SWP775

The Gross National Product of Hungary

Important Issues for Comparative Research

Ed A. Hewett

WORLD BANK STAFF WORKING PAPERS
Number 775

A Background Study
for
Dollar GNPs of the U.S.S.R. and Eastern Europe

WORLD BANK STAFF WORKING PAPERS
Number 775

A Background Study
for
Dollar GNPs of the U.S.S.R. and Eastern Europe

The Gross National Product of Hungary

Important Issues for Comparative Research

Ed A. Hewett

The World Bank
Washington, D.C., U.S.A.

Manufactured in the United States of America
First printing November 1985

Ed A. Hewett is a senior fellow at The Brookings Institution and a consultant to the World Bank.

Library of Congress Cataloging-in-Publication Data

Hewitt, Edward A.
The gross national product of Hungary.

(World Bank staff working papers ; no. 775)
Bibliography: p.
1. Gross national product--Hungary. 2. National income--Hungary. 3. Foreign exchange problem--Hungary. 4. Hungary--Economic conditions--1968- . I. Marer, Paul. Dollar GNPs of the U.S.S.R. and Eastern Europe. II. Title. III. Series.
HC300.295.I5H48 1985 339.3439 85-22729
ISBN 0-8213-0631-6

FOREWORD

Centrally planned economies (CPEs) account for a significant share of the world's production and income. In view of their importance in the world economy, and to facilitate international comparative analysis, for many years the World Bank has included statistical data on these countries in those of its publications that aim for universal coverage, such as The World Bank Atlas. Among these data, those relating to gross national product (GNP) and to GNP per capita are the most important, and the Bank also needs them for operational purposes for its member countries, which now include some CPEs.

In the CPEs prices are generally set administratively and are often loosely or not at all related to the relative scarcity and costs of production of goods and services. This is particularly true of the exchange rate. The World Bank normally uses exchange rates for converting GNP figures from national currencies into dollars (or into any other numeraire), an indispensable step for international comparisons. The choice of an appropriate conversion factor therefore poses particularly difficult problems for most CPEs. A further difficulty arises because the national accounts of the CPEs are based on the concept of net material product (NMP), which differs from the concept of GNP used in market economies. To derive the GNP numbers of those CPEs that compile only NMP accounts, various adjustments must be made. The data required for making these adjustments are not always fully available. Finally, a separate set of issues arises in relation to year to year comparisons within the same CPE. For these too and the corresponding growth rates, official data are not strictly comparable to growth rates of the market economies.

In early 1982 a research project sponsored and financed by the World Bank was undertaken to assess alternative methods of computing the per capita dollar GNP levels and growth rates of CPEs. It covered eight countries: Bulgaria, Cuba, Czechoslovakia, the German Democratic Republic, Hungary, Poland, Romania and the U.S.S.R. The purpose of this research project was to define the best among known methods that could be applied to CPEs as a group and make use of available data. It was not its aim to establish and define new computation methods whose application would have required many more years of effort, even if data had been available.

This research project has produced eleven reports, which are published simultaneously. The main report authored by the principal researcher for the project, Paul Marer, is published as a book, Dollar GNPs of the USSR and Eastern Europe (Johns Hopkins University Press, 1985). The eight country studies and two background papers are published separately in the World Bank Staff Working Paper series. The main report provides highly valuable insights into the problems related to the estimation and comparison of the GNPs and GNP growth rates of the CPEs. It also gives the author's best estimates of the actual values of these indicators for the majority of CPEs covered by the project, that is those for which there was some statistical basis for computing estimates or choosing between those already available.

The main report on the Research Project on CPEs concludes that adequate GNP data in national currencies can be derived for most CPEs by adjusting official information about net material product in the light of statistical and other information known to country experts. It further concludes that the best method generally applicable to CPEs for converting such GNP data from local currencies into dollars would use conversion rates based upon purchasing power parity (PPP) information. For comparison with

corresponding World Bank data on other World Bank members, these conversion rates should be adjusted to correct for the expected differences between the PPP rates and the actual official exchange rates (the "exchange rate deviation index"). The needed adjustments are estimated econometrically from the actual differences observed at each level of per capita GNP among the thirty-one market economies participating in Phase III (1975) of the International Comparison Project (ICP). For Hungary, Romania, and Poland, PPP information is derived from Phase III (1975) of the ICP, while for Czechoslovakia, the German Democratic Republic, and the U.S.S.R., it is derived from private bilateral comparisons chain-linked to the ICP data. This method yields a range of per capita GNP estimates: for example, $2,700 to $5,700 with a midpoint of $4,190, for the U.S.S.R. in 1980. No PPP estimate was available, and no GNP per capita figure in US dollars calculated, for Bulgaria and Cuba.

The main report also concludes that the official estimates of growth rates of the CPEs "tend to yield varying degrees of upward bias." For all countries except Hungary, the experts lean toward preferring alternative indices, constructed by outside experts with partial information, although these too present problems (especially for countries other than the U.S.S.R.) and the experts therefore fell short of endorsing them. The author of the study on Hungary leans toward preferring the official index at this time.

The country studies and background papers that are being issued in the World Bank Staff Working Paper series provide additional details on the CPEs studied and their exchange rates. Some of the country studies include the respective authors' estimates of per capita GNP in U.S. dollars. These estimates, however, are the individual authors' experimental computations, based on methods that may not be consistently applicable to CPEs generally.

There remain major uncertainties about GNP conversions by means of "adjusted PPPs." In addition to numerous remaining theoretical and practical problems associated with calculating PPPs within the framework of the centrally coordinated ICP, private estimates such as those used in this study for three CPEs still appear to be subject to a wide margin of error. Furthermore, there is no other way to estimate the exchange rate deviation index than to derive it from observation of the countries covered by the ICP (almost all of which are market economies). The applicability of an index derived in this fashion to the CPEs, whose economic structures are very different, remains subject to reservations.

The present study used ICP Phase III data relating to the year 1975, extrapolated to 1980. Phase IV ICP data already published shows estimates directly relating to 1980 for European countries, including Hungary and Poland; Romania, a participant in early phases of the ICP, has not provided the data needed for participation in Phase IV. It is noteworthy that Phase IV estimates of Hungary's and Poland's per capita GNP in 1980 are lower than the 1975 results extrapolated to 1980, used by the Research Report on CPEs. These differences are partly due to the greater attention paid in Phase IV to quality differences and to other methodological advances.

During the course of 1983 the Bank, with the help of a distinguished panel of experts, 1/ undertook a review of the methodological problems and issues related to the estimation of internationally comparable per capita GNP figures for all countries. The preliminary results of the research project on CPEs constituted an important input into that review, whose findings and

---

1/ Abram Bergson, Harvard University, Chairman; Andre Vanoli, Institut National de la Statistique et des Etudes Economiques; and Parmeet Singh, Commonwealth Secretariat.

recommendations were approved by the panel of experts. In light of the review, the Bank has decided that for the time being (that is, at least until data availability and other problems related to PPP information are resolved), official GNP information converted at official exchange rates should generally continue to provide the basis of the per capita GNP estimates published in The World Bank Atlas. Exceptions to this rule are to be made only when official GNP data, in national currency, is exceptionally bad or compiled in ways which diverge in an exceptionally large measure from the usual methods and standards, or when the official exchange rate is exceptionally far removed from the rate effectively governing foreign payments transactions. When there is a reason to believe that such exceptional circumstances prevail, and adequate information exists, appropriate adjustments are to be made. When adequate information does not exist and cannot be obtained, no estimates are to be published. At the time of writing this foreword, it seems likely that lack of information will for some time prevent the Bank from making estimates of the per capita GNP of most CPEs. Thus The World Bank Atlas published in early 1985 contains an estimate of the values of GNP and GNP per capita for only one European CPE, Hungary.

Following the review endorsed by the panel of experts, the World Bank has adopted calculation methods and obtained results which, for a few countries, are different from those of the research project of CPEs. The Bank's general methodology must be applicable to all its member countries, including most market economies and only a few CPEs; the Bank could demand that its member countries provide additional information when needed; and it could, and did, decide not to estimate the per capita GNP of countries for which a minimal, but still fairly extensive set of information could not be obtained. As noted earlier, however, the research project on CPEs has aimed

at defining a method consistently applicable to all CPEs and one that could make use of available information. These differences in aims and constraints readily explain the differences in results.

The research project on CPEs, whose major findings are published in the main report, has greatly enhanced the understanding of the CPEs' unique macroeconomic accounting frameworks and pricing systems. It has provided insight into many substantive issues, in particular the relationship of domestic and international prices. The individual country reports, published separately, shed much light on many important country-specific issues. The Bank will continue to build upon the valuable findings of the research project on CPEs in its future efforts to understand these important components of the global economy.

Jean Baneth
Director
Economic Analysis and Projections Department

Background Studies for
Dollar GNPs of the U.S.S.R. and Eastern Europe
Issued as World Bank Staff Working Papers

A Study of Cuba's Material Product System, Its Conversion to the System of National Accounts, and Estimation of Gross Domestic Product per Capita and Growth Rates.

National Accounts Statistics and Exchange Rates for Bulgaria.

The Gross Domestic Product of Czechoslovakia, 1970-1980.

The Estimation of Gross Domestic Product and Its Growth Rate for the German Democratic Republic.

National Accounts and the Estimation of Gross Domestic Product and Its Growth Rates for Romania.

The Gross National Product of Hungary: Important Issues for Comparative Research.

National Income Statistics for Poland, 1970-1980.

The Conversion of National Income Data of the U.S.S.R. to Concepts of the System of National Accounts in Dollars and Estimation of Growth Rates.

Exchange Rates in Eastern Europe: Types, Derivation, and Application.

Exchange Rates, Foreign Trade Accounting, and Purchasing-Power Parity for Centrally Planned Economies.

Abstract

This paper considers two issues: 1.) how to derive an estimate in dollars of Hungarian Gross Domestic Product (GDP), and 2.) how to reconcile divergences between official Hungarian statistics on real GDP growth rates (which are much lower). On the first issue the conclusion is that the preferred approach to derive a plausible estimate of the dollar value of Hungarian GDP comparable with the GDPs of market-type economies in terms of the volume of goods and services newly produced is the "adjusted purchasing power parity" approach. On the growth rate issue the tentative conclusion is that differences between official and Western price weights explain virtually none of the discrepancy between these estimates; instead the most likely sources of the differences are sample sizes (the official Hungarian sample is much larger) and composition, and techniques of computation.

Summary

Unlike other East European countries Hungary has published data on Gross Domestic Product (GDP) since 1968, as well as data using the Material Product System (MPS). An independent check has indicated that Hungarian GDP estimates are very close (within .05 percent) of what they would be if they followed a pure United Nations System of National Accounts (UN SNA) procedure. Hungary is, therefore, in a rather unique position in this project because the issue of the computation of GDP in national currency units has essentially been resolved. To be sure there are still some very difficult issues, particularly those related to the peculiarities of the Hungarian pricing and exchange rate system.

The two most difficult issues in the Hungarian case are the proper rate at which to convert GNP from forints into dollars, and the accurate measurement of GNP growth rates. Hungarian authorities advocate the use of the prevailing exchange rate for converting Hungarian GDP into dollars. Yet there is considerable evidence that the exchange rate now prevailing in Hungarian commercial and noncommercial transactions produces a very low estimate of GDP per capita in dollars. The growth rates present difficulties because the well known Alton estimates of GNP growth in Hungary differ significantly from Hungarian GDP estimates. This paper considers both of these issues, and suggests how they might be resolved.

The difficulty in converting Hungarian GDP into dollars can be illustrated using the data for 1980, which is the benchmark year for this project. Hungarian GDP in 1980 (Ft 731 billion) converted at the commercial rate prevailing that year (Ft 32.43) yields a per capita GDP of $2060. That places Hungary's per capita GDP at about the level of Algeria, Korea or Macao, and considerably below per capita GDPs in all of Europe (even southern Europe). That seems implausible. Other evidence from ICP studies (Kravis et.al.) show that the Hungarian exchange rate deviates from its purchasing power parity (in the direction of undervaluation) much more than is typical for countries at Hungary's level of development. These and other considerations support the conclusion that Hungary's prevailing exchange rate —however appropriate it may be for balance of payments purposes—is not the most plausible rate for the conversion of Hungarian GDP figures into dollars.

The most plausible convertor to estimate the relative volume of goods and services produced would be an exchange rate derived from the ICP purchasing power parity estimates for Hungary, adjusted using a statistically determined index linking that ppp to the exchange rate for countries at Hungary's level of development. An illustrative calculation using that procedure suggests Hungary's 1980 per capita GDP was (with a 95% level of confidence) in the range $2830-$5960, well above the $2060 derived using the prevailing exchange rate.

The indices of real GDP published by the Hungarian Statistical Office differ consistently and substantially from Thad Alton's estimates of Hungarian GNP growth rates. In 1981 the official Hungarian estimate shows GDP

67 percent above that of 1970; Alton's estimate shows 1981 GDP 31 percent above 1970. The paper explores a number of possible explanations for the discrepancy using closely comparable Alton and official Hungarian indices for 1975-80. Differences in price weights apparently contribute almost nothing to the difference. Rather the discrepancy seems to arise from different sample size and composition, and different computational techniques. It was not possible in this paper to go farther in pinpointing the differences between the two indices.

Table of Contents

Introduction

Unlike other East European countries Hungary has published data on Gross Domestic Product (GDP) since 1968, as well as data using the Material Product System (MPS). An independent check has indicated that Hungarian GDP estimates are very close (within .05 percent) of what they would be if they followed a pure United Nations System of National Accounts (UN SNA) procedure.1/ Hungary is, therefore, in a rather unique position in this project because the issue of the computation of GDP in national currency units has essentially been resolved. To be sure there are still some very difficult issues, particularly those related to the peculiarities of the Hungarian pricing and exchange rate system.

The two most difficult issues in the Hungarian case are the proper rate at which to convert GNP from forints into dollars, and the accurate measurement of GNP growth rates. Hungarian authorities advocate the use of the prevailing exchange rate for converting Hungarian GDP into dollars. Yet there is considerable evidence that the exchange rate now prevailing in Hungarian commercial and noncommercial transactions produces very low estimate of GDP per capita in dollars. The growth rates present difficulties because the well-known western estimates of GNP growth in Hungary differ significantly from official Hungarian figures on GDP growth.

The next section provides a brief discussion of the national income accounts in forints published by the Hungarian Central Statistical Office (CSO). Section III analyzes the issues involved in converting those forint

---

1/ INSEE and the Hungarian Central Statistical Office, 1982.

data into dollars. The last section considers the problems involved in estimating real national income growth rates in Hungary.

National Accounts in Domestic Currency 2/

Since the late 1960s the Hungarian CSO has published national income accounts compiled according to the system common to the CMEA countries--the Material Product System (MPS)--and according to a system very similar to (but not, as will be discussed below, identical to) the UN SNA. Accounts under the MPS system distinguish between material sectors (industry, construction, agriculture and forestry, transport and communications, trade, and water) and the non-material sectors (education, health, housing, and public administration). Gross Material Product (GMP) is the value of intermediate and final goods produced in material sectors.3/ Net Material Product (NMP) is GMP minus the value of material inputs and depreciation, namely value added in the output of material goods (minus depreciation).4/ Gross Product (GP) is GMP plus the value of non-material services.5/ The remaining two aggregates are SNA-type. GP minus all intermediate inputs yields Gross Domestic Product

---

2/ A useful discussion of Hungarian national income accounts can be found in IBRD, 1983, pp. 137-44.

3/ The Hungarian term here is Társadalmi termék, or Social Product. However, here and below I will follow the standard terms for the accounts in the MPS system, rather than the literal translation of the Hungarian names for the accounts. As will become evident below, the Hungarian names are easily confused with western terms with different meaning.

4/ The Hungarian term is Nemzeti jovedelem, or National Income.

5/ The Hungarian term is Bruttó nemzeti termelés, or Gross National Product.

(GDP) and that minus depreciation yields Net National Product (NNP).6/ Table 1 gives the data for all five concepts, and shows the interrelationship between them for 1980 and 1982.7/

The CSO, which has published estimates of GDP that go back to 1960, states that it follows SNA procedures in calculating it; and for all practical purposes that seems to be the case. A joint study conducted during 1979-81 by the Hungarian CSO and the French Statistical Office (INSEE) recalculated Hungarian GDP following as closely as possible the SNA procedures. While in some categories there was a need to adjust the figures published in the Hungarian yearbooks, the net effect was that Hungarian GDP in 1976 calculated in the project was .5 percent lower than the figure published for that year in the yearbook.8/

6/ Here the Hungarian terms are identical to the English: Bruttó hazai termék (Gross Domestic Product) and Netto nemzeti termék (Net National Product).

7/ Note that the value of intermediate materials and depreciation subtracted from GMP are less than those subtracted from GP because the latter include materials and depreciation for material and non-material sectors, while the former only cover material sectors.

8/ INSEE and the Hungarian Statistical Office, 1982.

Table 1

Comparison of Various National Income Concepts

in Hungary, 1980 & 1982

(all data in current 'realization' prices)

	1980		1982
	billion forint		
	Original[a]	Revised[b]	
Gross Material Product	1698.7	1701.5	1996.8
less:			
cost of intermediate materials in material production and	1040.4	1040.5	1221.0
depreciation in material production	77.3	78.1	85.4
Net Material Product	581.0	582.9	690.4
Gross Product	1877.6	1879.7	2210.8
less:			
cost of intermediate materials	1159.1	1158.7	1367.9
Gross Domestic Product	718.5	721.0	842.9
less depreciation	92.7	92.7	100.8
Net National Product	625.8	628.3	742.1

Sources: a Stév 1980, p. 85. In all subsequent computations these original figures will be used in order to be consistent with the data cited in Marer, 1984 and in the World Bank's country study on Hungary.

b Stév 1982, p. 60.

The Issue of Converting Hungarian GNP from Forints to Dollars

The Issue

I now turn to the question of how to convert GDP from domestic forints into dollars in a way compatible with current procedures used for western countries in the World Bank Atlas. To be fair the conversion rate used for Hungary must approximate what the exchange rate would be if Hungary's exchange rate were determined as it typically is in a western country at a similar level of development. This is a difficult criterion to fulfill since it does not specify a market-determined rate, but rather a rate reflecting the distortions typical in exchange rates determined in western countries. Nevertheless that is the only fair way to conceptualize the problem.

This excludes from consideration the direct use of ICP purchasing power parities for Hungary.9/ As do many experts, I much prefer those rates for converting all GDPs. But the ICP results clearly show that, for all but the highest income countries, ppp's yield higher GDP in dollars than do exchange rates. To use in the Atlas conversion rates based on ICP ppp's for Eastern Europe, but not for any other countries, would most certainly overstate East European GDPs relative to the remainder of the world.

With the introduction of the New Economic Mechanism in 1968, the Hungarian government also introduced an exchange rate system designed to

---

9/ Kravis et.al., 1982. This phase of the ICP did not calculate a ppp for Hungary for 1980, which is the benchmark here, so it is more accurate to say that this consideration excludes using ICP data to estimate a rate for 1980 using ICP benchmark data. Subsequently data for ICP-Phase IV data for 1980 became available, employing different methods (see Marer, 1974, Parts IV-C and IV-G).

reflect the real cost of earning a dollar or a ruble. It was official policy that these exchange rates should be the main criterion by which enterprises choose to export or import products. Quantitative barriers to trade were virtually eliminated for industrial goods; subsidies and taxes distorting the domestic values of foreign exchange converted at the exchange rates were to be gradually eliminated. While the latter has not happened, it is still probably fair to say that exchange rates in Hungary are an important consideration for enterprises in their export and import decisions, and that there are very few direct controls over the quantities of exports and imports in the industrial sector.10/

The dollar rates introduced in 1968 were Ft60 for commercial transactions rate, and Ft 30 for non-commercial transactions. By 1980 successive revaluations had left a rate of Ft32.43 in commercial transactions and Ft 22.14 in non-commercial transactions (average of monthly rates), implying that the commercial rate was revalued more rapidly than the non-commercial rate. Finally in October 1981 a unified rate of Ft34.43 was introduced. In 1982 the rate fell to a monthly average of Ft39.6; and in 1983 to Ft44.11/

Although there was no unified exchange rate for the Hungarian forint in 1980--the benchmark year for this project--had the exchange rate been

---

10/ There are much tighter controls over imports of consumer goods, and capital flows are totally controlled by the center.

11/ Paul Marer has discussed exchange rate determination over much of this period in Marer, 1980. The recent figures are from I.M.F., International Financial Statistics, March 1984, p.222.

unified, it would probably have been at the commercial rate.12/ The issue which must be resolved for purposes of the Atlas is whether the unified rate (really the commercial rate) is indeed the best conversion rate which can be found.

Converting Hungarian GDP at Official Exchange Rates: Reasons for Skepticism

Hungarian GDP in 1980 (Ft 719 billion - see Table 1) converted at the commercial rate that year (Ft 32.43/$) yields a per capita GDP of $2060.13/ To see how that places Hungary relative to other countries, here are the ratios of Hungarian GDP per capita to those of selected West European countries, as the latter are reported in the World Bank Atlas 1983 (p.10; Hungarian GDP per capita of $2060 is in the numerator).

Algeria 1.06	Greece .50
Austria .22	Italy .32
Belgium .19	Korea 1.38
Denmark .19	Macao .98
Finland .21	Netherlands .19
France .18	Portugal .89
FGR .17	Spain .39

While it is impossible to say with certainty if these figures are too high or too low, it seems likely that they are low, and that $2060 therefore

---

12/ In effect the 1981 unification of the rates occurred by devaluing the non-commercial rate and bringing it into line with the commercial rate. The non-commercial rate is heavily influenced by subsidies on consumer goods, and thus would clearly not be an appropriate rate for converting GNP from forints to dollars. Furthermore the commercial rate is, it could be argued, set primarily in order to accurately reflect the forint cost as earning dollars, and therefore it is the best available rate for converting from forints to dollars.

13/ Mid-year population from World Bank Atlas, 1983, p.12. The average exchange rate at the end of the year was Ft32.43. The 1983 Atlas, using a complex procedure for averaging GNP in market prices and exchange rates over several years (for details, see Atlas 1983, p.27).

is quite possibly too low. I do not know enough about these countries to say more than that. I would only caution that anyone who uses these data to make a subjective judgment one way or the other should take care not to rely too heavily on relative living standards as an index of relative GDPs. The policies in Hungary favoring investment over consumption mean that the GDP differential between Hungary and western countries is probably less than its most easily observed component--living standards--would suggest.

The second reason to suspect a downward bias in GDP converted at official exchange rates is related to the ICP studies. I will discuss only the most recently published results (Kravis, et.al., 1982), but the earlier studies support the same conclusions.

One of the by-products of the ICP project has been information about the relationship between exchange rates and ppp's. Consistently it has been evident in the results that while ppps and exchange rates differ in all countries, the gap between them narrows as the level of development increases, a phenomenon for which there are some well-known theoretical explanations.14/ The relationship seems to be regular enough in cross-sectional data that one can clearly see a negative relationship between the exchange rate deviation index (ERDI-exchange rate/ppp) and the level of development.15/ For the richest countries in the world the exchange rate deviation index tends toward unity, and in some cases of very rich countries it is below unity. For the poorest countries it can easily be in the range of 2-3 (Kenya-1.92, Malawi-2.55, India-3.23).

14/ Kravis et.al., 1982, Chapter 8

15/ Ibid., p.11

The truly odd thing about Hungary is that, even using the non-commercial rate, the exchange rate deviation index is high by world standards. For example in 1975 the ERDI was 1.68 (derived from a ppp of Ft12.3 and the non-commercial rate of Ft20.66). That places Hungary in the same range as Brazil, Iran, Zambia, and Yugoslavia, and far above the European countries, including Poland (1.39 and 1.37). Furthermore if in fact the commercial rate is the more appropriate rate for converting all of GDP, then using that rate would yield an exchange rate deviation index for 1975 of 3.6,16/ which is a higher exchange rate deviation index than that for any country in the ICP sample as of the 1975 GDP computations (the closest country is India with an exchange rate deviation index of 3.23).

The results of the ICP-Phase IV project suggest this anomaly continues. They estimate, using ppp's calculated according to a modified version of the original ICP methodology, that Hungary's 1980 per capita GDP was $4373, which yields an exchange rate deviation index of 2.124 (4373/2060).17/ The relationship between development levels and the exchange rate deviation index is not so tight that one can say the Hungarian index should be "x". But enough is known to say that its recent values are atypical of values elsewhere in the world.

These results from the ICP simply cannot be ignored; Hungary's exchange rate deviation index is too far out of line with a well defined relationship. It seems that the exchange rate is probably undervalued, at

---

16/ This is the implicit commercial rate of Ft43-90 (Wharton Econometric Forecasting, CPE Foreign Trade Databank).

17/ For a discussion of ICP IV and a derivation of the $4373 figure see Marer 1984, Section IV-G

least for purposes of converting Hungarian GNP into dollars. Yet the current debate in Hungary regarding the exchange rate is not whether or not the forint should be devalued, but rather how much the devaluation should be. It would be difficult to find a policy maker in Hungary who would argue for a revaluation of the forint. Is it conceivable that the unusual exchange rate index for Hungary is nevertheless fully explainable by underlying economic forces, and that therefore the official exchange rate is as decent a conversion rate as that of exchange rates in other countries?

The Strongest Case for Using the Official Exchange Rate to Convert GDP 18/

It is possible to make a fairly strong case for the commercial rate as a rate comparable in all important ways to rates prevailing in western countries near Hungary's level of development. The basic argument is that the exchange market's unbiased (and unflattering) valuation of Hungarian traded goods, along with price discrimination against those goods. Thus what the high exchange rate deviation index says is that Hungarian traded goods are worth relatively little on world markets.

GNP converts at a much more favorable rate, which is what the ICP says, although there is a general feeling in Hungary that ICP has not fully picked up the quality differences between Hungarian and other countries' goods. Frequently mentioned problems are: 1) special costs which consumers bear in Hungary in the form of imposed time requirements, and which consumers

---

18/ In developing the ideas in this section, I benefited greatly from discussions with several Hungarian economists during a visit to Budapest in July 1982.

in the West pay for in the price of their products (extra search time due to shortages; additional labor needed to repair products which were produced under poor quality control); 2) quality differences in services which are not fully accounted for in ICP (medical services being the most frequently discussed example); and 3) sample problems (for example, using prices of goods in short supply, hence not representative of actual goods purchased in the expenditure category concerned). Thus the argument is that the ppp is understated (in forints), and the resulting exchange rate deviation index is overstated. One would have to delve much more deeply than I have been able to into ICP procedures to ascertain if these objections are justified and if proper adjustments would lead to major changes in the ppp. My guess is that the ICP team was well aware of these problems and did the best it could. In some cases there is no obvious way to operationally make adjustments for the problems cited. Neverthless to the extent there is something of substance here, the ppps may be simultaneously the best that can be done, and still possibly below the actual ppp.

Aside from these issues there are reasons to expect that the exchange rate deviation index might be higher in Hungary than in other countries at similar levels of development because of special relationships between traded goods and the remainder of GNP in Hungary. First and most obvious is the presence of substantial subsidies on consumer goods and services, many of which are not traded goods, and which therefore would depress the ppp relative to the exchange rate (viewed in terms of forints). Furthermore Hungarian retail prices tend to have very small margins built in to compensate retailers for inventory holding and risk-taking, which could

depress the forint/dollar ratios in consumer goods, many of which are non-traded.19/

However there is a problem with this hypothesis which Tom Wolf (1982) has noted in his discussion of ICP. The relationship between the conversion rate for tradables and the ppp is similar for Hungary, Poland and Romania. It is the fact that the exchange rate relative to the conversion rate for all tradables is high (in forints) in Hungary, compared to Poland and Romania, which accounts for Hungary's relatively high exchange rate deviation index. It would be much more striking if the commercial rate were used. Of course tradables are not the same thing as traded goods; however, this does suggest that it is not the relatively high price of tradables, but the relatively high exchange rate (in forints) in relation to this price of tradables which explains the high exchange rate deviation index.

These considerations combined could form the basis for an extensive study of the reasons behind the high Hungarian exchange rate deviation index. Unfortunately nothing so ambitious was possible here. Nevertheless I suspect that even if all of these factors could be fully accounted for (which would require redoing ICP) that there would remain a significant part of the Hungarian exchange rate deviation index which cannot be explained. It is difficult to believe that ICP could be off that much on its quality adjustments, and unless there is a very odd relationship between traded and tradable goods, there is no major bias there.

19/ I know of no studies which have addressed this issue. It is certainly true that the markups over wholesale prices in many retail stores in the West appear, based on casual observation, to be much higher than similar markups in socialist countries.

If indeed this exchange rate is undervalued by world standards, does that mean that today's conventional wisdom is mistaken in contending that the Hungarian exchange rate is overvalued? Not necessarily. In the first place the Hungarian exchange rate has probably been undervalued since it was set in 1968 in order to provide strong stimulation for exports and strong brakes on imports. And that exchange rate was built into the entire price system. Since 1968 policy makers have used the exchange rate primarily to control price levels (Tarafás 1981), which would have the effect of perpetuating that undervaluation. In the last several years Hungarian balance of payments problems have grown quite serious, reflecting long-term structural problems in developing exports and import substitutes, and increasingly scarce credit. In that situation devaluation is a natural move to consider, and because the structural rigidities create very low elasticities in the Hungarian foreign sector, a substantial devaluation may be needed to improve the trade balance in dollars. Such an exchange rate might be appropriate for the current economic situation in Hungary, but the primary significance of the exchange rate is as a measure of how great the structural rigidities are in Hungary, and how serious the problems are in the current economic situation. This is definitely not an exchange rate appropriate for converting Hungarian GNP into dollars, since it is strongly affected by cyclical phenomena working in one direction.

An Alternative to the Official Exchange Rate for Converting GDP

Until and if a full and convincing case can be made for the very unusual exchange rate deviation index for Hungary, the most satisfactory procedure for estimating the relative volume of goods and services newly produced would be to scale up the Hungarian ppp from ICP by a factor

reflecting the high end of normal exchange rate deviation indices for countries at Hungary's (ICP estimated) level of development. The best procedure here would be to use equations linking real to nominal GDP (excluding socialist countries from the sample), such as those developed by Kravis et.al. (1982, Chapter 8). Such an equation, which uses multivariate techniques to establish (by implication) typical exchange-rate deviation indices for the world's economies, could be used to predict Hungarian nominal GDP within the range of, say, 2 standard deviations (approximately a 95 percent confidence interval).

Paul Marer in effect did that calculation for all of the East European countries for 1975 and 1980.20/ He estimates that for 1980 the exchange rate deviation index for Hungary, were it a "typical" country at the level of development estimated by ICP, would be somewhere in the range of .95-2.00, with a mean of 1.29. Using that mean, the implication is that if Hungary's exchange rate deviated from the ppp by the ratio "typical" of countries at its general level of development, then per capita GNP converted at the exchange rate would be $4390, not $2060 obtained by using the official exchange rate. And, using the rates at the two ends of the confidence interval there is a 95 percent probability that the Hungarian GDP, converted

---

20/ See Marer, 1984, Section IV. What Marer actually did was to regress the ratio of the ppp for tradables to the official exchange rate, on the per capita GDPs (in dollars estimated by ICP) for the 31 non-CPE covered in Phase III of the ICP. That regression yields an estimate of a "typical" ratio for each Eastern European country for which there is an ICP estimate of per capita GNP in dollars, which in turn can be used to estimate the exchange rate deviation index, for all CPEs for which ppp's are available from ICP and other sources.

at a "typical" exchange rate would be somewhere in the range of $5960-$2830, still well above the $2060 derived from the official rate.

The Hungarian Growth Record: Official Data vs. Western Estimates

Differences Between Official NMP Series and the Alton Series

As a rule East European countries only publish national income accounts on the material sectors of their economies in the form of net material product and national income time series. Because the material sectors tend to be the fastest growing sectors in these economies, the resulting picture of growth paths has always been regarded as higher than would be obtained using time series for GNP.

Thad Alton and his associates have for a number of years undertaken the enormous task of estimating GNP growth rates for Eastern Europe in order to provide a time series on economic activity similar to GNP time series available for western countries. As Table 2 shows their results have generally shown slower growth rates than obtained from net material product series. For all years Alton shows slower growth than the Hungarian official indices, although for the first half of the 1950s and the first half of the 1960s the differences are minimal. The cumulative effect of the consistently lower growth estimates by Alton are substantial. The official Hungarian data imply that net material product in 1980 was 4.76 times its size in 1950; Alton's data imply that GNP was 2.88 times what it was in 1950.

Table 2: Average Annual Rates of Growth by Quinquennia for Hungarian NMP (Official Series) and Hungarian GNP (Alton Series)

	NMP (official)	GNP (Alton)
	percent per annum	
1950-54	4.9	4.6
1955-59	7.4	4.6
1960-64	4.4	4.3
1965-69	6.8	3.0
1970-74	6.3	3.4
1975-80	3.6	2.4

Source and method: These are regression growth rates for five year periods (except apparently 1975-80) reported in Alton 1982a, Table 4.

Alton and his associates are well aware of these differences, and have commented on them in many of their publications. The major reasons they give for the discrepancies, and for their claimed superiority of their GNP indices are the following:21/

1. GNP covers service sectors excluded from NMP.
2. NMP is not a "clean" value added measure since it is calculated by subtracting from gross output of material sectors only material costs, but not the services of the excluded service sectors.
3. Alton et.al. aggregate their sectoral indices using factor cost weights, while NMP is calculated in realized prices.

These are indeed potent arguments in favor of the Alton indices. And in the absence of official computations in Eastern Europe of their GDP the Alton indices have enjoyed wide use as the only measure of the growth of economic activity in Eastern Europe computed in a way methodologically similar to indices published in western countries.

But even granting the three points above there is some reason to believe that in fact there may be more than just problems in coverage and weights involved. Consider the implications over time of the divergence between the Alton and the official version of the 1950-80 growth record in Hungary.22/ Assume the Hungarians are correct in their estimate that in 1980

21/ Alton et. al., 1982b, p.2

22/ These are computed from the individual times series in Alton, 1982a, Table 4.

the ratio of GNP to NMP was 123.7 percent,23/ which is in the range of what is typically considered to be the ratio between these two figures in Eastern Europe. That fact, combined with the Alton GNP index and the official Hungarian NMP index, implies that in 1950 GNP was approximately twice the level of net material product. To put it the other way around, the implications of these divergent indices is that in 1950 services and depreciation, accounted for one half of Hungarian GNP. That scarcely seems credible, and it suggests that either the Alton indices have consistently understated the growth rate of Hungarian GNP, or the Hungarian official data are overstating the growth rate of a major portion of GNP, namely NMP. For any East European country this divergence between Alton and the official data is qualitatively similar, as are the implications concerning the changing share of NMP in GNP over time.

Differences Between Official GNP Series and the Alton Series

But even more important evidence of a fundamental conflict between Alton and the official indices is available in official estimates of GDP published by the Hungarian Central Statistical Office (CSO). Here is a series which addresses Alton's first two points by measuring economic activity as western countries do. All that should be left to create a discrepancy is the weights. Table 3 reports the Alton GNP and the official Hungarian NMP and GDP indices for 1970-1981.

23/ Stév 1980 pp. 85 and 89. Current price GDP in 1980 was 718.5, and national income (or NMP) was 581.0. The first divided by the second yields, 1.237.

Table 3: Hungarian Real GNP Growth Rates, 1970-1981
Alton and Official Indices

	Alton	Official Hungarian GDP	Official Hungarian NMP
1970	100.0	100.0	100.0
1971	104.4	106.2	105.9
1972	106.6	112.7	112.4
1973	112.2	120.5	120.3
1974	115.1	127.5	127.5
1975	117.6	135.5	135.3
1976	118.0	140.3	139.3
1977	125.2	151.0	150.5
1978	128.7	157.7	156.9
1979	129.5	162.0	159.9
1980	130.2	162.4	158.6
1981	131.0	167.0	162.6

Sources: Alton series is from Alton et.al. 1980, Table 4 for data through 1975, and Alton et.al. 1982b, Table 4 for the remaining years. The data through 1975 are computed using 1969 price weights; the remaining data are computed using 1976 price weights. The 1976-80 indices are revised upward from those published the year before in Alton et.al. 1981, Table 4.

The official Hungarian series is from Stév 1982, p.63, and are in 1976 prices. Official Hungarian NMP is from Stév 1982, p.62.

The Hungarian NMP and GDP growth records do not differ significantly over the decade, although GDP does grow somewhat more rapidly during the late 1970s. Based on these two Hungarian official time series it would appear that Alton's first two sources of the NMP/GNP discrepancy are relatively unimportant in the Hungarian case. Neither the exclusion of services nor the fact that NMP is not "clean" value added seems to matter much in the Hungarian national income accounts. And if they do matter, they work in the opposite direction suggested by Alton, since GDP officially estimated by the Hungarian CSO grew slightly faster than NMP, thus it widens rather than narrows the divergence between the official time series and the Alton series.

The difference between the Alton and the Hungarian estimates is striking. The official Hungarian GDP time series implies an average annual growth rate over 1970-80 of 4.97 percent; Alton's GNP series implies 2,67 percent per annum. One (or possibly both) of these series is misleading, and it is important to try to figure out which one, or at least to figure out what we need to know in order to make that judgment.

Possible Reasons for the Difference between the Alton and Official Hungarian GNP Series

The discrepancy between the Alton and the official Hungarian GNP and GDP indices must consist of some combination of the following factors:

1. Different price weights
2. Differences in computation procedures
3. Differences in the size and composition of samples
4. Falsification or distortion of data.

In this list I ignore a possible fifth factor, the differences between GNP and GDP, since those are insignificant for a country such as Hungary.

In trying to reach a judgment on the relative importance of each of these four factors in explaining the discrepancy, I will limit the analysis to the 1975-80 period during which both the Alton and the official Hungarian GNP/GDP indices are weighted in 1976 prices. That limits potential weighting problems to differences in relative prices in a common base year. Even during that short period of time the discrepancy between the two indices is substantial: Alton reports GNP in 1980 is 10.7 percent above 1975, while the official Hungarian data report an increase of 19.9 percent.

Weights

Weights are obviously a potentially important source of differences between the Alton and the official Hungarian computations (indeed, the computations for all East European countries). Alton notes, quite rightly, that the use in official data of final sales prices to compute GNP--and to weight GNP growth indices--distorts the relative sectoral shares because of differential turnover tax and subsidy rates in various sectors. The most important distortion here is the overstatement of industrial value added and the understatement of agricultural value added because of the high net tax built into industrial prices and the net subsidies in agricultural prices. Because industry has enjoyed relatively high priorities in Eastern Europe, industrial growth rates have been high, and the high weights accorded value added in that sector relative to the slower growing agricultural sector would

seem to guarantee an overstatement of the growth record.24/ Housing is also potentially important here; it receives a very low weight in official data (because only state-subsidized rents and maintenance costs are used to compute value added there), and it tends to be a relatively slow-growing sector. Alton's conclusion is that one will obtain much lower, but more meaningful, GNP growth series by reweighting output at prices which reflect true factor costs, undistorted by any particular pattern of subsidies and taxes.

A study by Antolak and Bocian of the Polish growth experience over 1970-80 would seem to confirm that. A study by two Polish economists reports that while in realized prices NMP grew 10.0 percent in 1970-75 and 1.4 percent in 1975-80, in prices approximating factor costs, the respective growth rates were 8.1 percent and 1.1 percent.25/ Not only are the growth rates lower, but they turn out to be close to growth rates of GNP in the material sectors only, which Alton estimated for purposes of comparison.26/

In an attempt to derive meaningful weights, Alton has constructed estimates of the "price" of output in various subsectors of the Hungarian economy which reflect the fixed rate of return of 12 percent on each sector's capital stock, and the wages paid in that sector. The relative prices so derived constitute an estimate of the true factor cost of the output of each subsector, and indices aggregated with these "prices" should accurately reflect the true social costs of production output in each sector.

24/ Alton, 1982a, pp.13-14.

25/ Discussed in ibid., pp.14-17

26/ Ibid., pp.17 and 24.

Table 4: Sectoral weights in GNP using Hungarian official data and Alton factor-cost data: 1976

Sector	Alton[a]	Official Hungarian[b]
Industry	.324	.406
Agriculture	.233	.138
Forestry	.006	.005
Water	.018	.005
Construction	.075	.104
Transport	.072	
Communications	.011	.064
Trade	.070	
Housing	.106	
Commercial Services	.014	
Finance	.003	
Government	.068	
Other	—	.056[c]

Sources:

[a] Alton et.al. 1982b, p.11.

[b] Stév 1976, p.59.

[c] Tariffs and valuation adjustments to bring sources and uses into line (on the latter see Marer 1982, p.64).

Table 4 shows that when this adjustment is applied to Hungarian data, there is a significant shift in the sectoral structure of GNP. Industry and construction lose a substantial portion of their share in GNP to agriculture and services, particularly housing. The critical question is how important these different weights are in providing an explanation for the discrepancy between Alton and the official series.

It is not feasible for this paper to explore in detail the contribution which weight differences make to the discrepancy. However some experimental calculations were made, which are reported in detail in Appendix A, which wiIl will be summarized here. In order to check for the influence of weights Alton's twelve major sectoral indices were aggregated into 9 indices in order to match the level of disaggregation available in Hungarian data on GNP by sector of origin between 1955 and 1980 in 1976 prices. Then the level of Hungarian GNP in 1980 relative to 1975 was calculated using Alton's weights and the official Hungarian sectoral indices, and using the official Hungarian weights and the Alton sectoral indices. The results are reported in Table 5.

Table 5: Hungarian GNP in 1980 relative to 1975
Under Alternate Weighting Schemes

Weights Sectoral growth indices:	Alton	Official Hungarian
Alton	1.107	1.110
Official Hungarian	1.201	1.199

Source: See Appendix

The ratios on the diagonal are, respectively, Alton's and the official Hungarian, estimates of GNP in 1980 relative to 1975. The off-diagonal ratios represent data recalculated using the weights from one source and the sectoral growth indices of the other. Clearly at this level of aggregation (nine sectors, including the important industrial and agricultural sectors) weights make almost no difference. Reweighting Alton's growth indices with official Hungarian weights increases the ratio from 1.107 to 1.110, a tiny step towards the official Hungarian 1.199. Reweighting official Hungarian sectoral growth rates with Alton's weights actually increases the growth rate of GNP by several tenths of a point.

A glance at the indices reported in Appendix A reveals the source of these results. The official Hungarian indices of sectoral growth rates of GNP show agriculture as one of the fastest growing sectors in the economy, faster than industry and faster than GNP. A shift to Alton weights (which shifts weight from industry to agriculture) may increase growth rates, depending on indices in the remaining sectors.

No matter what the weights are the official Hungarian data will produce higher growth rates than Alton. The slowest growing sector in the

official Hungarian data--government at 1.108 (1980 over 1975)--is slightly above the average for Alton's entire sample.27/

It will require a much more systematic analysis than has been possible here to reach any firm conclusion about the importance of weights in explaining the discrepancy. What is needed is a recalculation of Alton's data using official Hungarian weights, and vice versa (although one way is really enough), for the entire post-war period. Furthermore since the sectoral indices themselves are weighted averages, it would be necessary to delve as deeply as possible into the effects of weights on those indices.

Until that analysis is done, my tentative conclusion is that at least for Hungary during the latter part of the 1970s there is no evidence that weights played an important role in explaining the discrepancy between Alton and official Hungarian indices. One of the other three categories mentioned at the beginning of this section would seem to hold the key to that gap.

It is important to note here that this apparent lack of influence of weights on the gap in the Hungarian case does not necessarily mean that the same will be true in the case of other East European countries. Hungary is

---

27/ Anyone who is using Alton's data for Hungary should be warned that Alton has considerably revised the indices for 1975-80 in his most recently published tables (cf. Alton et al., 1982b, Table 4 and Alton et al., 1981 Table 4). The most important among the many revisions is a substantial increase in the growth of agriculture, which raises the growth rate for 1975-80 by several points (the 1980/1975 GNP ratio was 1.089 in Alton et al., 1981 and 1.107 in Alton et al., 1982b). These revisions make the agriculture/industrial growth rate differential much smaller than in the earlier series, which reduces considerably the potential effect of reweighting on GNP growth rates.

unusual in the East European context because of the relatively rapid growth of agriculture compared to industry in recent years, and in a country such as Czechoslovakia with the more typical case of agriculture growing more slowly than industry, a shift in weights towards agriculture will lower growth rates.28/ But even so, it remains to be seen how much of the growth rate gaps in other East European countries can be closed through reweighting, and how much therefore is explained by the other three considerations.

Differences in Computational Procedure

The Alton and the official Hungarian indices are computed differently, and that could account for some of the difference. Alton derives his GNP estimates beginning with times series on individual products (and employment for services), which are then aggregated using factor cost weights into time series for sectoral growth rates, and then GNP growth rates.29/ The Hungarian CSO proceeds in the opposite direction, taking series on the value of gross output, and of material inputs, and deflating each to derive a fixed price value added series, total and by sector (the so-called double-deflation method).30/ There are several ways in which these differences in method could account for differences in the resulting indices.

28/ This can be seen quite readily in the sectoral growth rates reported by Alton (1982a, Tables 7 and 8) for Poland and Czechoslovakia.

29/ Alton (1975) outlines the procedure.

30/ Interview material.

Because Alton is beginning with time series on the output of products (or of labor inputs for services), he will miss all quality improvements in the products he is sampling. Furthermore any sample which is limited to goods whose production can be expressed in quantitative terms will probably be biased away from products in which quality change is particularly important (computers, for example). In effect the Alton index assumes the quality change is insignificant over the period in which the fixed weights are applied, and that is surely a source of downward bias in the resulting GNP indices.

The Hungarian CSO may on the other hand introduce an upward bias in the way they compute GNP by over-estimating changes in quality and quantity.31/ The Hungarian CSO deflates both gross outputs and material inputs in each sector by price indices specific to the product bundles involved.32/ For example, in industry, a price index is built up from 5100 commodities aggregated using gross output weights through several progressively smaller sub-groups into an index for industrial gross output. This is the index used to deflate gross industrial output. A similar index is apparently constructed for material inputs into industry; and other sectors are treated in a similar fashion.

31/ In a real GNP index, quantity and quality changes have the same effect: they increase the "quantity" of real GNP. The problem with complex goods whose quality is changing over time is to divide up changes in their value among changes in quantity per se, changes in the quality of each individual unit, and the remainder, which is changes in price. I am arguing here that the Hungarian CSO may be systematically assigning too much of the increased value of GNP to the first two categories.

32/ Interview material, and material submitted to the World Bank. ("The Hungarian System of Price Statistics," mimeo.)

The price indices are designed to be just that; considerable care is taken in an attempt to ensure that quality changes do not show up as price changes, and vice versa.33/ The indices are chain indices where the index for each year is a Laspeyres relative to the previous year.34/

It is the chain index which potentially could be a source of upward bias in the real GNP indices. When a new product enters the system its price does not become part of the index until the second year it is produced. In that second year the price for the first and second year are recorded, and the price change becomes part of the overall industrial price index. But what, then, happens to the value of the product in the first year it enters the income stream? National income goes up by the value of the new product (assuming for simplicity that this is a totally new product and that no other product's output falls) and the existing price index decides how value is divided between price increases and quantity/quality increases. If that new product is not new at all, or if at least the quality change portion of value is smaller than average for existing products, then the index for real GNP is biased upward. Despite the fact that the Hungarian CSO is aware of this problem, and constantly tries to identify pseudo-quality increases, it would not be surprising if some pseudo-quality changes do not make it in to the real

---

33/ Prices for the 5100 products are collected through surveys of 580 enterprises and cooperatives (the total number of enterprises and cooperatives in industry in Hungary in 1980 was 1300 [Stév 1980, p.147]) divided into 69 sub-branches. The data are gathered and the indices calculated on a monthly basis. There is a concerted attempt to specify the products involved quite carefully in order to ensure that quality and price changes are not intermingled. (Interview material.)

34/ The Hungarian CSO is now introducing Paasche indices, but they note that experiments suggest little influence on the indices from the switch, which is not surprising for one year changes in industry. (Ibid.)

GNP index because of the utilization of this chain price index. But it seems doubtful that this is a truly important factor explaining the relatively high (compared to Alton) official Hungarian version of GNP growth in the late 1970s.35/

Again, this is an issue which would require much more detailed analysis to come to any definitive conclusion concerning its importance in explaining the Alton-official Hungarian gap. It does seem on the basis of what is known that the chances are the Alton indices are downward biased to a proportionally greater extent than the Hungarian indices are biased upward. The Alton research team has to rely on quantity data for its indices since they have neither the time nor the information sufficient to make judgments on quality and quantity changes. The Hungarian CSO has much greater resources and is able indirectly to at least attempt to identify quality changes and include them in the index. Because in the 1970s the Hungarian economic reforms have probably forced enterprises to introduce improvements in the quality of some of their output, the Alton procedure will tend to understate the record.

35/ In interviews at the Hungarian CSO I was told that the product specifications for individual commodities are quite tightly drawn up, and that therefore it is difficult to "sneak" through what is essentially an old product at a new price. If, in fact, the CSO decides that is what has happened for a particular product, then they simply retain the product in the chain price index and show a price increase. It would take industrial and price experts a good deal of time to decide if the Hungarian procedure captures quality change at least as effectively as is the case in other developed countries. It is obvious the Hungarian CSO is sincere in its efforts, and I would guess that in fact their record is quite good by world standards.

Sample Composition and Size

Although it is impossible to do much more than indicate that there may be a problem in the samples involved, it is important to at least note this. Alton's team has used the available data on Hungary to construct as large a sample as is possible based on published data. In industry they begin the construction of their index with approximately 500 commodities, aggregating through several levels (at an early stage introducing value added weights) to reach the index for industry as a whole.36/ Similar techniques are used for other sectors.

The official Hungarian samples for their price indices are uniformly larger than Alton's and they are chosen without the constraint of using only published data. For example the official industrial price index is based on 5100 commodities, as opposed to Alton's 500, and it covers all of Hungarian industry in what is apparently a fairly representative fashion.

These differences in the size, and possibly the composition, of the samples suggest it is possible that some of the discrepancy between the Alton and the official Hungarian indices may simply reflect the poorer data available to outsiders, even outsiders as careful and meticulous as Alton's group. Without a detailed comparison of the samples, there is really no way to say for certain. What that comparison would have to look for is if for some reason Alton's sample was biased towards slower growing commodities (slower growing in quantity or quality).

This is one area in which, barring such a detailed comparison of samples, it is fruitless to guess about the answer. It does seem, based on

---

36/ Alton et. al., 1982b, p.39.

what is known about the Hungarian CSO's operation, and the long tradition of high quality statistical data and analyses, that the sample they are using is probably a very good one indeed by world standards.

Falsification or Distortion of Data

One of the key justifications offered by Alton for relying on his indices in preference to the official indices published in Eastern Europe is the fact that authorities Eastern Europe have been known to resort to the "...political manipulation of statistics by means of selection, concealment, and comment."37/ Here he is alluding not so much to outright falsification, as to the tendency of authorities to not report unfavorable data, to choose the most favorable averaging technique for the results they desire, and so on. He cites cases, primarily involving Poland, where some of these practices appear to have been relied upon.

No outsider can say unequivocally in the case of Hungary that some of the economic data published are not falsified; only a very well placed insider could have such information. I can say that after almost a decade of making at times quite intensive use of Hungarian data, and building macro models with some of them, that I have never encountered a case of an "incriminating" inconsistency, nor have I observed that the Hungarians follow the Soviet practice of withholding unpleasant data. Therefore I think it unlikely that there has been manipulation of macroeconomic data for Hungary. The real GNP index does truly reflect the real GNP calculated internally, and the price

---

37/ Alton, 1980a, p.10

indices involved seem to be an honest attempt to estimate underlying price movements.

There is a somewhat more subtle issue here concerning whether enterprises and other economic units in Hungary (or in any East European country) tell the truth in the price and value data they provide the CSO. In a traditional centrally planned economy there are strong incentives to lie to planners concerning the quantity of output, hence the price, and possibly even to lie also about the value of output if that is possible (it is difficult if planners are using the banking system to double check). All of these incentives--which presumably also operate for reports to the statistical offices, since planners could talk to them--operate as upward biases on reported real output. Consequently an honest statistical office could still be producing upwardly biased real GNP indices, reflecting distortions in the raw data.

Although this cannot be excluded in the Hungarian case, it would appear to be somewhat less of a potential problem than for other countries. Since 1968 enterprises have not had to operate under a formal plan which emphasized the quantity of output; they have been judged on more complex criteria relating to profits. Of course there is still an incentive to hide price increases as quality increases so that profits can rise, which could—as was discussed above--bias downward the price index computed by the CSO. But then these are incentives similar to those operating for western firms, and the biases in the Hungarian data may also be similar to those present in western data on real GNP increases.

My conclusion, pending strong evidence to the contrary, is that if any portion of the gap between Alton and the official Hungarian indices can be

explained by "falsification", it is in the price indices, for reasons discussed earlier. I see no evidence supporting direct falsification by central authorities of the GNP indices.

Resolving the Differences between Alton and the Official Series

These modest efforts at resolving the discrepancy between Alton and the official Hungary series at best provide hints of how to proceed from here. While more work needs to be done on the effect of varying weights, that seems unlikely to have much effect for the Hungarian case. Sample size and composition, and computational techniques would seem to hold more promise.

To further reduce our still considerable ignorance on the differences involved here, there are at least two ways to proceed. One would be to apply the Alton technique to some west European country roughly similar to Hungary (Austria, or some southern European country) to see how the resulting real GNP accounts compare to published accounts there. If a strong downward bias results there, that would add to the suspicion that they are understating East European (at least Hungarian) growth, though this would be hardly conclusive. The second, and more direct approach, would be a joint effort between Alton and the Hungarian CSO to identify the source of the difference between the two indices. Both of these projects would require a great deal of time and money, and the joint project with the Hungarian CSO would involve a complex collaborative arrangement. Still unless some fairly ambitious projects of this sort are undertaken, it will be difficult to reduce uncertainty about the source of these substantial differences between Alton and official indices.

Until more is known concerning these discrepancies it will be a difficult choice for anyone studying the Hungarian economy whether to rely on the Alton or the Hungarian indices. Certainly these two indices set the bounds within which actual GNP growth occurred. My guess is that the actual GNP index lies closer to the Hungarian official index than to the Alton index. But that will be little more than a guess until, and if, more careful work can be completed exploring the source of the discrepancies.

Appendix
The Effects of Weights on the Difference Between Alton and Official Hungarian Indices

		weights	1980 (1975 = 100)	Ratio/c	Alton weights	Hungarian weights
GDP	A/d	100.00	110.7		110.7	111.0/g
	H/e	100.0	119.9	1.083	120.1/f	119.9
Industry	A	32.37	112.1			
	H	41.01	119.8	1.069		
Agr. & forestry & water	A	25.67	108.6/a			
	H	16.29	124.1	1.143		
Construction	A	7.53	102.3			
	H	9.80	117.1	1.145		
Transportation & communication	A	8.25	121.5/b			
	H	7.93	115.4	.95		
Housing	A	10.63	110.0			
	H	2.23	125.7	1.143		
Trade	A	7.04	111.0			
	H	11.09	114.1	1.028		
Communal service	A	1.40	109.8			
	H	5.88	129.2	1.177		
Finance	A	.34	126.6			
	H	.56	122.1	.964		
Government	A	6.77	108.7			
	H	3.55	110.8	1.019		
Other	A	0.				
	H	1.66				

/a Aggregated agriculture, forestry and water using 76 weights.
/b As above for transportation and communication.
/c Official Hungarian Index divided by Alton index.
/d Alton indices.
/e Official Hungarian indices
/f Alton weights multiplied by official Hungarian sectoral indices.
/g Official Hungarian weights multiplied by the Alton sectoral indices.

Data Sources: Hungarian data are from a submission to the IBRD giving GDP by sector in 1976 prices for 1970-1981. Alton data are from Alton 1982, p.11.

References

Thad P. Alton, et.al., Statistics on East European Economic Structure and Growth. Research Project on National Income in East Central Europe, OP-48, mimeo, 1975.

_____. ____. "Economic Growth in Eastern Europe 1965-1979," Research Project on National Income in East Central Europe, OP-59, mimeo, 1980.

_____. ____. "Estimates of East European Countries' GNP Structure and Growth at Factor Cost," Paper for the June 7-8, 1982a Workshop on CPE National Income Statistics at the World Bank, Washington, D.C.

_____. ____. "Economic Growth in Eastern Europe 1965, 1970, and 1975-1980," Research Project on National Income in East Central Europe, OP-65, mimeo, 1981.

_____. ____. "Economic Growth in Eastern Europe 1965, 1970, and 1975-1981," Research Project on National Income in East Central Europe, OP-70, mimeo, 1982b.

Ed A. Hewett, Foreign Trade Price in the Council for Mutual Economic Assistance (Cambridge: Cambridge University Press, 1974).

Hungary. Központi Statisztikai Hivatal (Central Statistical Office), Népgazdasagi mérlégek 1980 (Economic Balances for 1980), (Budapest, 1981).

___. _____ (____), Statisztikai évkönyv (Statistical Yearbook, Budapest: annual) (abbreviated here Stév)

INSEE (France) and the Hungarian Statistical Office, "Comparison of the National Accounts and Balances of France and Hungary," mimeo, no date (c. 1982).

International Bank for Reconstruction and Development (IBRD), Economic Development and Reforms in Hungary, Volume 1, March 21, 1983.

Irving B. Kravis, Alan Heston, and Robert Summers, World Product and Income. International Comparisons of Real Gross Product, (Baltimore: Johns Hopkins University Press for the World Bank, 1982).

Paul Marer, "Exchange Rates and Convertibility in Hungary's New Economic Mechanism," in U.S. Congress, Joint Economic Committee, East European Economic Assessment. Part 1 (Washington: 1980), pp. 525-548.

_____. "Evaluation and Estimation of National Accounts Statistics of Centrally Planned Economies," final report, 1984.

Imre Tarafás. "A gazdaságpolitikai koncepció és az árfolyam-politika," ("Economic Policy Concept and Exchange-Rate Policy"), Közgazdasági Szemle, 7-8 (1981), pp. 913-926.

United Nations (U.N.) Economic and Social Council, "Information on the Hungarian System of Balances of the National Economy," Report by the Central Statistical Office of Hungary," CES/WP.22/69, mimeo, May 5, 1982.

United Nations (U.N.) Statistical Office, "Comparisons of the System of National Accounts and the System of Balances of the National Economy." Part two. "Conversion of Aggregates of SNA to MPS and Vice-Versa for Selected Countries." Series F, No.20 (Part II) (New York: United Nations, 1981).

Thomas A. Wolf, "Exchange Rates, Foreign Trade Accounting, and Purchasing Power Parity for Centrally Planned Economies," paper prepared for the Workshop on CPE National Income Statistics, The World Bank, Washington. D.C., June 7, 1972, mimeo.

The World Bank

Headquarters
1818 H Street, N.W.
Washington, D.C. 20433, U.S.A.

Telephone: (202) 477-1234
Telex: WUI 64145 WORLDBANK
RCA 248423 WORLDBK
Cable Address: INTBAFRAD
WASHINGTONDC

European Office
66, avenue d'Iéna
75116 Paris, France

Telephone: (1) 723-54.21
Telex: 842-620628

Tokyo Office
Kokusai Building
1-1 Marunouchi 3-chome
Chiyoda-ku, Tokyo 100, Japan

Telephone: (03) 214-5001
Telex: 781-26838

ISSN 0253-2115/ISBN 0-8213-0631-6