

BOX IV.1

CORE INFLATION MEASURES

The Central Bank of Chile's monetary policy is oriented toward ensuring that the annual CPI inflation forecast is around 3% in a two-year horizon. In the short term, changes in CPI inflation tend to be noisy. After seasonal factors are taken into account, sharp fluctuations month to month might not be associated with the economic cycle, but rather with other types of factors, such as transitory supply shocks in specific sectors (unforeseen weather events, short-term production disruptions, geopolitical events that temporarily affect the oil price, etc.) and measurement errors.

In this context, to evaluate the current and future inflation path, central banks usually consider the evolution of so-called core inflation indicators^{1/}. These measures seek to identify medium-term inflation trends—after correcting for short-term “noise”—which are associated with the economic cycle and which can be more successfully influenced by monetary policy. Given that it is not possible to identify the noise component with absolute certainty, central banks use a set of indicators based on different methodologies to try to eliminate it. This box describes a new measure that the Central Bank of Chile has recently incorporated into its set of core indicators that are regularly monitored^{2/}.

The literature identifies two alternative methodologies for separating the stable signal from the noise. The first consists in re-weighting the CPI components as a function of the “noise quantity” contained in their variations, assigning lower (higher) weights to components that are more (less) noisy. The second uses statistical methods to smooth the time series in order to extract the stable inflation signal.

The most common practice for central banks is to use the first alternative, because it provides measures that are easier to communicate and that are thus easier for the market to use to form their expectations. A specific example of this alternative is an exclusion measure, in which the noisiest components are directly removed from the calculation; that is, they are given a weight of zero. The excluded components can always be the same (fixed exclusion) or they can change every month (variable exclusion).

The main core indicator currently used by the Central Bank of Chile is based on fixed exclusion, and it excludes all food and energy items (CPIEFE)^{3/}. This measure has two key advantages: simple calculation and easy communication to the general public. However, like other fixed-exclusion measures, it also has two limitations. First, although the transitory shocks that motivate the construction of core measures do not always affect the same components, the set of components excluded from the CPIEFE is always the same. Thus, this measure could potentially include prices affected by transitory shocks and leave out other unaffected prices. This limitation is common to all fixed-exclusion indicators.

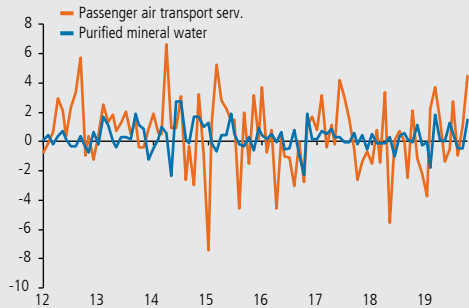
Second, even among fixed-exclusion indicators, the criterion of excluding all food and energy prices and no other component of the basket is not necessarily optimal. For example, the CPIEFE excludes the price of mineral water, which is fairly stable, and includes passenger air transport, which is very noisy (figure IV.9). These limitations are not merely conceptual, but rather are reflected in the statistical properties of the CPIEFE discussed below.

^{1/} Clark (2001) provides a general description of core measures. Hogan et al. (2001), Roger (1997), Shiratsuka (1997), Cutler (2001) argue that core inflation is relevant for monetary policy decisionmaking.

^{2/} Analysis of a broader set of core measures can be found in the Monetary Policy Report, March 2015, box V.1; and in Córdova (2008).

^{3/} For the full details on the calculation of the CPIEFE, see INE (2019, appendix 6).

FIGURE IV.9
CPI: Mineral water and passenger air transport
(seasonally adjusted monthly change, percent)



Sources: Central Bank of Chile and National Statistics Institute (INE).

As indicated by Carlomagno and Sansone (2019), an alternative method for choosing the items to exclude consists in determining the desired statistical properties of a core indicator and then choosing the exclusions that produce the indicator with the best possible properties. The literature identifies five desirable properties:

- **Bias:** Given that the Central Bank’s objective is for headline inflation and not core inflation, the average value of the latter should be as close as possible to the former.
- **Persistence:** If the core indicator adequately filters transitory shocks that are not associated with monetary policy, then the fluctuations around the mean level should be “soft.” That is, convergence to the mean should be relatively slow.
- **Volatility:** in addition, the convergence path must be as stable as possible, which implies that the fluctuations of the core indicator should be characterized by low volatility.
- **Relation to the output gap:** If the core measure accurately reflects the fundamental movements of headline inflation, it should be closely related the output gap.
- **Forecasting:** Finally, a core indicator should contain relevant information for predicting future inflation trends.

Carlomagno and Sansone (2019) propose a strategy for summarizing these five properties in a single indicator, as well as a procedure for choosing the components to be excluded so as to construct an optimal indicator. The procedure allows for either fixed or variable exclusion. Going forward, the fixed-exclusion measure constructed using this procedure is called the CPI excluding volatile items (figure IV.10). Table IV.1 shows that the CPI excluding volatile items surpasses the CPIEFE on the five dimensions considered.

FIGURE IV.10
CPI, CPIEFE, and CPI excluding volatile items
(annual change, percent)



Sources: Central Bank of Chile and National Statistics Institute (INE).

TABLE IV.1
Evaluation of properties (*)

	CPI excl. volatile items	CPIEFE	CPI
Bias	Yellow	Red	Green
Persistence	Green	Red	Yellow
Volatility	Green	Yellow	Red
Output gap	Green	Red	Yellow
Forecasting	Green	Yellow	Red

(*) Green, yellow, and red indicate best, intermediate, and worst, respectively.

Source: Carlomagno and Sansone (2019).

In sum, the CPI excluding volatile items is less biased, more persistent, less volatile, more closely related to the output gap, and a better predictor than the CPIEFE. However, while these core inflation measures are useful analytical tools for forecasting, empirical evidence shows that no analytical instrument always delivers the correct signals. Consequently, these measures should be used with a degree of caution and in conjunction with other tools. Furthermore, given the limitation of all fixed-exclusion measures described above, the excluded components should be revised periodically.