11 ALTERNATIVE MEASURES OF CORE INFLATION IN ROMANIA

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Abstract

The paper intends to present synthetically the main approaches to computing core inflation, taking into consideration the importance of core inflation for conducting monetary policy. At the same time, the paper computes different measures of core inflation using methods based on excluding certain categories of prices from overall inflation rate and methods based on excluding from the overall inflation rate temporary movements of various prices which at different moments register extremely high volatility (using trimmed methodology). For the monetary policies it is important to select the inflation indicator with the lowest volatility. In this respect, the paper analyzes the efficiency of the computed core inflation indicators using a statistical approach. At the same time, the paper analyzes the usefulness of core indicators for monetary policy measures.

Key words: core inflation, price stability, methods of computation

Jel Classification : E31, E37, C53, P22

Introduction

Empirical studies focusing on the evolution of inflation in different countries have revealed in the structure of the inflation indicator two components: i) a common component derived from the demand side which can be influenced by monetary policy, named core inflation; on this component the National Banks are focusing their attention and ii) a volatile component, related to shocks on the supply side; the sources of this component can be traced to the volatility of different components of price indexes and the effect of irregular price adjustments of some services and public utilities on irregular price adjustments (generally through government regulations). The common component reflects the persistent influence of aggregate demand on the general level of prices. The volatile component reveals the presence of higher volatility products in aggregate distribution.

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The identification of the common component is, therefore, based on the elimination of the higher volatility induced by the prices of some products or group of products from the general price index.

The development of the concept of core inflation (Pelinescu, 1999) was influenced by the increasing preoccupation of central banks to establish as an objective of there monetary policy the stability of prices (Haldane, 1995). The problem to be addressed was the accurate determination of the component of inflation rate which the central banks can influence through the monetary policies and the need to have a high degree of predictability of the price index.

The adoption of the Law 312/2004 set the main goal of the National Bank of Romania, which is "the ensurance and maintenance of prices stability". This goal depends on the accurate measure of the future level of the inflation rate and, especially, of the components which are sensitive to the monetary policy measures.

Under these circumstances, the aim of this paper is to present a methodology for measuring the inflation components which can be influenced by monetary policy measures, i.e. building a measure of "core inflation". From this point of view, the index of core inflation may be considered a measure of the central bank's monetary policy efficiency of reaching its goal to ensure price stability, and a favorable economic environment for the long-run economic development.

The problem of measurement and determination of core inflation was presented in other articles (Pelinescu 1999, 2001). This paper uses the accumulations of past articles and introduces some important elements. First of all, the statistical data have been more comprehensive since 2001. In this respect, the administrative prices are computed more accurately using information from INSSE on the prices of post services and radio–TV subscription (only the fixed telephone services and services for the issuance of identity cards, driving licenses and passports were eliminated from the new computation). Second, this paper uses the consumer price index detailed for 101 groups of products and services and not only 64 groups like in the previous papers. Third, this paper analyses the extent to which the elimination of some groups of products from the core indicator generates a constant lower volatility of the core indicator.

1. Conceptual clarification

The literature offers a wide variety of approaches to core inflation, but at the same time it lacks consensus. Some studies focus on the theoretical approaches, taking into consideration the determinant factors of core inflation. Other studies focused on measuring the level of the inflation indicator, based on a different theoretical approach. Some major approaches developed are:

a) measuring core inflation in direct relation to money growth, based on the quantitative theory of money (Buiter and Miller, 1981, Bryan and Cecchetti, 1993);
b) the submission of core inflation as a component of changing prices based on the shocks of the aggregate demand (Gartner and Wehinger, 1998);
c) the core inflation considered as a measure of inflation that has no medium to long-run impact on real output, approach that is in accordance with the vertical

long-run Phillips curve interpretation (D. Quah and S. Vahey, 1995).

d) a significant relationship has been established between the variance in relative prices and the rate of inflation or deflation (Parks, Blejer and Leiderman, Vining and Elwertowski, E. Dobrescu, 1999)

Because the inflationist phenomena cannot be explained exclusively on the demand or supply side causes, researchers may be "agnostics" when it comes to the main determinants of core inflation (D. Quah and S. Vahey, 1995).

The issue is more complex in the transition economies because of a high number of factors which are specific to this period and influence the changes in the level of relative prices, such as monetary distortions generated by arrears and dollarisation effects (E. Dobrescu, 1998) or maintaining administered prices.

"**Core inflation**" reflects the moving of general prices with the exception of the most volatile components or those that are not determined by market, in this way the premises of the best projection being achieved. (C.J. McNeilly, D. Schiesser-Gachnang, 1996). From other points of view, "core inflation" is, in fact, that component of moving prices determined by the play of demand (C. Gartner and G. D. Wehinger, 1998) or the irreversible one (E. Dobrescu, 1999).

The experience of other countries proved that the index of core inflation, specially built, may reveal the level of inflation as a monetary phenomenon, excluding the impact of other factors (play of supply, including seasonal moving) and measuring errors (overevaluation and underevaluation moving with the general price level).

2. Methods for measuring core inflation

The assumption of some measurements of core inflation is that "the changes in goods and service prices between two periods contain a common component (core) and an idiosyncratic component that primarily reflects developments in local markets" (M. Wynne, 1999, p.3). This idea is formalized as follows:

$$\pi_{i,t} = \Pi_t + x_{i,t}$$

where: $\pi_{i,t}$ = the rate in change of the price in an individual commodity *i* at the time *t*;

$x_{i,t}$ = the relative consumer goods price change component;

Π_t = an aggregate inflation component, interpreted as money purchasing power.

The core inflation size should be associated with two issues:

a) One is correlated with the elimination of transitory phenomena or noises that should not affect policy-makers' decisions because of their short-run impact on prices; in this category we find: seasonal moving, supply side shocks, exchange rate changes and changes in indirect taxes.

b) The other is determined through the measurement of the long-run biases impact over the inflation rate, as a consequence of weighting schemes sampling techniques, and quality adjustments employed in the calculation of price index (S

G. Cecchetti, 1996, p. 1).

The solving of those issues led to the use of various techniques, different from one country to another, the best known being presented further on.

2.1. The most widely used method for measuring core inflation consists in simply excluding certain categories of prices from overall inflation rate as components highly affected by market changes (as food and energy goods), administered prices[1] or substitute goods, hence those goods which have major (upper or under) deviations from the general level of inflation rate (see Pelinescu 2001 for details).

We can see that, in practice, the method is based on attaching zero weights to all goods or groups of goods, which have to be eliminated from the core inflation indicator, and after the elimination the aggregate index is counted again. Moreover, this approach is based on the observation of individual price series of goods, which are included in consumer price index, the prices which tend to show substantial asymmetries. Some of these asymmetries could not be explained by an accounting error, but on seasonal factors or shocks on supply side. Their effects could be found in changes in aggregate price index of consumer goods.

The country studies show the wide use of the method of excluding some components in measuring core inflation and the existence of some differences in the goods which are excluded. For instance, in the case of Albania, core inflation is measured by eliminating the shocks generated by liberalization measures and increasing administered prices and in Hungary[2] by excluding the price of the goods affected by seasonal factors (eggs, vegetables, potatoes, solid and liquid fuel - coal, coke coal, coal brick, firewood, fuel for heating, gasoline). In the Czech Republic[3] core inflation is measured by eliminating the effect of the adjustment in the administered prices, and the changes in indirect[4] taxes and subsidies on consumer price index.

In Croatia[5] the measurement of core inflation is based on the elimination of the high level of seasonal goods - many of them, food goods - and by using the zero weighting method. The Croatian experts consider only this method viable at this moment because: i) the figures series associated in the macroeconomic stability period are not long enough for econometric purposes; ii) the indirect taxes could not be eliminated because of the presence of a mixed system of indirect taxes. In the US case, both the influences

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[2] *The elimination from the consumer basket of certain goods the prices of which are administrated is based on points of view expressed by Koen and Masi in 1997. They state that shocks generated by administered prices should be considered as "artificial" season moving because they take place in irregular periods of time.*

[2] *Starting in July 1998, the Central Bank of Hungary computed the index of core inflation by excluding seasonal effects of changes in food prices (eggs, vegetables, potatoes) and liquid fuel (coal, coke coal, coal brick, firewood, fuel for heating, gasoline),* Quarterly Report on Inflation*, November 1998, p.13, National Bank of Hungary.*

[3] *Inflation Report, October 1998*

[4] *Donkers and others (1983-1984) explained that for some European countries the measurement of the impact of indirect taxes on net inflation is based on the implicit assumption that the change in indirect taxes is reflected in the relative price moving under the circumstances of perfect elasticity.*

[5] *Croatian National Bank, Methodological Basis for Measuring Core Inflation, Research and Statistic Area, Research and Analysis Department, p. 5.*

of food and energy price changes are excluded, and in Japan the moving of fresh food goods, which sustain the influence of the weather change shocks is eliminated. (S. Shiratsuka, 1997).

Lately, there are strong critics of this method because it is difficult to determine, under the circumstances of the most volatile components of consumer good prices, the most important prices versus the prices which are not so important from the point of view of the quantity of the incorporated information (E. Dobrescu, 1999).

2.2. Core inflation can be measured also by the elimination of seasonal changes from the consumer price. This method is based on empirical analyses, which show a strong seasonal influence on consumer prices. It must be mentioned that in the transition countries, because the food goods had a great share in the consumer basket (50.36% in 1994 and decreasing to 38.9% in 2007 in Romania), the exclusion of food goods has a major impact on the inflation development and, at the same time, it could lead to an important information loss in the predictability of this indicator.

Bryan and Cecchetti (1997) offered the fundamental theoretical reason for this approach to core inflation. In their opinion, there are two groups of prices. The prices of the first group are flexible, so they can be adjusted in every period as a response to the changes in the economy. The second group includes the prices which change at a slower rate because the adjustment costs are high.

2.3. Measuring core inflation based on Limited Influence Estimators (LIE) has been spreading by the contribution of Bryan and Cecchetti, S. Shiratsuka, C. J. McNeilly, D. Schiesser-Gachnang, M. Wynne, A.Gagales, H. Bakhshi and T. Yates, Jevons and others. The most used methods are: trimmed mean, mean and median.

Trimmed mean is a "LIE" indicator which is found by calculating the mean of some central portion of the distribution of price changes. The results in the case of Japan (shown by S. Shiratsuka) and for the United Kingdom (H. Bakhshi and T. Yates) were considered satisfactory (see Pelinescu 2001 for detailes).

Median and mean can be considered as a particular case of trimmed mean. So, if α=0, we obtain a weighted mean and if α=50 we obtain the median. Bryan and Pike (1991) consider the median as a more robust measure of the central tendency of inflation.

The advantage of this weighting scheme is that it does not discard useful information about core inflation that may be contained in excluded prices as in the first method presented, and temporary movements are not included in calculation (Ball and Mankiw, 1995). In addition, this weighting scheme computes the changes in weights using the information regarding the changes in the volatility of different price categories. The speed at which the weights are changed, as a response to various fluctuations, will be established by choosing the "window" for variance to estimate inflation. Differing from these methods, the approach which excludes energy, food goods, or other goods is affected by the fact that is necessary only one determination of a minimum category of prices used for core inflation estimation.

2.4. An alternative to core inflation method based on the weighting scheme is Dynamic-Factor Index applied on the Bryan and Cecchetti (1993) and Ceccheti (1997) models (some improved by applying a Kalman filter) and shown by Mark Wynne (1999).

The clear advantage of this method consists in the accurate calculation of standard error, correctly defined, and limits are linked with the persistence of transitory bias, necessity of a high number of observations and changes in the historical figures by re-estimations of the model's parameters.

Quah and Vahey (1995) proposed the building of a core inflation index by applying the vector autoregressive models (VAR) assuming that inflation and output have a stochastic trend and are not co-integrated.

2.5. E. Dobrescu (1999) proposed for the Romanian economy a core inflation index (denoted by COPI (t)) determined by including all individual price indexes for which the relative coefficient of price changes, RSSTD(t) does not exceed the coefficient of persistent relative price changes (denoted by NSSTD), under the circumstances that the coefficient of persistent change has a certain quantifiable level, which tends to a minimum level above zero.

The advantage of this consists in the fact that it permits the minimization of losses of information contained in the consumer price index (PI(t)) (E.Dobrescu, 1999, p. 8).

Denoting the retained individual price indices as j (j=1…m), then the proposed solution described by E. Dobrescu was (the bars indicate modulus - see equations 1 and 2):

$$COPI(t) = \left| \frac{\sum_{j=1}^{m} PI(j,t)w(j)}{\sum_{j=1}^{m} w(j)} \right| \quad (1)$$

$$RSD(j,t) = \left| \frac{PI(j,t) - COPI(t)}{COPI(t)} \right| \quad (2)$$

$$RSSTD(t) = \sum_{j=1}^{m} RSD(j,t)\, w(j)$$

$$\sum_{j=1}^{m} w(j) = max$$

$$SSDT(t) \geq RSSTD(t) \leq NSSTD \quad (*)$$

The calculation algorithm used by E.Dobrescu (1999, p. 9) was:

- The coefficient of relative price changes (SSTD) was calculated for initial statistical series: if it surpasses NSSTD, the individual price index with the highest deviation is excluded;
- For this shortened series the mean index is recalculated; if the coefficient of relative price changes thus obtained is again higher than NSSTD, a new individual price index (with the highest deviation) is eliminated;

- This procedure is continued as long as the resulted coefficient of relative price changes remains higher than NSSTD;
- If the exclusion of the last individual price index (with the highest deviation) generates a coefficient of relative price changes lower than NSSTD, this index is retained with a fractional weight; in this way RSSTD will satisfy the restriction (*) simultaneously with the condition (*).

The criteria used to choose the best methods of estimation of core inflation are:

- The low volatility (core inflation does not move much off the general level of inflation);
- The high degree of correlation with the general price index (it is necessary to choose the stable goods from the point of view of moving pices, in order to ensure a better predictable capacity for future inflation);
- The possibility of real time computation;
- Easy to understand by the people;
- Theoretical ground;
- Access to the statistical figures and a long satisfactory series.

3. Measuring core inflation in Romania

We calculated different measurements of core inflation based on the methodologies presented above. Consequently, the indicators reflect different theoretical and methodological perspectives on identifying the common component of inflation and offer various information to the decision-makers. Synthesizing, the indicators calculated in this paper can be grouped in two categories: 1) methods based on excluding certain categories of prices from the overall inflation rate; 2) methods based on excluding from the overall inflation rate temporary movements of various prices, which at different moments register extremely high volatility (using the trimmed methodology). In the case of trimmed methodology we used unweighted computing method, different from the weighted computing method used in the previous papers (see Pelinescu 2001).

From the first category of indicators we calculated:

"Core 1" index was obtained by eliminating the goods groups under the Competition Council[1] supervision and also the following goods groups: vegetables and canned vegetables, fruits and canned fruits.

"Core 2" index was obtained by eliminating the following goods groups: vegetables and canned vegetables and fruits and canned fruits.

[1] *The administered goods groups which were taken into consideration during all the analyzed periods were: medicines, electric power; gas; heat power; rent established by local government, water, sewer, sanitation; town transport; railway; post services; radio-TV subscription. During January 1994-March 1997 there were also considered: maize flour; flour; bread; pork; poultry; milk; cheese; and until September 1997 the administered goods groups included fuels group as according to the legislation.*

"Core 3" index was obtained by eliminating from the consumer price index both fuel price and prices of other goods: "seeds, beans and other leguminous", "potatoes", "other vegetables", "fresh fruits", "citric and other southern fruits" and "eggs".

"Core 4" index was obtained by eliminating other goods from the consumer price index. These goods are: "seeds, beans and other leguminous", "potatoes", "other leguminous", "fresh fruits", "citric and other southern fruits" and "eggs".

"Core 5" index was obtained by eliminating from the consumer price index the price other goods: "bread", "potatoes", "other vegetables and canned vegetables", "fruits and canned fruits", "milk and dairy products" and "eggs".

"Core 6" index was obtained by eliminating from the consumer price index the fuel price and the prices of electric power, gas and central heating.

"Core 7" index was obtained by eliminating from the consumer price index the food goods prices and the prices of electric power, gas and central heating.

The index of "inflation without seasonal goods" was computed by excluding other product groups:" vegetables and canned vegetables", " fruits and canned fruits", "salad oil, lard, fats", "meat, canned meat and meat products", "fish and canned fish", "eggs".

The index of "inflation without food goods prices" was computed by excluding the food price index from the consumer price index, these goods representing about 47.5% of the consumer basket in 1995, 50.36% in 1997 and 38.9% in 2007.

The index of "inflation without administered prices" was computed by excluding from the consumer price index the goods groups under the Competition Council's supervision.

From the second category of indicators we calculated 5 indicators, based on trimmed mean method, obtained by computing the mean of price goods situated on the central part of distribution, which represent 87.5%, 75%, 50%, 25%, and 12.5% of the consumer basket. At the same time, we have calculated the median and the mean, which can be considered as a particular case of the trimmed mean.

For the computation of the first category of indicators and the median and the mean we used the monthly consumer price index detailed for 101 groups of goods and services, from January 1994 to October 2007.

For the computation of the indicators using the trimmed mean method we used the monthly consumer price index detailed for 64 groups of goods and services, from January 1994 to October 2007.

We present synthetically the results of the computations (see Table 1). Due to the length of the series, namely 168 months for each indicator, we are presenting the annualized indicators December-to-December (except for 2007, December-to-October) obtained from the monthly indicators.

Table 1

Evolution of different core inflation indicators in Romania

	1994	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Inflation index	161.7	127.7	156.7	251.7	140.7	154.9	140.7	130.9	117.9	114.2	109.2	108.7	107.1	104.9

Core 1	157.7	125.9	153.1	167.0	137.6	148.5	137.6	129.6	113.7	114.8	107.5	108.9	106.7	103.9
Core 2	158.8	127.6	156.5	251.1	141.2	157.1	141.5	132.7	115.5	114.8	109.4	108.2	108.6	104.0
Core 3	161.3	126.2	156.0	247.3	141.6	153.5	141.3	133.7	114.0	114.5	108.6	107.9	108.5	104.2
Core 4	159.4	126.8	155.7	250.6	141.7	156.3	141.2	132.7	115.2	114.3	109.5	107.8	108.2	104.1
Core 5	156.8	127.4	153.7	248.6	143.7	157.5	139.7	134.3	115.5	111.8	109.9	108.9	108.8	103.8
Core 6	164.5	127.7	156.6	245.3	138.7	150.1	139.6	129.8	116.6	113.7	107.2	107.6	105.2	105.4
Core 7	160.6	130.7	157.3	250.1	152.1	172.5	133.5	130.8	119.1	113.5	108.9	108.8	109.2	103.9
Inflation without seasonal products	158.2	127.6	157.5	244.2	147.5	166.7	136.9	130.7	116.4	115.7	109.1	108.5	109.2	104.1
Inflation without food goods	159.2	129.7	157.9	256.3	154.8	175.3	135.8	133.8	119.5	114.6	110.4	110.6	111.8	103.6
Inflation without administered prices	162.1	126.2	153.5	177.4	137.4	147.0	137.1	127.8	116.8	114.1	107.4	109.4	105.1	105.0
Median	156.3	120.1	137.9	209.6	134.7	137.8	131.3	124.2	113.1	110.6	106.6	103.7	102.9	102.3
Mean	144.5	112.6	139.7	219.0	125.5	150.4	131.0	126.6	122.0	112.3	108.6	101.7	105.1	106.0
12.5% trimmmed mean	155.4	127.2	148.9	237.1	136.8	144.5	140.2	126.9	115.5	111.7	108.8	106.5	105.2	104.0
25% trimmmed mean	152.7	124.2	141.8	227.8	135.2	142.0	137.1	125.7	113.7	112.0	108.0	105.6	104.6	103.6
50% trimmmed mean	152.6	122.4	135.9	222.3	134.0	140.0	134.7	124.9	113.0	111.1	107.2	104.5	103.7	103.0
75% trimmmed mean	152.6	121.7	134.0	218.2	133.8	139.1	133.2	124.3	112.9	110.9	106.8	104.1	103.3	102.8
87.5% trimmmed mean	152.7	121.8	134.1	216.1	133.7	138.8	132.7	124.1	112.9	110.8	106.7	104.0	103.2	102.8

Starting in 2006, The National Institute of Statistics computed a series of core inflation indicators based on eliminating the more volatile groups of products and services (see Table 2).

Tables 2 and 3 show a comparative image of the alternative indicators computed in this paper and the indicators computed by the National Institute of Statistics.

Table 2

Evolution of core inflation indicator in 2007, official statistical data (National Institute of Statistics)

	Ian	Febr.	March	April	May	June	July	Aug.	Sept.	Oct.
Total CPI	100.20	100.04	100.07	100.52	100.64	100.14	100.29	100.86	101.08	100.97
Total CPI excluding vegetable, fruits and eggs	100.18	100.10	100.16	100.49	100.55	99.98	100.15	100.62	100.91	100.91

Total CPI excluding alcoholic beverages, tobacco	100.11	99.98	100.04	100.54	100.67	100.13	100.07	100.87	101.13	100.99
Total CPI excluding fuel	100.28	100.13	100.07	100.44	100.56	100.12	100.13	100.94	101.15	100.99
Total CPI excluding administered prices	100.37	100.02	100.07	100.41	100.29	100.20	100.47	101.00	101.23	100.99
Total CPI excluding vegetable, fruits, eggs, fuels and administered prices	100.47	100.24	100.21	100.23	99.98	99.96	100.34	100.80	101.12	100.93

Source: INS, Monthly Price Bulletins.

Table 3

Monthly evolution of core inflation indicators in 2007

	Ian	Febr.	March	April	May	June	July	Aug.	Sept.	Oct.
Inflation index	100.20	100.04	100.07	100.52	100.64	100.14	100.29	100.86	101.08	100.97
Core 1	100.23	99.92	100.06	100.27	100.01	100.01	100.21	100.88	101.21	101.00
Core 2	100.09	99.95	100.07	100.46	100.48	100.02	100.15	100.71	101.00	100.97
Core 3	100.23	100.19	100.17	100.38	100.47	100.02	100.16	100.67	100.93	100.91
Core 4	100.15	100.08	100.16	100.48	100.56	100.04	100.15	100.60	100.87	100.90
Core 5	100.10	100.02	100.16	100.50	100.67	100.06	100.14	100.37	100.80	100.90
Core 6	100.42	100.15	100.08	100.25	100.63	100.14	100.35	101.07	101.30	100.94
Core 7	100.36	100.09	100.18	100.27	101.08	100.03	100.14	100.40	100.64	100.63
Total CPI excluding seasonal products	100.19	100.17	100.17	100.48	100.68	100.07	100.15	100.62	100.65	100.80
Total CPI excluding food goods	100.15	100.08	100.15	100.54	100.90	100.03	100.12	100.34	100.53	100.76
Total CPI excluding administered prices	100.35	100.03	100.07	100.36	100.23	100.16	100.38	101.06	101.30	101.01
Median	100.25	100.24	100.19	100.19	100.13	100.08	100.11	100.26	100.38	100.47
Mean	100.28	100.23	100.24	100.37	100.90	100.10	100.20	101.27	101.29	101.02
12.5% trimmmed mean	100.27	100.31	100.26	100.26	100.16	100.09	100.14	100.69	101.02	100.79
25% trimmmed mean	100.26	100.30	100.26	100.21	100.15	100.07	100.16	100.54	100.86	100.69
50% trimmmed mean	100.25	100.27	100.23	100.21	100.13	100.08	100.12	100.36	100.65	100.64
75% trimmmed mean	100.25	100.26	100.22	100.21	100.11	100.08	100.11	100.31	100.53	100.65
87.5% trimmmed mean	100.25	100.26	100.22	100.21	100.12	100.08	100.11	100.31	100.52	100.66

The differences between the computed indicators of core inflation reflect the influence of different prices on the price index. The differences between CPI excluding administered prices computed in this paper and the one computed by the National Institute of Statistics (see Tables 2 and 3) are given by the group of administered prices taken into account in our computation, namely the group without transport by inland waterways, fixed telephone services, services for the issuance of identity cards, driving licenses and passports. For these groups, the National Institute of Statistics has no available data previous to 2006. Nonetheless, these differences are not significant, so that we can compute the CPI indicator excluding administered prices using the available monthly data for 101 groups published by the NIS for the period prior to 2006.

The indicators calculated are complementary. For example, the total CPI indicator excluding fuel calculated by the NIS underlines the influence of the fuel price on the price index. The "Core 6" indicator calculated in this paper underlines not only the direct influence of the change in the price of oil but, at the same time, the indirect influence of oil price through the prices of electric power, gas and central heating. The changes in these prices can be considered a result of the main effect of external shocks on the consumer price index. It does not take into account the propagation effect to other prices. The knowledge of these changes permits the anticipation of the minimum effect of future external shocks and helps in choosing the monetary policy measures to compensate for these effects.

The elimination from the CPI of alcoholic beverages and tobacco, which were under the regulation of supplementary taxes, underline the influence of the increase in such taxes on inflation. Moreover, this computation is important for the calculation of the impact of fiscal policies on inflation, due to the fact that this kind of taxes register more frequent changes as compared to other consumer taxes (VAT).

The analyses of the monthly indicators (see Tables 2 and 3) show the nature of the change in those prices, especially the administrated prices, which do not register constant changes over year.

The computations in Table 4 shade some light on the differences among the core inflation indicators. The methods based on excluding certain categories of prices from the overall inflation rate assume that there are products or groups of products with a constant higher volatility which do not tend to give any information about common inflation. The methods based on trimmed mean do not eliminate certain products or groups of products from the index. They eliminate those products or groups of products that are more volatile in each period. In this context, the efficiency of different methods can be analysed by computing the percentage difference between the coefficient of variation in core indicators and the coefficient in variation of CPI (see Table 4). A lower value of the coefficient of variation of core indicators reflects the smaller volatility of that indicator, therefore the capacity of the indicator to eliminate the volatility of the goods and services prices which exhibit a high volatility. In this respect, the negative values of the percentage difference between the coefficient in variation of core indicators and the coefficient of variation in CPI reflect the capacity of the core indicator to eliminate the higher volatility of the goods and services prices included in the index. The reality in Romania is more complex, as we can see in Table 2.

Table 4

Percentage difference between coefficient in variation in core indicators and the coefficient of variation in CPI

	94	95	96	97	98	99	00	01	02	03	04	05	06	07	Average
Core 1	-35.8	19.0	16.1	41.0	4.2	-13.7	-23.8	7.3	-25.7	-14.2	-20.0	43.5	-50.6	20.8	-2.3
Core 2	-11.3	3.7	3.7	6.0	-4.3	-4.5	2.7	4.7	-12.7	23.6	14.8	13.5	-12.1	1.2	2.1
Core 3	0.4	-11.8	-3.7	6.6	0.6	1.5	6.8	11.0	-29.8	23.5	-6.6	7.9	-11.3	-16.3	-1.5
Core 4	-2.7	-15.3	-2.3	8.8	-0.1	5.2	2.0	5.0	-30.8	18.6	-1.8	14.1	-6.8	-16.3	-1.6
Core 5	-14.4	-22.8	-7.0	-6.3	-11.5	13.0	9.6	-2.8	-21.0	36.5	16.0	38.1	14.7	-16.2	1.8

Core 6	4.4	8.5	0.3	-8.1	8.3	-9.0	-10.7	27.6	-9.6	-13.9	-40.2	-35.0	-37.5	10.7	-7.4
Core 7	-26.7	-5.5	-6.4	-17.9	-4.8	44.6	13.8	39.6	-33.1	4.6	-0.9	-0.8	-4.0	-17.1	-1.0
Inflation, for except admi-nistrative prices	-19.9	47.0	20.9	19.2	8.5	-4.0	-20.7	19.4	-5.0	-10.7	-33.4	31.4	-34.5	16.7	2.5
Median	-21.3	-18.7	-14.9	-12.2	-3.3	-36.9	-66.4	-29.5	-74.1	-53.1	-73.8	-76.3	-83.5	-69.1	-45.2
Mean	-19.5	6.3	12.9	-2.5	-0.7	198.4	-26.5	-20.0	-28.7	30.2	-17.2	85.8	-28.3	21.8	15.1
Trim 12.5%	-26.9	9.8	-4.4	-3.0	-6.5	-25.5	-32.8	-22.3	-57.3	-19.3	-42.1	-55.6	-61.1	-18.9	-26.1
Trim 25%	-25.9	3.3	-14.3	-3.9	-4.3	-28.5	-40.7	-21.5	-65.3	-41.6	-52.7	-63.0	-68.9	-33.5	-32.9
Trim 50%	-25.0	-3.7	-26.3	-3.6	-3.8	-32.1	-49.8	-22.9	-69.2	-42.6	-62.3	-70.1	-77.0	-48.2	-38.3
Trim 75%	-24.7	-5.1	-29.0	-3.7	-4.2	-34.4	-54.8	-26.2	-71.2	-43.9	-68.4	-73.7	-79.8	-52.6	-40.8
Trim 85.5%	-24.7	-4.1	-27.3	-5.3	-4.7	-35.3	-58.1	-26.6	-71.6	-43.6	-68.5	-74.4	-80.5	-52.9	-41.2

The results suggest that the indicators calculated with the first method tend, on the average to register negative values of the respective differences, with the exception of "Core 2" indicator. Moreover, there are years in which the indicators calculated by the first method have smaller values than the indicators calculated by the trimmed method, see for example "Core 1" indicator in 1994, "Core 3", "Core 4", "Core 5" in 1995 and "Core 7" in 1997. This suggests that the indicators calculated by the first method have in the mentioned periods a higher degree of efficiency in eliminating the volatility of some groups of products and services. Nonetheless, the indicators computed using the trimmed method are more stable and have, on the average, better results in eliminating the volatility of some groups of products and services. When we talk about stability, we mean that the coefficient of variation tends to remain negative and fluctuate within a small bend. In contrast, the indicators obtained by the first method are less stable.

On the average, "Core 2" and "Core 5" indicators tend to be less efficient in eliminating the volatility of some groups of products and services. If we analyse the components of "Core 2" and "Core 5" we can see that the groups "vegetables and canned vegetables" and "fruits and canned fruits, "bread", "potatoes" , "other vegetables and canned vegetables", "fruits and canned fruits", "milk and dairy products" and "eggs" are not constantly the most volatile components, so the exclusion of these groups from the CPI does not generate a core index more efficient than the one generated using the trimmed method. During the period 1995-1997 some of the food goods prices (maize flour; flour; bread; pork; poultry; milk; cheese) were under the supervision of the Competition Council, which influenced the values of the indicators over this period. This suggests that in a period of changes in the administered prices it is advisable to compose the core inflation indicators using different methods, which are able to capture the complexity of price modifications.

The coefficient of variation for the mean indicator in 1999 has an abnormally high value, which is explainable through the adjustment of the rent established by the local government to the level of inflation (in May, the price increased 18 times as compared to April). The mean indicator was the most affected, but also all the other indicators

which contained the rent established by the local government were affected. This highlights the high impact of major modification of prices on inflation, even if their weights in the consumer basket are low. The value of "Core 7" in 1999 reflects the impact of the first phase of price adjustment of the electric power, gas and central heating.

After the introduction of the National Program for Disinflation in 2001 a reduction in the volatility of all core inflation indicators and a higher stability generated by coherent monetary policies measures focused on the principal goal, namely price stability, can be noticed.

The results of the paper suggest some conclusions:

- It is useful to take into consideration for choosing the computing method criteria such as theoretical soundness of the method, the availability of statistical published series and the people's capacity to understand the context of the indicator.
- For monetary policies it is important to select the inflation indicator with the lowest volatility. In this respect, the computation of the difference between the coefficient of variation in CPI and the core inflation indicators permits the identification of the core inflation indicator with the lowest volatility (see Table 4).
- The core indicators computed as total CPI excluding alcoholic beverages and tobacco permit the anticipation of fiscal policy modifications upon the evolution of CPI. This indicator offers useful information for monetary policy measures under the regime of inflation targeting.
- The core indicators computed as total CPI excluding fuel and "Core 6" permit the anticipation of external shocks. These indicators also offers useful information for monetary policy measures under the regime of inflation targeting.

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