

TWO IMPORTANT TRADITIONAL PRICES' INDICES FOR THE MEASUREMENT OF INFLATION AND COST-OF-LIVING IN ROMANIA, DURING THE LAST CENTURY

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Abstract. *This paper details the two original constructions of price indices made by the author in the last ten years. These constructions are a proposal of centennial price index and an over eighty years old Romanian cost-of-living index. First part of the paper describes the centennial index for measuring inflation in Romania, proposed by author in 2007, in international conference to “I.G. Zane” Romanian Academic Institute, from Jassy. The experience and the constructions of price indices realized after 1913 in the Romanian economy are capable of ensuring deflation or inflation movements for several economic and historical values, all over the subsequent existence in Romania, if, to that effect, the main instruments that we consider are correctly sequenced. We deal with three constructions that exemplarily define the quality and the tradition of Romanian statistics. The first belongs to an effort foreign to the national statistical effort, and is known as the index according to Argus, being a product of the early economic thought, and the first interpret index, published in “Anuarul pentru toți” (Everyone’s Yearbook), appeared at the “Cultura Poporului” Printing House in Bucharest, during the years after 1918, up to 1926. The second one is the interpret index of the ICV type, conducted by the Central Statistics Institute, from 1929 till 1938, and the third one is the interpret index of the IPC type, conducted after the year 1990 by the National Board of Statistics. In-between, the constructions derived from the ratio of the indexes of nominal and real wages allow the correct sequencing of such a Schumpeterian construction of a historical, and mainly economic, value hard to estimate at present. The approach substantiated in this logically necessary sequencing is finalized through an original construction of a Romanian centennial price index. The second part of the paper describes the construction of cost-of-living index (ICV type, published in the Romanian Statistical Review, in 2007, too). In this original cost-of-living index too, after 1929, in Romania, the author has used the two same indices that exemplarily define the quality and the tradition of Romanian statistics (the cost-of-living index, from 1929 till 1938, and the interpret index of the PCI type, after the year 1990). This second index contributes, as illustrated in the context, to diminishing the risk of re-evaluations and uncertainties of the comparisons of a social and economic nature. The final approach is finalized through an original construction of an over eighty years old Romanian cost-of-living index. A last final remark underlines the necessity of the statistical traditional instruments in our country too.*

Key words: statistical index, interpret index, cost-of-living index (CLI), consumer price index (PCI), harmonized consumer price index (HPCI), Schumpeterian index, centennial index.

JEL codes: N11; C1; O5

1. INTRODUCTION

“The evolution of the prices is suggestive of the economic history, in general. The currency’s power of buying is the factor that determines, in fact, a nation’s wealth or poverty...”
- Nicolae Georgescu-Roegen in *Romania’s Encyclopaedia*, vol. IV, 1943-

Measuring the phenomenon of general and continuous increase of the prices was initiated by bishop Fleetwood William in 1707, by estimating at circa 500% the inflation present in the

English economy after 1440. Subsequently, the science of statistics materializes various specific instruments of evaluation, defined as price indices. In a constant manner, a price index must meet the following essential criteria as far as their practical construction is concerned: extended coverage, national and regional comparability, promptness and periodicity adjusted to the economy, certainty and stability as to random fluctuations), objectivity and reproducibility, simplicity / plainness, and theoretical consistency.

By analysing the statistical traditions, very old as far as the economic and historical reevaluations, through the agency of a number of prices or interpret indices, one can easily find that the time universe covered exceeds, in England, two hundred years, and that it ensures historical and centennial series in the rest of Europe. But the experience and the constructions of price indices realized after 1913, in the Romanian economy are capable of ensuring deflation or inflation movements for several economic and historical values, all over the subsequent existence in Romania, if the main instruments created by the national statistics, to that effect.

The study of the price evolution in Romania or in the Romanian Principalities could provide the researchers with a variety of surprising data. Unfortunately, homogeneous and easily controllable data are scarce before the First World War. The first sober, well-documented, realistic and concise analyses, although distinctly carried out on modern Romania between 1920 and 1940 by Nicolae Georgescu-Roegen and Virgil Madgearu, are identically periodized economic analyses. The tradition of the Romanian economic and statistical school transforms their works into testimonies of analytical rigorousness and original synthesis. Combining all the data available, one can attempt a novel construction of interpret index of consumer's prices taking as a basis the year 1913. What an instrument whose nature is to reflect the "imbalance of imbalances" or inflation looks like in a practical way is a question with important consequences, both practical and historical? Combining information available after 1929, one can attempt a novel construction of a cost-of- living index, too. Capturing a general increase in the level of prices over one century period and a cost-of-living index for eighty years period could become telling examples of national statistical tradition.

2. A TRADITIONAL PRICE INDEX FOR THE INFLATION'S MEASUREMENT

Etymologically, the terminology of *interpret* index can represent a reasonable linguistic solution, and its signification must be that of the original value of the Latin term, basically made up of *inter* = "between" (hence the idea of implicit go-between, and mediation) and *pretium* "price". Nearly all the index constructions are originally interpret indices, and they use quantity (q_i) as a co-measurer or weight, starting from the total volume of the transactions done $T_i = p_i \cdot q_i$. The qualitative factor is permanently price (p_i). As a usual image, an interpret index, in keeping with the conform classical theory, is expressed as:

$$I_{1/0}^p = \frac{\sum q_{ai} P_{1i}}{\sum q_{ai} P_{ai}}, \quad (1)$$

where $a = 0$, or $a = 1$, and q_{ai} is a simple average ($\sqrt{q_1 \times q_2}$), be it geometrical, arithmetical, etc. The distinct definitions of the national statistics, attributed to the various types of price indices, validate the statement that the interpret index has the following characteristic features as its constantly identical elements: a measuring instrument furnishing an *estimate* of price evolution; *estrangement* of commodities and doing of services (prices and tariffs *actually used*); *modification of prices in-between a fixed period* (called the basic or reference period), and a *variable period* (called the current period). *Three constructions of price indices mark the remarkable tradition of Romanian statistics.* One of them belongs to an endeavor coming from

outside the national statistical institution, and is known as the *index according to Argus*, being a product of the early economic thought, and the first interpret index ever published in this country:

Table no. 1.

The Index according to ARGUS (1916 - 1926)								
Year	1916/1917	1921/1922	1922/1923	1923	1924	1925	1926	Year
- % -	100	1500	2170	3162	3954	4557	5100	- % -

Source: *Everyone's Yearbook*, "Cultura Poporului" Publishing House, Bucharest, 1929.

The second one is the interpret index of the cost-of-living type compiled by the Central Statistics Institute, more precisely by the price department led by none other than N. Georgescu - Roegen:

$$I^{CL} = \frac{\sum v_1}{\sum \frac{1}{i^p} v_1} \quad (2)$$

The theory concerning the cost-of-living (i.e. the cost-of-living index theory) dominated the inter-war period, being developed, independently, by both the Russian mathematician A.A. Konüs, and most of the English-speaking economists of the thirties (whose solutions were synthesized by R. Frisch, in 1936, in an article, as famous as that index "bible" authored by Irving Fisher (*The Making of Index Numbers. A Study of Their Varieties, Tests, and Reliability*, published in 1922). This explains why the CLI put forward as an interpret solution, generating a Paasche index, was used by N., Georgescu-Roegen in constructing the Romanian index. Comparability and the wish of instrumental confrontation are prevalent in the inter-war age of statistics. Culling prices, processing the data and publishing them position Romania in a high-class, prominent context of the price statistics that are comparable internationally:

Table no. 2.

The cost-of-living index in various countries (1932-1938)								
Romania	1932	1933	1934	1935	1936	1937	1938	Romania
1929=100	62,2	56,7	53,4	55,6	57,9	66,1	74,6	1929=100

Source: *Romania's statistical summary*, vol. II-1939, ICS, Bucharest, 1939

Since 1990 up to the present, the National Institute of Statistics has undertaken an effort quite comparable to that in the period following the year 1910. Compiled in a very short period – in December 1990 the first type PCI interpret index had already been published – and based on the French method of NISSE, adapted, in view of the great number of assortments (2551), to the relative „penury” of the Romanian market, the interpret index planned holds a special significance in the statistical practice. The system of balancing used in constructing the index for commodity price index is of the Laspeyres type, that is:

$$PCI = \frac{\sum I^p(p_0q_0)}{\sum (p_0q_0)}, \quad (3)$$

where: $\frac{(p_0q_0)}{\sum (p_0q_0)} = C_p$ and: I^p = price index of the level of aggregation specific to the post, or group of commodities and services, C_p = coefficient of balancing specific to the post, or group of commodities and services. This new interpret index, constructed by the statistician V.V. Dumitrescu, is published in the first number of the *Bulletin of public information* of CNS, in December 1990:

Table no. 3.

Index of prices for public consumption in November, as compared to October 1990 (on the aggregate, and per categories of expenses)	
- percentages -	
General total	123.4
Food goods	120.4
Non-food goods	124.7
Services	127.0

Source: *Statistical Bulletin of Prices*, no. 1/ 1990, Ed. DCS, Bucharest, 1990

The remarkable instrumental comparability must be underlined, no less than the tradition of Romanian statistics as compared to that of French extraction, represented by the famous *l'indice des 34 articles*, constructed starting in 1914, or the equally well-known *l'indice des 13 articles*, published constantly since 1916. It is to the same 1914-1916, period of the American price interpret indices, or those of the overwhelming majority of the European economies belong.

In the practical, actual construction there were quite a lot of obstacles, starting from the essential differences of conception and de evaluation between the principal systems of balancing of the price interpret indices (of the Paasche and Laspeyres types), which underlie the constructions belonging to the CLI and CPI standards, and maybe ending with the solution of the ratio between the nominal and real wages in *Romania's Statistical Yearbook* for the period 1952-1989, where the administration of the single prices tried to conceal inflation – actually, a rather moderate one, yet considered to be an economic term incompatible with planned economy. Although the statistical effort of the sequencings is outstanding, while the theory of the chronological index series apparently contributes to further complicate any attempt at making a long-term index construction through imposing periodical relational reassessments (generated by the changes occurring in the balancing coefficients), be it for the impressive effort of the Romanian statistical and economic school, a centennial construction of a Romanian interpret index of inflation was in order.

The main bibliographical and methodological landmarks of the construction proposed are:

- *Anuarul pentru toți (INDEX ARGUS)*, Tipografia “Cultura poporului” București, 1929;
- N. Georgescu-Roegen (coord.), *Statistica prețurilor pe anii 1928 și 1929 (The Price Statistics for the Years 1928 and 1929)*, Ed. ICS, București, 1930;
- N. Georgescu-Roegen (coord.), *Statistica prețurilor pe anul 1937 (The Price Statistics for the Year 1937)*, Ed. ICS București, 1939;
- *Breviarul statistic al României (Romania's Statistical Summary)*, vol. II-1939, Ed. ICS București, 1939;
- *Enciclopedia României (Romania's Encyclopaedia)*, vol. IV, București, Ed. Monitorul Oficial și Imprimeriile Statului, Imprimeria Națională, București, 1943;
- *Anuarul statistic al României (Romania's Statistical Yearbook)*, Ed DCS, INS, București, the 1960-2008 collection, and
- *Buletinul statistic de prețuri (The Statistical Price Bulletin)*, the December 1990 - March 2009 collection, INS, București.

Methodologically, not every aspect could be solved, which was specific to the theory of the construction of Schumpeterian statistical indices, but a few original solutions of redressing and “intrapolation” were attempted. The result of that simultaneous historical, economic and statistical investigation is presented below, by the name of Romanian centennial interpret index:

**The evolution of the Romanian centennial interpret index of the PCI type
(Instrumental proposal)**

Table no. 4.

Year	Interpret index of the PCI type		Year	Interpret index of the PCI type		Year	Interpret index of the PCI type	
1913	1,000	100,0	1947	243588,800	24358880,0	1980	41,509	4150,9
1914	0,820	82,0	15.08. 1947	Second great monetary reform 1:20000		1981	43,312	4331,2
1915	-	-	1947	12,179	1217,9	1982	51,022	5102,2
1916	0,755	75,0	1948	-	-	1983	53,062	5306,2
1917	-	-	1949	-	-	1984	53,593	5359,3
1918	-	-	1950	-	-	1985	54,713	5471,3
1919	-	-	1951	-	-	1986	55,687	5568,7
1920	-	-	1952	24,360	2436,0	1987	57,027	5702,7
1921	11,330	1133,0	1953*	25,651	2565,1	1988	58,610	5861,0
1922	16,390	1639,0	1954*	27,015	2701,5	1989	59,682	5968,2
1923	23,880	2388,0	1955	28,452	2845,2	1990	62,727	6272,7
1924	29,850	2985,0	1956	29,451	2945,1	1991	169,497	16949,7
1925	32,500	3250,0	1957	29,524	2952,4	1992	526,079	52607,9
1926	35,520	3552,0	1958	31,497	3149,7	1993	1873,381	187338,1
1927	38,550	3855,0	1959	31,205	3120,5	1994	4434,275	443427,5
1928	39,640	3964,0	1960	30,669	3066,9	1995	5866,546	586654,6
7.02. 1929	First great monetary reform		1961	31,400	3140,0	1996	8142,768	814276,8
1929	39,030	3903,0	1962	31,540	3154,0	1997	20747,802	2074780,2
1930	34,500	3450,0	1963	31,058	3205,8	1998	33009,749	3300974,9
1931	28,370	2837,0	1964	32,715	3271,5	1999	48128,214	4812821,4
1932	24,280	2428,0	1965	32,886	3288,6	2000	70122,808	7012280,8
1933	22,130	2213,0	1966	32,959	3295,9	2001	94315,176	9431517,6
1934	20,840	2084,0	1967	32,789	3278,9	2002	115536,091	11553609,1
1935	21,700	2170,0	1968	33,641	3364,1	2003	133213,113	13321311,3
1936	22,600	2260,0	1969	34,323	3432,3	2004	149065,474	14906547,4
1937	25,800	2580,0	1970	34,348	3434,8	2005***	162481,366	16248136,6
1938	29,120	2912,0	1971**	33,714	3371,4	2006	173140,144	17314014,4
1939	30,400	3040,0	1972**	33,739	3373,9	2007	181520,127	18152012,7
1940	43,130	4313,0	1973**	34,104	3410,4	2008	195769,457	19576945,7
1941	-	-	1974**	34,737	3473,7	1.02. 2009	199939,346	19993934,6
1942	-	-	1975	35,444	3544,4	2010	*	*
1943	-	-	1976	35,858	3585,8	2011	*	*
1944	364,800	36480,0	1977	35,980	3598,0	2012	*	*
1945	-	-	1978	36,808	3680,8	2013	*	*
1946	-	-	1979	37,758	3775,8			

Note* - = data missing * = Useful data in the future till the moment of monetary convergence RON - EURO

The level of that index of 19993934,6 %, or an increase in prices by about 200 000 times, reached in nearly 96 years of evolution of the prices in Romania is a really impressive one, and it is probably incomparable to the very inflationary phenomena typical of inter-war and early post-war Germany, becoming, in retrospect also one of the fundamental lessons in economics as far as the permanent balancing of national economy is concerned. If one contrasts this un-denominated approach to the denominated vision, then the Romanian centennial interpret index of RON would have a different image, reflecting another tendency, which is greatly reduced (significantly de-multiplied) to 1999,39 %, or an increase by only 20 times.

3. A TRADITIONAL COST-OF-LIVING INDEX

Computation method for cost-of-leaving index underlines the importance of different weights that must be used, specific to every year from the period 1990-2008 (cancelling the two years final discrepancy between 2009 and 2008 generated by the Household Budget Survey - HBS).

The result of that simultaneous historical, economic and statistical investigation is presented below, by the name of an over eighty years old Romanian cost-of-living index (the most significant details have been in brief presented in the next table):

Table no. 5.

Year	Year HBS	Weighting coefficient			Detailed price index			Type of Index	
		Food goods	Non-food goods	Services	Food goods	Non-food goods	Services	CLI**	PCI
1990	1990	4049	4028	1923	104.5	105.5	105.5	105.1	105.1
1991	1991*	4046	4377	1577	286.2	267.8	235.7	269.0	270.2
1992	1992*	4254	4273	1473	336.6	294.2	280.4	308.5	310.4
1993	1993	4692	4054	1254	348.9	369.0	340,3	355.6	356.1
1994	1994*	4705	4070	1225	236.2	232.8	250.8	236.5	236.7
1995	1995	4793	4032	1175	131.9	129.6	142,7	132.1	132.3
1996	1996*	4888	3915	1197	136.4	139.1	146.9	138.6	138.8
1997	1997	5036	3730	1234	251.4	252.5	276.5	254.7	254.8
1998	1998	4761	3789	1450	148.4	160.2	192.1	158.0	159.1
1999	1999	4388	4022	1590	127.9	152.3	184.0	144.2	145.8
2000	2000	4470	3956	1574	143.7	144.0	153.9	145.3	145.7
2001	2001	4434	3925	1641	135.7	133.1	135.4	134.6	134.5
2002	2002	4226	4131	1640	118.3	125,5	126.8	122.6	122.5
2003	2003	4168	4182	1650	114.7	116.1	114,8	115.9	115.3
2004	2004	4071	4225	1704	109.5	113.2	114.7	111.9	111.9
2005	2005	3892	4354	1754	106.1	111.3	110.5	109.1	109.0
2006	2006	3750	4470	1780	103.84	108.47	108.20	106.64	106.56
2007	2007	3758	4405	1837	103.89	104.99	106.63	104.87	104.84
2008	2008 ¹	3750	4400	1850	109.22	106.36	108.57	107.82	107.85

Source: www. insse. ro și *Statistical Bulletin of Prices*, no. 1/ 1990-3/ 2009, Ed.INS, Bucharest

* Note: data are redressing. Note ¹ = estimated data

The Romanian cost-of-living index is intended to be not only a homage to the endeavour made by the Romanian school of statistics and de economics, but also an instrument of genuine theoretical and practical, social and economic valences.

The evolution of the Romanian cost-of-living interpret index (CLI type)

- an instrumental proposal -

Table no.6.

Year	Cost-of-living Index	
	Coefficient	Per cent
7.02. 1929	First great monetary reform	
1929	1,000	100.0
1930	0.884	88.4
1931	0.727	72.7
1932	0.622	62.2

Year	Cost-of-living Index	
	Coefficient	Per cent
1954	0.692	69.2
1955	0.729	72.9
1956	0.755	75.5
1957	0.756	75.6
1958	0.807	80.7
1959	0.800	80.0

Year	Cost-of-living Index	
	Coefficient	Per cent
1984	1.373	137.3
1985	1.402	140,2
1986	1.427	142.7
1987	1.461	146.1
1988	1.502	150.2
1989	1.529	152.9

Two important traditional prices' indices for the measurement of inflation and cost-of-living in Romania, during the last century

1933	0.567	56.7	1960	0.786	78.6	1990	1.607	160.7
1934	0.534	53.4	1961	0.805	80.5	1991	4.323	432.3
1935	0.556	55.6	1962	0.808	80.8	1992	13.336	1333.6
1936	0.579	57.9	1963	0.796	79.6	1993	47.427	4742.7
1937	0.661	66.1	1964	0.838	83.8	1994	112.165	11216.5
1938	0.746	74.6	1965	0.843	84.3	1995	148.170	14817.0
1939	0.779	77.9	1966	0.845	84.5	1996	205.364	20536.4
1940	1.105	110.5	1967	0.840	84.0	1997	523.062	52306.2
1941	-	-	1968	0.862	86.2	1998	826.438	82643.8
1942	-	-	1969	0.879	87.9	1999	1191.724	119172.4
1943	-	-	1970	0.880	88.0	2000	1731.575	173157.5
1944	9.347	934.7	1971	0.864	86.4	2001	2330.700	233070.0
1945	-	-	1972	0.864	86.4	2002	2857.438	285743.8
1946	-	-	1973	0.874	87.4	2003	3311.771	331177.1
1947	6241.065	624106.5	1974	0.890	89.0	2004	3705.872	370587.2
15.08. 1947	Second great monetary reform 1:20000		1975	0.908	90.8	2005	4043.106	404310.6
1947	0.312	31.2	1976	0.919	91.9	2005*	denomination 0.404	1:10000 40.4
1948	-	-	1977	0.922	92.2	2006	4311.568	431156.8
1949	-	-	1978	0.943	94.3	2007	4521.542	452154.2
1950	-	-	1979	0.967	96.7	2008	4875.126	487512.6
1951	-	-	1980	1.064	106.4	2009	*	*
1952	0.624	62.4	1981	1.110	111.0	2010	*	*
1953	0.657	65.7	1982	1.307	130.7	2011	*	*
			1983	1.360	136.0	2012	*	*

Note* - = data missing * = Useful data available in the future, till the moment of monetary convergence
RON - EURO

The estimated level of that index of 487512.6 %, or an increase in prices by about 4875 times, reached in 2009, nearly 80 years of evolution of the prices (inclusive the cost-of-living), in Romania is a really impressive one, and it is probably incomparable to the very inflationary phenomena typical of inter-war and early post-war Germany, becoming, in retrospect also one of the fundamental lessons in economics as far as the permanent balancing of national economy is concerned. If one contrasts this non denominated approach to the denominated vision, then the Romanian cost-of-living index of RON would have a different image, reflecting another tendency, which is greatly reduced (significantly de-multiplied) to 48.8 %, or an decrease to only 0.488 times.

Romania, through the National Statistics Institute, aligned itself with the European programme of calculus of the harmonized index of the consumer prices (HPCI, an index that was imposed at the same time as the single currency, in January 2000, and represents, exclusively, a manner of internationally comparing the level of inflation among the member states, as well as a means of establishing monetary policy at the level of the European Union), long before 1st January 2007, the date of Romania's joining the la E.U.

4. A FINAL REMARK

No other E.U. member state, not even EUROSTAT, will impose Romania the assurance for the historical and economic comparisons of a centennial interpret index or an eighty years cost-of-living index, but the domestic political, statistical and economic needs certainly will, in the new Europe our national economy is part of, as naturally as possible... An instrumental comparison on a European plane facilitates the knowledge of the past real economics, as, as Gottfried Wilhelm Leibniz stated, one should never omit the fact that *"The present contains the past, and is full of future..."*

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