THE MANNER OF BUILDING SPECIFIC PARTIAL INTERPRETER INDICES AND THEIR PRESENTATION IN THE GENERAL INFLATION INDEX (GII)

Vasile V. DUMITRESCU, PhD,
Gheorghe SĂVOIU, PhD
Piteşti University

Abstract

The motivation to build the General Inflation Index (GII) stemmed from the fact that "inflation" is considered a "pathological" state of the economic system in a country or region, which has multiple effects, representing one of the important issues of fiscal, financial, monetary, and wage policies. A brief introduction principally intends to prove the importance of assessing inflation with the help of a maximally accurate and prompt index, with a major macroeconomic and microeconomic impact, at the institutional level, including research institutions, individuals or the public opinion, an index easy to capitalize in analyses, studies and calculations related to the evolution of the gross incomes of the population in real terms (wages and pensions), as well as the dynamics of purchasing power. This important initial issue also points out that measuring inflation exclusively by means of a consumer price index covers only a part of the scope of the inflationary phenomenon, which urgently implies a new statistical and economic concept – already discussed in three other articles published in the last two years – namely GII. The major section of the article is structured in the same way as a methodological guide, which secures a scientific character to an IGI construction project, and is based on a meticulous and methodical research intended to determine the area where inflation appears and unfolds, resulting from the relationship between the rising prices, tariffs and quotas in use, as well as the decrease in the purchasing and payment power of the national currency and the gross incomes of the population, which are expressed/measured through an integrated system of specific partial interpreter indices. The methodological and construction approach is synthetically described through the execution steps, applying, with creative instinct and intuition, statistical methods and procedures, which are finally presented in a general table, where all the component indices are distinguished, including their main groups. Some final remarks describe the main advantages of applying IGI to the economy of a country like Romania, and implicitly in the European Union (EU).

Key words: *index construction guide, methodological approach, staging, specific nomenclatures, interpreter index, general inflation index (GII), detailing, ordering, grouping of elements, stage computation algorithm.*
Jel codes: C43, C46, E31, P24.

1. INTRODUCTION

In some relatively recent articles, we have identified significant and sufficient reasons for which the current consumer price index (CPI) is an imperfect tool for calculating inflation (Dumitrecu, Săvoiu, 2016a, Dumitrescu, Săvoiu, 2016b, Dumitrescu, Săvoiu, 2017). Even in the general theoretical context, in the case of the CPI, or Consummer Index Prices (as it appears in the statistical literature in English), whether it be determined for the euro or the dollar, there is a relative approximation of the depreciation of the purchasing power of these currencies, and respectively a quantified downward trend with recognized cost-of-living errors, caused by relatively late updating of the product and service nomenclature that makes up the standard basket, by the consumer's slow reactivity to price changes, or by the distortions with qualitative explanations, and they cannot be covered correctly and completely by measuring quantitative developments (Mankiw, 2012, p. 526).

Under current conditions, the construction of a general inflation index (GII) can be achieved by designing and introducing into the national statistical information system the elements necessary for the practical implementation of the four specific partial performance indices: a) the Index of variation of incomes devoted to population's mandatory payments (IVVDPOP or IVIDPMP); b) the investment price index (IPI); c) the the Foreign Exchange Rate Index (ICV or FERI); d) the Index of the stock-exchange values (IVACB or ISEV). All these indexes have a different homogeneous content, and together with the consumer goods price index (CPI), they concur to form, by aggregation, the real and complete level of inflation in Romania. By generating a new statistical and economic approach, it is necessary to study, with tenacity, attention and analytical spirit, the content and scope of each particular partial interpreter index, in addition to those published, and through research work at economic entities, institutions that possess and provide data, with expert advice, which can bring additional insight into how to build indexes and include them into the system.

This specific investigation is all the more necessary as there are various, varied and extensive, yet interesting domains for which ways, means and methods of obtaining data have to be found, and which should allow collection, conveying and processing, for the construction of the four new indices that participate in the much more accurate expression of the level of inflation, and more accurately establishing it.

Statistical survey conducted spatially in sectors and/or fields with inflation-generating activities allows identification and knowledge of factors and payments for which the trend and level are not completely known. This category includes the variation in house, agricultural, forestry, or livestock prices for agricultural activities, etc. In the context of the new General Inflation Index (GII), a very important element is also the increase in quotas. This concept, whose orGIInal meaning, as glossed in 1929 in the *Universal Dictionary of the Romanian Language* by Lazăr Şăineanu, was described and defined as "the value, or the charge, or the course of the public effects", would later carry multiple meanings and forms, ranging from taxes to imposts and fees, from fines to penalties, etc., established by the Public Administration Councils. Other local payments whose significance is sometimes associated with quotas are generated by major family or household events, from weddings to funerals, as well as various other payments made in churches. Of particular importance have also been insurance policies in general, and in particular those relating to the means of transport (CAR), which are subject to change over time, all of which, and other such payments, requiring special investigative actions to highlight specific issues, distinct issues and the means to determine the amount of their temporal and spatial variation.

In conclusion, the construction of specific partial interpreter indices for the purpose of determining the general inflation index (GII) requires an ongoing, constant investigation and study and design activity to create a unitary system meant to obtain data and information grouped by their nature, in keeping with the factors that trigger the inflationary phenomenon, which have a relatively important weight in the diversity, volume, magnitude of the variations and their usefulness in the correct and factorially predictive determination of the GII, and for this purpose it is necessary to synthetically present the concrete construction of the four specific partial interpreter indices, with the stages and the technical aggregation process through which the whole sphere of coverage is secured, as well as the clear presentation of the data in such a way that the content, structure and the grouped elements of each component index can be seen, which describe the sphere and the areas where these phenomena occur.

2. A STAGED GUIDE OF THE CONSTRUCTION OF INTERPRETER INDICES USED IN GII

The index is a relative statistical indicator that expresses the quantitative or qualitative variation of the relationship between two entities/ sizes of the same kind (type), in time, in space, or in relation to the evolution programme or schedule of a researched phenomenon. The literature suggests

that the index theory and method provides a significant number of formulae intended to build indexes (Săvoiu, 2001; 2013); but each one is appropriate to a specific, partial reality, generating results depending on the content and structure of the component elements which characterize them.

In statistical practice, two types of index-building formulas are mainly used, starting from the two classic weighting systems made by the representatives of German statistics:

1. for the purpose of determining the level of physical volume variation, the Laspeyres-type index is preferred (from the statistician, economist and professor Etienne Laspeyres of the University of Basel, who developed it at 30 years, in 1864, without changing its specific formula, although he lived from 1834 until 1913);
2. for the quantification of the level of price variation, the formula of a Paasche-type index is considered to be more suitable (from the young German economist, stock-broker and statistics scholar Hermann Paasche (1851-1925), who was also concerned with the price evolution statistics, and developed his own system focused on the index method, at the age of just 23 years, in 1874).

The General Inflation Index (GII) has the following characteristics, which establish it constructively, in the context of raising the dynamic character of economies, but above all of diversifying expenditure on the whole, from products and services, up to quotas or other specific payments:

a) it is a qualitative index, and the specific partial interpreter indices that make up it should theoretically be constructed on the basis of the Paasche-type formula, but due to the practical lack of prompt data on the weights of the current calculation period (t), the Laspeyres formula is used, and they are finally aggregated by a polynomial formula based on the structure (weights) in the most recent current calculation period (Wt-1): GII = WCPI × CPI + WIVIDPMP × IVIDPMP + WIPI × IPI + WFERI × FERI + WISEV × ISEV + W free (Dumitrescu, Săvoiu, 2017);
b) it is a synthetic index, especially with a broad content and scope, which characterizes a complex, diverse economic phenomenon, having major effects on the correlations, the proportions in the economy, especially the gross incomes/final expenditures of the population, respectively the decrease the effective payment of the national currency;
c) it includes both the contributions and the revenues obtained from them, because the latter are also increased from other budgetary

sources, which have other tendencies;

d) it can also be built, distinctly, according to the dominant categories of the population (in a single or multi-criteria vision, employees, retirees, employers and associates, self-employed or free-lancers, farmers, peasants, unemployed, to the extent that there are incomes and nomenclatures for each category).

The General Inflation Index (GII) is a statistical and economic indicator that expresses a phenomenon of the highest strategic importance, as is, in fact, inflation, which occurs as an imbalance in a national economic system with multiple or diverse effects, and requires special attention and intense research, as well as constant, extensive and profound studies in order to determine the effects triggered by the social and economic policies applied, which cause an inflationary effect.

Partial specific interpreter indices are built by taking the following steps:

I. Development of methodologies for the construction of the four specific partial interpreter indices, which are not currently evaluated in the current information statistic system, and mainly contain the following useful aspects: object, purpose, content, coverage, establishing the nomenclature criteria, selection of centers and observation points, collection and recording of statistical data and information, mode of transmission, processing, type of formula and, implicitly, the weighting system used, as well as calculation, frequency of observation, processing, presentation and publication of the inflation rate.

II. The elaboration of the nomenclatures for the four specific partial interpreter indicators, centred on an intense activity of studying the content and scope of the indexes, employing a set of statistical techniques for statistical research, collecting, determining the component elements, ordering the material, breakdown or dismembering by category, detailing and structuring it in keeping with the representative elements in homogeneous groups. In the first stage, one has recourse to the product and service classifications, the national tax code and other existing regulatory acts containing such elements, and in the second stage, to the preliminary research (field documentation and completion) in the respective fields and sectors, where, besides the manner of collecting and homogeneously defining data, information is obtained on some aspects of the selected assortments for the "basket" sample, as well as their characterization, ordering and grouping in steps according to the nature, homogeneity, representativeness, frequency in consumption/payment, continuity or belonging to the corresponding group, being stratified down to the smallest, simplest, individual/elementary level, or assortment/position

containing the related varieties they belong to: goods prices, service tariffs, and the quota positions are expressed either in lei/ROL, or in percentages (%). It is very important to draw the detail by structuring the entire volume of the content and the scope of each specific partial interpreter index, proportionally, by dividing the elements both on the whole and on each level, step, so as to ensure a necessary representative character to all component elements. Thus, for example, in order to characterize the level of the insurance group, the optional ones will be included, besides the obligatory ones, to form a unitary whole, a cause being a similar provision allowing to bear the costs of damage in case of occurrence. The detailed description and classification of nomenclature components down to the most basic level of assortment/position, in order to select the representative ones, which underlie the construction of indices, becomes a *sine qua non* condition that ensures proportionality, homogeneity and a characterization with a real degree of coverage of each level / step, which is done by field investigations on certain groups, to determine their specific weightings in the aggregate flow, and allows for substitutions / additions / imputation in case of disappearance/appearance of some elements.

In the process of drawing up the nomenclature, there are some items, sorts or varieties that need to be studied carefully, such as: the variety and diversity of fiscal and/or non-fiscal taxes, duties, fines, penalties, accompanied or followed by interest, established at a central or local level, mobile telephony charges from different operators and interconnection to the EU, NBR intervention at the recovery rate to create a balance between internal and external prices for exporters and importers (deficit differences or surpluses), or the manner of expressing the price per square metre in residential building (which rose 20% to 50% in 2017 compared to 2014 in cities such as Bucharest, Cluj-Napoca, Timişoara, Iaşi, etc.). Some content analyses of the level of quantification of the effect that many other aspects have on price, tariff, or nominal quota are also required. At this stage, the manner will be also analyzed of separating some components such as: the tax on dwellings that is paid separately from the tax on the land where the dwelling is located, or that the owner owns. Another factor that also requires a distinct analysis is the housing, since the taxation of land presents other types of ranking, starting from an expanding multiplication of criteria and varieties, from residential, non-residential, mixed, then amplified according to size, rank/area (there are six ranks already), where they are located, etc. Contributions paid by employees have also become an important element, since moving from employer to employee they virtually increase from 10.5% to 35%, coupled with an announced drop in income tax from 16% to 10%: all of this can always yet further increases. There are situations where some analyses of the degree of influence related to the occurrence or disappearance of cheaper

or more expensive sorts/items, depending on the distributor, manufacturer, quality, quantity or the inclusion of other elements in the prices, tariffs, quotas. Eloquent examples in this regard appear more and more frequently, and one can merely mention those of excise duties on petroleum products, green certificates on electricity, interest on fixed or variable loans, influenced by the change in ROBOR (the interest rate set by banks, and applied to sums borrowed between them), including examples of exceptional positive or negative developments, as in the case of the ROBOR level that doubled in one week, at the end of the month of September 2017, from 0.96 to 1.87, due to lack of of bank liquidity, which triggered an increase in interest rates on loans granted to the population according to the interests of each bank.

III. Designing and establishing the support for recording, and the ways to archive data on prices, tariffs, rates and quotas (from laptops, individual datasheets and/or notebooks where detailed selections or representative items/ varieties or positions are selected, from the "basket" established, with a clear identification of the main technical characteristics of each item/variety.

IV. Establishing the centres for reporting the price and tariff data for Consumer Price Index (CPI) was done in 1990 on the basis of two criteria, the number of inhabitants in the county capitals and the Municipality of Bucharest, and also the volume of value of the sales of goods and services in 1989, when the majority of the rural (or urban) population who was commuting worked in places other than home and bought supplies from cities (and towns). The observation and collection points were staggered according to the real and objective situation of that time, but after almost three decades, in 2018, the situation is completely different, and enlargement of the centers would be necessary, as there are other proposals already made Dumitrescu, Săvoiu, 2017), so that other localities are included, having a population of at least five thousand inhabitants, and periodically (for example, a decade after the census), the principle of inclusion in the sample of centers should be a rotational one, so as to include other centers or collection points in different areas in point of activity, or territorial location. The methods used to determine or obtain data and information remain selective (focused / directed) research or scrutiny, whose role is very important in determining the coverage area, size, structure, territorial and national representativeness, sample size, maintaining the samples taken fixed or rotational, that the data and information obtained allow to be expanded, ordered, grouped, structured, non-redundant, determined/imputed where appropriate, so as to make inference or extrapolations and correlations between them, and also to provide the full volume required to express the whole sphere of inclusion.

V. The gross incomes of the population are broken down according to the purpose of the expenditure and the structure of the nomenclatures,

annually constituting and updating weighting coefficients in two periods, the base year (o) is broken down according to the structure of the elements contained in the four specific partial interpreter indices, thus becoming an integrated indicator, as the degree of detail is different depending on the volume, diversity of content, structure and the number of steps of each index, which will be expressed in prodecimiles ($^{0}/_{000}$), the incomes being those of the previous year (t-1) for the five indices (including CPI), thus expressed in a unitary manner, and so the rule becomes applicable to the free term (W).

VI. The construction of specific partial interpreter indices starts from the basic, individual, elementary level of the representative sorts or items/ varieties or positions, where the following are determined:

a) the average price/tariff/quota of the assortments (for goods and services, expressed in lei/ROL), of the position of quotas (taxes, imposts, dues) in lei or as percentage (%), based on prices/tariffs/ nominal quotas of the varieties of components or representative items/varieties or positions, using the arithmetic mean value, or the geometric or other average, for the base/reference period (year (0) and for the current calculation period (month or year = t);

b) the elementary index of the assortments or representative items/ varieties or positions is obtained as the ratio between the price/ tariff/average quota of the current calculation period (t) and the price/tariff/average quota of the base period, reference (0);

c) the average index of the assortments or varieties or representative positions of the same nature/genre is obtained at the first level from the sum of the elementary indices of the same assortments or items/ varieties or representative positions weighted by the coefficient assigned to each elementary index;

d) the average index of the assortments or varieties or representative positions of the same genre or nature, obtained under point c), is applied to the weighting coefficient assigned overall to the category of assortments or items/varieties or positions concerned, on the grounds that the other assortments or items/varieties or positions, not included in the calculation, have the same tendency of evolution, as bein representative. Through this calculation method, applied to all categories at this level, the full coverage of the scope of the specific partial interpreter index is secured;

e) the average indices obtained under point d) are summed for the higher level according to the common characteristics of the component elements, or for the presentation of some more particular aspects (according to the calculation formula);

f) the specific partial interpreter indices are obtained by summing up/aggregating the indices from point e), in the very groups of the respective indices.

VII. Elaboration of the programme of export/import or data transmission of the data and final processing algorithm describing the construction of the specific partial interpreter indices, respectively the General Inflation Index (GII).

VIII. Data presentation is a process that completes and closes the complex construction effort of GII as a synthetic indicator resulting from the inclusion of the five specific partial interpreter indices (Table 1):

A detailed and structural presentation of specific partial interpreter indices within the GII

Table 1

Name of indices and component groups	Weighing coefficients	Indices (%)		Index (%) [(t):(t-1)]
		Month (t-1)	Month (t)	
General Index of Inflation (GII)				
TOTAL	1,0000			
1. Consumer Goods Price Index (CPI)	1,0000			
Food goods				
Non-food goods				
Services				
2. Index of variation of incomes devoted to population's mandatory payments (IVIDPMP)	1,0000			
Taxes				
Fees and dues				
Contributions				
Fines				
Interest on loans				
Insurance policies				
Other payments				
3. Individual investment prices (IPI)	1,0000			
Housing				
Special constructions				
Farmland				
In-city land				
Forestry				
Cars				
Other investments				
4. Foreign Exchange Rate Index (FERI)	1,0000			
5. Index of Stock – Exchange Values (ISEV)	1,0000			
OTHER ELEMENTS (W)				

Note: The indices are recorded with the base of the reference year (o) of the previous month (t-1) and the current month (t), and the current month index **[(t):(t-1)]** is quantified. The weighting coefficients made use of in this construction are two-fold: a) for the construction of specific partial interpreter indices, they are expressed in prodecimiles ($^{0}/_{000}$); b) for the general index, they are described as coefficients whose total is unitary.

CONCLUSIONS

Statistical indexes, and, in particular, the GII-type interpreter indices, are built from databases, but not from any data, rather by means of exclusively real and complete data that correspond to the intended purpose, which are necessary, rigorously selected as not being aberrant or erroneous, and which allow to clearly define the variations of a number of complex phenomena, also providing information that explains factors and causes in as clear as possible a manner, ensuring that the content and scope of the statistical indicator is fully understood, thus enabling it to express, as faithfully as possible, the evolution of a phenomenon that is constantly investigated and analyzed.

The construction of the Global Inflation Indicator (GII) has a number of advantages, which can bring additional elements in the analysis of the cases of continuity and discontinuity, balance and imbalance, as well as establishing critical macroeconomic context solutions. Among the major advantages one can mention:

- **a.** ever new and consistent data and information are obtained concerning the developments in areas and sectors not yet explored so far, which quantify and explain, for example, the variation in the incomes of the population by destination of expenditure, the share of each destination in the total expenditure, the structure and composition of the specific indices, which then allow identifying a set of correlations and associations that are useful both in macroeconomic and microeconomic terms;
- **b.** determining the effect on the gross income of the population and diminishing the purchasing power (payment) of the national currency;
- **c.** variations in the elements affecting the fiscal, financial, banking, insurance, foreign exchange and stock exchange sectors may be known;
- **d.** providing a real and continuous basis for NBR, which is useful in establishing the inflation forecast;
- **e.** other databases are expanded and deepened, which can then, by means of selection, sorting and grouping, be used to construct the deflating indices for the real expression of some components of the gross domestic product and of the consolidated state budget, etc.;
- **f.** it can also be applied in the Euro area, with similar implications, and also with similar major advantages.

This index is a complex statistical tool for measuring, encompassing, expressing and guiding the mechanism for setting political and economic measures practiced in a national economic system, which allows, based on

this new concept of general inflation index, elaborating deeper, clearer and more documented analyses, which in turn provide continuity in economic and administrative political solutions that can secure the strengthening of the national currency and, implicitly, improving relations in international exchanges and international comparisons, more accurately anticipating the impact of joining the Euro area, as well as in other studies or practical works. The current changes to the national Fiscal Code require the introduction of the proposed indices in the national statistical information system in order to obtain useful and detailed data and information, necessary in order to know the effects produced, and made available to policy-makers to enable them to establish the necessary measures to improve the national and regional market economy system.

BIBLIOGRAPHY

1. Dumitrescu, V. V. & Săvoiu, G. 2016a. Major Issues of Statistical Quantification of Current Inflation in Accordance with Romania's Total Gross Revenues of Population-The Necessity for a General Index of Inflation (GII), Romanian Statistical Review Supplement, Romania Statistical Review, vol. 64(10), pp. 14-24.
2. Dumitrescu, V.V.& Săvoiu, G. 2016b. A Method for Statistically Determining Inflation-Calculating the "General Index of Inflation" (GII), Romanian Statistical Review Supplement. Romanian Statistical Review, vol. 64(11), pp. 12-20.
3. Dumitrescu, V.V. & Săvoiu, G. 2017, Some methodological aspects concerning the statistical determination of inflation, Romanian Statistical Review Supplement. Romanian Statistical Review, vol. 65(10), pp. 82-96.
4. Mankiw, G., (2012). Principles of Economics, Sixth Edition, Harvard University Press, Mason: South –Western Cengage Learning.
5. Dumitrescu, V. V., 2008. O metoda de determinare a puterii leului, Tribuna Economică, nr. 43, miercuri, 29, octombrie, 2008.
6. Șăineanu, L., 1929. Dicționarul Universal al Limbei Române, A șasea edițiune revăzută și adăogită, Craiova: Editura Scrisul românesc, S.A., p.172.
7. Săvoiu, G., 2001. Universul prețurilor și indicii interpret, Pitesti: Editura Independența Economică.
8. Săvoiu, G., 2013. Situații statistice financiar-contabile și sisteme de indicatori statistici derivați, București: Editura Universitară.