

Analysis of the underlying inflation through trimmed means

January, 2023

The inflationary global phenomenon raised the question of the true nature of the underlying inflation dynamic, we propose a strategy to provide an answer



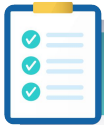
Objective

Extract information about the dynamic of the underlying (core) inflation by estimating trend inflation.



Motivation

Understanding inflation dynamics, in particular under severe distortions, is important for the economy. Core inflation is usually understood as a guide of the true underlying inflation. However, it may also include some noise that fogs its signal. For this reason, in this document we aim to find a measure with fewer disturbances.




Methodology

We follow the strategy through trimmed means developed by BBVA Research Spain and adapt it to the Colombian data. The trimmed mean is a statistical measure of central tendency. It calculates the mean by discarding a given proportion of the CPI basket both at the upper and lower end of the sample. We then find the optimal trimmed mean that better fits the data through a simple RMSE.

For the development of the project the following steps were taken into account

DETAILS



Data collection: the baskets of 2008 and 2018 were merged joining the inflation indexes of 188 products (maintaining the weights present in each basket).

Data adjustment: the 188 series were seasonally adjusted. Five products were dropped as there was no matches between 2008 and 2018 baskets for those items (they represent 0.5%).

Application of the methodology: the methodology used by BBVA Research Spain was adapted for colombian data and replicated.

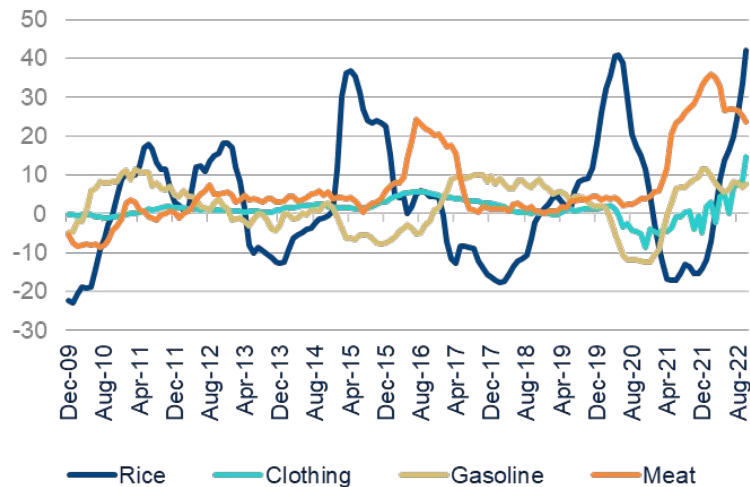
Results: we obtained an optimum trimmed mean close to the median, in line with the results found by Michael F. and Stephen G. and by the BBVA Research Spain team.

Methodology



Data from 2009 until 2022 with a monthly frequency is included in the analysis. The series are seasonally adjusted.

ANNUAL PRICE CHANGE FOR SELECTED ITEMS (AS AN EXAMPLE, %)



Source: BBVA Research with data from DANE



The groups in the total basket are organized according to their monthly variation and weight.

CHANGE AND WEIGHT FOR SELECTED ITEMS (AS AN EXAMPLE, %)

December	Monthly variation (%)	Weight
Clothing	0.76	1.04
Meat	1.51	1.89
Gasoline	2.26	2.91
Rice	4.18	0.93
Potato	17.32	0.3

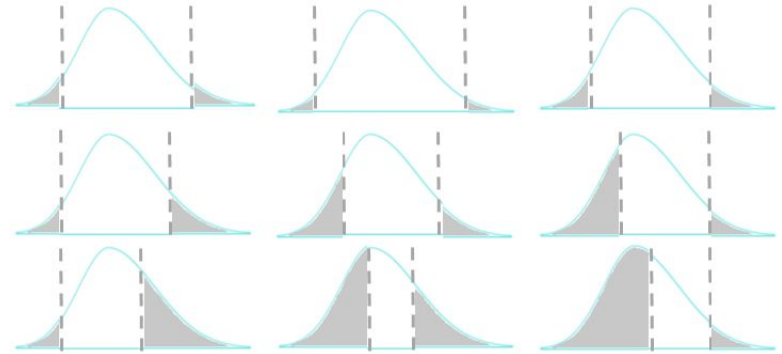
Methodology



The frequency of the weighted inflation of the basket is calculated.



All the possible combinations for the trimmed means are calculated (both symmetrical and asymmetrical), obtaining 2601 combinations.

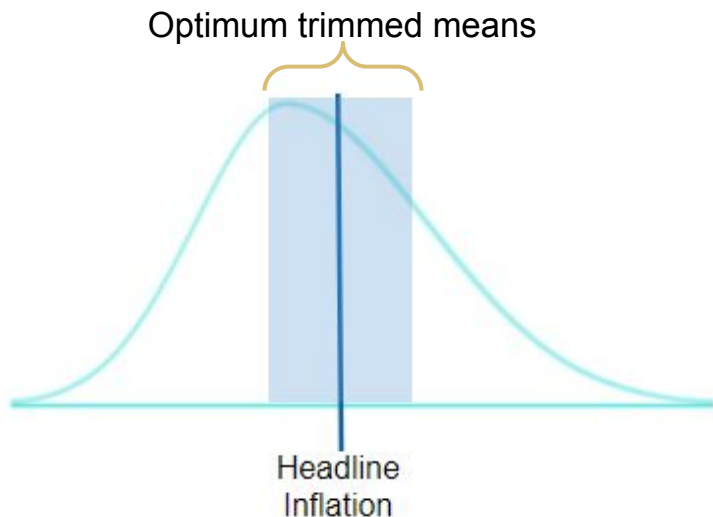


the grey sections are the percentage of each tail removed in the calculation of each trimmed mean.

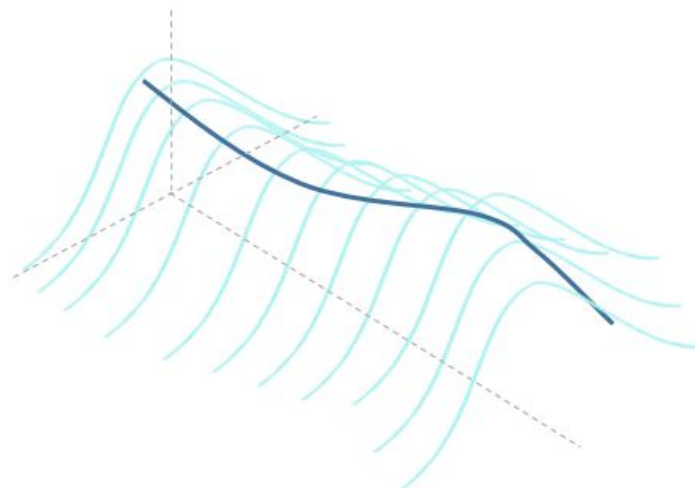
Methodology



The adjustment of each trimmed mean is evaluated against the headline monthly inflation n-months ahead and we calculate the RMSE for each trimmed mean.



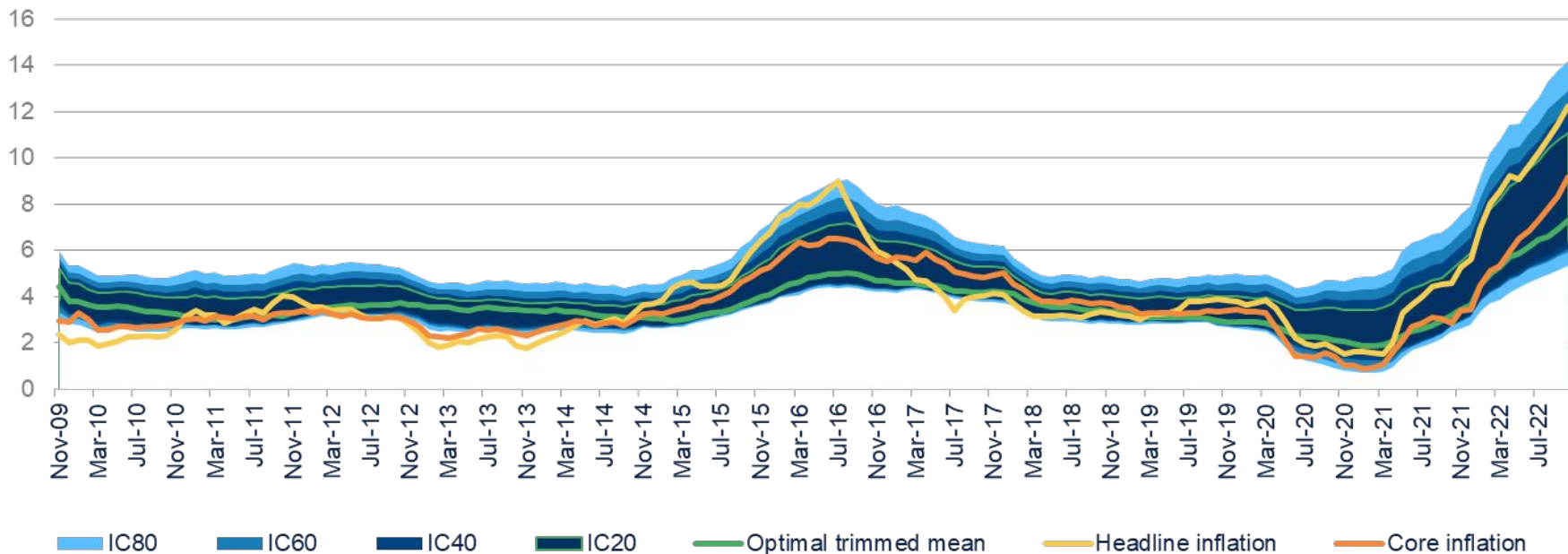
From the trimmed means with the lowest RMSE, we use the Diebold-Mariano test to select the best trimmed mean. The one with the highest accuracy to anticipate the trend of inflation.



The optimal trimmed mean has an upward trend, though it is below both core and headline inflation, suggesting a part of the current inflation is transitory

OPTIMAL TRIMMED MEAN, CONFIDENCE INTERVALS, HEADLINE AND CORE INFLATIONS

(ANNUAL CHANGE, %)



The underlying inflation is significantly lower than headline and core inflation, though it signals structural inflation is still trending upward

MAIN CONCLUSIONS



In periods of extreme inflation uncertainty increases, increasing the width of confidence intervals. Three periods of higher uncertainty are identified: 2016 and 2022 with high inflation and 2020 with low inflation. In this periods the distribution of inflation results also show an important upward skewness of the confidence intervals. This result may be explained by price stickiness or strong price indexing.



The optimal trimmed mean shows a lower variance than the official core (without food) inflation. However, it does respond to periods of extreme inflation.



For the latest data, the optimal trimmed mean remains below both the official core (without food) inflation and headline inflation, suggesting that part of the inflationary phenomenon is transitory. Nonetheless, it exhibits an upward trend that suggests that inflation maintains a certain structural acceleration that has not yet slowed down and its turning point has not yet been achieved.

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