

How to compute a Consumer Price Index in the context of the Covid-19 crisis ?

Definitive estimate-October 2020

The health crisis and the lockdown measures in the context of the Covid-19 crisis have impacts on the measures of short term statistics such as the Consumer Price Index (CPI).

On the one hand, **in order to preserve price collectors but also consumers and salesmen, INSEE adjourned the collection of prices by INSEE collectors in physical outlets from the 16th March to 15th June 2020¹ and again since the 29th of October in the territories where a lockdown has been implemented.** These prices collected on the field are only one data source among others used to compute the CPI; however, they represent more than four tenth of the CPI, in terms of consumption share. **Their adjournment² impacted temporary the quality of the CPI from March to June. They had no impact from July to October 2020.**

On the other hand, CPI aims to describe an average measure of price changes for all the purchased items. The basket of products is renewed yearly but it remains fixed during a year; the slow changes in the consumption structure ensure that this basket fixity is globally neutral on the inflation measure. **The Covid-19 crisis disrupted deeply and suddenly the household consumption structure** either because the consumption was prevented by the impossible move of households (transport, tourism), or because outlets were closed (in particular, during the lockdowns), or because confronted to the crisis, the households decided to adapt their consumption habits (food, for instance).

In compliance with [Eurostat guidelines](#), shared with the different European countries, INSEE carried out new collection methods and adapted imputation methods. INSEE proposes also an alternative measure of inflation taking into account the change in consumption.

1 – How to take into account price changes for products that are no more purchased?.

During the lockdown, some consumption segments simply disappeared (shows, tourism, restaurants, hairdresser, cars, guiding lessons...) either because these activities were not allowed according to the implementing order of 15 March 2020 related to measures for the struggle against the Covid-19 spreading, or because households adapted their consumption. Since the end of the lockdown, the 11 May, reopening of outlets has been progressively authorized and the structure of the consumption has got closer to what it was before the lockdown. However, some gaps still exist, for instance for transport, tourism, cultural services. Since the end of September, health restrictions have prevented again the consumption of some services (bars, restaurants, gyms) in alert zones .

1 This adjournment lasted up to the 20 September in French Guyana, where price collection in physical outlets have resumed since this date.

2 This adjournment was mitigated by the implementation of alternative collections, (by phone, on line) and by a more important use of scanner data

The consumer price index which is a fixed-basket index (a Laspeyres-type index) uses a fixed consumption structure, updated each year. The assumption is that this structure slowly evolves and is usually true. But it does not fit the huge shock that occurred on the consumption structure during the health crisis.

In compliance with [the methodological guidance note of the compilation of the HICP in the context of the Covid-19 crisis](#) by Eurostat,

- The CPI remains a fixed-basket index and the weights for each consumption segments remain unchanged (that is to say the one observed for the year 2019): for instance, whereas the household fuel expenditures decrease with the lockdown, the fuel weight remained the one observed before the health crisis.
- When a consumption segment is not transacted any more, its price cannot be observed; the sub-index is consequently imputed (i) either with the price changes of a similar product or of the nearest higher aggregate (ii) or with the all-item index, (iii) or scarcely, in duly justified circumstances, by carrying forward the last observed price. Moreover, when the price of a product follows a highly seasonal pattern, the imputation reproduces the past seasonality.

Finally, the share of imputation due to the Covid-19 is less than 1% in the October all-item index (as in September, July and August, after one quarter in June 2020); these imputations include the remaining unavailability of some services (transport services, tourism, in particular). They did not take into account the usual imputation due to usual closure of outlets or usual products out of stocks.

2 – An alternative consumer price index in order to take into account the distortion in the consumption structure.

The official consumer price index, which is consistent with the past habits of consumption, enables to describe the inflationary / deflationary pressure in the economy, in particular the scarce drop in the fuel prices during the lockdown. However, it could be quite far from the consumer feelings who, because of the health crisis, were no more able or no more eager to purchase some products. For that reason and in order to illustrate the consequences of this major shock on household consumption, alternative price indices were built. Contrary to the CPI that is a chained Laspeyres-type index (built on the past structure of the consumption, yearly updated), these indices use the current structure of the consumption (the April, May, June, July, August, September or October structure³).

In order to compute such indices, the nowcasting exercise carried out by INSEE since the health crisis complete with now available business indicators for April to September was used. Although the exercise was performed at a lower detailed level than the one used for CPI weights, it enables to illustrate what inflation should have been with a consumption basket purchased for each of the months from April to October 2020.

According to this exercise, fuel consumption dropped sharply in April and sharpened progressively but partially meanwhile, as well as transport services, accommodation, catering services or cultural and sports services, whose recovery was however less marked; food consumption was contrariwise one of the few products whose consumption was maintained during the lockdown. Therefore, the consumption structure during the lockdown has a higher weight for food and a smaller weight for fuel, transport and accommodation services whose volatile prices have often a high contribution to the monthly change in prices. Since June, the

³ Seven alternative indices were computed; each one describes, for the whole period, the inflation that would be observed if the consumption structure would have been the one observed in April 2020 (respectively in May, June, July, August, September or October 2020). These seven indices were not chained one with the other (which would have allowed to produce an index representative of the current consumption of the month). Indeed, monthly chaining causes a chain drift in indices and is not recommended by the index theory. This is why the CPI is chained yearly.

service weight has still been lower to what was observed in 2019 but that of manufactured products has been higher, due to a correcting effect.

By using the consumption structure observed in April 2020 (*figure 1*), the measured price change in metropolitan France would have been more dynamic in April 2020 than that measured by the CPI (+0.3% against a stability measured by the CPI); the sharp fall in fuel prices in April had a lesser impact on the alternative index since its weight was lower in the April 2020 consumption. This gap between the price changes measured with the CPI and the alternative index reversed from May to August: using the consumption structure observed in May 2020, prices would have risen by 0,1% in May (against +0.2% measured with the CPI); using the consumption structure observed in June 2020, prices would have slightly decreased in June (against +0.1% measured with the CPI) and would have risen by 0.2% in July (with the July 2020 consumption structure) against +0.4 measured by the CPI. Service prices were indeed more dynamic than the all-item index (because of transport services) whereas services were less purchased in June and July 2020 than in 2019. In august, prices dropped by 0.1% in average whether measured with the CPI basket or the August 2020 purchased basket. In September, however, the CPI dropped by 0.5% but only by 0.2% when measured with the September consumption structure: airfare and tourism prices decreased seasonally in September and their weight is higher in the CPI basket than in the alternative index. Contrariwise, clothes prices, whose weight is higher in the alternative basket, rebounded in September as every year after the summer sales. In October, prices are stable in average, whether measured with the CPI or the index using the October consumption structure.

The gap between the indices is therefore also the consequence of seasonality effects: all these indices are not seasonally adjusted and their seasonality is different because of the different weight of highly seasonal products as airfares or tourism.

The year-on-year change in prices enables to take into account seasonality effects: the CPI increased by 0.1% year on year in October after +0,0% in September, +0.2% in August, +0.8% in July, +0.2% in June, +0.4% in May and +0.3% in April whereas the index built from the October 2020 consumption structure increased by 0.2% in October after +0,2% in September, +0.3% August, +0,9% in July,+0.3% in June, 0.5% in May and April. However, this gap existed even before the health crisis when the true consumption structure was nearer from that used for the CPI (*figure 2*).

To conduct a consistent analysis and to take into account seasonality effect, we should compare the change in the yearly price evolution for each index: with the CPI, the year-on-year change in prices decreased by 1.3 point between February and October 2020 (from +1.4% in February to +0.1% in October 2020) as well as with the index that uses the October 2020 consumption structure (from +1.5% in February to +0,2% in October).

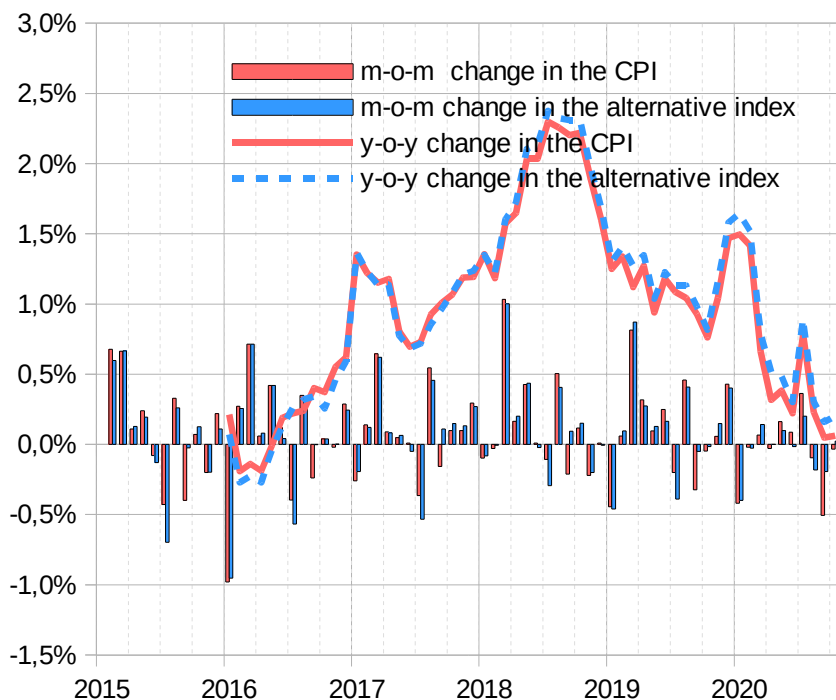
Figure 1: The Consumer Price Index and alternative indices using the consumption structure observed in April, May, June, July, August, September and October 2020 (annual and monthly rate)

	Monthly rate									Annual rate								
	March	April	May	June	July	August	September	October		February	March	April	May	June	July	August	September	October
CPI	0.1%	0.0%	0.2%	0.1%	0.4%	-0.1%	-0.5%	0.0%		1.4%	0.7%	0.3%	0.4%	0.2%	0.8%	0.2%	0.0%	0.1%
Alternative indices																		
April 2020 structure	0.1%	0.2%	0.2%	-0.3%	-0.1%	0.1%	-0.2%	-0.1%		1.8%	1.2%	1.3%	1.3%	0.8%	0.9%	0.7%	0.5%	0.7%
May 2020 structure	0.3%	0.1%	0.1%	-0.2%	0.0%	-0.2%	0.1%	0.0%		1.6%	0.9%	0.8%	0.7%	0.4%	1.0%	0.4%	0.3%	0.4%
June 2020 structure	0.2%	0.0%	0.1%	-0.1%	0.1%	-0.1%	-0.1%	0.0%		1.5%	0.8%	0.6%	0.5%	0.3%	0.9%	0.4%	0.2%	0.3%
July 2020 structure	0.1%	-0.1%	0.1%	0.0%	0.2%	-0.1%	-0.2%	0.0%		1.5%	0.8%	0.5%	0.4%	0.2%	0.8%	0.4%	0.1%	0.2%
August 2020 structure	0.2%	-0.1%	0.1%	0.0%	0.3%	-0.1%	-0.3%	0.0%		1.5%	0.8%	0.5%	0.4%	0.2%	0.9%	0.4%	0.2%	0.2%
September 2020 structure	0.1%	-0.1%	0.1%	0.0%	0.2%	-0.1%	-0.2%	0.0%		1.5%	0.8%	0.5%	0.4%	0.2%	0.9%	0.4%	0.2%	0.2%
October 2020 structure	0.1%	0.0%	0.1%	0.0%	0.2%	-0.2%	-0.2%	0.0%		1.5%	0.8%	0.5%	0.5%	0.3%	0.9%	0.3%	0.2%	0.2%

Scope: metropolitan France

Lecture: If the consumption structure, from 2015 on, was that observed in June 2020, the month-on-month change in prices in June 2020 would have been -0.2% against +0.1% measured by the CPI (i.e. the 2019 consumption structure for 2020 indices, the year Y-1 structure for the year Y index). The year-on-year change in prices in June 2020 would have been +0.4% against +0.2% measured by the CPI

Figure 2: The Consumer Price Index and an alternative index using the consumption structure observed in October 2020 (annual and monthly rate)



Scope: metropolitan France

Lecture: If the consumption structure, from 2015 on, was that observed in October 2020, the month-on-month change in prices in October 2020 would have been 0,0% as measured by the CPI (i.e. the 2019 consumption structure for 2020 indices, the year Y-1 structure for the year Y index). The year-on-year change in prices in September 2020, measured with the September basket, would have been +0.2% against +0.1% measured by the CPI