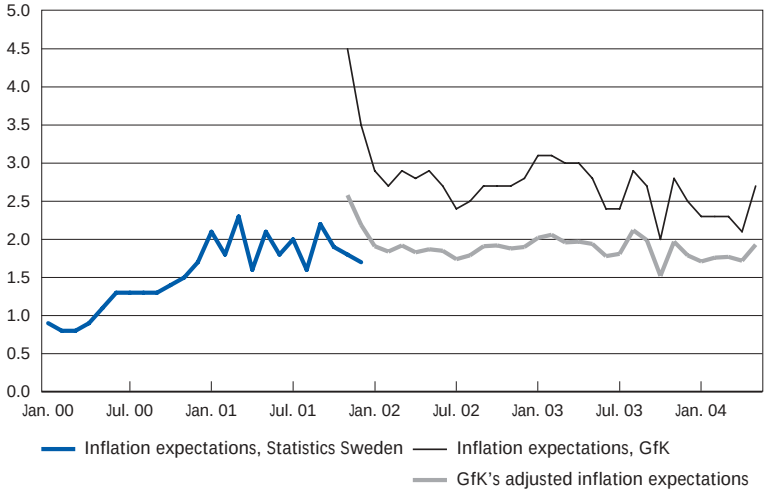
Note. In the adjusted series for GfK, the proportion perceiving 0 per cent inflation is set to 64 per cent.

Sources: GfK, Statistics Sweden and own calculations.

It will be seen from the figures that adjusting for the proportion of zero responses gives time series that are fairly consistent on the whole but not for just November and December 2001, when the proportion of extreme responses also contributed to the discrepancy.[19] The adjusted series naturally give a different picture of households' average inflation opinions. The profiles of the series are also somewhat different, however. For example, the original series indicates that households' inflation perceptions have fallen over time, while the adjusted series shows that this is mainly due to

[19] We have also created series in which both the proportion of zero responses and the proportion above 15 per cent are matched. These series deviate by about 0.2 percentage points from the adjusted series in Figures 6 and 7. As a large part of the variations in average inflation opinions is due to variations in the proportions, we prefer to leave the proportions alone as far as possible and therefore only present series in which we match zero responses.

Figure 7. Original and adjusted inflation expectations, January 2000-May 2004
Per cent



Note. In the adjusted series for GfK, the proportion expecting 0 per cent inflation is set to 52 per cent.

Sources: GfK, Statistics Sweden and own calculations.

a growing proportion of zero responses. It is also a falling proportion of zero responses that largely explains the increase in perceived inflation towards the end of the period. For inflation expectations, the adjusted series indicates that throughout the period these were firmly anchored around the Riksbank's inflation target.

The difference between the original and the adjusted series narrows over time for perceived inflation and is relatively stable for expected inflation.

For perceived inflation, the difference between the original and the adjusted series narrows over time, from about 1.2 percentage points in January 2002 to about 0.6 percentage points in May 2004. For expected inflation the difference narrows from 0.9 to 0.8 percentage points. As the difference for perceived inflation varies over time, the break in the time series cannot be corrected with a dummy variable. For expected inflation, on the other hand, the difference between the original and the adjusted series is relatively stable. For the purpose, for example, of testing whether households' inflation expectations comply with the assumption of rationality, the break in the time series should be manageable at present with a dummy variable. But the proportion of zero responses in GfK's surveys needs to be followed in the future to see whether it approaches the levels in SCB's earlier series. If that happens, an adjustment of the type presented in Figures 6 and 7 would be preferable to dummy variables.

Much of the difference left unexplained

The differences in socioeconomic structures and the effects of probing can explain up to 0.5 percentage points of the discrepancy.

The inflation opinions of households differ, as we have seen, between different socioeconomic groups. SCB and GfK both stratify the sample to ensure that it is representative in terms of gender, age and region. But the structure of income does differ between the two surveys. However, the income differences can only explain up to 0.1 percentage point of the discrepancy in households' inflation opinions.

A difference between the surveys that is quantitatively more important has to do with how an "about the same" response is followed up. SCB simply codes these responders as perceiving or expecting 0 per cent inflation. GfK uses a probing procedure to distinguish those who believe prices are about the same (e.g. only 1 per cent higher) from those who consider prices are completely unchanged (0 per cent inflation). These secondary questions tend to raise households' inflation opinions by up to 0.4 percentage points.

The remaining discrepancy is mainly due to GfK having considerably fewer respondents who perceive or expect 0 per cent inflation.

The remaining discrepancy is mainly due to GfK having considerably fewer respondents who perceive or expect 0 per cent inflation, even when an adjustment is made for probing. The proportion with 0 per cent inflation opinions does rise over time in GfK's surveys but is still a bit below the earlier level in SCB's surveys. We cannot explain why GfK's proportion of zero responders is so much lower but we can at least create consistent time series by adjusting for the difference in this proportion. In the case of inflation expectations, we find that it is possible at present to manage the break in the series with a simple dummy variable, for instance when testing whether households' inflation expectations comply with the assumption of rationality. But the proportion of 0 per cent inflation expectations should be monitored in future; if it were to rise and approach the levels in SCB's earlier surveys, it would no longer be possible to handle the break in such a simple manner as with a dummy variable.

The survey does not seem to be representative of educational levels and the distribution of income.

Our analysis also indicates that the survey is not representative of educational levels and the distribution of income. As households' inflation opinions vary with their education and income, it is important to make the survey as representative as possible in these respects. Inflation opinions vary more with income than with education, so it is more important to make the survey representative of income. The income concept in the HIP is the household's total annual disposable income, including taxable benefits, before taxes. One argument against stratifying the sample for this concept of income is that respondents have difficulty in arriving at a reliable figure. If that is the case, one could try stratifying the survey in terms of a variable that correlates with this concept of income, for instance the respondent's monthly wage before tax.

Finally, a break in an important time series is naturally unfortunate. In the event of future changes of method, it would therefore be desirable if the surveys were carried out in parallel for more than two months so that if a break occurs, its causes can be elucidated with a view to creating consistent time series.

References

Bryan, M. F. & Palmqvist, S., (2004), "Testing Near-Rationality Using Detailed Survey Data", PM, Sveriges Riksbank.

Bryan, M. F. & Venkatu, G., (2001a), "The Demographics of Inflation Opinion Surveys", *Economic Commentary*, Federal Reserve Bank of Cleveland.

Bryan, M. F. & Venkatu, G., (2001b), "The Curiously Different Inflation Perspectives of Men and Women", *Economic Commentary*, Federal Reserve Bank of Cleveland.

Heikensten, L., (1999), "The Riksbank's inflation target – clarification and evaluation", *Quarterly Review* 1, Sveriges Riksbank.

Heikensten, L. & Vredin, A., (2002), "The art of targeting inflation", *Economic Review* 4, Sveriges Riksbank.

Jonung, L., (1981), "Perceived and Expected Rates of Inflation in Sweden", *American Economic Review* 71 (5), 961–8.

Kokoski, M., (2000), "Alternative CPI Aggregations: Two Approaches", *Monthly Labor Review* 123 (11), 31–9.