Perceived inflation, measured inflation: are there differences between categories of households?

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At the overall level, the inflation perceived by households, measured in the monthly business surveys, is rather in line with the inflation calculated by the consumer price index (CPI). In particular, it increased continuously from 2015 to the end of 2018.

When broken down by household category, it appears that the opinion of the 50% lowest-income households on price trends changes in line with that of the 50% most affluent households, although a permanent gap remains. Indeed, over time, CPI inflation is very close across household categories: over 20 years, the gap is +0.1 percentage points per year for the lowest 10% of households, compared to the richest 10%. These differences in trends reflect the heterogeneity of the basket of goods and services consumed by households.

For the other categories of households (classified by age or activity status), these differences are not more pronounced; price changes have been relatively homogeneous most of the time. Nevertheless, in 2018, more rural households experienced a price increase than urban households.

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The consumer price index is used to measure average inflation

The consumer price index (CPI) calculated by INSEE measures inflation, that is, the variation over one year in the prices of products consumed by households. This index is based on observation of the prices of a fixed basket of goods and services, which is updated each year. It is calculated by weighting each elementary price of products in proportion to its weight in household consumption expenditure. Consequently, it is an average price index based on consumption by all households.

Behind this average, the inflation rate may differ depending on each consumer's habits: over the course of 2018, for example, the rise in inflation was mainly driven by the rise in energy prices and, to a lesser extent, those of tobacco; a household that consumes more fuel therefore experiences a higher rate of inflation than the average measured by the CPI. Thanks to the data from the household budget survey regularly conducted by INSEE (2017 for the last survey, 2011 for the data used in the calculation of the index), price indices can be calculated for particular categories of households based on knowledge of their consumption structure. In addition, changes in the price of each category of product are those observed for the overall price index. The category price indices constructed in this way can be used to evaluate the effect of the differences in consumption structure on the trend in consumer prices for the different categories of household.

A consumer price index can be calculated by category of households

Since 1998, inflation has been higher for the lowest-income households than for the most affluent households, by 0.1 points on average per year.

For the last 20 years, the differences in inflation between the 10% lowest-income households (households whose living standard, i.e. income per consumption unit, is lower than the 1st decile) and the 10% most affluent (households whose living standard is higher than the 9th decile) were 0.1 points on average per year. Over the period, the largest difference between the inflation of the lowest income and that of the most affluent households was more than 0.6 points, in 2004 and 2008 (linked to increases in the prices of food, tobacco, rents and fuel and the greater weight of these products in their consumption). From 2012 to 2017, the inflation experienced by low income households was, however, slightly lower than that of affluent households: over the course of these years, fuel, but also communication services, saw lower price rises than the average, whereas the spending of low-income households on these products is higher in proportion to their budget. Conversely, certain services and goods consumed in higher proportions by more affluent households (tourism, domestic services, cars, for example) saw greater rises than average in their prices over this period, which contributed to reversing the difference in inflation between the two categories of household[2].

In 2018, inflation was slightly higher for the lowest-income households

In 2018, the increase in consumer prices was higher than the average for the households with the lowest living standard (*Graph 1*). While inflation for these households stood at +1.2% in January 2018, it increased to +1.6% in March 2018 and reached a high point in the summer (+2.4% in July) before dropping back at the end of the year (+1.6% in December). As for the 10% most affluent households, they saw a similar inflation history, but with less marked trends: their inflation, which was +1.3% in January 2018, reached its high point of +2.2% in

1. Indices by category are calculated for Metropolitan France only. Thus, the study focuses on this scope.

2. The price changes for each product category are the same as those used to calculate the overall price index. The categorical price indices thus constructed make it possible to assess the effect of differences in consumption structure on the movement in consumer prices of the various categories of households. In doing so, any product range effects are not taken into account: if certain categories of household consume lower-range products or shop more often at the hard discounter chains and these low-end products or these forms of selling have their own price dynamics, these differences will not be taken into account.

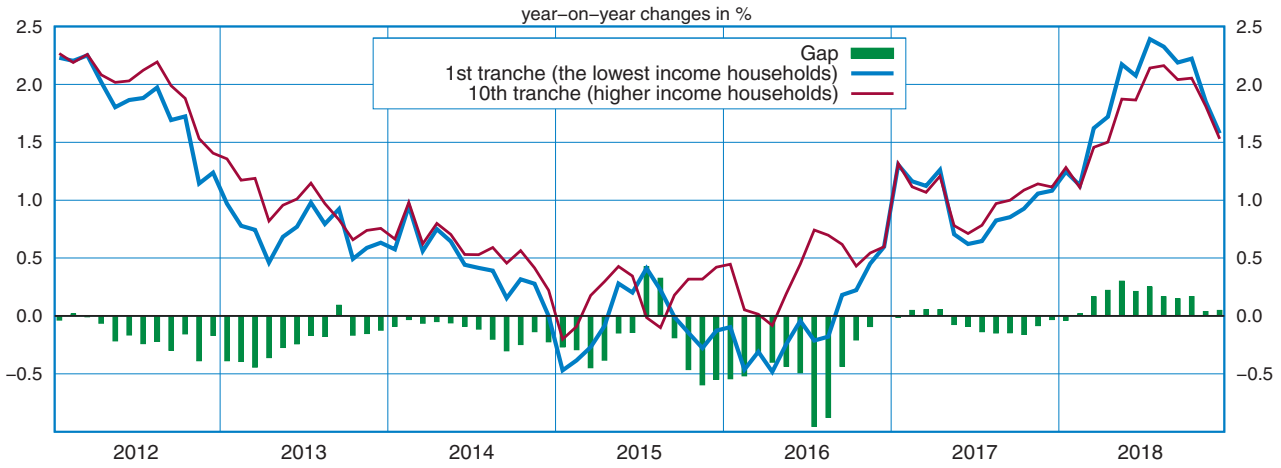
August before dropping back to 1.5% in December. All in all, in 2018, the rise in prices was felt more strongly by low-income households (+1.9% in 2018 after +1.0% in 2017 and +0.0% in 2016; Table 1) than by the most affluent households (+1.7% after +1.0% in 2017 and +0.4% in 2016). On average in 2018, the difference in inflation between the lowest-income and the most affluent households was therefore 0.1 points.

These differences can be explained naturally by these households' different consumption structure (*Graph 2*). Accordingly, for example, the weight of spending on tobacco is greater for low-income households (3.2% of the expenditure of the lowest-income households compared to 1.0% of the expenditure of the most affluent households); the same applies to expenditure on fuel (3.5% compared to 2.7% for the most affluent households). And it is mainly the rise in the prices of these two items that contributed to the high inflation of 2018.

Differences in inflation between all categories of households have been relatively limited.

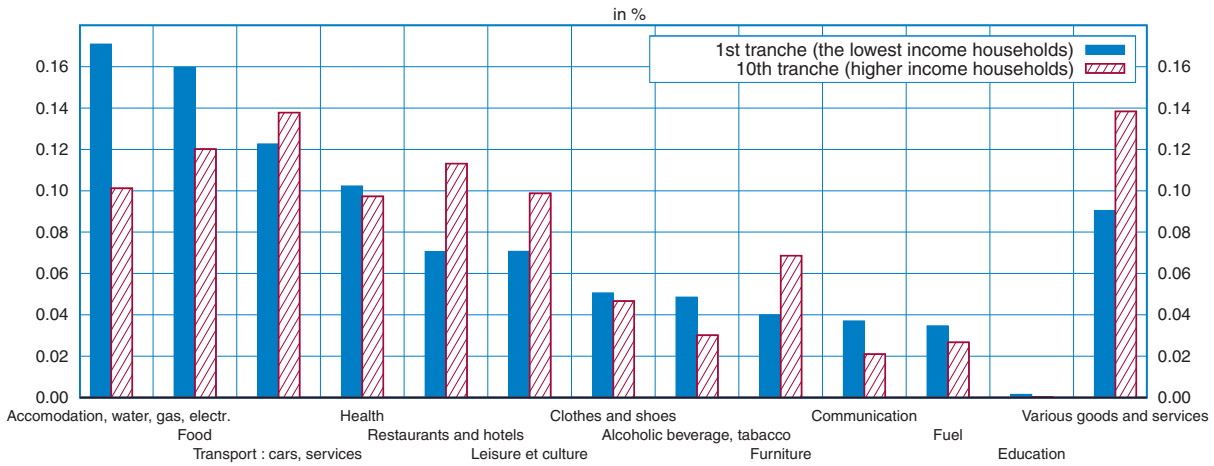
Inflation measured for different population categories is never very different to average inflation measured by the CPI. On average, over 20 years, the differences in annual inflation have been about 0.1 points (*Table 1*): the under 30s have experienced lower inflation due to the fall in the price of communications and moderate rises in clothing prices; childless households

1 - Consumer price indices of the lowest-income households and the most affluent households



Source: INSEE, CPI

2 - Consumption structure of the lowest-income households and the most affluent households in 2011



Source: INSEE; food: excluding alcoholic beverage; fourniture: furniture, household supplied and care

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have benefited from their lower expenditure on childhood-related services; since 1998 tenants have experienced inflation that is barely any higher than that of homeowners due to rents being slightly more buoyant over the period than the rest of inflation[3].

These gaps are more pronounced in 2018

The year 2018, however, saw differences that were slightly more marked: the under 30s, less sensitive to increases in energy prices as they consume less, and benefiting more from the fall in telephone prices, in particular, experienced inflation of only +1.5% on average over the year while for the 45-74 age group the figure was +2.0%. The inflation rate recorded for tenants stood at +1.6 % – due to the fall in social housing rents[4] – compared to +2.1% for homeowners (rents have a weight of 615 out of 10,000 in the CPI). Inflation felt by pensioners (+2.0%) was slightly higher that that of the working population (+1.8%) as they are affected more by increases in energy prices, especially those related to housing.

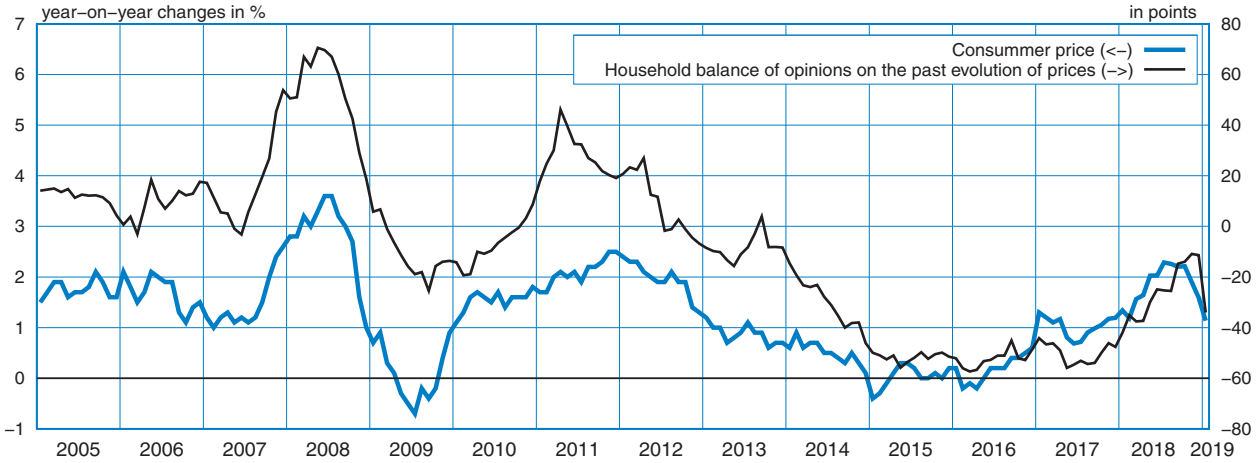
Table1

Consumer price index for different categories of household

	Evolution since 1998	Average annual change since 1998	Evolution in 2018
All households	31.9	1.4	1.9
Households with a living standard per CU lower than the 1st decile	32.9	1.4	1.9
Households with a living standard per CU lower than the 9th decile	30.0	1.3	1.7
Under 30 years old	29.6	1.3	1.5
30-44 years	32.8	1.4	1.7
45-59 years	31.2	1.4	2.0
60-74 years	32.0	1.4	2.0
Childless households	30.8	1.4	2.0
Tenants	32.0	1.4	1.6
Homeowners	31.5	1.4	2.1
Retired	31.9	1.4	2.0
In work	31.9	1.4	1.8

How to read it: from 1998 to 2018, the consumer price index for all households in Metropolitan France increased by 31.9%, or an average of 1.4% a year. In 2018, this index increased by an average of 1.9% over the year.

3 - Inflation perceived by households and consumer price inflation



Note: the period studied is the period after the change in the questionnaire on prices in the Camme survey, in 2004. The positioning of the curves was obtained econometrically by estimating the best adjustment using the ordinary least squares method. That being the case, the graph can be interpreted by analysing the changes in the balance by comparing them to those of the CPI and not their respective levels.

Source: INSEE, CPI, Camme survey

3. According to the CPI, owner households do not spend on "actual housing rents", unlike tenant households. On the other hand, they affect expenses related to the maintenance and repair of housing, current expenses, etc.
4.For the calculation of the CPI, despite the decrease applied to the APLs in the social stock, only the decrease in rents is taken into account. The downward conjunction of PLAs and rents was accounting neutral for households.

These differences do not tell us anything about the difference in purchasing power variations according to living standard; this would imply mobilising data not only on prices but also on incomes, which become available later. It is possible, however, whilst remaining focused on the analysis of inflation, to connect these differences in the relative importance accorded by households to the trends in the prices of each product.

The consumer confidence survey tracks inflation as perceived by households.

Every month, the survey collects household's perception of price trends

Households' perception of price trends may differ from the measurement of inflation by the CPI, for various reasons. It is possible to compare price trends and the impressions felt by households using the monthly consumer confidence survey ("Camme"). This survey has been published every month since January 1987. It concerns the way households perceive their personal situation, present and future (price trends, financial situation, etc.), and the general situation of the French economy (unemployment, etc.). The interviews are conducted during the first three weeks of each month, with a representative sample of about 2,000 households. The balance of opinion on each qualitative question is classically obtained by calculating the difference between the number of positive responses and the number of negative responses.

Households' opinions as tracked by the Camme survey give an account of the differences between their perception of price trends and those actually measured by the CPI. In particular, each month the survey collects their impressions of price trends over the previous twelve months ("past prices") and for the forthcoming twelve months ("future prices"). More specifically, the questions asked about past prices provide information on households' impressions of whether prices have risen or fallen (*Annex*). A positive balance (respectively negative) means that more (respectively fewer) households think that prices have increased sharply rather than a little, have stagnated or have fallen.

Overall, households' perception of past price changes follows the variations in the consumer price index

The trend in the balance of household' opinions on past price changes on the whole matches that of inflation as measured by the CPI (*Graph 3*; Leclair and Passeron, 2017). Accordingly, a rising balance of opinion on past price increases is associated with an acceleration in consumer prices as measured by INSEE. Nevertheless, some differences subsist. During the 2009 recession, the balance of opinion fell substantially, but less so than the CPI measurement. Between the beginning of 2015 and the end of 2016, a period when inflation rose sharply, the balance of opinion remained stable until 2017, before taking off. Since then, the balance of households' opinion has evolved in line with measured inflation. Finally, over the most recent period, an increasing number of households have perceived the slowdown in price rises that began in December 2018 and has continued since the beginning of 2019.

The importance accorded by households to changes in the price of each product generally matches the average structure of the basket of goods and services used for the CPI

83% of variations in the balance of opinion are explained by variations in the CPI

It is possible to identify the product groupings that best explain the variations in the perception of price trends by households. To do this, an econometric model can provide an estimate, all other things being equal, of the correlations between variations in the balance of opinion on past prices and inflation on the main product groupings measured by INSEE (*Methodology*). Over the period 2005-2018, it appears that 83% of variations in the balance of opinion are explained by variations in the CPI. The 17% that remain unexplained by the model reflect differences in households' perception of the price trend compared to the measurement given by the CPI. Nevertheless, it also appears that the relative importance accorded by households to variations in the prices of the products

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structuring their opinion corresponds more or less to the structure of the basket of goods used to measure the CPI (*Table 2*). In particular, to arrive at their impression of past price changes, households grant great importance to changes in the prices of services (rents in particular), the items with the greatest weight in the CPI. Conversely, they grant less importance to changes in the price of tobacco, in line with its weight in the CPI.

In 2018, increases in energy and tobacco prices contributed most the feeling that household prices were rising faster

Although their weight in the CPI and their relative importance in households' perception are low, changes in energy prices contribute to a large degree to measured inflation (*Graph 5*) and perceived inflation (*Graph 4*). Accordingly, in 2018, with the rise in the TICPE (domestic consumption tax on energy products) in January and soaring oil prices, energy prices contributed 7.1 points on average to the balance of households' responses (compared to 2.9 on average in 2017), i.e. the largest contribution to their impression of past price changes compared to other items. In comparison, energy prices also contributed to the actual measured trend in prices, but to a greater extent, in line with the weight of this product in the CPI. Likewise, the increase in the tax on tobacco in March 2018 contributed strongly to inflation as felt by households (+5.5 points in March 2018 compared to +0.4 points in February 2018), in line with its actual contribution in the measurement of the CPI.

Table 2

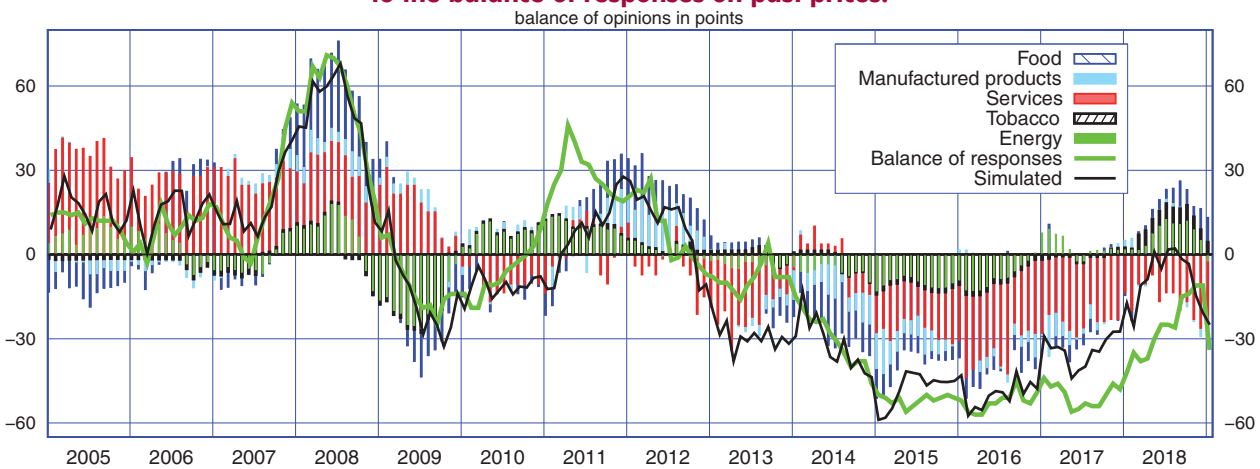
Relative importance of products in the perception of changes in household prices

	Average relative importance over the period 2005-2008	average CPI weight 2005-2018
Services	62	45%
Manufactured goods	22	29%
Food	13	17%
Energy	2	8%
Tobacco	1	2%

Note: The econometric model used regresses the balance of responses on the inflation of energy products, services, manufactured goods, tobacco and food products, as calculated by the CPI. The ranking is calculated using this model (detailed in the Annex)

Source: INSEE

4 - Estimated contributions of the change in the prices of the main product groupings to the balance of responses on past prices.



How to read it: in June 2018, inflation in energy prices contributed 10 points to the balance of responses on past prices, according to the methodology used.

Source: INSEE, Camme survey

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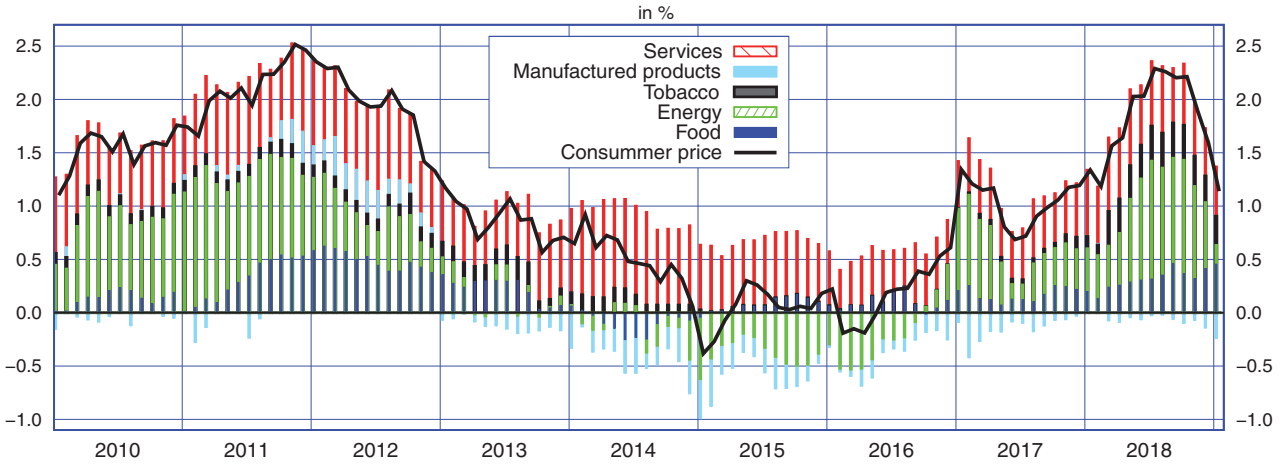
The opinions of the most modest households on prices and those of the wealthiest evolve together; but inflation perceived by the most modest remains generally higher

Since 2010, the lowest-income households have been the most pessimistic about past price changes

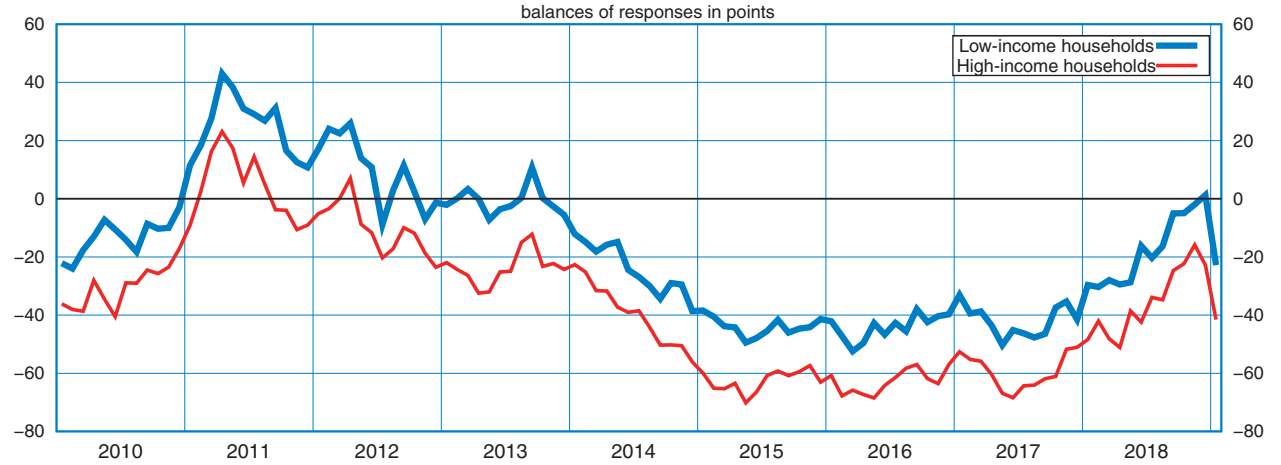
The way the Camme survey is devised makes it possible to calculate a balance of opinion according to households' living standards[5]. The balances of opinion on past and future price changes have been established for the lowest-income households and for the most affluent; they are defined here as the households which have an income per consumption unit (UC) lower or higher than the median income per UC of the survey. Since 2010, the balance of opinion on past price changes has systematically been higher among the lowest-income households than among the most affluent: the average difference between the balances is 19 points (*Graph 6*). Nevertheless, the changes in the balances from one month to the next are similar for both groups. Accordingly, the lowest-income households are on average more pessimistic about price rises than the most affluent households (if the term "pessimism" is associated with expectations of higher inflation). Apart from their higher average level of pessimism, their perception of the trend in consumer prices is relatively similar. Over the year 2018, the difference in perception between the two groups did not increase, in

5 - Inflation measured by the CPI and contributions of the main products



Source: INSEE, CPI

6 - Past prices according to living standard



Note: Low-income households (respectively affluent) have an income per consumption uni (CU) lower (respectively higher) than the median income per CU in the survey.
Source: INSEE, Camme survey

5. A similar analysis was carried out on income and consumption in the December 2018 *Conjoncture in France*: "How do households perceive changes in their standards of living in the economic outlook surveys?"

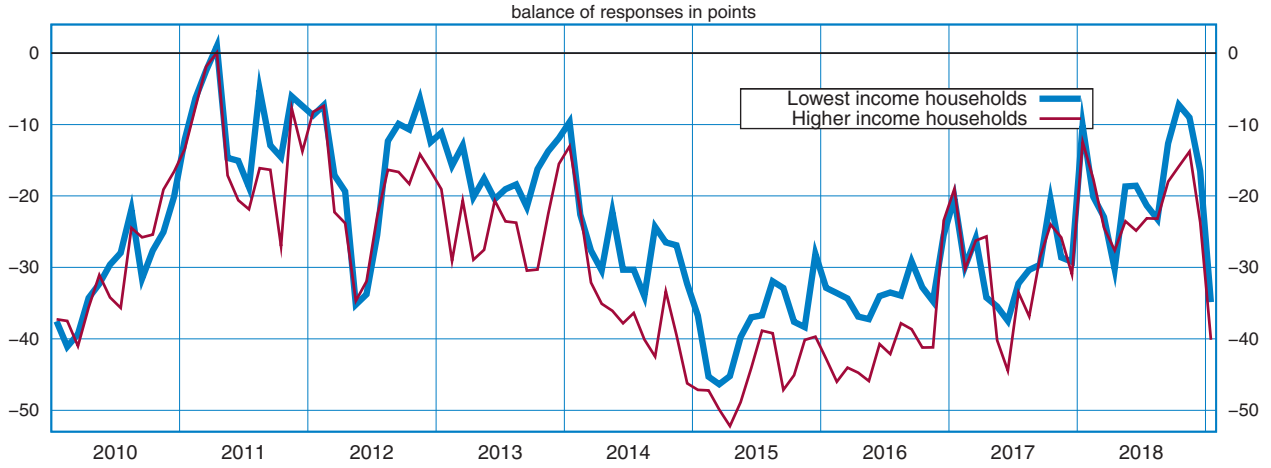
spite of a measured inflation that was slightly higher for the lowest-income households. At the beginning of 2019, fewer households in both categories think that prices have increased: the fall in inflation observed in December and January was therefore perceived in a comparable way by both groups.

Episodically, the lowest-income households also have a more pessimistic perception of future price trends

Concerning future price changes, the balances of households' opinions by category of living standard are similar (Graph 7), in terms of both level and trend. Nevertheless, sometimes more of the lowest-income households expected an increase in prices. This was the case particularly between mid-2012 and the end of 2013 and between 2014 and 2016. More recently, this gap in perception widened again: in mid-2018 and from September to November 2018. As for the balances relating to past prices, in January households expected a slowdown in prices over the next twelve months, and this was similar for both categories of households.

All in all, whether for the balance of opinion on past or future price changes, more of the lowest-income households think that price rises have accelerated rather than slowed. This finding is therefore a little different from the change in prices measured by the CPI, where the higher inflation for low-income households only occurs episodically.

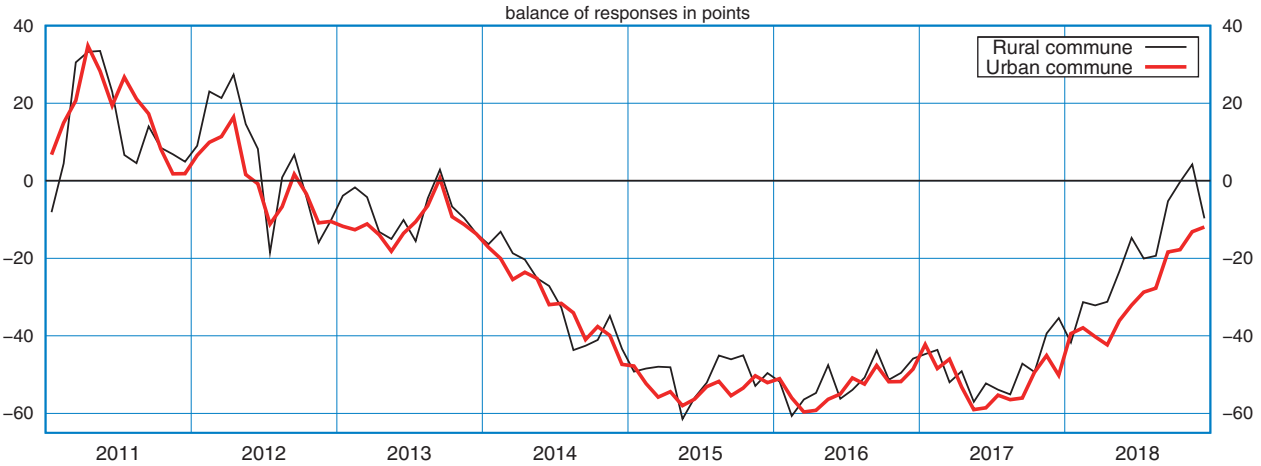
7 - Future prices according to living standard



Note: Low-income households (respectively affluent) have an income per consumption uni (CU) lower (respectively higher) than the median income per CU in the survey.

Source: INSEE, Camme survey

8 - Past prices according to area of residence



Note: the distinction between rural municipality and urban municipality is defined according to the Official geographical code at 1 January 2018 based on the 2015 population census. The unit is said to be urban when the household's municipality belongs to an urban unit of more than 2,000 inhabitants. Camme data enabling municipalities to be identified correctly have only been available since 2011.

Source: INSEE, Camme survey

The ex-post perception of higher inflation by the lowest-income households seems to be structural and goes beyond simple socioeconomic differences

The difference observed between the impressions of price trends in affluent and low-income households could be attributed to characteristics other than living standard: age, professional status, area of residence, etc. To control for these modalities, an econometric model, of the logistic regression type, can be used to estimate the effect of such characteristics on households' responses to the Camme survey questionnaire about prices. It would seem that the probability of a household giving different responses to the question about past price changes according to its living standard (low-income or affluent), the age bracket of the respondent, his/her employment status (employed, retired or other) or area of residence (urban or rural) is statistically significant (*Annex*). All other things being equal, between 2011 and 2018, a low-income household was almost twice as likely as an affluent household to respond that prices had "increased sharply" rather than "increased a little", "stagnated" or "fallen", which is consistent with the previous observations. In other words, the differences in perception of past price changes between affluent and low-income households persist after the effects related to the age, employment status and area of residence have been taken into account.

Living in an urban unit rather than a rural community appears to be secondary to standard of living

Between 2011 and 2018, living in an urban area rather than in a rural area had little effect on households' responses on past prices. All other things being equal, a household living in a rural municipality is only 1.03 times more likely to answer that prices increased sharply than urban households are. Nevertheless, since 2018, the gap between the balances of opinion of these two categories of households has widened (*Graph 8*) in a statistically significant way, for given socioeconomic characteristics of households. In other words, as well as the difference over the entire period, a household living in a rural municipality was 2.41 times more likely to respond that prices increased sharply between 2018 and 2017 than a household living in a city.

Conclusion

For the last 20 years, in view of the differences in consumption structure, the inflation experienced by low-income households has been a little higher than that of the most affluent households. Although the balance of opinion on past price changes varied more or less in line with inflation measured by the CPI, the fact remains that the lowest-income households tend to perceive higher increases in prices, no doubt to a greater extent than a simple comparison of the baskets of goods consumed would suggest.

Accardo et al. (2011) mention several factors that could lead to this difference: greater importance accorded to the prices of products purchased frequently, a more particular sensitivity to price increases than to price cuts, etc. In addition, there could also be a difference in perception linked to households' budgetary constraints: the lowest-income households perceive sharp increases in prices more often, as the purchasing power of their income, which by definition is lower, is all the more affected, while they are less likely to be able to adjust their saving.

In 2018, households' perception was largely influenced by the rises in energy prices, but also tobacco. It is true that in the long run, the relative importance granted by households to changes in energy and tobacco prices may appear modest. Nevertheless, the scale of the price changes measured in 2018 for these products was such that they contributed to almost half of the inflation measured by the CPI, as well as to the change in households' opinions on past prices. ■

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INSEE (2018), « How do households perceive changes in their standards of living in the economic outlook surveys », focus in Conjoncture in France report, December.

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Methodology for calculating the relative importance of products

Description of the model

The aim of the model is to identify the contribution of the main aggregates in the consumer price index to inflation perceived by households (i.e. the balance of responses in the Camme survey). These main aggregates are food, energy, tobacco, manufactured goods and services. The balance of responses is modelled using the linear regression technique whose explanatory variables are these different aggregates. The series of monthly data used extend from 1991 to 2019. In 2004, some changes were made to the questions on prices in the Camme survey. These changes are liable to lead to breaks in the series and therefore distort the estimates. In addition, the changeover to the euro took place in 2002 and it is likely that households' impressions of changes in prices were affected by that for a few years afterwards. This is why the period studied runs from January 2005 to January 2019.

The equation obtained is as follows (Student statistics are given in brackets below the relevant coefficients):

$$\text{BalanceRéponses} = \underset{(-17,1)}{-74,98} + \underset{(7,5)}{1,19} \times \text{Energy} + \underset{(16,3)}{31,67} \times \text{Services} + \underset{(4,3)}{10,95} \times \text{ManufacturedProducts}$$

$$+ \underset{(6,8)}{6,43} \times \text{Food} + \underset{(1,5)}{0,45} \times \text{Tobacco}$$

$R^2 = 0,83$

Estimation period: January 2005 to January 2019

where:

- Balance of Responses is the balance of responses to the question concerning past price changes in the Camme survey;
- Energy is energy inflation (measured by INSEE, year-on-year);
- Services is services inflation;
- Manufactured Goods is manufactured goods inflation;
- Food is food product inflation;
- Tobacco is tobacco inflation.

The constant and the coefficients of the explanatory variables are significant at the 1% threshold with the exception of tobacco. However, the corresponding p-value being equal to 0.13, it is nevertheless relevant to the modelling.

Calculation of the relative importance given to products by households

According to the model, an increase in inflation of one percentage point, spread evenly across all the products, increases the balance of opinion by 1.19 + 31.67 + 10.95 + 6.43 + 0.45 = 50.69 points. In order to render comparable these average relative levels of importance given by a household to inflation on one product to build its opinion, it is possible to rank them. For a given product, the effect of a one-point increase in inflation on this product on the balance of opinion is converted into a percentage of the total effect. For example, the relative importance of energy inflation is: 1.19/50.69 = 2%.

Robustness of the model

In order to test the robustness of the estimated coefficients, alternative models were built. In particular, the model was estimated with different groupings of products (for example food with tobacco, manufactured goods with energy), with finer degrees of aggregation of products (separation of services into five subgroups of products, manufactured goods into two or three subgroups), or with a simpler specification (energy and all the other products). Generally, the order of magnitude of the coefficients is retained and does not interfere with the ranking of the relative importances presented. Furthermore, it appears that the high coefficient associated with services inflation is mainly due to rent inflation.

Methodology for calculating the category indices

Calculation principle

The consumer price index (CPI) rests on a set of elementary price indices, each corresponding to a change in prices measured for a particular group of products (e.g. clothing). Each elementary index contributes to the calculation of the overall index in proportion the weight of the expenditure it covers in overall consumption.

For each category of households, for example households where the reference person is aged under 30, a price index is calculated as follows: the consumption structure of the category in question is applied to the elementary price indices. Therefore only the differences compared to the consumption structure of all households are taken into account.

In this exercise, the elementary indices considered are those corresponding to a breakdown of consumption into 91 subclasses (for example «bread and cereals», «clothing», «vehicle purchases», «medical services»). Thus by notating the category weighting associated with the ith item and its index, the category index for a given category of households is written as follows:

$$IPC_{cat} = \sum_{i=1}^{91} pond_{cat,i} \times IPC_i$$

Five types of categories of household are considered. They are defined by the socio-economic category of the reference person, their age, living standard (income per consumption unit), composition and the occupancy status of the home (owner, mortgage holder, tenant).

The sources

The weight of the different elementary consumptions is based on the annual national accounts for year N-2 to calculate the index for year N (for example, the consumptions of 2016 for the 2018 indices). For each of the categories of household considered, the weight of the elementary consumptions taken from the national accounts is adjusted according to its consumption profile as measured in the periodic Household Budget surveys (BDFs). The category weights are updated annually according to the annual update of the overall weights based on the national accounts. The link between the BDF data and the CPI data is made at level 3 in the COICOP classification of consumption purposes (4-digit identifier, 91 subclasses). ■

Annex 1

Wording of the questions asked in the Camme survey (since 2004).

Past prices:

Do you find that, over the last twelve months, prices have…

- Increased sharply (+)
- Increased moderately
- Increased slightly (–)
- Stagnated (–)
- F allen (–)

Future prices:

Compared to the last twelve months, in your opinion, how will prices change over the next twelve months? The increase will be:

- faster (+)
- continue at the same rate
- continue less fast (–)
- prices will remain stationary (–)
- prices will fall (–)

The balance of each qualitative question is arrived at by calculating the difference between the percentages of positive and negative responses. The series need to be interpreted with caution: the change in a series will always prevail over its level. ■

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Annex 2

Determinants of the probability that a household will respond that over the past 12 months prices have "increased significantly" rather than "slightly increased", "stagnated" or "decreased".

Explanatory variations	Probability differences	
	(1)	(2)
Standard of living		
Easy	Réf.	Réf.
Modest	1.97***	1.97***
Type of urban unit		
Urban	Réf.	Réf.
Rural commune	1.03*	0.99
Rural commune x year 2018	-	1.27***
Age		
Under 30 years old	Réf.	Réf.
Between 30 and 44 years	1.19***	1.19***
Between 45 and 59 years	1.53***	1.52***
Between 60 et 74 years	1.55***	1.55***
More 75 years old	1.32***	1.32***
Activity		
In work	Réf.	Réf.
Retired	1.28***	1.28***
Other	1.06**	1.06**
Years		
2011	Réf.	Réf.
2012	0.66**	0.66**
2013	0.48***	0.48***
2014	0.25***	0.25***
2015	0.11***	0.11***
2016	0.12***	0.12***
2017	0.12***	0.12***
2018	0.32***	0.30***
Constant	0.71***	0.72***
Observations	107508	107508
username R2	12%	12%
estimation period	2011-2018	2011-2018

Note: significance threshold*** 1%, **5%, *10%. In addition to the variables in model 1, model 2 includes an interaction between the type of urban unit and the year 2018.

How to read it: all other things being equal, the fact that a household living in a rural commune multiplies by 1.03 its chances of thinking that prices have risen sharply over the last twelve months.