

AN INTERNATIONAL COMPARISON OF YUGOSLAV NATIONAL PRODUCT*)

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1. INTRODUCTORY NOTES

1.1. In what follows we shall discuss some results of the attempt to assess the purchasing power parity of the Dinar and the French Franc, and to provide an evaluation of the relation of the level of the basic macroeconomic aggregates of the two countries.

The results should as yet be considered preliminary, the comparisons being onesided from several points of view:

- (a) from the point of view of the concept of the basic aggregate;
- (b) measures are based only on production, without regard to expenditures; and
- (c) with respect to the applied weighting system (to be discussed below).

1.2 In order to verify the results of this computation a global estimate of the relation of the purchasing powers of the dinar and the US dollar was undertaken.

Both computations take 1962 as the base year because this year was the most recent one for which the information for France and Yugoslavia necessary for this comparison was most complete.

2. COMPARISON PROCEDURE BETWEEN YUGOSLAVIA AND FRANCE

The computation of the parity of the purchasing power of the Dinar and Franc is achieved:

a. completely — from the point of view of industrial origin of social product¹⁾ and G.N.P. at market prices;

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¹⁾ Social product = Gross material product (at market prices) of the Yugoslav definition equals net material product + depreciation.

b. partially — from the aspect of expenditures in the sphere of investment in fixed funds and in the sphere of personal consumption. Further research is under way.

The basic aggregate through which comparison is achieved is, as mentioned, the social product of the Yugoslav definition, and the respective data for France have been adjusted to this aggregate.

2.1 The procedure applied for comparison on the basis of industrial origin of social product and G.N.P. is essentially of the same type as the one expounded by Deborah Paige and S. Adler²⁾, later applied in Deborah Paige's and Gottfried Bombach's work for comparison of the level of the macroaggregates, purchasing powers and labour productivities of Great Britain and U.S.A.³⁾.

This idea is, however, applied with modifications which have been imposed by the character of available data.

The goals consisted in defining the differences of the levels of the social products of Yugoslavia and France and deriving from them the parity of the internal purchasing powers of the Dinar and the Franc.

The procedure of determining the differences in levels is based on valorizations on the basis of Yugoslav prices, i.e. Yugoslav price structures (if the prices were not directly applied as weighting factors). The inverse operation with the French prices could not as yet be realized.

In this way, the level index, on the basis of valorization through Yugoslav prices, yielded the parity of purchasing power based on French quantitative weights. The procedure can be illustrated in the following way:

$$Y_{Jj} I_{vj} = Y_{Fj}$$

where $Y_{Jj} = \sum Q_j P_j$ = material product or G.N.P. of Yugoslavia in Yugoslav prices; I_{vj} = index of the volume (i. e. the level) on the basis of Yugoslav prices; $Y_{Fj} = \sum Q_j P_j$ = material product or G.N.P. of France in Yugoslav prices (coverage being adequate to the Yugoslav aggregate).

A second phase represents the relation:

$$\frac{Y_{Fj}}{Y_{Ff}} = P_{jff}$$

where $Y_{Ff} = \sum Q_f P_f$ = material product or G.N.P. of France in French prices, and P_{jff} = the purchasing power parity of the Dinar in relation to the Franc.

In this case the material product of France (if this aggregate is in question) is supposed to be adequately adjusted to the Yugoslav definition.

²⁾ Deborah Paige and S. Adler, »International Comparisons of Real Product: An Approach by Industry of Origin«, IARIW: *Income and Wealth*. Series IV, London, 1955, pp. 120—140.

³⁾ Deborah Paige and Gottfried Bombach, *A Comparison of National Output and Productivity*, OECD, Paris, 1959.

The level index (I_{vj}) gets the shape of the Paasche's index of volume⁴):

$$\frac{\sum Q_j P_j}{\sum Q_j P_j}$$

and the purchasing power parity index ($P_{j/f}$) is expressed in the form of Lespeyres' price index:

$$\frac{\sum Q_j P_j}{\sum Q_j P_f}$$

2.2 The assessment of the differences in level of social product and of the purchasing power parities of the two countries has been carried out by basic production activities.

In the framework of some activities (e.g. manufacturing and handi-craft and transport and communications) measurements by industry have been made in order to obtain aggregated indices of the levels of the activities and of the purchasing parities in each industry.

The procedure, in general, can be illustrated in the following way:

$$\sum_{(i)=1}^n Y_{Jj}^{(i)} I_{vj}^{(i)} = \sum_{(i)=1}^n Y_{Fj}^{(i)}$$

and further:

$$\frac{\sum_{(i)=1}^n Y_{Jj}^{(i)} I_{vj}^{(i)}}{\sum_{(i)=1}^n Y_{Fj}^{(i)}} = \sum_{(i)=1}^n P_{j/f}^{(i)}$$

⁴) The index of the volume, i.e. of the level can fall into two basic components: 1. the index of labour (expressed by the relation of the number of employed, the number of work/hours and similar) ($L' = L_F/L_J$); and 2. the index of level of labour productivity, which can be denoted by p' or in a different way:

$$\frac{\sum Q_j P_f}{L_F} / \frac{\sum Q_j P_j}{L_J}$$

The labour productivity index in this case must be equivalent to the value of the observed aggregate per unit of labour. That is the condition for the production function of the type discussed.

It is clear that this can be discussed only if comparisons of this type are carried out from the point of view of production rather than expenditures.

A productivity formula, like the one above, could be achieved only if the purchasing power of the respective currencies are well known. This would mean that the formula can be realized ex post. For ex ante purposes it would be necessary to find such a substitute for expressing the level of labour productivity which could to a large extent correspond to the values p' , i.e. $p' \approx p''$. In this case it would be possible to get information on the level of respective per capita aggregate and on the purchasing power of a number of countries, in a relatively simple and rapid way.

However, this problem still awaits solution.

It appears to be still more complicated when the aggregate is broken down into its industries. In addition to the differences in real productivity in each industry, there appear differences because of the variable influence of price structure especially where important interventions of noneconomic factors in the field of market and price appear. These differences bring about variable «purchasing powers» in various industries.

where »j« and »f« continue to denote the application of the currencies of the respective countries, and »(i)« — the respective industry or branch of production.

The Yugoslav nomenclature, i.e. the nomenclature accepted by the statistics of S.F.R. Yugoslavia, in compatibility with the mentioned concept of social product, has been applied. On this basis corresponding quantities of French products have been grouped.

In the framework of the industry it has been endeavoured to cover the largest possible number of representative products (i.e. groups of products) and material services featured in the nomenclature of either country.

2.3 A detailed survey of the procedure of computation per industry⁵⁾.

2.31 Comparisons of manufacturing industry, power and mining on the basis of data on the quantities of over 300 products i.e. groups of products in both countries have been made.

(a) The measurements were made by grouping the products or groups of products by industry.

As stated above, the Yugoslav nomenclature was followed. Therefore, the film industry, for example, which in French statistics is included in services, had to be separated from this group and added to manufacturing industry, power and mining in order to secure comparability of coverage of this industry in both countries.

On the other hand, it should be noted that the French concept of industries that belong here covers handicraft (except for private services) and material communal services. As the available material did not allow for the separation of these two industries, for global comparative purposes the social product of handicraft and communal activities have been added to the Yugoslav social product created in manufacturing industry, power and mining.

(b) The coverage per industry is not equal, but in most cases it is high. In power, coal, oil and gas, ferrous metallurgy, paper and tobacco industries it is practically 100 per cent in both countries.

In the other industries, the coverage per country is not equal. Keeping in mind that Yugoslav prices have been applied as weights, the degree of coverage can be discussed only for the respective industries Yugoslav manufacturing, power and mining. In this respect there is a very high degree of coverage in the metals industry (about 90 per cent) and in non-ferrous metallurgy, construction materials, food processing, chemicals, textile, printing and rubber industries. In the non-metallic minerals industry, wood industry and leather industry it is somewhat lower.

⁵⁾ To make these computations, numerous sources offered by official statistical bodies of the two countries have been used. Besides, other sources and documentation published by various international organizations have been taken advantage of. The quoting of the source is considered irrelevant in this case, the more so as the list would be too long.

When working on this study (1964) the author was offered an O.E.C.D. fellowship which enabled him to spend four months in Paris where he had valuable contacts in INSEE, in the French Ministry of Finance as well as in other institutions and organizations.

(c) In all industries, the coverage of only the final products was aimed at (e.g. the inclusion of intra-industry semimanufactured goods, processed by ferrous metallurgy and similar, was avoided), although in some cases — due to the lack of adequate data for final products — the comparison had to be made through the quantities of consumed raw material and semi-manufactured goods. But these cases are exceptional, and some alternative comparisons (via finished products and raw materials i.e. semi-manufactured goods, in the textile industry) yielded minimal differences in results.

(d) If the products are not identical, or cannot be reduced to a common quality (e.g. power, coal, oil and gas, steel and other metals reduced to degree of processing), as a rule a wide assortment of different products is produced in the two countries.

Consequently in most cases, the groups of products had to be compared on the basis of types which are equal in both countries. In other words, if not given in the original data, the groups are created on the basis of unity of use values, i.e. unity of function (e.g. machines for wood processing, compressors, cars etc.)

(e) The question of the differences in product quality and of proportionality of prices on both markets, with a view to differences in product quality, is connected with this.

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The mentioned differences in types of products, and the differences in the number of assortments in the framework of the same type (e.g. in machine production, in production of electrical facilities, textile products, shoes etc.) make more difficult the corrections to be made in the course of the computation of quality differences (which in some respect are already manifest in the type and make of the commodities).

It is not necessary to stress the indispensability of correction for differences in product quality in international comparisons of this type, if the fact that the quality appears as obvious component of the level of labour productivity is borne in mind.

Although in our research these corrections could not be completely applied, they are applied wherever documentation made it possible. So, for example, they are made in coal, oil and gas production, in metal production and in the production of some major chemical products (such as nitric fertilizers), some products of metal consumer goods, such as refrigerators and similar), construction material industry, printing industry, tobacco industry and some other. Due to lack of documentation, no corrections could be made in the textile industry, in the shoe industry and in most foodprocessing industries. Research in this direction is under way.

(f) Since products treated as types and often grouped in complexes according to their destination, the problem of unique products could not be taken into special consideration.

(g) The prices applied for valorization represent the Yugoslav average sales values per unit of respective product, i.e. types of products, or the average weighted values, in the case of groups of products.

These average values are obtained from the data on overall income from sold commodities, f.o.b., in 1962.

(h) If we consider what has been said concerning inequality of coverage, one can say that the results for manufacturing, power and mining, as a whole, are comparable to a larger extent than for individual industries.

2.32 In agriculture, forestry and fishing, comparison is achieved on the basis of 33 groups of products, excluding intermediate products, i.e. those products which serve as material for processing in other agricultural industries in the same year. In some cases, where there were not enough satisfactory data on domestic processing, the data on primary production (e.g. fresh fruit) have been used.

In such a way 90—95 per cent of final production in agriculture, forestry and fishing has been covered.

In valuation of production, we have applied the delivery prices of respective products, i.e. the weighted prices of groups of products. In some cases where the delivery prices were not available, the retail prices have been used.

No corrections were made for quality differences in this field.

2.33 The index of the level of construction activity was arrived at on the basis of documentation which is uniform for this region in both countries.

It should be pointed out that the indexes offered by the statistics of S.F.R.Y.⁶⁾ are far more exhaustive and precise than the French data. Whereas Yugoslav statistics survey all construction undertakings both in physical (i.e. quantitative) and value terms, the French statistics give data only for building construction (the rest is given only in value terms), and here only housing construction data are more completely represented.

Accordingly, there remain two possibilities for arriving at the level index with common indicators:

(a) use of data on consumed construction material in each country; or

(b) transformation of the overall production of the construction activities into housing construction (in m² of useful floor space) coupled by application of average Yugoslav prices of construction per m².

Both possibilities have been used.

In the former case the comparison was done on the basis of the data for 27 groups of products, the weights, as in manufacturing, power and mining, being the average values obtained on the basis of data on the overall income from sold goods.

⁶⁾ *Građevinarstvo*, 1963. *Statistički bilten* 328, Savezni zavod za statistiku, Beograd, 1964.

In the latter case, a preliminary correction was made of the differences in the quality of average useful floor space in both countries (on the basis of several major indicators which refer to the quality of housing construction and equipment). For other types of buildings no essential differences in quality are assumed, although, strictly speaking, this assumption could not be justified, but is mainly the consequence of the fact that not all necessary elements for estimation of these differences are available. Then, the average weighted price per unit of useful floor space for all buildings was arrived at.

As there were no comparable data for any other jobs, the social product in construction for each country (for France — valeur ajoutée) was divided by the corresponding computed average prices in order to get overall floor space, to which total construction activity is reduced. This relation should display the differences in the levels of this activity in both countries.

The first procedure yielded the coefficient 10.0 as the difference level, the second — 13.7. The latter result is undoubtedly dominated by significant differences in housing construction prices, because this kind of construction had undergone corrections for quality differences. Therefore, the coefficient 12 was taken as the level difference, in order to reduce, to some extent, the effects of this correction which need not be pronounced in overall construction.

2.34 In transport and communication the level difference was obtained by reducing:

- (a) commodity and passenger transport, per industry, to uniform net ton-kilometers;
- (b) all PTT operations to letter mail within the country.

For reduction, the procedures accepted by official Yugoslav statistics when working out the transport and communication index were adopted.⁷⁾

On the basis of industry by industry reduction, the coefficient of level differences for the overall sector was obtained.

The coverage in this sector was practically 100 per cent: only passenger river transport is not covered, data being unavailable for France.

2.35 Commerce and catering are the residual item, left over after other spheres of material production have been covered and once the respective amount of overall French product, corresponding to the Yugoslav definition of social product, is known. In this way the coefficient of level difference of 13.9 is obtained.

This relation can, however, be adjusted to the results obtained on the basis of the difference in number of employed and assumed difference in labour productivity level. The relation of number of employed in commerce and catering in Yugoslavia and France in 1962 was 1.00:6.42⁸⁾.

⁷⁾ Ing. Srećko Stanić, »Indeks saobraćajnih usluga«, *Statistička revija*, maj 1958, No. 1. pp. 26–42.

⁸⁾ The data for Yugoslavia were obtained from: *Statistički godišnjak SFRJ*, 1965, p. 97. For France the data of several sources have been combined: INSEE, *Bulletin hebdomadaire de statistique*, No. 781, 8 juin 1963 (Supplément); INSEE, *Les Etablissements Industriels et Commerciaux en France en 1963*, PUF, Paris, 1963; INSEE, *Etudes et Conjoncture*, No. 4, 1964, p. 17. The data used represent annual averages.

The number of employed in one commercial and catering unit — the only available substitute for degree of efficiency in this industry — amounts to about 2:1 in favour of France. In the residual computation the productivity relation would amount to about 1.0:2.2, which is probably more realistic.

2.36 To provide for a comparison on the basis of the G.N.P. definition, additional computations of services, which according to the Yugoslav official definition of macroaggregates are considered to be non-productive, has been undertaken.

Several computations have been made of aggregate G.N.P. for Yugoslavia. One official computation in current prices was presented to the O.E.C.D.; it covers the period 1958—1962⁹⁾. Another computation (on the basis of the U.N. definition) was made by professor G. Grđić for 1956—1958¹⁰⁾. There is also one computation done by Dr. I. Vinski for 1947—1963, in constant 1956 prices, to be used in an unpublished study.

The first two computations are very consistent with each other, and can be made into one time series. According to the cited official estimates, G.N.P. in 1958 amounted to 2,236 billion dinars and according to the evaluation of Dr. Grđić to 2,255 billion dinars. The estimate of Dr. Vinski for 1956 does not differ substantially from that of Dr. Grđić.

A special index has been constructed on the basis of current prices to illustrate the trend of those tertiary activities which are not covered by the Yugoslav definition of material production¹¹⁾. Prof. Grđić's data for 1956 served as a basis for extrapolation of the values of these activities for earlier and later years. The results were added to the current values of the social product, thereby obtaining the values of G.N.P. in current prices for all years in the period 1947—1964. For the period 1957—1962 the obtained figures do not differ substantially from the ones estimated in the quoted studies.

Yugoslav Gross National Product 1956—1962

(Bln. din. in current prices)

Years	Dr. Grđić's estimates	The estimates presented to O. E. C. D.	Expanded figures on the basis of the special index
1956.	1,820	—	1,820,0
1957	2,260	—	2,242,8
1958	2,255	2,236	2,302,8
1959	—	2,722	2,801,6
1960	—	3,231	3,304,0
1961	—	3,835	3,831,6
1962	—	4,390	4,296,8

⁹⁾ *République Socialiste Fédérative de Yougoslavie*, Etudes économiques de l'OCDE, Paris, Juin 1964, p. 38.

¹⁰⁾ Dr. Gojko Grđić, »Proizvodno materijalno bogatstvo Jugoslavije«, *Ekonomist*, Beograd, 1965, No. 3, p. 375.

¹¹⁾ The index is obtained from the trends (in current prices) of the wages of government and other non-productive institutions.

In order to compute the purchasing power parity for 1962 the data on number of employed in the mentioned tertiary activities for both countries have been used. This relation is found to be 1:8.54 in favour of France, whereas the relation of productivity level was estimated at 1:1.6. These data, taken together, would yield a level difference of 1:13.5.

2.37 The computation results are illustrated in the following table.

**Results of computation of the purchasing power parities
for the Dinar and the French Franc for 1962.**

(Bln. Din. i.e. Fr. Franc)

Industry	Y_{Jj}	I_{vj}	Y_{Fj}	Y_{FF}	$P_{j f}$
Agriculture, forestry and fishing	980,342	4.0	3,921,368	32,674	120.0
Manufacturing industry, power and mining with handicraft and communal activities	1,745,954	10.5	18,332,517	142,190	128.9
Construction	286,902	12.0	3,442,824	25,693	134.0
Transport and communication	292,076	8.6	2,511,954	18,174	138.2
Commerce and catering	457,969	13.9	6,351,172	50,937	124.7
Productive industries covered by the social product definition	3,763,243	9.2	34,559,735	269,668	128.1
Non-covered difference	9,396	—	—	—	—
Non-productive tertiary activities	524,161	13.5	7,076,174	86,626	81.7
Gross National Product	4,296,800	9.7	41,635,909	356,294	116.9

Sources: 1. The data for Yugoslavia were obtained on the basis of *Statistički godišnjak SFRJ, 1964*, p. 119.

2. For France the aggregate «valeur ajoutée brute par branches» was used, its sum, branchwise, including import duty, yielding the gross domestic product (production intérieure brute). This aggregate suits best the Yugoslav definition of social product (see, in this connection, L.-A. Vincent, «La notion de la valeur ajoutée et la prévision économique», *Etudes et Conjoncture*, No 1, janvier 1963, pp. 87—88; «Methodes de la comptabilité nationale», *Etudes et Conjoncture*, No. 3, mars 1966, p 274 and 284).

The figures are taken from »Les comptes de la nation de l'année 1965«, *Etudes et Conjoncture*, No. 6, juin 1966. p. 346. From the value of PIB, housing services (service du logement) and other services (autres services) were deducted, the estimated value of social product of the film industry (1,553.5 mln. Francs) added to the value production of manufacturing industry, power and mining, being deducted in advance.

The identification of industries for France was done on the basis of *Nomenclature des activités économiques*. Ministère des Finances et des Affaires Economiques, INSEE, Paris, 1959.

As it is impossible to undertake any detailed analysis of the given results, let us mention only that the global purchasing power parities amount to 78 and 85.4 per cent of the official exchange rate, respectively.

3. TENTATIVE VERIFICATION OF RESULTS

3.1 The basic way of verifying parity differences and level differences in a binary comparison consists in (1) application of an alternative weighting system and (2) in detailed research from the consumption aspect. The latter would, in principle, bring about identical or very close results with those obtained through comparisons from the production aspect.

However, it is at yet impossible to do it, our computation from the consumption aspect being only partial. For informative purposes, one can say that a comparison of investment equipment (with 27 groups of products) yielded a level difference of 11.2:1 in favour of France on the basis of weighting in Yugoslav prices, and 11:1 on the basis of weighting in French prices. The respective purchasing power parities in this domain amount to 146.3 dinars per franc (on the basis of French quantity structure) and 143.4 dinars per franc (on the basis of Yugoslav quantity structure). Likewise, for personal consumption the purchasing power parities of the dinar and the franc on the basis of a list which does not cover non-productive services was obtained: 77.4 dinars for 1 franc according to Yugoslav quantity weights and 93.4 dinars for 1 franc according to French quantity weights.

In spite of all this, if a comparison like this were made, it would again be necessary to connect the results between the two countries with the currencies of other countries, first of all the American dollar.

Such verification is, however, possible only via the results of a separate calculation.

In this respect it is by all means best to rely on a very complete work of this type, such as Gilbert and Kravis's¹²). However, their comparisons did not cover Yugoslavia, so in this case it was impossible to verify the results obtained by comparing Yugoslavia and France directly through their accounts.

This would be possible only if the purchasing power parities of the U.S.A and Yugoslavia were available. By application of respective

¹²) Milton Gilbert and Irving B. Kravis, *An International Comparison as National Products and the Purchasing Power of Currencies*, O.E.E.C., Paris, 1954; Milton Gilbert and Associates, *Comparative National Products and Price Levels*, O.E.E.C., Paris, 1960.

implicit price indexes — whatever their shortcomings it becomes possible to include Yugoslavia in the relations existing according to Gilbert-Kravis's computations for 1950 or 1955, thereby verifying the accuracy of the above results.

3.2. To this end an estimate of the relations between the U.S.A. and Yugoslavia was made. This estimate is of a global character.

The starting point was some estimates of the magnitude of per capita national income (or product) for Yugoslavia for 1953. These estimates yielded a figure of about 200 dollars, at the purchasing power of that year.

This evaluation was given by M. L. Watkins (Center for International Studies of the Massachusetts Institute of Technology¹³), it is also contained in a UN document of August 1960¹⁴). According to an estimate made in 1955, Yugoslav per capita income in 1953 amounted to 197,4 dollars¹⁵).

Going back to 1938 and 1939 by way of implicit price indices based on the aggregates of social product (according to the Yugoslav definition) for the U.S.A. and Yugoslavia¹⁶), it was estimated that the parity of the purchasing powers of the respective countries, under these conditions, amounted to 37.3 dinars for 2 dollar in 1938 (38.3 dinars for 1 dollar in 1939) as compared to the exchange rate of 43.25 dinars for 1 dollar recorded by American statistics for 1939 and 1940¹⁷). This made probable the level of national income in Yugoslavia as about 200 dollars per capita in 1953, at the purchasing power of the dollar of that year.

Using these estimates and taking into consideration the price variations that occurred in both countries between 1953 and 1961/62 (implicit price indices on the basis of respective categories of the social product of the Yugoslav definition) the parity of the purchasing power of the dinar and the dollar in the respective countries in 1961 was 419 dinars for 1 dollar and in 1962 — 445.6 dinars for 1 dollar.

This estimate corresponds to the purchasing power relations on the basis of Yugoslav price computations, and are compatible with the results of the earlier estimates of Yugoslav national income, made by this author, in dinars on the basis of 1938 prices¹⁸);

In order to compute the purchasing power parities on a G.N.P. basis, data on the number of employed in tertiary non-productive activities (the relation of which was 1 : 38.7 in favour of the U.S.A.) were used. The probable difference in productivity level, i.e. labour efficiency, was also evaluated (1:2.8 in favour of the U.S.A.).

¹³ See P. Kindleberger, *Economic Development*, 1958, p. 6.

¹⁴ U.N., Memorandum D-4: *Patterns of Industrial Growth*. Statistical Annex, Tab. A-2.

¹⁵ Stevan Stajić, «Narodni dohodak», *Deset godina nove Jugoslavije*, Beograd, 1955, p. 156. This amount refers to the value at market prices, whereas the former evaluations are probably at factor cost.

¹⁶ G. N. P. for U.S.A. was computed by a special procedure on the basis of data provided by *Survey of Current Business*, U.S. Department of Commerce, Office of Business Economics (July 1963, July 1964 and August 1965).

¹⁷ *Statistical Abstract of the United States*, 1939, p. 288; *Ibid.* for 1940, p. 291.

¹⁸ See: Stevan Stajić, «Realni nacionalni dohodak Jugoslavije u periodima 1926—1939 i 1947—1956», *Ekonomski problemi*, Ekonomski institut FNRJ, Beograd, 1957, pp. 7—58; Stevan Stajić, *Nacionalni dohodak Jugoslavije 1923—1939*, Ekonomski institut NR Srbije, Beograd, 1959.

In such a way the relations between level of G.N.P. for the U.S.A. and Yugoslavia, and the respective parities of the purchasing powers of the dinar and the dollar were determined (394.0 dinars for 1 dollar in 1961 and 416.77 dinars for 1 dollar in 1962).

3.3. According to Gilbert-Kravis (and their associates), the purchasing power parities of the franc and the dollar differ according to whether American or French quantity weights are used. These parities are the following (in Francs of the respective year per 1 dollar):

Year	U.S. quantity weights	French quantity weights
1950	312	223
1955	394	287

These results ensue from the accounts on the basis of gross national product whereas in this work the basic aggregate is social product.

In order to make possible the verification of the results that are given above, which reflect the relations in material production, it was necessary to exclude non-productive services from Gilbert-Kravis's computations. This was possible only for 1950, for which the authors gave sufficiently detailed data¹⁹⁾.

Excluding non-productive services from 1950, the parity on the basis of French quantity weights of 241.0 francs for 1 dollar was obtained.

3.4 In the comparisons undertaken by Gilbert and Kravis between the franc and the dollar in 1950, the parity on the basis of the French quantity weights had the following form:

$$\frac{\sum Q_f P_f}{\sum Q_a P_a}$$

	Social Product	Gross National Product
France	189.52	204.00
U.S.A	124.05	131.96

where »f« and »a« symbolize the two countries.

By applying implicit price indices²⁰⁾ for both countries from 1950 to 1962 respective relations for 1962 can be obtained. These indexes are (1950 = 100.0):

¹⁹⁾ Milton Gilbert and Irving B. Kravis, *op. cit.*, p. 115 (Table 28).

²⁰⁾ These indices have been obtained from the relations of the respective aggregates (G.N.P. or Social product) in current and constant prices for each country.

The indices in constant prices which were applied here have the bases: for France — 1959, for U.S.A. — 1958, and for Yugoslavia — 1956. These differences in the base years can cause some deviations in the results.

On the basis of the cited parities and illustrated indices the following parities of the purchasing powers of the franc and the dollar in 1962 were obtained:

for gross national product	3,447
for social product	3,682

in new francs for 1 dollar of 1962 purchasing power, assuming, of course, that the applied indices reflected relatively well the relations and changes of prices in the two countries.

On the basis of the parities presented here one gets the following direct relations between the dollar and franc for 1962:

according to the G.N.P. definition	$416.77/116.9 = 3.465$
according to the social product definition	$445.60/128.1 = 3.479$

However, one should point out that the purchasing power parities which are shown here have the following form:

$$\frac{\sum Q_f P_j}{\sum Q_f P_j} \text{ and } \frac{\sum Q_a P_j}{\sum Q_a P_a}$$

where »f«, »a« and »j« denote the three countries which are mutually compared.

A direct comparison of the results obtained does not yield a solution identical to the one in Gilbert-Kravis's comparison because:

$$\frac{\sum Q_a P_j}{\sum Q_a P_a} : \frac{\sum Q_f P_j}{\sum Q_f P_f} \neq \frac{\sum Q_f P_f}{\sum Q_f P_a}$$

In order to obtain the parity of the franc and dollar on the basis of French quantity weights and have confidence in the accuracy of the verified results it is necessary to make some corrections.

No further discussion of the problems of this correction is necessary. By dividing these two price indices of Laspeyres's type it is impossible to arrive at any third index of the same type. As we are concerned with an indirect, threefold, comparison, the solution can be obtained by simultaneous application of three price indices of the Laspeyres's type and in them — three respective indices of volume of Paasche's type.

See, in this connection: *Survey of Current Business*, Vol. 45, No 8 August 1965, pp. 48—52; *Survey of Current Business*, Vol. 46, No 7, July 1966, p. 12; »Les Comptes de la Nation de l'Année 1965«, *Etudes et Conjoncture*, No 6, 1966, p. 218, 346 and 402—403.

It was supposed, in this case, that the implicit indices were identical for both quantity weights variants.

The correction factor in this type of indirect comparison can be close to one. The nearer the indirect parity relation (in our case the one between the U.S.A. and France through comparison with Yugoslavia) to the direct relation (in this case directly between the U.S.A. and France) the closer is the correction factor to 1.

In the above figures, the divergence of indirect relations from the direct one (on the assumption that the implicit price indices are correct amounts to + 5.8 per cent for the aggregate social product and — 0,5 per cent for G.N.P.

3.5 One should not neglect still another factor that can exercise an influence on verification of the results.

We have in mind earlier estimates of the parities of the dollar and franc which serve as a basis for verification of our results, achieved on the basis of data which are hard to dovetail in the series which are today applied in the respective countries. Since then all these aggregate have undergone greater or smaller corrections and changes. The figures with which we have dealt in the case of France, the U.S.A. and later during verification, have not been directly connected with the data used by Gilbert and Kravis in their calculations. A calculation with those data cannot be repeated.

In the course of verification, one operated on the assumption that on the basis of data which today refer to 1950, one could arrive at identical parities of the purchasing powers of the dollar and the franc.

It is clear that the implicit indices applied during verifications register the changes in the time series of the aggregates discussed, so they can exercise some influence (it is difficult to determine it) on the relations created between the earlier assessed parity and the one obtained from indirect comparisons. These deviations can be positive and negative. In other words, the correction factors we spoke about do not have an absolute significance.

Finally, it is necessary to keep in mind the possibility of errors in our estimate of material product for the U.S.A. and France (although we took pains to escape such errors and to reduce them to the minimum), as well as in our estimate of aggregate G.N.P. in dinars for these two countries.

JEDNA MEĐUNARODNA KOMPARACIJA JUGOSLOVENSKE DRUŠTVENOG PROIZVODA

Stevan STAJIĆ

Re z i m e

Cilj ovog rada bio je da se procene pariteti interne kupovne snage jugoslovenske i francuske valute, kao i razlike u nivoima osnovnih makroekonomskih agregata ovih dveju zemalja u 1962. godini.

Osnovni agregat za komparaciju bio je društveni proizvod prema jugoslovenskoj definiciji (tj. bruto materijalni produkt) kome su zatim prilagođeni francuski agregati. Ova komparacija je izvršena na bazi proizvodnog aspekta, a u ponderisanju je primenjena jugoslovenska struktura cena.

Prvo su izvršene procene razlika u nivoima između društvenog proizvoda Jugoslavije i Francuske po glavnim privrednim sektorima i granama. Zatim su putem prilagođavanja odgovarajućih francuskih podataka prema jugoslovenskim po sektorima i granama izračunati pariteti interne kupovne snage ovih dveju valuta na bazi francuskih kvantitativnih pondera.

Ovaj postupak možemo ilustrovati na sledeći način:

$$Y_{Jj} I_{vj} = Y_{Fj}$$

gde je $Y_{Jj} = \sum Q_j P_j$ = materijalni produkt ili bruto nacionalni produkt (GNP) Jugoslavije u jugoslovenskim cenama; I_{vj} = indeks volumena na bazi jugoslovenskih cena; $Y_{Fj} = \sum Q_j P_j$ = materijalni produkt ili GNP Francuske u jugoslovenskim cenama. Druga faza predstavlja sledeći odnos:

$$\frac{Y_{Fj}}{Y_{Ff}} = P_{j/f}$$

gde je $Y_{Ff} = \sum Q_j P_j$ = materijalni proizvod ili GNP Francuske u francuskim francima a $P_{j/f}$ = kupovna snaga dinara u odnosu na franak.

Izvršena je i procena vrednosti neproizvodnih delatnosti za Jugoslaviju, kako bi se ostvarila odgovarajuća komparacija GNP.

Prema ovim proračunima pariteti interne kupovne snage iznosili su u 1962. godini 128,1 dinara za 1 novi franak na bazi društvenog proizvoda, a 116,9 dinara za 1 novi franak na bazi GNP, u odnosu na zvanični kurs razmene koji je iznosio 150 dinara za 1 novi franak.

U cilju proveravanja ovih rezultata izračunat je globalnim putem odnos između kupovne snage dinara i američkog dolara. Prema ovim proračunima u 1962. godini paritet kupovne snage iznosio je 416,8 dinara za 1 američki dolar na bazi GNP, a 445,6 dinara za 1 američki dolar na bazi društvenog proizvoda.

Ovi proračuni povezani su sa podacima za 1950. godinu za Francusku i SAD do kojih su došli Gilbert i Kravis. Ekstrapolirajući ove rezultate putem implicitnih indeksa cena do 1962. godine i povezujući ih sa proračunima do kojih se došlo u ovom radu, autor je ocenio da se moguća odstupanja od pariteta interne kupovne snage između dinara i franka kreću u granicama od + 5,8% do - 0,5%.