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EXPERIENCE WITH DIFFERENT METHODOLOGIES FOR NATIONAL INCOME ACCOUNTING IN CENTRAL AND EASTERN EUROPEAN COUNTRIES, 1950-1990[2]

During the period of centrally planning in the Central and Eastern European (CEE) countries the officially applied accounting system was the so-called Material Product System (MPS), which has been different from the System of National Accounts (SNA). This hampered the international comparisons of national income (Net Material Product - NMP), which was the basic macro-indicators of the centrally planned economies (CPEs) and Gross Domestic Product (GDP) in the market type economies. In parallel with the official practice in CPEs individual authors (like T. P. Alton and associates, A. Maddison, and others) or/and international organisations derived estimates of these countries' national income mainly trying to transform NMP into GDP (GNP). The International Comparison Project (ICP), where countries from CEE participated, was of great importance for producing comparable estimates.

In this study the known different approaches are presented, their methodological specificity is analysed and estimates of national income and economic growth for the period 1950-1990 are compared.

JEL: N10, P24, O4

Introduction

During the period of central planning (1950-1990) the CEE countries applied a specific accounting system known as Material Product System (MPS). It was initiated by the planning and statistical bodies in the USSR at the early 1920s. After World War II it was introduced in all countries which fell into the political and economic sphere of the USSR and which formed the so-called socialist system of CPEs. From the beginning of the 1970s onwards the MPS received an equal status with that of the SNA in the international statistics of the UNs. Thus the two accounting systems coexisted throughout several decades. During that period the two systems exerted a mutual influence which was useful for their development.

In fact the MPS was the official statistical standard used for measurement of economic performance and development for nearly than seven decades in the USSR and three decades in 15 other CPEs.[3] This means that all data on the economy of the former CPEs

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[2] Paper presented at the XIV International Economic History Congress, Helsinki, Finland, 21-25 August 2006, Session 103 "New Experiences with Historical National Accounts, Methodologies and Analysis". The paper is based on the second chapter of the author's book Рангелова, Р., България в Европа – икономически растеж през XX век. Академично издателство „Проф. М. Дринов", София, 2006.

[3] These countries were: Albania, Bulgaria, China, Cuba, Czechoslovakia, German Democratic Republic (GDR or East Germany), Hungary, Cambodia, Korean Democratic Republic, Laos, Mongolia, Poland, Romania, Vietnam, and Yugoslavia.

available in national and international yearbooks or other statistical publications are conformed to the definitions and classifications of the MPS.

Hungary was the only country which considerably extended the scope of its macroeconomic statistics and introduced a unique accounting system. In this respect it was different not only from all other former country-members of the Council of Mutual Economic Assistance (CMEA) but also from all market economies. Basically, the Hungarian system preserved all important indicators required by the MPS, but also incorporated all major macrostatistical aggregates proposed by the SNA.

As the previous economic system was marked by stimulation of high growth, the macroeconomic statistical indicators were often overestimated. The first very sharp critical publications on this topic in Russia dated from the middle of the 1980s. The critical attitude was against the published data in a jubilee yearbook presenting an increase of the industrial production for the period 1917-1987 by 330 times and of the NMP - by 149 times.[4] In the case of Bulgaria, the 1988 increase of the MNP has originally been reported as 6.2%, but only after several months it has been reduced to 2.4%.[5] This means that the trust in statistics was more or less eroded.

The basic methodological differencies between the two systems hampered many of the undertaken international comparisons of national income between the centrally planned and market type economies. Different international organisations, research centres or even individual authors elaborated approaches to overcome these differences producing their own estimates of NMP (or GNP) in the former socialist countries. They tried, on the one hand, to overcome the methodological difficulties at achieving comparability of the national income indicators due to the different systems of national accounting, and on the other hand, to deliver parallel of the official sources estimates of NMP, respectively the economic growth rates. May be the most methodologically consistent and reliable work is that of T.P. Alton and associates, who produced long-term calculations in parallel with the official sources in the CPEs.

The paper aims to consider in a comprative perspective the applied methodologies for the national income (NMP) and GDP and respectively the economic growth in the CEE countries over the period 1950-1990. Firstly, the main features of the MPS and its historical development are shortly presented, and basic differences between the MPS and SNA related to the differences of the NMP methodology in comparison with the GDP methodology are discussed. Then the variety of developed approaches to estimate NMP or GDP for these countries is dicussed. They are shown briefly in the Appendix, whwrw this variety is divided into two regions: for the CEE countries and for the former USSR, as far as then a special attention has been devoted to the accounting problems of this country. The listed methodologies are classfied also by the type of the used approach - based on PPPs, factor cost or physical indicators. Among these approaches the most known projects and authors (ICP, T. P. Alton and associates, A. Maddison, etc.) are analysed in the study. The derived by them estimates of MNP/GDP and the economic growth rates are compared with the offical data. Finally concluding remarks are given.

[4] See Гужвин, П., Доверие к статистике. Вестник статистики. – Госкомстат Российской Федерации, 1992, № 9, с. 3-21.

[5] See Рангелова, Р. Международни икономически сравнения - методология и анализ. Издателство "Next", 2003, с.73.

1. Material Product System: the Official Accounting System of the Centrally Planned Economies

1.1. Theoretical Background

1.1.1. The MPS

The roots of the MPS could be found in the economic theory created by Adam Smith more than two hundred years ago. In his work „An Inquiry into the Nature and Causes of the Wealth of Nations" known as "The Wealth of Nations" (1776) he restricted the scope of productive work and creation of value to activities in the sphere of branches producing material goods. After A. Smith, during the 19th and a part of the 20th century the concept of material production was the dominating theoretical basis for the definition and estimation of national income in the developed world. Many proponents of economic science – the best known amongst them was Karl Marx - accepted and incorporated this conceptual basis of national income. Thus the fundamental concept of national income was derived by both A. Smith and K. Marx from the theory of "value-creating labour". According to this theory "value-creating labour" produces material goods only. This means that national income is creating only in the material production sphere, and it is determined by the sum of the material goods. Thus in the MPS (in difference with the SNA) are separated two spheres: material production and non-material production. The so-called production sphere covered the three major sectors: (a) industry (including coal mining and power production) and construction; (b) agriculture, forestry and fishing; (c) transport and trade (the part of these services only which are of material nature).[6]

It should be noticed that the main features of the MPS were determined not only by the underlying economic theory, i.e. the limited scope of productive activity only, but also by the specific economic policy and economic management system in the CPEs.[7] The Hungarian statistician J. Arvay argues that the MPS is not the only possible and adequate system of central planning. In his view "the latter does not necessarily exclude the concept of national income based on all fundamental needs of the population. At the same time the MPS-type system does not satisfy the statistical needs of a market economy".[8]

1.1.2. The SNA

In difference with the MPS the theoretical approach of the SNA assumes a broader interpretation of the scope of the economic activity.[9]

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[6] The economic views and analyses within the MPS however differ significantly from those within the SNA even for branches which are covered by the two systems, like industry or agriculture.

[7] See "Basic Principles of the System of Balances of the National Economy". Studies in Methods. Series F, № 17. United Nations, New York, 1971.

[8] See Арвай, Я., Системата на материалния продукт: ретроспектива. Статистика, Списание на Националния статистически институт, 2006, № 6, 79-101.

[9] Official interest in the comparability of economic information dates back to 1928, when the League of Nations held an International Conference Relating to Economic Statistics to encouraging the compilation of such statistics and the adoption of uniform presentation methods. Thus this organization has initiated an activity to create a comparable system of national accounting. In the following years a growing recognition of the usefulness of national income estimates to fiscal and economic policy-making (in particular for war-time mobilisation in some countries) strengthened official interest in this field. For more details on emergence and developments of the SNA in a comparative perspective with the MPS see Арвай, Я. Системата на материалния продукт: ретроспектива. Статистика, Списание на Националния статистически институт, 2006, №2, с.79-101 and Rangelova, R. (2006), Replacement of Material

The theoretical framework of this work was taken from the ideas of John M. Keynes. In his famous book "The General Theory of Employment, Interest and Money" (1936) known as "The General Theory" he outlined the key role of the aggregates real income and national income, focusing attention on disaggregating the expenditures of consumers and investors, and stressing the importance of intersectoral economic relations.
The SNA concept covers all kinds of labour creating consumer values, where the final result is priced value, independently if they are material goods or non-material services (such as healthcare, education, culture, administration, etc.). The inclusion of these services and goods in the value added is caused by the fact that they influence in one way or another on the overall people's living standard.
The greatest advantage of the SNA is manifested in the fuller coverage of economic activities although the inclusion of non-material services into the value of national income or GDP increases their magnitude to a relatively small extent (only 15-20%) and does not change the growth rate of the economy considerably.[10]

1.2. Historical Development of the MPS

Considering the MPS development three basic stages can separate:

- **First stage** – from the early 1920s when the work on the MPS was initiated in the USSR to 1948-1950 when it was adopted as a common accounting system for the newly-created CPEs integrated in the CMEA.

The initial version of the MPS-type statistical system was elaborated in the early 1920s in the USSR. The first relatively detailed data on the national income and other macroeconomic aggregates covering the fiscal year 1923/1924 were presented in the so-called inter-department table.[11] The official compilations of the national balances were continued and stabilized in the second half of the 1920s and in the 1930s. After World War II when the Soviet-type system of central planning was introduced in the CEE countries, they followed the practice of the USSR statistics in respect of the accounting system.

- **Second stage** – from the end of the 1940s to the beginning of the 1970s when the MPS was developed and recognised by the UNs as an official accounting system on a par with the SNA.

Actually a first description of the MPS intended to cover the entire economic system and to be generally accepted by all member countries of the CMEA, was initiated in 1957 by the UNs Statistical Commission. The main purpose of this request was to improve the international comparability of the main macroeconomic aggregates.[12]

Product System by System of National Accounts in the Transition Countries from Central and Eastern Europe. Paper presented to the International Conference on Accounting and Finance Transition (ICAFT), University of South Australia, Adelaide, 10-12 April 2006.

[10] See Arvay, J. (1993), The Impact of the National Accounting Systems (SNA or MPS) on the Growth Rates. Paper presented at the International Conference on "Output Decline in Eastern Europe", Laxenburg (Austria), 18-21 November.

[11] In this work had participated Wassily Leontief (1906-1999), who later on had emigrated to the USA and continued working on input-output analysis. For the elaborated by him input-output model he has received the 1973 Nobel Prize in Economics.

[12] There was also a more specific goal, namely to answer the question if the different scope of national income had a considerable impact on the membership fees to be paid by the individual countries to the UNs. There was a wide spread view that the membership fee of countries using the MPS should be increased because the scope of national income in these countries was narrower than that of countries using the SNA.

In 1971 the UNs Statistical Commission approved the submitted by the CMEA Secretariat the newly adopted system and decided that this document titled "Basic Principles of the System of Balances of the National economy" was to be published and widely disseminated by the UNs as one of the available international recommendations.[13]

- **Third stage** – from the early 1970s to 1990 when the MPS' application was terminated.

During all the time of mutual coexistence improvements and developments of the two systems were observed both on national and international level. In the 1980s the former socialist counries undertook more active efforts to participate in different international comparisons approaching in this way to the methodological principles of the SNA. Some of these countries undertook parallel accounting procedures on the basis of the two systems. These changes in the statistical work of the CPEs were caused by several factors:

⇒ the observed extending international relations in the world;

⇒ new ideas and proposals on economic reforms, which have been under discussion since the 1960s in almost all countries and several of those reforms were introduced into the practice in some countries. The reforms focused on the increase of independence and self-management of enterprises and on the development of market conditions and financial instruments**;**

⇒ the increasing role of the so-called non-material products and services, which raised the question if their interpretation based on the MPS is reasonable;

⇒ the existing difficulties to compare the main economic aggregates between CPEs and market economies, etc.

At the end of the 1980s a question of integration of the two systems was on the agenda, meaning basically to widen the scope of the MPS. The political and economic transformation which have taken place in the former socialist countries in CEE countries since 1989 onwards, including the dissolution of the CMEA, the disintegration of the USSR and the transition of these countries to a market type economy stopped using of the MPS in the region officially changing it by the SNA.

1.3. Links Between the SNA and the MPS in Terms of the Main Economic Macroindicators

Since the first half of the 1970s the Conference of the European Statisticians (CES) has initiated an activity to build bridges for transforming, the main aggregates from one system into the other and vice-versa. This work resulted in two UNs publications which are known as Document F.20, containing the so-called transition matrix. It presents three transformation tables showing the necessary steps to derive GDP from NMP and vice versa.[14]

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[13] Basic Principles of the System of Balances of the National Economy. Studies in Methods. Series F №.17. United Nations, New York, 1971.

[14] See Comparison of the System of National Account and the System of Balances of the National Economy. Part one: Conceptual Relations. Studies in Methods. Series F № 20. United Nations, New York, 1977. Part two: The Transformation of SNA Aggregates into MPS Aggregates and vice-versa in Selected Countries. United Nations, New York, 1981. Bulgaria is an example of a country with available data series for GDP 1980-1990 calculated on the basis of Document F.20.

At the end of the 1980s most of the statistical offices of these countries started to publish data on the value of the GDP and its major components as defined in the SNA.[15]
Some of them have also gained an experience with participation in international GDP comparisons. Hungary was the only country from the former CPEs consistently participating in all phases of the UNs ICP carried out since the end of the 1960s. Poland, Romania and former Yugoslavia have participated in one or two rounds before 1990.

1.4. Basic Methodological Differences Between National Income Accounting in the MPS and the SNA

Two major indicators of output are of central importance in the MPS. One of them is *global social product* (named also *gross material product*) which is the sum of all material goods produced in the sphere of material production during the accounting year, including products used for production of other products (the so-called intermediate consumption) and those used for final uses. According to the SNA terminology this value is *gross output of branches producing material goods*. The other major category of output in the MPS is *national income* which is derived from global social product by deducting the intermediate consumption of goods and consumption of fixed assets used for the production of other goods (Table 1). In the international terminology this concept is referred to as *Net Material Product (NMP)* to avoid confusion with *national income* as defined by the SNA.[16]
According to the SNA 1993 GDP is the sum of Gross Value Added (GVA) added of all resident producer units (institutional sectors or, alternatively, industries) plus that part (possibly the total) of taxes, less subsidies, on products which is not included in the valuation output. GVA is the difference between output and intermediate consumption. In contrast to GDP Gross National Income (GNI) is not a concept of value added but a concept of income (primary income). It is equal to GDP less primary incomes payable to non-resident units plus primary imcomes receivable from non-resident units (Table 1). GNI at market prices was called Gross National Product in the 1953 SNA, and it is commonly denominated GNP.[17]

[15] The practice until 1988 was the following**.** Some CMEA countries which have been members of the World Bank and the IMF still since the 1980s (Yugoslavia, Romania, Poland, Hungary), supplied data on their economic performance to these organisations according to the requirements of the SNA. In their own official publications however these countries (with the exception of Hungary) published macro-statistical data exclusively according to the MPS.
[10] It should be noted that the MPS does not regard the factor incomes transferred from or to abroad, because at the time of formulating this accounting system such types of incomes were negligible in the CMEA countries.
[16] It should be noted that the MPS does not regard the factor incomes transferred from or to abroad, because at the time of formulating this accounting system such types of incomes were negligible in the CMEA countries See Рангелова, Р., М. Райнова, Т. Радев. Показателите национален доход и брутен вътрешен продукт при международните сравнения.- Икономическа мисъл, 1989, №.1, с. 56-65.
[17] System of National Accounts 1993. Prepared under the auspices of the Inter-Secretariat Working Group on National Accounts. Commission of the European Communities - Eurostat, International Monetary Fund, Organisation for Economic Cooperation and Development, United Nations, World Bank. Brussels/Luxembourg, New York, Washington, D.C., 1993, p.41.

Table 1

Basic Methodological Differences Between GDP by the SNA and NMP by the MPS

<table>
<tr><td colspan="4">SNA</td><td colspan="2">MPS</td></tr>
<tr><td>Gross National Income (GNI)</td><td colspan="3"></td><td colspan="2"></td></tr>
<tr><td>Net Primary Incomes from the Rest of the World</td><td><u>GDP</u></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td rowspan="4"></td><td>Consumption of Fixed Capital</td><td>Net National Product</td><td></td><td colspan="2"></td></tr>
<tr><td rowspan="3"></td><td>Indirect Taxes</td><td>National Income</td><td></td><td>Gross (quasi-net) Material Product</td></tr>
<tr><td rowspan="2"></td><td>Income in Non-material Sphere</td><td><u>NMP</u></td><td>Consumption of Fixed Capital</td></tr>
<tr><td>Income in Material Sphere</td><td>National Income in Material Sphere</td><td></td></tr>
</table>

Comparing national income between the SNA and the MPS it turned out that the addition of value added originating in the non-material sphere is not the only major adjustment needed to bring the value of national income in CEE countries to the level of national income as determined in the SNA. It was also necessary to carry out another major adjustment in the opposite direction. In the 1953 version of the SNA national income is defined on the basis of "factor cost", i.e. excluding net indirect taxes. In the MPS national income is defined at prices paid by the final users, i.e. including indirect taxes. Therefore, if the CMEA countries followed the recommendations of the SNA in their compilation of national income indicator, the final result would not significantly differ from the original official value because the net value added of non-material services would increase it by 14-17%, but the deduction of the turnover tax would decrease the value of national income by 20-25%.[18]

2. NMP by Official Data

2.1. NMP Growth Rates by Official Data

The official source of comparable macroeconomic statistical data for MNP and its dynamics in the former CPEs was the CMEA (Table 2).

[18] In all CPEs turnover tax was treated as an indirect tax. It was the main channel of centralizing revenues in the State budget, while the role of direct taxes was negligible.
The 'compensation' between the value added of the non-material product and turnover tax was the decisive argument against that time intention to increase the UN membership fee of the CMEA countries based on the national income indicators.

Table 2

Annual Average Growth Rates of the Produced MNP in CEE Member-Countries of the CMEA, 1951-1988, %

Country	1951-1955	1956-1960	1961-1965	1966-1970	1971-1975	1976-1980	1981-1985	1986-1988	1951-1988
Bulgaria	12.2	9.7	6.7	8.8	7.8	6.1	3.7	4.3**	7.4
		-	-	+	-	-	-	+	
Hungary	5.7	5.9	4.1	6.8	6.3	2.8	1.3	1.7	4.3
		+	-	+	-	-	-	+	
East Germany	13.1	7.1	3.5	5.2	5.4	4.1	4.5	3.5	5.8
		-	-	+	+	-	+	-	
Poland	8.6	6.6	6.2	6.0	9.8	1.2	-0.8	3.9	5.2
		-	-	-	+	-	-	+	
Romania	14.1	6.6	9.1	7.7	11.4	7.0	4.4	5.1	8.2
		-	+	-	+	-	-	+	
The USSR	11.4	9.2	6.5	7.8	5.7	4.3	3.2	2.8	6.4
		-	-	+	-	-	-	-	
Czechoslovakia	8.2	7.0	1.9	7.0	5.5	3.7	1.7	2.4	4.7
		-	-	+	-	-	-	+	
CMEA- total*	10.8	8.5	6.0	7.4	6.4	4.1	3.0	3.0	6.1
		-	-	+	-	-	-	-	

* Including Vietnam, Cuba and Mongolia

****** The official data is 5.6%, but we corrected it taking account the wrong given by the official statistics overestimated growth rate for 1988 6.2% instead of 2.4%.

Source: Статистический ежегодник стран-членов Совета Экономической Взаимопомощи, 1989. Москва, Статистика, с. 18-28.

The CMEA country-members marked comparatively high NMP growth of rate during the period under review - 6.1% total. The highest rates are observed for Romania, Bulgaria, the USSR, East Germany (GDR) etc. Considering by sub-periods the highest even double-digit rates of growth are achieved in the first half of the 1950s, as the lowest rate of growth then is that in Hungary – 5.7%.

In general the countries under review kept their ranking by the level of economic development within the following nearly 40 years. The data also show that the MNP dynamics did not follow constant increase. Since the second half of the 1950s a decline of the MNP growth rates has begun. The only exception is Hungary, where the increase is very low - by 0.2 percentage points. The MNP growth rates continued to slow down in 1961-1965, as this time the exception is Romania. The second half of the 1960s is more successful for the most countries (with exception of Romania and Poland). A new wave of slow-down in the MNP dynamics is observed from the first half of the 1970s, including most the CMEA country-members and this tendency kept until the end of the 1980s.[19]

[19] Some authors distinguish cycles in the development of the former socialist countries (see for example Kolodko, 2000, Globalization and Catching-Up: From Recession to Growth in Transition Economies. International Monetary Fund. IMF Working Paper, June, WP/00/100; as well as the Bulgarian authors Димитров, А. 1984, Иконометрични макромодели за развитие на народното стопанство, С.; Аврамов, Р., Цикличността в българската икономика: теоретични и методологични основи на анализа. Икономическа мисъл, 1989 № 11, с. 3-16.; Аврамов, Р., Цикличността в българската икономика: външни шокове и вътрешни фактори. Икономическа мисъл, 1990, № 2, с.13-29; Антонов, В., Някои характеристики на структурните промени в икономиката: приспособимост и цикличност в промишлеността, Икономическа мисъл, 1987, № 5, 5-27).

2.2. The CMEA Comparison

Depending on the organization of the international comparisons there are two maior groups: detailed (based on a big data set and peformed by individual organizations or in collaboration) and short-cut (which are performed by individual experts using data from official sources). The detailed comparisons of national income are regarded as more reliable source of comparable data. Related to the CPEs in the period under review, two basic comparisons are interesting – under the CMEA and the ICP.

The CMEA comparison was based on the method of detailed repricing. It was organized by the CMEA Statistical Standing Commission and started at the beginning of the 1970s. The main aim of this comparison was to estimate the most important benchmark years and they were, as follows: 1973, 1978, 1983 and 1988. Since this comparison was confidential it had a very limited utilization. After the collapse of the centrally planned system and the dissolution of the CMEA main results of this comparison were open and published.[20]

There are common features between the methodology of the CMEA comparison and that of the ICP, which are the following:

Firstly, in the two of them national income indicators are calculated, through processing of huge statistical information for quantities of a great number of identical or similar representative goods and services and their prices for each country included in the comparison.

Secondly, both of them were carried out on the principle of a "star" system, as for the CMEA countries the former USSR was a numeraire country, in the ICP this country was (and still is) the USA. There should remind that against the advantages in terms of easy understanding and calculation, using the "star" system the estimates for the various countries are influenced by the structure of the country chosen as a centre of the star. For example, domestic USSR prices which overvalued manufactures and undervalued primary products, influenced intra CMEA price and respectively CMEA comparisons. In this comparison non-material services include only activities in education, science, culture, management and some kinds of social services. Thus the CMEA Statistical Standing Commission could not include the whole activities in the service sector, or at least the representative part of them.

Thirdly, both of them aimed at obtaining more reliable data on the main components of the national income indicator. In the case of the CMEA comparison the main goal was not only to estimate NMP, but also the following indicators: used NMP, consumption fund, accumulation fund (it covers changes in stock and gross capital formation net of depreciation), fixed capital formation, total consumption of population, total output in industry and agriculture, total labour productivity.

Fourthly, the two comparisons were organized periodically, in consecutive rounds (phases).

According to the specificity of the MPS, respectively the CPEs' official data presentation, the figures are given mainly as index numbers and/or structure breakdowns (Table 3).[21]

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[20] See Георгиева, Д. и Ю. Иванов. Макроэкономические показатели: опыт для международного сопоставления. – Экономическое сотрудничества стран-членов СЭВ, 1990, № 10, с. 104-111.

[21] All the same data for used NMP per capita in 1983 are given: 2241 rubles in Bulgaria; 2268 rubles in Hungary; 1843 rubles in Poland; 2598 rubles in East Germany; 1983 rubles in the USSR and 2497 rubles in Czechoslovakia.

Table 3

Indexes of Produced and Used NMP per Capita in CEE Countries in 1988 (the USSR=100)

Country	Produced MNP			Used MNP			Labour productivity
	USSR=100	In national currency	Average index	Total	Including		
					Consumption	Accumulation	
Bulgaria	108	105	106	**113**	**123**	**88**	**92**
East Germany	156	131	143	**147**	**174**	**92**	**132**
Poland	109	93	101	**99**	**105**	**85**	**92**
Czechoslovakia	137	126	132	**151**	**151**	**67**	**137**

* Hungary did not take part in this round of the comparison.

Source: Георгиева, Д. и Ю. Иванов. Макроекономические показатели: опыт для международного сопоставления. – Экономическое сотрудничества стран-членов СЭВ, 1990, № 10, с. 104-111.

In the process of calculation the Gershenkron effect has appeared, i.e. value indicators for a given country are higher if they are calculated at prices of the partner-country and are lower if they are calculated using the prices of the same country. This effect is evident for all countries in the Table 3, as the most expressed difference is marked for East Germany - the index number of the produced NMP per capita related to the USSR=100 is 156 but 131 related to the national currency.

The estimates of the consecutive phases of comparison allow coming to the following conclusions:[22]

- The highest level of economic development marked GDR (East Germany), followed by Czechoslovakia. Hungary, Bulgaria and Poland altered each other in different years and by different indicators. The advanced position of GDR and Czechoslovakia could be explained by their higher level of labour productivity, caused by more developed industrial production, etc. The USSR produced over 70% of total CMEA NMP, but judging by the basic figures on economic performance, it lagged behind the other countries.
- There are estimates from the CMEA comparison for the total consumption of population in 1988; if the USSR=100, the ratio for Bulgaria is 119, East Germany - 159, Poland - 98 and Czechoslovakia - 140. Judging by the disaggregated data, the consumption of material goods is predominantly over consumption of services. Concerning the latter, GDR and Czechoslovakia are again in advanced positions in comparison with the other countries.

3. The ICP Detailed Repricing Comparison of GDP Including CPE and Short-Cut Approaches

Comparison of countries with different economic systems based on a detailed repricing was first started in 1968 in the framework of the ICP. This project is based on the method pioneered by M.Gilbert and I. Kravis.[23]

The ICP is regarded as the most significant progress in the area of economic level comparisons. It is based on aggregate GDP (according to SNA methodology), produced by final expenditure approach. Altdough the fundamental framework of this

[22] Рангелова, Р. Сближение уровней экономического развития стран-членов СЭВ. В: "СЭВ - новый этап сотрудничества", под ред. К. И. Микульского, Москва, Экономика, 1986, с. 249-260.

[23] Gilbert, M. and I.B. Kravis (1954), An International Comparison of National Products and the Purchasing Power of Currencies, OEEC, Paris.

methodology has remained basicly the same over time some changes and improvements have been implemented.[24] May be the most important modifications were the setting up of regional sub-projects at the end of the 1970s, including European Comparison Project, or the changed approach of pricing from the so-called GK to EKS.[25]

Concerning the former CPEs, from the very beginning Hungary was included in the ICP. In the different phases other CEE countries like Poland, Romania and Yugoslavia were included only once or more times.[26]

At times scholars use short-cut approaches for producing estimates of national income indicators. Notwithstanding the advantages of these approaches at the international comparisons (they require less time and are less expensive), under the conditions of centrally planning they could be considered first of all as an initial or supplementary phase for the real work, namely involvement of the countries in detailed repricing international comparisons.

Further the short-cut approach of R. Summers and A. Heston, producing at that time their own estimates based on the ICP results will be presented. The two authors' comparable estimates are regarded as consistent and reliable long-time series. They as well as the estimates of A. Maddison are the most used in the world practice.

3.1. The Short-Cut Approach of R. Summers and A. Heston

Parallel with the work on the ICP, R. Summers and A. Heston, who are amongst its methodologists, calculated time series of real GDP and of its major components: consumption, investment and price level, for many countries, most of which were not included in the project. Their implemented idea is the following: the application of the system of national accounting in the individual countries leads to the calculation of data in the national currencies, which are not comparable on an international perspective. On the other hand, the periodically carried out ICP, as well as comparisons drawn by other international organizations provide estimates for certain years of the real GDP. On the basis of these comparisons it is possible to obtain estimates for other years around the basic one, before and after. In other words, Summers and Heston have made interpolations between the individual rounds on the basis of the real growth rates presented by the national official statistics. Their calculations embraced the period under consideration in the present paper (1950-1988) covering 130 countries, 9 of which were CPEs. The data are presented in the so-called Penn World Tables (PWT) derived from the benchmark studies of the ICP, which cover the years 1970, 1975, 1980 and 1985. The estimates of GDP for 1975 for the CPEs have been obtained using the following method: four of them (Hungary, Poland, Romania and Yugoslavia) were participants in the third phase of the ICP and their estimates were used, while for the

[24] The ICP methodology and its experience are well-known so we will shorten its presentation and will refer to the significant number of publications on it. One of the latest critical analysis of the ICP is made by Korzeniewicz et al. (2004), Measuring National Income: A Critical Assessment. National Income (journal), Society for Comparative Study of Society and History, Vol. 46, № 3, 535-586.

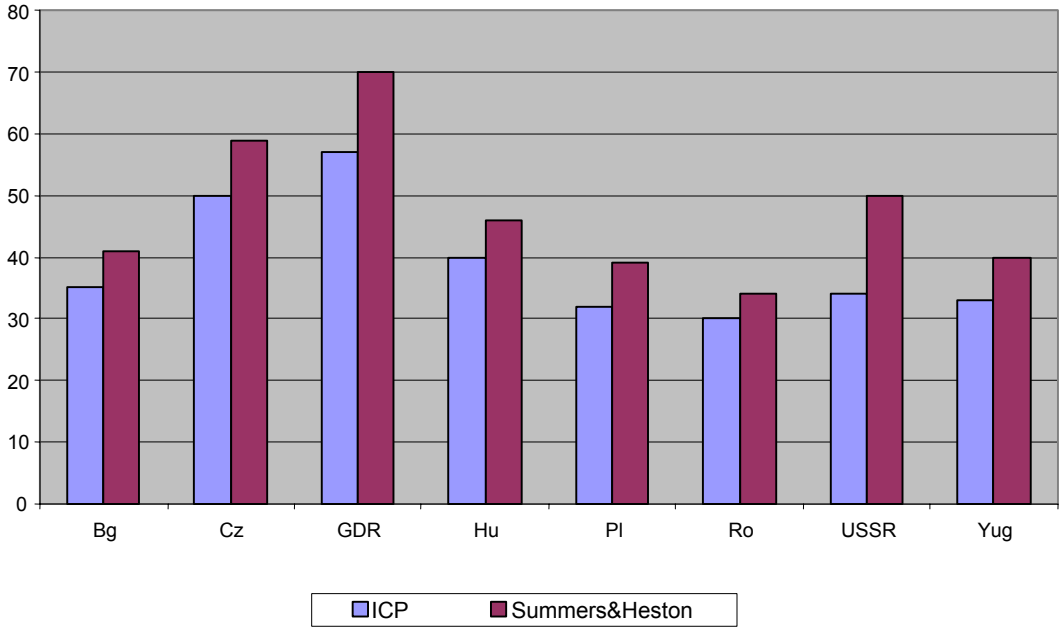
[25] For details about the so-called Geary-Khamis (GK) method and Elteto-Kóves-Szulc (EKS) method see for example Рангелова, Р. Международни икономически сравнения - методология и анализ, Глава VII „Проектът за международни сравнения на ООН". Издателство "Next", 2003, с.110-121.

[26] Since Bulgaria was not included in the ICP some authors made attempts to estimate GDP for the country using indirect methods and Hungary as a bridge-country (see Rangelova and Raynova, 1990, Comparability of GDP in the International Comparisons, Economic Thought'1990. Institute of Economics, Bulgarian Academy of Sciences, Year VI, 93-105.

remaining five countries data from national statistics were used. This is followed by extrapolation backward and forward in time using both data from the official national statistics of these countries for the rates of economic growth in constant prices.
At the end of 1980s time series for per capita GDPs of four other CPEs - Bulgaria, Czechoslovakia, East Germany and the USSR - did not appear in PWT5, i.e. up to 1988. This was due mainly to that time events and particularly to the growing consensus among CPE experts that both the levels and growth rates in these economies have been overestimated and this reason held off the two authors to attempt to provide estimates (see Figure 1). Only four CPEs have full representation in PWT5 - China, Hungary, Poland and Yugoslavia, which has supplied SNA data over time. The latter three have participated in benchmark ICP studies, while China has been involved in a quasi-benchmark comparison with the USA.

Figure 1

Indices of GDP per capita based on PPPs in 1985, estimated by ICP and Summers and Heston, USA=100



3.2. Comparison of the GDP per Capita for the CPEs Using Short-Cut Approaches Based on the ICP

Another short-cut approach was used by two Bulgarian authors. They used primarily the results from the fourth phase of the ICP for 1980, as well as the comparisons of the basic value indicators for 1983 among the CMEA countries. These latter comparisons involved calculations of the value volume of the non-material services rendered in the various countries, thereby making it possible to calculate indirectly the approximate ratios of the GDP in them. There has also been taken into account the employment growth of rates in the non-productive sphere. The estimates in international dollars were likewise obtained indirectly through the PPPs of Hungary and Poland, which were included in both

comparisons undertaken by the ICP and the CMEA. In the case of Bulgaria there has already been some experience from the bilateral comparison of this indicator with Finland for 1982 (where was calculated that the GDP for Bulgaria is by 28.2% higher than the MNP), as well as from the estimates made by individual authors.

In Table 4 are given the GDP per capita estimates for Hungary and Yugoslavia in the fourth and the fifth phase of ICP, based on respectively 1980 and 1985. The estimates for the rest of CPEs are calculated by Rangelova and Raynova[27] (1990). These estimates are compared with those of the two authors R. Summers R. and A. Heston. The main findings from the period 1980-1985 are as follows:

- The two applied approaches outline a decreasing or stagnating trend of the indices related to USA=100 for almost all countries, in particular Poland.
- The Summers and Heston approach gives higher estimates for the real GDP per capita, which has already been discussed (see Figure 1).

Table 4

GDP per capita based on PPPs, 1980 and 1985 (in international Geary-Khamis dollars, 1985 prices)

Country	ICP estimates of GDP*				R. Summers R. and A. Heston estimates of GDP - 1985			
	Fourth round – 1980		Fifth round – 1985					
	Intern. Dollars	USA=100	Intern. Dollars	USA=100	1980		1985	
					Dollars	USA=100	Dollars	USA=100
Bulgaria	4183	37	4331*	35	4904	43	5 113	41
Czechoslovakia	5856	51	6063	50	7002	61	7 424	59
GDR	6312	55	6969	57	7891	69	8 740	70
Hungary	4660	41	4885	40	5508	48	5 765	46
Poland	4278	37	3898	32	5006	44	4 913	39
Romania	3430	30	3625	30	3946	35	4 273	34
USSR	3894	34	4214	34	5626	49	6 266	50
Yugoslavia	4042	35	4052	33	4733	42	5 063	40

* The estimates for 1980 for Bulgaria, Czechoslovakia, GDR, Poland, Romania and USSR and for 1985 for all CPEs are produced by Rangelova and Raynova (1990).

Sources: World Comparison of Purchasing Power and Real Product for 1980. Phase IV of the International Comparison Project. United Nations, Commission of the European Communities, 1986; World Comparisons of Real Gross Domestic Product and Purchasing Power, 1985. Phase V of the International Comparison Programme. United Nations and Commission of the European Communities. United Nations, New York, 1994; Summers, R. and A. Heston (1988), New Set of International Comparisons of Real Product and Prices: Estimates for 130 Countries, 1950-1985.The Review of Income and Wealth, March 1988, 6-25.

4. The Alternative Approach of T. P. Alton and Associates for Estimation of GNP in Six Former CPEs: Empirical Comparison

The work team of Thad P. Alton has carried out a research project on national income in CEE over the period of centrally planning. Assessing the Alton's team approach as a whole, we come to a conclusion that it is of a great importance for the former CPEs trying to revaluate their official statistical data in retrospective. This is why we devote more attention in the study to the Alton and associates approach.

[27] See Рангелова, Р. и М. Райнова. Съпоставимост на брутния вътрешен продукт при международните сравнения.- Икономическа мисъл, 1989, кн. 7, 55-68 and Rangelova, R. and M. Raynova (1990), Comparability of GDP in the International Comparisons, Economic Thought'1990. Institute of Economics, Bulgarian Academy of Sciences, Year VI, 93-105.

Alton and associates have followed SNA methodology in construction a set of national income accounts for six CEE countries. On the basis of the official statistical data and numerous additional information sources they have transformed the basic indicators of NMP to GNP by sector of product origin. The authors have revalued all components of NMP in terms of their real factor cost aiming to eliminate many of the shortcomings of the official statistics of the former CPEs and to obtain more reliable and more comparable to Western statistics data for resource allocation. As a result, they present estimates of GNP and index numbers of the real growth and structural changes for the considered countries.[28]

A starting point of the Alton team's approach is that the GNP indicator covers various service sectors excluded in the NMP concept. Besides, the latter is calculated by subtracting from gross material product of officially defined material sectors only so-called material costs, including depreciation, but not subtracting inputs from the excluded service sectors. For this reason NMP is not a "clean" value added measure.

Gross National Product by production approach (at factor cost) =
Net Material Product
+ consumption of fixed capital in the material production sphere
+ Gross National Product in non-material sphere
- net indirect taxes (taxes minus subsidies)

One specificity of this approach is that the sectoral indexes of Alton's team are combined into the overall GNP index number by means of approximate factor cost weights, while the official figures are based on actual prices which in some cases diverge substantially from factor costs and in this way distort the structure and rate of growth of the economy from what it would be at factor cost.

It is known that in CPEs the relatively slow-growing agriculture sector and services were subsidised. This is why application of market prices for deriving weights for those sectors overstates the total growth because it gives a relatively low weight to the slow-growing sectors and a high weight to fast growing industry sector. For this reason estimates of GDP/NMP growth rates depend partly on if they are at market or at factor cost. Differences in these estimates reflect the uneven sectoral distribution of indirect taxes as turnover tax and subsidies.

One of the most important points of the Alton's team approach is the realized more detailed breakdown of GNP at market prices by sectors of product origin. Market price structure is interesting in view of following the actual transactions. However because of the price specificity in the former CPEs the official prices could not reflect the actual resource cost of producing various commodities. The Alton's team adjustments to factor cost reveal the change in the ratio of industry to agriculture at market prices in favour of the former to favouring agriculture at factor cost. In Table 5 is given an example in the case of Poland.

[28] In fact Abraham Bergson was that, who elaborated the methodology to transform NMP into GNP thus making them more comparable. A. Bergson focused his attention to the former USSR, while T. P. Alton and associates considered six CEE countries (see Appendix).

Table 5

Poland: GNP structure for 1956 at market prices and at factor cost, Total=100

Branches	At market prices	At factor cost
Industry and crafts	45.1	28.1
Agriculture	23.2	30.0
Construction	6.5	6.2
Transport and communications	5.7	6.9
Trade and catering	6.7	6.1
Housing construction	1.6	10.9
Defense	1.9	1.8
Others*	9.3	10.0

* Including all of the rest branches where no change is observed, namely: forestry, other services, education, arts and culture, science, health care, administration and law, religion and police.
Source: Alton et al. (1965), Polish National Income and Product in 1954, 1955, and 1956. Columbia University Press. New York and London, 86-87.

In Table 5 are presented only the branches where using the two approaches (at market prices and at factor cost) a difference in their share is observed. No changes in the share are observed for the so-called non-productive sphere. Comparatively small are the differences in the share for branches of the material sphere, where the factors labour and capital participate in a different way and indirect taxes and profit have complementary (distributive) nature like transport and communications, trade and catering. Most substantial is the difference between industry and crafts and agriculture, where the proportion is 2:1 at market prices and 1:1 at factor cost. This is the reason Alton and associates to turn main attention to the latter two branches. The share of housing construction estimated at factor cost is nearly 7 times bigger than that estimated at market prices. The latter fact reflects the pricing specificity of the CPEs prompted by the social state policy.

The Alton's team produced estimates of GNP using two ways of calculation by production approach and by final use (Table 6). But while producing the GNP origin estimates the authors have a consistent set of weights reflecting adjusted factor cost, the weights for the final use estimates are defined by them as hybrids. The lack of necessary data and research time constraints are pointed out as the real reasons for not extended the factor cost concept comprehensively to weights for final uses.[29] For this reason and because the production approach is closer to the NMP methodology we focus our attention to the weights for the GNP aggregations which reflect adjusted factor costs for country-specific base years.

The estimates for Poland in Table 6 serve just for an illustration of this approach. Considering the basic components ratio, i.e. total consumption to gross fixed capital formation we see that estimation at market prices favours the total consumption in comparison with the estimation at factor cost (which favours the gross fixed capital formation).

[29] Alton, T.P. et al, (1986), Eastern Europe: Domestic Final Uses of Gross Product, 1970 and 1975-1985. Research Project on National Income in East Central Europe. OP-92, New York, p.1.

Table 6

Poland: GNP structure by final use in 1956,%

	At market prices	At factor cost
Individual consumption	59.5	56.5
Collective consumption	9.9	8.4
Gross fixed capital formation	26.8	30.7

Source: Alton et al. (1965), Polish National Income and Product in 1954, 1955, and 1956. Columbia University Press. New York and London, p. 82.

The GNP volumes are estimated both in national currency and USD, as the first choice takes the advantage to use original data sources and respectively to ensure higher reliability of the estimates, while the second choice allows better cross-country comparability (Table 7).

Table 7

CEE: GNP per capita, 1970 and 1975-1985, in USD at 1985 prices

Years	Bulgaria	CSSR	GDR	Hungary	Poland	Romania	Average (6)	USA
1970	4 973	6 891	7 202	5 811	5 175	3 410	5 449	13 168
1975	6 082	7 869	8 639	6 709	6 777	4 496	6 704	13 939
1976	6 237	7 948	8 845	6 693	6 878	4 935	6 875	14 477
1977	6 144	8 230	9 125	7 081	6 938	5 010	7 020	15 003
1978	6 270	8 302	9 286	7 229	7 119	5 196	7 174	15 636
1979	6 502	8 317	9 553	7 233	6 945	5 337	7 205	15 835
1980	6 290	8 467	9 758	7 297	6 714	5 219	7 144	15 634
1981	6 436	8 416	9 958	7 349	6 300	5 196	7 041	15 762
1982	6 619	8 556	9 938	7 624	6 180	5 303	7 076	15 209
1983	6 484	8 659	10 111	7 555	6 425	5 286	7 173	15 590
1984	6 658	8 868	10 451	7 776	6 584	5 509	7 382	16 456
1985	6 590	8 993	10 723	7 718	6 638	5 580	7 457	16 671
Index 1985-1970	133	131	149	133	128	164	137	127

Source: Alton, T.P. et al (1986), Economic Growth in Eastern Europe, 1970 and 1975-1985, Research Project on National Income in East Europe, OP-90, p. 23.

The estimates in Table 8 outline the scale of each one considered CEE country as well as their common potential changes from 1970 to 1985. The temporal comparison shows the known fact about the slow-down of the economic growth in CEE after 1975. While the index numbers of GNP increase from about 79 to 100 within only five years (from 1970 to 1975) in the following 10 years it reaches only 117. The highest GNP per capita is marked for East Germany, followed by Czechoslovakia, Hungary etc.

The estimates given in Table 8 allow presenting the individual country contribution to total GNP for the six countries (Figure 2). In 1985 the biggest is the share of Poland - nearly 30%, followed by East Germany - 21%, Czechoslovakia - 17%, Romania - 15%, Hungary - 10% and the smallest is the share of Bulgaria - 7%.

Table 8

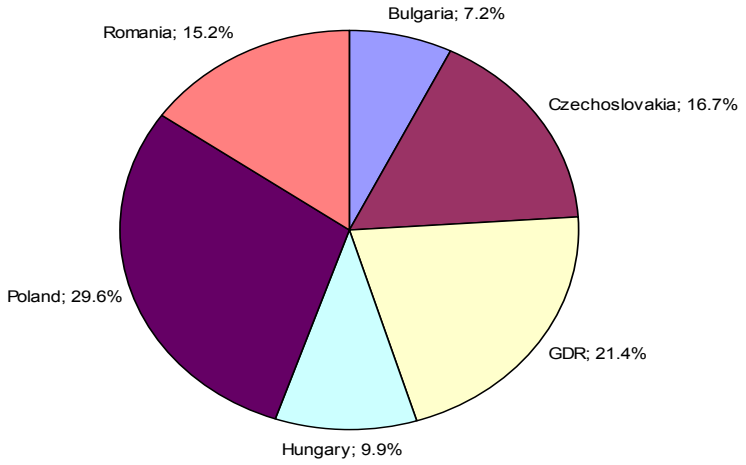
CEE: Total GNP and its distribution by country, 1970 and 1975-1985, in USD, at 1985 prices

Year	Distribution of GNP among the six countries (Total=100)						GNP - total for the six countries	
	Bulgaria	Czechoslovakia	GDR	Hungary	Poland	Romania	USD	Index 1975=100
1970	7.5	17.6	21.9	10.7	30.0	12.3	561 278	78.9
1975	7.5	16.4	20.4	9.9	32.4	13.4	711 820	100.0
1976	7.4	16.1	20.2	9.6	32.3	14.4	734 711	103.2
1977	7.2	16.4	20.2	10.0	31.8	14.4	755 325	106.1
1978	7.1	16.2	20.1	9.9	32.1	14.6	776 522	109.1
1979	7.3	16.2	20.4	9.9	31.2	15.0	783 997	110.1
1980	7.1	16.6	20.9	10.0	30.6	14.8	781 580	109.8
1981	7.4	16.7	21.5	10.2	29.2	15.0	773 885	108.7
1982	7.6	16.8	21.2	10.4	28.7	15.3	781 170	109.7
1983	7.3	16.8	21.2	10.2	29.5	15.0	795 221	111.7
1984	7.3	16.7	21.2	10.0	29.6	15.2	821 619	115.4
1985	7.2	16.7	21.4	9.9	29.6	15.2	833 127	117.0

Source: Alton, T.P. et al (1986), Economic Growth in Eastern Europe, 1970 and 1975-1985, Research Project on National Income in East Europe, OP-90, p. 23.

Figure 2

Distribution of the total GNP by six CEE countries, 1985



Source: Alton et al. (1986), Economic Growth in Eastern Europe, 1970 and 1975-1985, Research Project on National Income in East Europe, OP-90, p. 23.

The authors point out that the dollar estimates are provisional and served for calculation of the annual growth rates or interpolation of estimates between the individual phases on the basis of the real growth rates presented by the national official statistics. The set of individual country's dollar values should not be considered as precise comparative indicators of absolute levels of development. They have to be used for very rough comparisons between the countries considered (see Table 9).

Table 9

CEE: Average annual rates of growth of GNP, 1966-1990, (%)

	1966 - 1970	1971 – 1975	1976 - 1980	1981 - 1985	1986 - 1990
Estimated by T. P. Alton and associates – GNP					
Bulgaria	4.7	4.5	1.2	0.9	-1.8
Hungary	3.1	3.4	2.3	0.9	-0.5
Poland	3.8	6.6	0.9	1.2	-1.1
Czechoslovakia	3.5	3.4	2.2	1.4	0.8
Accounted by the CMEA - produced MNP*					
Bulgaria	8.8	7.8	6.1	3.7	4.3**
Hungary	6.8	6.3	2.8	1.3	1.7
Poland	6.0	9.8	1.2	-0.8	3.9
Czechoslovakia	7.0	5.5	3.7	1.7	2.4

Notes:

* The last time sub-period is 1986-1988

** This is a corrected by the author of this paper growth rate due to the already discussed mistake of the official statistics in Bulgaria calculating the 1988/1987 growth rate 6.2% instead of 2.4%.

Source: Alton et al. (1992), Economic Growth in Eastern Europe, 1975 - 1991, OP-120, 31-32 и Statistical Yearbook of the country-members of the CMEA, 1989. CMEA, Moscow, 18-28.

Comparing the dynamics of the two indicators - GNP and NMP, we should take account the conventionality caused by their different scope, which could contribute to the lower growth rates estimated on the basis of GNP in comparison with MNP. On the other hand we can not prove that the official data are calculated correctly at constant prices. [17]

The estimated by Alton and his team growth rates as a whole are lower than those by the official CMEA statistics (see Figure 3 and Figure 4). What is common this is the observed decreasing GNP trend over time for the individual countries, in particular since 1970-1975. According to Alton's team contrary to the CMEA estimates the economic growth continues to slowdown in the second half of the 1980s.

The lines presented for the individual countries show that for three of them (Bulgaria, Hungary and Czechslovakia) the Alton and associate's estimates are lower that that of the former CMEA comparison, while for Poland the economic slowdown around 1980 is estimated by the SMEA comparison as more severe than the Alton's team has done this.

[17] Comments and critical remarks on the Alton and associates approach one can see in Рангелова, Р. Оценки за икономическия растеж на България в ретроспектива.- Икономическа мисъл, 1996, кн. 2, 103-117 and Maddison, A. (1998), Measuring the Performance of a Communist Command Economy: An Assessment of the CIA Estimates for the U.S.S.R. Review of Income and Wealth, Series 44, Number 3, September 1998, 307-323.

Figure 3
Average annual rates of growth of produced MNP in 4 CPEs, 1966-1990 accounted by the CMEA (%)

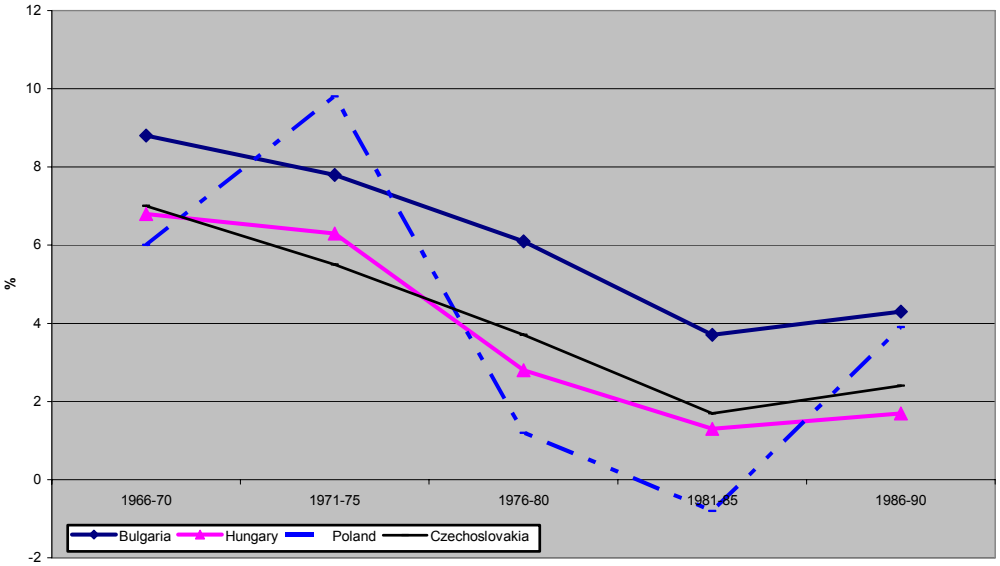


Figure 4
Average annual growth rates of GNP in 4 CPEs, 1966-1990 estimated by Alton and associates (%)

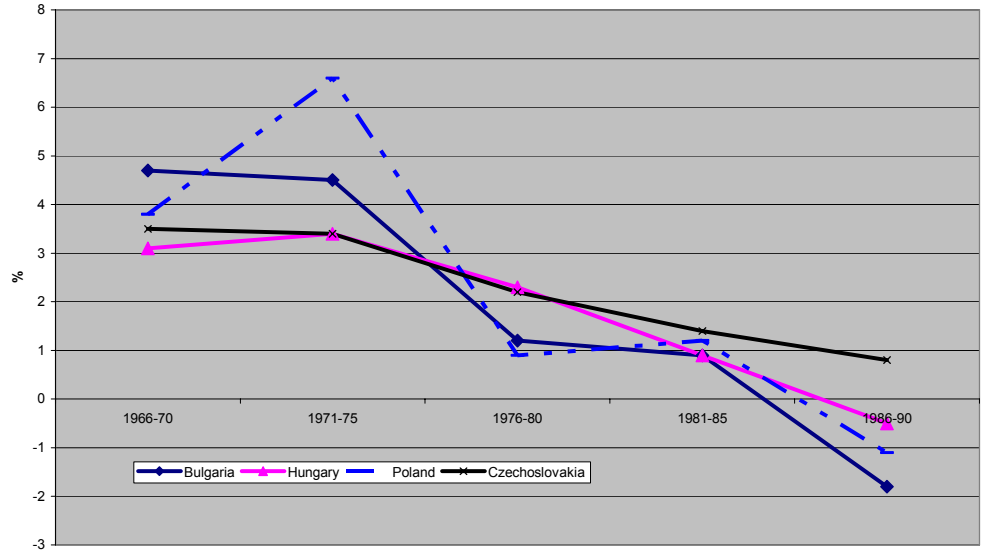


Figure 5
Average annual growth rates of GNP in Bulgaria, 1966-1990 estimated by Alton and associates and the CMEA, (%)

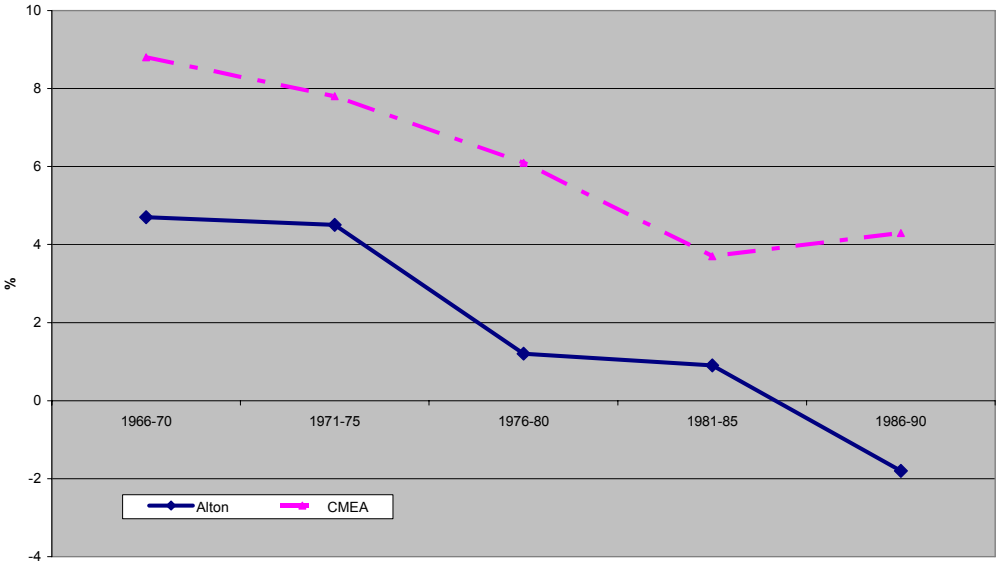


Figure 6
Average annual growth rates of GNP in Hungary, 1966-1990 estimated by Alton and associates and the CMEA, (%)

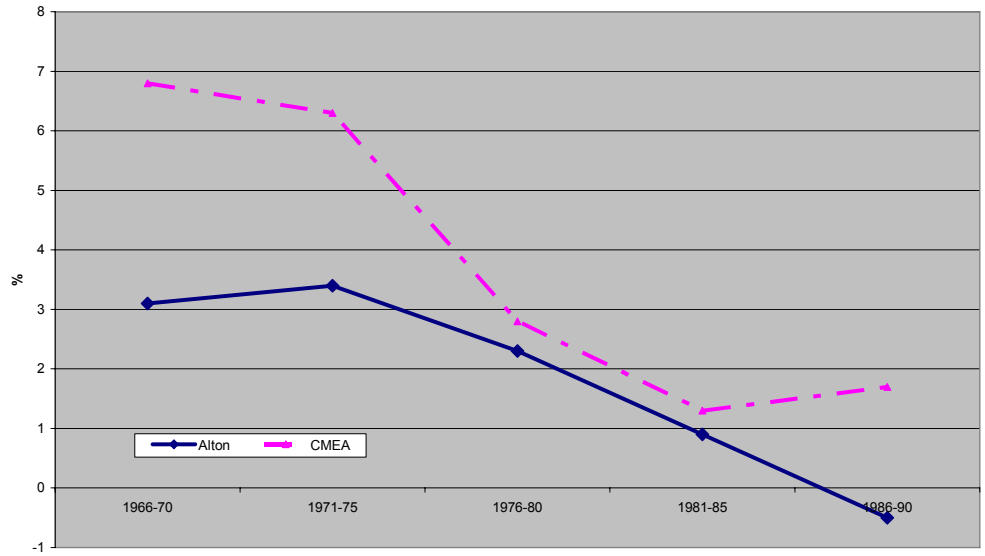


Figure 7
Average annual growth rates of GNP in Poland, 1966-1990 estimated by Alton and associates and the CMEA, (%)

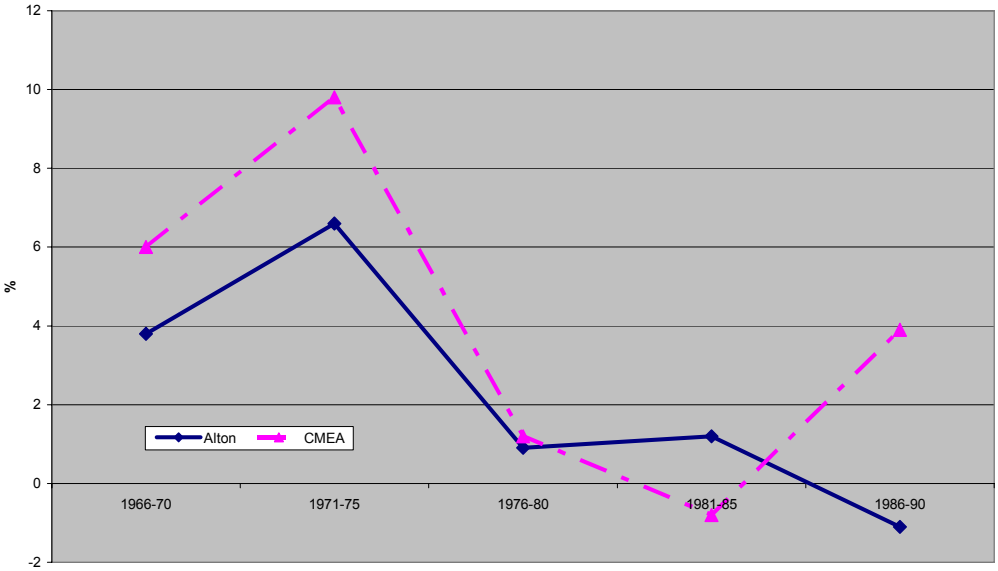
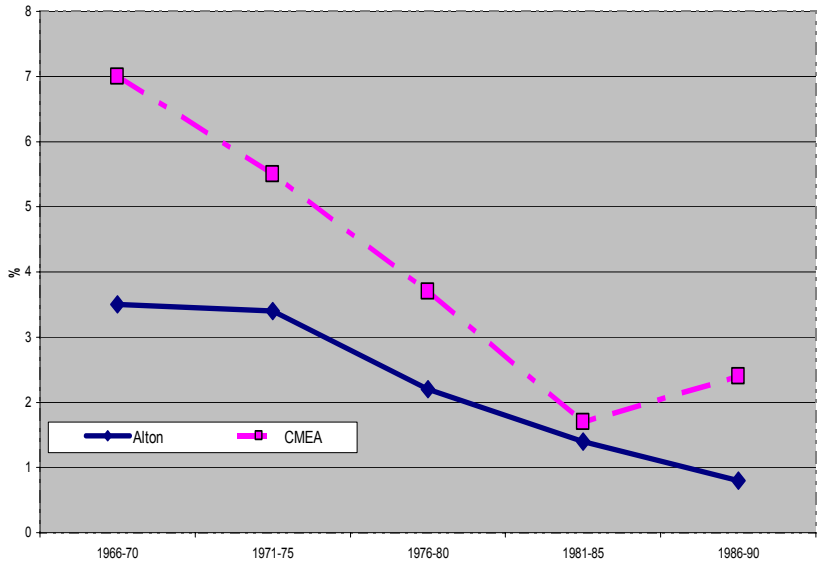


Figure 8
Average annual growth rates of GNP in Czechslovakia, 1966-1990 estimated by Alton and associates and the CMEA, (%)



5. The Maddison Approach

The work of A. Maddison is intended as a reference source for empirical analysis of world development, and for assessment of the comparative performance of individual nations. His approach is close to the ICP methodology but there are essential differences in comparison with the Summers&Heston approach. Maddison realises that the EKS PPP is the convertor now preferred by Eurostat and OECD, but prefers to use the Geary-Khamis converter. The latter is usually nearest to the Paasche convertor, while the Fisher convertor is somewhat higher, and the Laspeyres converter shows the highest PPPs. The wider dispersion between alternative PPPs, the lower the relative GDP per capita of the country concerned. For consistency with the procedure used for non-OECD countries, Maddison uses the Geary-Khamis PPPs.[30]

His belief is that the variance between successive ICP rounds (phases) is more likely to be the source of problem than errors in the national growth measures. This is why in general he keeps to the successive ICP rounds. The last Maddison series are based on the ICP6 Geary-Khamis benchmark for 1990. For the former USSR he used the A. Bergson's estimates, and for the other CEE countries he used the Alton and associates' estimates.

In Table 10 there are presented the Maddison estimates of per capita GDP for 14 European countries: Western European countries forming the so-called "old" EU (without Luxemburg) and seven former CPEs in CEE for selected years - 1950, 1975 and 1990. The second chosen year (1975) reflects the best results in most countries of two groups over the period under review, followed by more or less expressed slowdown.

The ranking of the CPEs by GDP per capita kept almost the same during the period after the Second World War until 1990. Leaders are East Germany, Czechoslovakia and Hungary, but countries with lower level of GDP (Bulgaria, Romania, USSR, Yugoslavia) have realised faster economic growth, i.e. catching up effect was observed.[31]

The CEE countries have never been among the wealthy nations in Europe, but during the period of CPE they worsened their position income per capita in comparison with the Western countries. In 1939 the average position of CPEs was about 52 to the Western European countries equal to 100 (the EU-14, i.e. the "old" country-members of the EU without Luxemburg), in 1989, i.e. in the year of the CPEs collapse this ratio decreased to nearly 42:100, i.e. by 10 percentage points.[32]

[30] Maddison, A. (1995), Monitoring the World Economy, 1820-1992, Development Centre of the Organisation for Economic Co-operation and Development, Paris, 194-201.

[31] The latter was observed also in the more-backward ex-republics of the former USSR or ex-republics of the former Yugoslavia, like FRY Macedonia.

[32] See. Рангелова, Р., България в Европа – икономически растеж през XX век. Академично издателство „Проф. М. Дринов", С., 2006, с.116-120.

Table 10

European Countries: GDP per Capita in 1950, 1975 and 1990
(1990 Geary-Khamis dollars)

Country	1950		1975		1990	
	(1)	(2)	(1)	(2)	(1)	(2)
Austria	3,731	87	11,724	106	16,792	109
Belgium	5,346	124	12,133	110	16,807	109
Denmark	6,683	155	13,104	119	17,953	116
Finland	4,131	96	11,098	100	16,604	107
France	5,221	121	13,101	119	17,777	115
Germany	4,281	99	13,034	118	18,685	121
Greece	1,951	45	7,867	71	10,051	65
Ireland	3,518	82	7,117	64	11,123	72
Italy	3,425	80	10,558	96	15,951	103
Netherlands	5,850	136	13,037	118	16,569	107
Portugal	2,132	50	6,790	61	10,685	69
Spain	2,397	56	9,151	83	12,170	79
Sweden	6,738	156	14,185	128	17,695	114
United Kingdom	6,847	159	11,701	106	16,302	105
EU-14*	4,306	100	11,043	100	15,463	100
Bulgaria	1,651	38	5,831	53	5,764	37
Czechoslovakia	3,501	81	7,384	67	8,464	55
Hungary	2,480	58	5,805	53	6,348	41
Poland	2,447	57	5,799	53	5,113	33
Romania	1,182	27	3,761	34	3,460	22
USSR	2,834	66	6,136	56	6,871	44
Yugoslavia	1,546	36	4,693	42	5,458	35

Legend:
(1) - GDP per capita, in dollars based on PPPs
(2) - Index at EU(14) =100 (EU-15 without Luxemburg)
Note:
* Without Luxemburg.
Source: Maddison (1995), Monitoring the World Economy 1820-1992. OECD Development Center, Paris, Appendix D, Levels of GDP Per Capita, Table D-1(a,b,c,d), 194-201.

It should be marked that the former CPEs, in particular Bulgaria, Romania and Yugoslavia were in their best position in comparison with EU(14) around 1975. According to the Maddison estimates the GDP per capita level of Bulgaria for 1975 is 5,831 dollars and an index number 53 at EU(14)=100, while in 1990 it is 5,764 dollars but the index is only 37. The other CPEs under review (Czechoslovakia, Hungary, Poland, USSR) definitely worsened their position concerning EU (14)=100. The common trend for all 7 countries is the slow-down of the economic growth after 1975.

The Maddison estimates allow following the process of convergence inside of the two groups of countries - CPEs to the Western European economies. For example the coefficients of variation for the former group decrease from 36.5% in 1950 to 26.3% in 1990, while in the latter group decreased respectively from

38.3% in 1950 to 19.4 % in 1990, which is an indication that the process of convergence in Western Europe was more clearly expressed.[33]

Concluding Remarks

- The fundamental statistical concepts in the accounting system titled MPS, which was been acting in the conditions of the CPEs are based on the Smithian and Marxian economic theory on "value-creating labour", while those in the SNA (which is adequate to market type economies) are based on the economic theory of John M. Keynes, assuming a broader interpretation of the scope of the economic activity. This fact predetermined the narrower scope of the concept of MNP in comparison with GDP.
- The coexistence the two accounting systems allowed to endure mutual influences and thus to develop themselves both separately and jointly, including the building of links between them. In the 1970s and 1980s some of the former socialist countries introduced parallel with by the MPS calculations of basic indicators by the SNA. The collapse of the CPEs in the CEE imposed the replacement of the MPS by the SNA.
- In this paper we have tried to present different applied methodologies in order to illustrate their own specificity which in one way or another reflect on the derived estimates. We will agree with T. P. Alton and associates that "international comparisons of levels of national product encounter serious methodological and basic data problems. Every approach leaves something to be desired".[34]
- Many of the developed methodologies were connected with carried out at that time international comparisons of the economic performance. This is way any participation of a given country in another international comparison is a valuable contribution. Such a country could have benefited from a higher level of cooperation from the host country and more extensive expert field of observations than the actual situation allowed. Among the former socialist countries Hungary was this typical case.
- The variety of the worked out and applied methodologies contains big intellectual efforts which experts employed in order to achieve comparability between the indicators of national income (MNP) in the acting MPS in the former CPEs and GDP in the acting in the market economies SNA. These efforts deserve their place in the economic history.

[33] See Рангелова, Р. Икономическия растеж на България през XX век. Икономика, № 3, 2005, с. 6-11.

[34] Alton, T.P. et al (1986), Economic Growth in Eastern Europe, 1970 and 1975-1985, Research Project on National Income in Eastern Europe, L.W. International Financial Research, Inc. New York, OP-90, p.5.

Appendix

Alternative Methodologies and Approaches for Estimation of MNP (or GDP) in the CPEs

Organisation /Author(s)	References	Essence of the methodology (approach)	Comments or/and remarks
GDP approach based on PPPs			
International Comparison Project (ICP) - Gilbert, M. and I.B. Kravis (1954),An International Comparison of National Products and the Purchasing Power of Currencies, OEEC, Paris.	The most comprehensive and prestigious comparison of real GDP of the UNs and World Bank carried out periodically since the end of the 1960s.	- PPPs calculated of quantities ('real' volumes) of goods and services expressed in GDP; - Decentralised price surveys carried out by national statistical offices and coordinated by the ICP office at the World Bank.	Major critiques: - Low quality of direct and indirect price estimates, in particular due to quality differences in goods and difficulty in determining price of services and some goods through input prices; - Limited number of observations due to irregular and limited benchmark studies.
Summers, R. and A. Heston (1988), New Set of International Comparisons of Real Product and Prices: Estimates for 130 Countries, 1950-1985.The Review of Income and Wealth, March 1988, 6-25. Summers, R. and A. Heston (1991), The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950-1988. Quarterly Journal of Economics, Vol. CVI, May, Issue № 2.	A. Heston and R. Summers took part in the ICP work from its inception in 1968 until about 1985. They produced the so-called Penn World Tables on the basis of the ICP rounds estimates. These tables cover a great number of countries in the world (over 150), including the former CPEs. In 1990 the Center for International Comparisons at the University of Pennsylvania (CICUP) was established. The present directors of the Center are the two authors.	The approach of the two authors concernes the expenditure side of GDP. They produced time series for individual countries based on temporal and spatial interpolations or extrapolations from successive ICP benchmark studies to countries and years not covered in the periodical surveys. In particular: - They used the original basic data for countries participating in the different ICP rounds and reworked the Geary-Khamis PPPs on a global basis. - The updating was done on a disaggregated basis, with separate estimates for consumption, investment, government expenditure and net foreign balance; - The procedure to eliminate the variance between successive ICP rounds involved modification of the growth rates in national prices.	R. Summers and A. Heston could not overcome the main shortcoming of the official MPS estimates, i.e. they tended to underestmate the level of output and exaggerate growth rates. (See Heston, A. (1994), A Brief Review of Some Problems in Using National Accounts Data in Level of Output Comparisons and Growth Studies. Journal of Development Economics. Vol. 44, № 1, 29-52).

Organisation /Author(s)	References	Essence of the methodology (approach)	Comments or/and remarks
Maddison, A. (1995), Monitoring the World Economy, 1820-1992, Development Centre of the Organisation for Economic Co-operation and Development, Paris.	In the referred book the author uses the ICP-6 Geary-Khamis benchmark for 1990 as the latest available and the most complete in country coverage.	A. Maddison assumes that the variance between successive ICP rounds is more likely to be a source of methodology's problems than errors in the national growth measures. His updating is cruder than that of R. Summers and A. Heston and done only at the GDP level. Although the EKS PPP is the converter now preferred by Eurostat and OECD, A. Maddison prefers to use the Geary-Khamis method in order to keep consistency with the procedure used for non-OECD countries.	- The applied Geary-Khamis method may suffer from Gerschenkron effect, i.e. may produced biased estimates for those countries whose expenditure and price structure differ substantially from the international average, which tends to be dominated by high-income countries, since the weighting scheme reflects country shares in total expenditure. -The author recognizes that measures of output over such a long period are necessarily rough.
Rangelova, R. and M. Raynova (1990), Comparability of GDP in the International Comparisons, Economic Thought'1990. Institute of Economics, Bulgarian Academy of Sciences, Vol. 93-105.	This is a short-cut method based on the fourth (1980) and the fifth (1985) rounds of the ICP. The main intention was to estimate GDP for Bulgaria as a country which did not participate in the ICP.	The authors used primarily the results from the ICP-4 for 1980, as well as comparisons of the basic value indicators, including NMP for 1983 among the CMEA countries. The latter comparisons involved calculations of the volume indexes of the non-material services rendered in the various countries, thereby making it possible to calculate indirectly the approximate ratios of the GDP in them. There also was taken account the employment growth of rates in the non-productive sphere. The estimates in international dollars were likewise obtained indirectly through the PPPs of Hungary and Poland, which were included in both comparisons: of the ICP and the CMEA. In Bulgaria's case there has already been some experience from the bilateral comparison of GDP with Finland for 1982, as well as from estimates derived by other individual authors.	The applied short-cut method was one of the small number of methods possible to be used in Bulgaria under the conditions of the different accounting systems. However it led to rough estimates.

Organisation /Author(s)	References	Essence of the methodology (approach)	Comments or/and remarks
Approach based on factor cost			
Alton, T. P. and associates (1956-1992), see: - Alton, T.P. et al (1980), Statistics on East European Economic Structure and Growth, Research Project on National Income in East Central Europe, OP-48. - Alton, T.P. et al (1992), Economic Growth in Eastern Europe, 1975-1991. L.W. International Financial Research, Inc. New York, OP-120, and others.	This is the most consistent approach for estimation of GNP in the CPEs using the official statistics and trying to correct the NMP according to SNA. Annual recalculations were made for the whole period of centrally planning in CEE countries allowing to estimate more precisely the real economic growth. Alton and associates have begun this work since the beginning of the 1950s. As a result they published numerous papers - over 130 both for the CEE courtiers as a whole and for the individual countries.	A. Bergson developed an "adjusted factor cost" framework for valuation of Soviet output, where the commodity prices were adjusted to equal average cost, and imputations were made for capital cost. Later he adjusted for turnover taxes and subsidies. He has also adjusted the scope of the accounts so that they approximated to the SNA concept of GDP, and indicators of production volume were intended to reflect value added rather that gross output. Bergson's approach was adopted by the USA Central Intelligence Agency (CIA) which made the annual estimates of CPEs' GDP. T. P. Alton and his team did the same work for CEE countries. It should be stressed that the experts are very correct in terms of references, trying to use mainly original and reliable sources of data. They are also exceptionally precise in using the statistical data.	The general remarks concern the approach to use the employment rate in the branches of the non-productive sphere in order to estimate the value added does not reflect the changes in the labour productivity. In our view as far as the MPS is not suitable for accounting the non-productive activities it is difficult to derive their real contribution to GDP (GNP). Even if we assume that the productivity in the service sector changes according to the employment growth rates (what is the Alton team assumption), the data show that we could hardly agree with the low and even negative rates of growth for government and other services.
PlanEcon, (see PlanEcon, Review and Outlook for the Eastern Europe. Washington: PlanEcon Inc., December 1999.	This was a research agency in the USA has been producing alternative estimates of the CPEs economic performance.	The main approach of this agency was using both national statistics of the former CPEs and additional data and applying short-cut methods to correct the official declared economic performance data in these countries. The methodology was not clearly published.	As all short-cut methods this approach has also some limitations, but in general it indicated the probable overestimation of the official statistics of the CPEs and thus served as a corrector.

Organisation /Author(s)	References	Essence of the methodology (approach)	Comments or/and remarks
Approach based on physical indicators			
Эрлих, Е., Международные сопоставления националъного дохода на душу населения в социалистических и капиталистических странах.- В: „Методологические проблемы международных соизмерений стоимостных показателей. М. 1968, 207-221. - Ehrlich, E. (1992), Economic Growth in Eastern Central Europe after World War II. Institute for World Economics, Hungarian Academy of Sciences, Working Paper, № 7.	At the end of the 1950s the Hungarian economist F. Janossy developed a method trying to avoid the difficulties from the two socio-economic systems in the world and to form the differences in their pricing systems. Later on F. Janossy and E. Ehrlich continued working on application of this method.	The idea is the following: the method is based on a set of physical indicators of consumption, for which an attempt is made to find a functional dependence on the per capita GDP value. Preference has been given to consumption indicators because there is closer dependence between them and the size of the GDP, as compare to the dependence between the GDP and the production indicators. A geometric mean, which is the corrected value of this macroindicators, is calculated from the quantities of its level for each country, depending on each physical indicator. The distorting influence of the exchange rate (ER) has been removed to a certain extent in the applied geometric mean. Comparisons of GDP per capita for several basic years covering the 1937-1980 period have been done with the active participation and further developments by E. Ehrlich. The last comparison relates to 46 countries for 1980, by employing 49 physical indicators.	*The advantages* of this method consist in the following: (a) possibility of correcting the ER and (b) determining the GDP for each country in which GDP has not been available, but there are statistical data on the physical indicators. *Disadvantages*: (a) using physical indicators in order to estimate the output volume in many cases they are not representative for a given branch (for one or another reason) and they are connected more with the output but not with the value added; (b) using physical indicators it is not possible to account the quality and technical progress; (c) the method is not very suitable for comparing the per capita GDP of countries for which a big gap between their income level is observed.
Marer, P. (1985), Dollar GNP's of the USSR and Eastern Europe. Published for the World Bank. The John Hopkins University Press, Baltimore and London. - Marer, P. et al (1992), Historically Planned Economies. A Guide to the Data. The World Bank. Washington, D.C.	The applied method is similar to that of F. Janossy and E. Ehrlich.	This method consists along most general lines of correcting the ER and of calculating the index of the GDP (GNP) in the so-called approximate US dollars.	This idea is developed in: Comparative GDP Levels (1993), Physical Indicators, Phase III, by I. Borenstein. Economic Commission for Europe. Economic Studies № 4, UNs, New York.

Organisation /Author(s)	References	Essence of the methodology (approach)	Comments or/and remarks
Havlik, P. (1986), Comparison of Real Products between East and West, 1970-1983. The Vienna Institute for Comparative Economic Studies (WIIW), April, № 115.	P. Havlik used the F. Janossy method with certain modifications.	The level of economic development of a given country is presented by per capita GDP, converted from national currency into US dollars through the current ER. The purpose is to calculate the dependence between this indicator and selected physical indicators for countries for which such data are available. This dependence is also used for obtaining estimates about countries for which no such data are available. Havlik adopts a critical approach to this fact, inasmuch as it introduces a high degree of conventionality in the results. He has selected 28 physical indicators which are closer in composition to the ones used in the Economic Commission for Europe than to those used by E. Ehrlich.	The author's considerations are connected with the kind of the mean used for obtaining the aggregate estimate. The geometrical mean (applied by E. Ehrlich) leads to lower estimates, while the arithmetic mean (used by P. Havlik) is influencing by the extreme values of the individual quantities.

Organisation /Author(s)	References	Essence of the methodology (approach)	Comments or/and remarks
Estimation of the USSR NMP/GDP			
Bergson, A., (1953), Soviet National Income and Product in 1937, Columbia University Press;	This research work was initiated by A. Bergson and his associates in the early 1950s, and developed by government funded research in the Rand Corporation and later by Central Inteligence Agency (CIA) and other government agencies. Afterwards forty years of scholarly activity followed in producing estimates of the USSR national income performance.	The CIA presented two sets of estimation for USSR national income and its growth: at Soviet prices and at adjusted factor cost. The Bergson's practice is followed in converting data in Soviet purchaser prices into producer prices at factor cost in order to get a more realistic appreciation of the resource costs involved. Bergson's' measures were in terms of expenditure categories, whereas the CIA preferred to estimate mainly by industry of origin. The move from purchaser to producer prices involved removing indirect taxes, transport and distributive margins, and addition of subsidies just as it is according to the SNA methodology. It involved also an adjustment of Soviet profit margins, which were simply mark-ups on labour and material inputs, but they did not reflect the cost of capital assets. This is why a major statistical weakness in this approach was the poor quality of the official USSR estimates of capital stock which was the basis for the CIA imputations.	As a result the factor cost adjustment brought some minor changes in the growth rates for industry and services, but the big changes were in the weights for the different sectors. In the early 1990s there was strong criticism of this research approach and the US government stop funding it and the similar work on CEE countries. Most of the archives of CIA financed work on CEE countries now seem to have been destroyed. It would be a pity to have the same thing with the archives on the former USSR (see Maddison, A., 1998, Measuring the Performance of a Communist Command Economy: An Assessment of the CIA Estimates for the U.S.S.R. Review of Income and Wealth, Series 44, Number 3, September 1998, 307-323).
Эйдельман М., Пересмотр динамических рядов основных макроэкономических показателей. – Вестник статистики, Госкомстат Российской Федерации, 1992, № 4, 19-26.	In his capacity of a leading statistician at the research Statistical Institute at the State Statistical Committee (Goscomstat) in Russia Edelman was in a position to dispose with more accurate and disaggregated data.	Edelman produced alternative indexes of economic growth of the USSR for the years of centrally planning.	The results show that the alternative trajectory of the economic growth of the USSR reflects the original (official) data. In general there are differences only concerning the machine building sector.

Organisation /Author(s)	References	Essence of the methodology (approach)	Comments or/and remarks
Ruocho, S. (see Руохо С., Советский экономический рост в ретроспективе: оценка методологии расчетов. Вопросы статистики, Госкомстат, Москва, 2001, №1, , с. 26-36).	The author has produced for years alternative estimates of the official Soviet statistics concerning national income and growth.	Ruoho's main point is to prove if the officially declared by the USSR statistics economic growth was comparable with that estimated by applying known alternative approaches. He applies mainly index number analysis or Physical Indicator Model (PMI) using officially published indicators of the USSR economy and trying to discover the influence of the unaccounted inflation.	Ruoho's results are close to that of Edelman.
Kouwenhoven, R. (1996), A Comparison of Soviet and U.S. Industrial performance 1928-1990. Research memorandum GD 29, Groningen Growth and Development Centre, May 1996.	At the University of Groningen was developed an alternative approach called International Comparison of Output and Productivity (ICOP).to measuring levels of performance by industry of origin, using census and input/output data and other information on quantities produced and producer prices.	Within the framework of the ICOP comparisons are carried out for USSR industry and farming for the benchmark year 1987 and retrapolating them for several decades. The year 1987 was chosen as a benchmark because the availability of input-output tables for both the USSR and the USA.	The results for farming shows that the USSR advantage was greater in terms of gross value added, as the USA ratio of inputs to gross output was higher than in the USSR.