Hitotsubashi Journal of Economics 39 (1998) 67-100. © The Hitotsubashi Academy

NATIONAL INCOME IN POSTWAR CENTRAL ASIA

MASAAKI KUBONIWA

Abstract

Making effective use of the changed statistical environment after the collapse of the Soviet Union, this paper first shows all the existing official data on national income (NMP), output and employment in postwar Central Asian countries, namely Uzbekistan, Kazakhstan, Kyrgyz Republic, Tajikistan and Turkmenistan. Some of these officia0l data have not been available. This paper then presents the author's own preliminary estimates of national income and gross domestic product for 1960–1995 by using the official output and employment data. Estimated figures of national income show much lower values than those of the official data. Estimated GDP figures for 1960–1990 would be useful because any official data for the period have not been compiled.

Introduction

Since the collapse of the Soviet Union, we have come to recognize the importance of the quantitative historical research on the republics of the former Soviet Union (FSU), including Russia and Central Asian countries. The breakup of the Soviet Union brought about a marked drop in output in all the transition economies of the FSU. This drop was much larger than that during the Great Depression of the 1930's. However, the collapse of the totalitarian Soviet system is making it possible to have access to much statistical data which was once hidden. Further, the transition to a market economy is bringing a striking change to the statistical system of all the FSU republics, namely the shift from the traditional System of Material Products (MPS) to the market-oriented System of National Accounts (SNA).

Making effective use of the changed statistical environment, the present report first shows the existing official data on national income, output and employment in postwar Central Asia. This report then presents the author's own estimate of national income and gross domestic product by using the official output and employment data. This preliminary, but pioneering, research on the Central Asian national income is intended to contribute to developing further the Asian Historical Statistics Project [see Odaka (1996)].

This report presents the following data sets:

(a) the official data of 'national income (NMP; net material product)' in the postwar Central Asian republics, namely Uzbekistan, Kazakhstan, Kyrgyz Republic, Tajikistan and Turkmenistan (Section 1 in this report);
(b) the official data on gross output of the regions by sector (Section 2);

(c) the author's own estimate of national income, based on the official gross output data by sector (Section 2);
(d) the official data on employment by sector in the Central Asian economies (Section 3);
(e) the author's own estimate of growth of gross domestic product (GDP) in the Central Asian republics, relying on the official output and employment data (Section 3).

These data sets cover only the postwar period after 1950, mainly the years from 1960 to 1995, because before 1960 no official data for national income in each republic of the FSU was compiled by the USSR Statistical Commission (*TsSU*, later renamed *USSR Goskomstat*) nor by its branches in the republics. Although since 1960 republican statistical commissions began to compile their own national income data, the aggregate of all the republican data did not always correspond to the data for the entire FSU, which was independently compiled by the USSR Statistical Commission. For the sake of consistency, the data of the USSR Statistical Commission was taken as the official data and republican data was adjusted to meet the USSR data (based on the hearing from the staff of the CIS Statistical Commission, or the *CIS Komstat*). Further it should be noted that the comprehensive time series of republican national income for 1960–1990 presented in this report has not yet been made public while only a part of the time series appeared in the Statistical Yearbooks (*Narkhoz*) of each republic.

After presenting the official national income data in postwar Central Asia, this report identifies serious defects in republican data in terms of constant prices. In order to develop further republican national income statistics, the basic official data of output and employment by sector are collected. Then, based on these data an alternative estimate of growth of national income in constant prices will be presented. Finally, this report attempts to provide a preliminary estimate of the growth of gross national product (GDP) in the Central Asian republics for 1960–1995 by moving from the MPS (NMP) to the SNA (GDP).

I. *National Income (NMP) Statistics in Postwar Central Asia*

Official and Semi-Official Data of National Income Produced

Table 1 shows values of 'national income produced', or 'NMP produced', in current prices and national income growth rates in the Central Asian republics for 1950–1990. The data for 1960–1990 are taken from the official historical data in the Soviet era, a comprehensive set of which has hitherto never appeared in the literature. The data for 1950–1959 should be regarded as a preliminary semi-official estimate provided by the CIS Komstat in response to the author's request.

The method employed by the CIS Komstat to estimate the national income growth for 1950–1960 can be arranged in the following way.

First, the figures of republican national income by sector in 1960 in current prices are selected as the base data. Here let $Y_i(t)^{(k)}$ be the i-th sector's national income in the country k at the t-th period. Second, given $Y_i(t)^{(k)}$, $t=1960$, we proceed to derive $Y_i(t-1)^{(k)}$,

TABLE 1.1. NATIONAL INCOME (NMP) PRODUCED IN CENTRAL ASIAN REPUBLICS, 1950–1990

	in current prices; millions of rubles					real growth rates; %				
	Uzbekistan	Kazakh-stan	Kyrgyz Rep.	Tajikistan	Turkmeni-stan	Uzbek.	Kazakh.	Kyrgyz	Tajik.	Turkmen.
1950	(2459.5)	(2756.3)	(541.4)	(428.6)	(491.8)	...	...	...		
1951	(2603.7)	(2786.2)	(554.6)	(442.0)	(517.5)	(8.1)	(3.2)	(4.6)	(5.3)	(7.4)
1952	(2631.8)	(2844.9)	(565.6)	(456.9)	(531.9)	(7.4)	(8.5)	(8.3)	(9.8)	(9.2)
1953	(2694.1)	(2966.5)	(596.4)	(471.8)	(541.7)	(4.9)	(6.9)	(8.1)	(5.8)	(4.4)
1954	(2797.3)	(3173.6)	(639.5)	(496.3)	(558.1)	(7.3)	(10.6)	(10.9)	(8.8)	(6.5)
1955	(2980.5)	(3630.7)	(668.9)	(528.7)	(600.8)	(10.1)	(18.3)	(8.1)	(10.1)	(11.3)
1956	(3131.2)	(3993.8)	(702.4)	(578.4)	(616.1)	(8.2)	(13.3)	(8.1)	(12.7)	(5.6)
1957	(3288.4)	(3797.1)	(782.5)	(613.1)	(658.5)	(5.3)	(−4.7)	(11.7)	(6.3)	(7.2)
1958	(3556.9)	(4615.9)	(836.7)	(634.5)	(726.4)	(7.7)	(21.1)	(6.5)	(3.0)	(9.8)
1959	(3867.4)	(4955.3)	(921.0)	(702.7)	(787.1)	(10.2)	(8.8)	(11.6)	(12.3)	(9.9)
1960	3998.4	5442.1	990.8	720.2	829.4	(4.3)	(10.8)	(8.6)	(3.4)	(6.3)
1961	4002.0	5983.5	1065.7	853.3	805.1	1.9	4.0	5.6	15.1	2.4
1962	4350.2	6465.2	1228.8	917.5	876.5	7.7	6.2	8.9	4.7	2.9
1963	4853.3	6444.1	1389.7	1009.7	999.7	9.1	3.0	14.0	10.8	9.3
1964	4976.8	7323.5	1413.0	1082.9	996.5	8.3	18.4	4.2	8.1	3.3
1965	5495.9	7610.3	1603.3	1378.2	1126.8	12.3	−2.5	10.0	8.0	9.7
1966	5909.0	9597.6	1662.1	1406.0	1281.6	5.2	29.2	9.6	6.0	5.0
1967	6428.6	9591.3	1848.6	1515.7	1474.7	9.7	0.8	10.9	9.6	8.1
1968	6807.9	10422.8	1968.3	1569.4	1520.4	4.6	10.0	8.3	3.3	5.6
1969	7022.2	11103.4	2045.4	1616.7	1572.3	−0.9	2.9	0.9	1.5	−5.2
1970	8702.5	12844.7	2338.8	1977.1	1944.4	16.0	10.6	9.1	12.8	16.4
1971	9446.1	13749.2	2518.6	2221.6	2108.9	5.6	6.1	4.3	10.3	6.2
1972	9766.3	14867.5	2605.8	2231.6	2130.7	6.7	9.9	6.5	2.5	1.4
1973	10841.5	15359.2	2776.3	2446.9	2568.3	7.8	2.4	5.0	3.7	7.9
1974	11889.8	15468.9	2900.4	2621.7	2827.9	10.3	2.6	4.0	7.4	8.4
1975	12483.1	15114.1	2969.2	2810.0	3009.0	3.9	−0.7	3.6	6.1	4.3
1976	13593.8	17616.1	3096.6	2915.2	2863.0	8.9	8.3	3.5	2.2	−0.2
1977	14384.9	16801.9	3205.6	3108.0	3075.7	4.7	−2.6	3.1	3.3	3.2
1978	14694.3	18324.2	3393.2	3208.1	3165.8	1.8	11.1	5.6	5.8	2.4
1979	15761.1	19662.5	3467.3	3494.2	3444.1	4.5	2.0	3.0	4.9	3.8
1980	17464.7	20572.0	3722.3	3873.6	3502.3	8.5	3.7	5.8	8.1	−1.6
1981	18821.7	21061.2	3969.0	4096.8	3652.8	3.8	0.7	4.9	3.1	1.0
1982	20406.6	22096.5	4208.0	4255.0	4080.6	5.6	−2.6	2.0	0.1	4.7
1983	21621.3	23838.6	4918.5	4396.6	4269.1	4.1	5.2	9.4	4.8	3.2
1984	21036.8	24427.8	5080.7	4516.3	4327.4	−2.2	−0.2	4.0	2.8	0.4
1985	19874.4	23153.0	4437.5	4432.6	3994.9	3.8	1.4	−1.4	2.2	1.7
1986	19498.1	24270.0	4367.9	4295.2	4198.1	−0.2	1.7	0.9	3.5	4.5
1987	19353.8	24197.2	4509.6	4354.6	4469.5	0.5	−0.2	1.4	−1.2	4.0
1988	20743.0	26719.2	4946.3	4877.6	4717.6	9.7	8.6	12.9	13.9	10.8
1989	21558.1	27997.5	5554.4	4817.4	4827.7	3.1	−0.1	4.5	−6.5	−7.0
1990	23603.4	33361.6	6026.5	5489.8	5321.4	4.3	−0.9	4.8	0.2	1.8

Sources: CIS Komstat and USSR Goskomstat.

Notes: Figures in parenthesis are preliminary estimates of CIS Komstat.

TABLE 1.2A. NATIONAL INCOME PRODUCED BY ORIGIN: UZBEKISTAN
(in current prices; millions of rubles)

	NMP produced	Industry	Agriculture and forestry	Construction	Transport & communications	Trade	Procurement	MTS	Other material branches	Information computer services	Foreign trade earnings
1960	3998.4	1778.1	1264.0	354.9	96.5	182.3	76.1	49.0	63.5	–	134.0
1961	4002.0	1706.8	1307.6	384.9	113.5	169.4	86.9	29.6	59.1	–	144.2
1962	4350.2	1888.8	1436.4	398.2	144.8	175.8	81.1	24.4	55.8	–	144.9
1963	4853.3	1943.5	1843.3	414.3	154.1	187.6	82.5	22.4	59.3	–	146.3
1964	4976.8	2014.6	1755.3	476.7	181.6	203.8	79.6	30.3	67.5	–	167.4
1965	5495.9	2021.9	2065.7	579.7	220.1	227.1	94.2	39.5	72.6	–	175.1
1966	5909.0	2199.2	2102.3	725.1	246.9	270.1	86.8	33.8	76.5	–	168.3
1967	6428.6	2444.6	2132.0	854.2	267.4	306.0	90.3	55.2	80.4	–	198.5
1968	6807.9	2521.8	2241.3	917.1	304.1	349.9	92.7	80.9	80.5	–	219.6
1969	7022.2	2654.1	2172.1	1011.9	310.3	368.7	105.0	83.6	80.6	–	235.9
1970	8702.5	2939.4	3205.1	1197.6	337.3	397.7	127.1	85.3	74.4	–	338.6
1971	9446.1	3341.4	3261.6	1329.9	372.0	418.8	146.5	107.3	94.0	–	374.6
1972	9766.3	3448.7	3318.0	1410.2	404.6	439.9	121.1	123.0	80.6	–	420.2
1973	10841.5	3846.2	3678.9	1541.1	451.4	471.2	135.3	129.7	109.2	–	478.5
1974	11889.8	4306.2	4054.5	1624.8	479.1	508.1	162.6	148.4	81.8	–	524.3
1975	12483.1	4736.4	4008.7	1653.1	475.7	546.1	161.1	165.5	78.0	–	658.5
1976	13593.8	4853.9	4457.9	1877.8	539.8	584.2	169.8	172.0	82.4	–	856.0
1977	14384.9	4916.2	4907.6	1968.3	574.2	611.9	182.7	177.1	69.8	–	977.1
1978	14694.3	5196.9	4821.3	1987.1	573.7	652.1	179.3	194.6	71.7	–	1017.6
1979	15761.1	5140.8	5388.9	2081.0	608.5	751.8	214.6	265.8	75.9	–	1233.8
1980	17464.7	5548.6	5952.6	2218.9	671.0	832.2	217.9	262.1	83.9	–	1677.5
1981	18821.7	6051.0	6222.8	2417.4	736.9	890.0	227.2	274.3	78.7	–	1923.4
1982	20406.6	6830.5	6599.4	2519.2	856.5	912.3	244.5	279.5	96.5	–	2068.2
1983	21621.3	6480.7	7904.9	2569.0	878.6	962.9	230.5	316.9	103.2	–	2174.6
1984	21036.8	6391.6	6902.5	2877.5	949.0	986.4	254.5	329.8	104.7	–	2240.8
1985	19874.4	6981.0	7143.0	2588.0	1073.0	1006.6	264.8	328.7	111.0	30.1	348.2
1986	19498.1	6834.3	6770.6	2778.2	1010.9	1068.7	239.8	321.2	125.3	28.0	321.1
1987	19353.8	6968.7	6521.3	2754.6	989.8	1034.1	232.3	336.3	134.8	28.9	353.0
1988	20743.0	6520.9	7822.8	3052.1	1047.6	1166.3	249.6	322.4	164.7	31.5	365.1
1989	21558.1	5610.0	9128.2	3062.3	1100.4	1294.3	251.4	345.2	208.9	50.5	506.9
1990	23603.4	5564.7	10370.4	3477.0	1340.1	1328.5	282.8	371.7	236.5	42.9	588.8

Sources: CIS Komstat and USSR Goskomstat.

$Y_i(t-2)^{(k)},...,Y_i(t-10)^{(k)}$ with $t=1960$ as the reference year by using independently estimated sectoral real growth rates, $g_i(t)^{(k)}$, namely

$$Y_i(t-1)^{(k)}=Y_i(t)^{(k)}/(g_i(t)^{(k)}+1) \quad t=1960,1959,.....,1951. \tag{1.1}$$

Then the real growth rate of national income in the country k for the t-th period can be

TABLE 1.2B. GROWTH RATES OF NATIONAL INCOME PRODUCED BY ORIGIN: UZBEKISTAN (in constant prices; %)

	NMP produced	Industry	Agriculture and forestry	Construction	Transport & communications	Trade	Procurement	MTS	Other material branches	Information computer services	Foreign trade earnings
1961	1.9	5.6	−5.4	7.2	13.2	0.9	−7.3	−4.0	−2.0	—	15.6
1962	7.7	11.1	3.8	4.3	28.2	6.5	−12.2	30.0	2.9	—	1.1
1963	9.1	9.6	14.3	1.5	8.7	4.9	15.9	1.4	−18.6	—	−3.9
1964	8.3	15.2	−5.7	17.8	19.0	6.2	−8.2	30.9	3.1	—	15.3
1965	12.3	11.5	11.7	24.5	11.9	13.3	0.4	−16.5	4.9	—	10.1
1966	5.2	11.0	−2.5	13.0	12.2	9.4	15.1	5.6	−8.7	—	−9.6
1967	9.7	13.5	−0.1	26.8	9.2	10.7	2.0	13.7	14.5	—	12.0
1968	4.6	3.7	1.2	8.8	16.1	9.3	−8.0	1.5	−2.4	—	23.6
1969	−0.9	5.7	−12.1	−0.0	3.2	5.5	1.3	−6.0	−5.9	—	9.6
1970	16.0	7.8	35.1	13.7	9.8	7.6	15.2	−2.0	−8.5	—	4.1
1971	5.6	9.5	−5.7	5.5	10.2	10.6	−2.5	3.4	2.0	—	62.1
1972	6.7	9.5	1.9	5.9	9.0	7.4	11.9	2.2	−3.8	—	9.8
1973	7.8	9.3	7.1	7.4	11.5	7.2	5.0	12.4	23.0	—	−5.0
1974	10.3	14.4	8.0	6.3	6.5	8.7	3.4	7.0	−19.5	—	10.9
1975	3.9	12.7	−13.1	−1.7	0.9	9.0	5.9	6.0	0.0	—	32.1
1976	8.9	6.5	8.7	12.9	13.4	5.7	5.5	2.9	5.2	—	20.2
1977	4.7	3.4	7.4	3.0	6.4	7.3	3.9	1.0	−20.2	—	4.4
1978	1.8	4.7	−6.7	3.0	6.0	4.8	2.9	4.8	2.9	—	15.9
1979	4.5	2.1	6.3	1.8	6.6	6.9	7.0	−6.3	6.2	—	17.4
1980	8.5	5.5	7.9	11.0	4.7	9.0	12.1	1.1	11.0	—	25.2
1981	3.8	6.2	−3.4	5.2	10.2	7.7	−11.3	−1.5	−7.4	—	11.3
1982	5.6	6.9	1.2	6.0	3.8	6.7	2.1	0.7	8.7	—	12.5
1983	4.1	4.2	2.7	3.7	3.5	4.3	5.1	−1.1	5.1	—	8.3
1984	−2.2	−1.2	−9.2	−5.0	7.5	0.4	−8.8	−1.6	17.1	—	8.9
1985	3.8	10.0	−0.2	−7.1	4.1	0.7	−16.9	−8.2	6.9	—	5.8
1986	−0.2	−0.0	−3.9	10.6	−5.8	3.1	21.4	0.2	2.0	−7.0	−8.8
1987	0.5	1.7	1.0	−4.1	−2.1	−3.4	0.7	3.3	15.7	3.2	11.3
1988	9.7	9.2	10.6	12.2	5.8	9.2	22.6	−17.5	40.3	9.0	3.0
1989	3.1	12.4	−3.0	−4.4	0.9	10.7	0.0	−5.5	−21.0	61.3	30.5
1990	4.3	3.6	7.0	3.2	5.7	9.8	3.9	−25.1	13.5	−12.9	−27.9

Sources: CIS Komstat and USSR Goskomstat.

computed as

$$G(t)^{(k)}=(\Sigma_i Y_i(t)^{(k)}-\Sigma_i Y_i(t-1)^{(k)})/\Sigma_i Y_i(t-1)^{(k)} \quad t=1960,1959,.....,1951. \tag{1.2}$$

As can easily be seen, this equation is equivalent to

$$G(t)^{(k)}=1/[\Sigma_i\, \omega_i(t)^{(k)}/(g_i(t)^{(k)}+1)]-1, \tag{1.3}$$

where $\omega_i(t)^{(k)} = Y_i(t)^{(k)} / \Sigma_i Y_i(t)^{(k)}$ denotes the sectoral weight in the t-th period national income of the country k.

Here the crucial step in computing the global growth rate of each country at each period is to estimate sectoral real growth rates, $g_i(t)^{(k)}$, which were calculated directly by employing the following official data:

For $i=1$ (industry): republican industrial gross output indexes;
For $i=2$ (construction): republican capital investment indexes;
For $i=3$ (agriculture and forestry): republican gross agricultural output indexes for 1957–60, and the Soviet gross agricultural output indexes for 1951–1956, which were uniformly applied to each republic because of the lack of republican data;
For $i=4$ (transportation and communications): growth rates of republican freight transportation in physical terms;
For $i=5$ (trade): retail trade turnover indexes;
For $i=6$ (foreign trade earnings): the Soviet foreign trade indexes, which were uniformly applied to each republic because of the lack of republican data;
For $i=7$ ('other material branches'): an average growth rate for republican 'other material branches' for 1960–1970, which were uniformly applied to each republic for 1951–1960.

In order to check the plausibility of the estimates, the CIS Komstat made similar calculations for Russia, Ukraine and Belarus for 1957–1960 because for these three FSU republics the official data were available for those particular years. By comparing the calculated growth rates with those in the official reports they found calculation errors to be within the range of 1% to 3% in each year. Thus they concluded that their estimates were rather reliable.

Due to the complete lack of the official data, the CIS Komstat estimated 'national income produced' in current prices for 1950–1959 (Table 1.1) as follows: Based on the assumption that no relative price changes took place for 1950–1960, the Soviet 'national income produced' in current prices for year t was distributed over republics according to the following proportions

$$\Sigma_i\, Y_i(t)^{(Russia)} : \Sigma_i\, Y_i(t)^{(Ukraine)} : \Sigma_i\, Y_i(t)^{(Uzbekistan)} : \ldots \text{ for } t = 1959, \ldots, 1950$$

with 1960 as the reference base.

Here it may be worth making comments on the CIS Komstat estimate.

In regard to the growth estimate, the author is skeptical of the mechanical application of the entire Soviet data to the Central Asian republics for 1951–1956 because these countries heavily relied on agriculture and their agricultural output displayed wild fluctuations. This defect arising from the CIS Komstat method may also taint the plausibility of their estimate on national income in current prices even if their assumption on no price changes is accepted. Of course, national income estimate in terms of current prices should be accompanied by careful examination of relative price changes over the periods. However, this was not done by the CIS Komstat. Although the CIS Komstat estimate can be regarded as an important and pioneering work, it may be more important in that it clearly showed the limitations of a simple

application of the FSU's well-organized official output statistics in estimating national income.

Figures 1.1 to 1.5 display the graphs of annual real growth rates and cumulative growth of NMP with 1960 as the reference base (1960 = 100), which were based on the official figures in the Soviet era. From these figures we find the following features:

First, all the Central Asian economies show a decreasing trend in NMP growth from 1960 to 1990.

Second, Kazakhstan shows a most remarkable decreasing trend and, furthermore, marked fluctuations around the time trend line, and Tajikistan also shows these features (although not as clearly as Kazakhstan).

Third, Uzbekistan, Kyrgyz Republic and Tajikistan show rather high cumulative growth for the 30 year period from 1960 while Kazakhstan and Turkmenistan show a relatively stagnant growth trend.

Official Data of National Income Produced by Origin

Tables 1.2A and 1.2B show the official data, in current prices, of 'national income (NMP) produced' by sector of origin and its real growth rates in Uzbekistan economies for 1960–1990. For other Central Asian Countries, Kuboniwa (1996) shows the official data.

FIGURE 1.1. GROWTH OF NMP PRODUCED IN UZBEKISTAN, 1960–1990

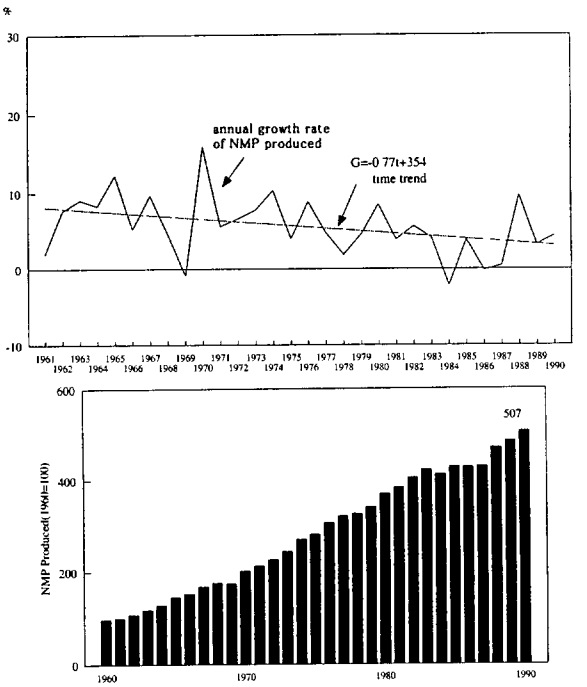


FIGURE 1.2. GROWTH OF NMP PRODUCED IN KAZAKHSTAN, 1960–1990

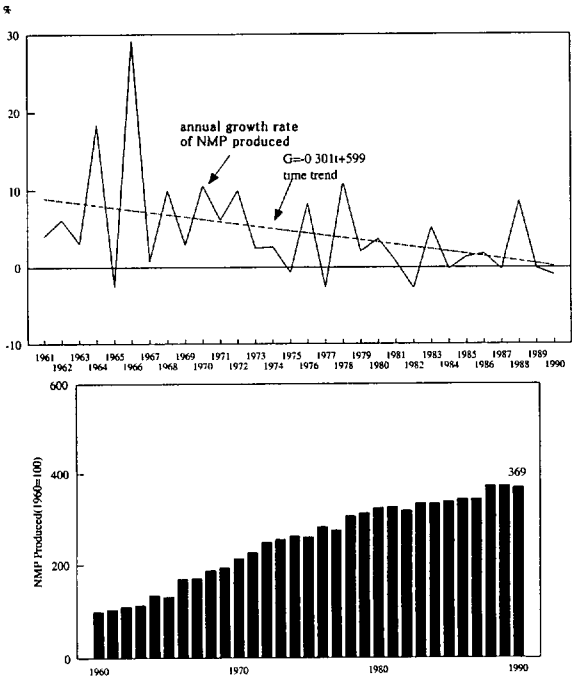


FIGURE 1.3. GROWTH OF NMP PRODUCED IN KYRGYZ REPUBLIC, 1960–1990

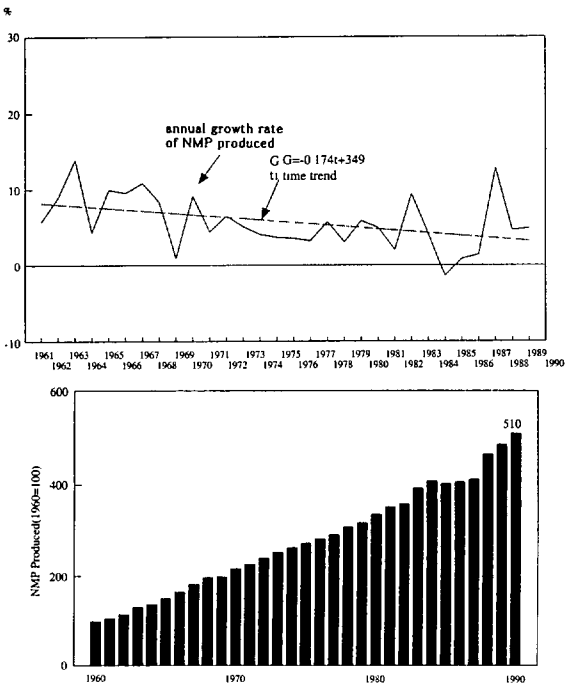


FIGURE 1.4. GROWTH OF NMP PRODUCED IN TAJIKISTAN, 1960–1990

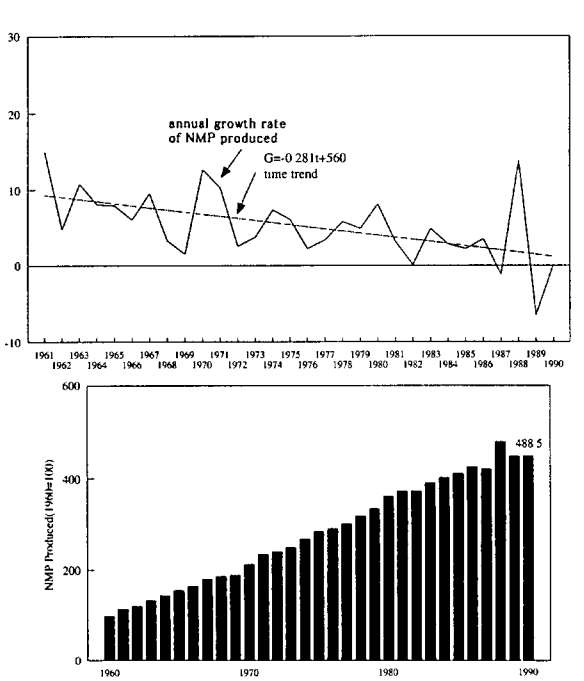
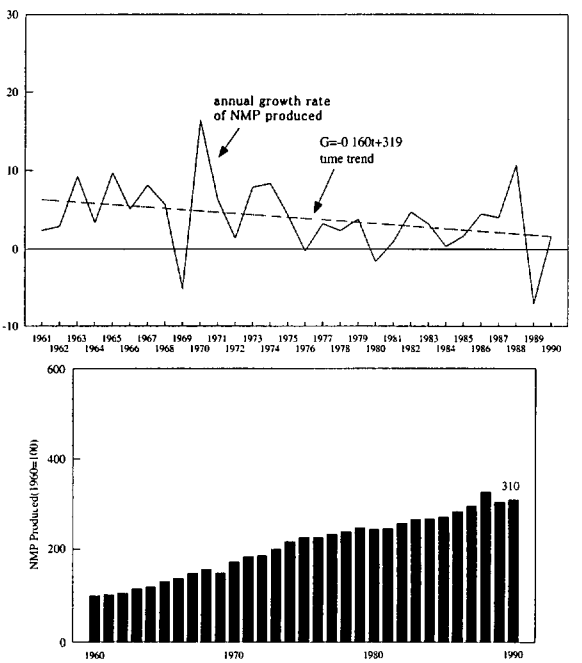


FIGURE 1.5. GROWTH OF NMP PRODUCED IN TURKMENISTAN, 1960–1990



It should be noted that these tables explicitly specify 'foreign trade earnings' and classify distribution activities into three sectors, namely the (domestic) trade (in which restaurants are included), the procurement of agricultural products and the MTS ('material technical supply'; the centralized assignment of equipment and industrial materials). The time series data for foreign trade earnings and details of distribution activities have never appeared in the republican and the Soviet Statistical Yearbooks. Further, the sectoral growth rates of NMP produced in Table 1.2B were never made public.

Official Data of National Income by End Use

Tables 1.3A and 1.3B show the official data, in current prices, of national income (NMP) by end use, or 'national income (NMP) utilized', and its official real growth rates in Uzbekistan for 1960–1990. The official data for other Central Asian countries are shown in Kuboniwa (1996). The FSU republics began to compile the growth rates by each component of end use from 1966; this means that no official data of the sectoral growth rates was compiled before 1966.

Intrinsic Problems in the Official National Income Data

As has been pointed out by numerous articles and books, the Soviet official national income statistics suffered numerous defects. This holds also for the republican data. Here, we would like to two problems inherent in the traditional Soviet and republican national income data.

Figures 1.6 to 1.10 describe changes in the structure of 'national income (NMP) produced' by sector, computed by using the official data. As can be seen from these figures, all the Central Asian official data at nominal basis show an increase in the share of agriculture in national income: namely from 32%(1960) to 44%(1990) in Uzbekistan, from 28%(1960) to 42%(1990) in Kazakhstan, from 33%(1960) to 43%(1990) in Kyrgyz Republic, from 35% (1960) to 37%(1990) in Tajikistan, and from 33%(1960) to 48%(1990) in Turkmenistan. Except for the Tajik case, the changes are rather drastic. In contrast, the official data at nominal basis show a fall in the share of industry in national income: namely from 45% (1960) to 24%(1990) in Uzbekistan, from 36%(1960) to 21%(1990) in Kazakhstan, from 41% (1960) to 32%(1990) in Kyrgyz Republic, from 34% (1960) to 27%(1990) in Tajikistan, and from 34%(1960) to 16%(1990) in Turkmenistan.

These odd changes can be considered not as a symptom of the development of agriculture in comparison with industry but as that of a marked increase in agricultural subsidies. According to the Soviet methodology for national income at market prices, the agricultural subsidies, which support the state procurement prices of agricultural products, are subtracted not from the national income of agriculture but from that of the light and food industries which purchase agricultural products as intermediate inputs. If agricultural subsidies are rearranged so that they are deducted from the value of national income originating in agriculture, the Central Asian industrial structure after 1980 would show a shape which is quite different from that based on the official data. Table 1.4 verifies this for the 1988 Uzbek national income. After the rearrangement of agricultural subsidies by conceptual adjustments in accordance with the Western convention, the share of agriculture in national income

TABLE 1.3A. NATIONAL INCOME (NMP) BY END USE: UZBEKISTAN

(in current prices; millions of rubles)

National Income Utilized						Capital Formation and Other Expenditures		
		Non-productive Consumption						
			Private Household Consumption	Material Inputs to Facilities Serving Population	Material Inputs to Scientific Facilities & Administration		Net Fixed Capital Formation	Increase in Stocks and Other Expenditures
1961	...	...	...	...	...	...	...	...
1962	4247.9	3096.7	2800.0	242.7	54.0	1151.2	899.4	251.8
1963	5060.3	3410.3	3087.7	262.0	60.6	1650.0	915.0	735.0
1964	5418.9	3731.3	3371.8	292.5	67.0	1687.6	1057.0	630.6
1965	6023.4	4160.0	3790.8	307.7	61.5	1863.4	861.5	1001.9
1966	6476.3	4549.5	4134.8	334.0	80.7	1926.8	989.0	937.8
1967	7228.0	5002.8	4547.5	373.3	82.0	2225.2	1329.0	896.2
1968	7916.9	5462.6	4968.9	402.0	91.7	2454.3	1318.6	1135.7
1969	8291.7	5800.7	5261.1	438.4	101.2	2491.0	1349.0	1142.0
1970	9441.1	6412.1	5830.6	472.0	109.5	3029.0	1718.5	1310.5
1971	9854.2	7058.6	6414.4	528.8	115.4	2795.6	1952.0	843.6
1972	10445.8	7415.0	6729.1	556.1	129.8	3030.8	1969.9	1060.9
1973	11397.0	7968.6	7185.2	642.5	140.9	3428.4	2436.8	991.6
1974	12398.1	8512.8	7648.3	709.5	155.0	3885.3	2371.5	1513.8
1975	12711.6	9236.9	8254.1	806.9	175.9	3474.7	2273.4	1201.3
1976	14007.6	9856.6	8810.0	871.2	175.4	4151.0	2421.7	1729.3
1977	14899.0	10470.5	9350.7	939.5	180.3	4428.5	2777.4	1651.1
1978	15522.2	11239.2	9997.9	1038.9	202.4	4283.0	2864.2	1418.8
1979	16949.4	12092.9	10767.7	1110.5	214.7	4856.5	2838.3	2018.2
1980	18431.8	13241.4	11812.2	1169.7	259.5	5190.4	3640.5	1549.9
1981	19404.7	14285.6	12772.8	1240.0	272.8	5119.1	3258.2	1860.9
1982	21356.5	15040.9	13479.1	1297.0	264.8	6315.6	3163.6	3152.0
1983	22895.8	15897.2	14188.4	1420.8	288.0	6998.6	3206.7	3791.9
1984	23377.0	16504.1	14743.6	1460.5	300.0	6872.9	3553.0	3319.9
1985	22838.0	17026.0	14961.0	1539.0	526.0	5812.0	3425.0	2387.0
1986	22470.1	17298.4	15325.2	1601.0	372.2	5171.7	3876.0	1295.7
1987	22694.6	17350.4	15270.4	1706.9	373.1	5344.2	4115.0	1229.2
1988	21913.0	18540.6	16286.5	1822.7	431.4	3372.4	3766.0	−393.6
1989	24640.0	19595.9	17189.6	1955.0	451.3	5044.1	4649.0	395.1
1990	28836.7	21745.8	19007.3	2226.4	512.1	7090.9	4670.0	2420.9

Sources: CIS Komstat and USSR Goskomstat.

TABLE 1.3B. GROWTH RATES OF NATIONAL INCOME (NMP) BY END USE: UZBEKISTAN (in constant prices; %)

	National Income Utilized					Capital Formation and Other Expenditures		
		Non-productive Consumption						
			Private Household Consumption	Material Inputs to Facilities Serving Population	Material Inputs to Scientific Facilities & Administration		Net Fixed Capital Formation	Increase in Stocks and Other Expenditures
1966	9.1	12.1	11.9	10.6	30.1	2.6	14.2	−7.5
1967	10.3	10.2	10.4	10.8	−1.2	10.5	32.5	−13.0
1968	9.5	8.8	9.1	5.4	12.4	11.1	−5.5	38.2
1969	2.8	5.7	5.4	8.4	10.6	−3.9	−5.2	−2.5
1970	11.8	9.9	10.1	8.1	6.6	16.6	16.9	16.3
1971	3.7	7.7	7.6	9.9	5.7	−6.3	15.7	−30.1
1972	7.2	6.6	6.6	5.3	12.7	8.8	−3.2	30.3
1973	8.2	7.2	6.4	15.6	8.5	11.0	24.8	−7.4
1974	9.6	7.2	6.8	10.4	10.9	15.8	−5.7	54.6
1975	2.4	7.4	7.1	9.8	9.5	−9.8	1.8	−22.5
1976	10.6	6.9	6.9	8.0	−0.1	20.3	8.0	42.6
1977	3.8	4.0	3.7	7.8	2.7	3.1	13.7	−11.4
1978	4.2	6.7	6.4	8.1	11.3	−1.6	3.0	−9.8
1979	7.9	5.9	5.8	6.9	5.9	12.8	−3.2	45.2
1980	7.6	8.1	8.1	5.3	20.7	6.6	29.5	−24.1
1981	3.2	7.1	7.3	6.0	4.4	−6.1	−10.7	4.3
1982	7.7	3.7	3.9	3.3	−3.7	18.8	−6.0	67.5
1983	5.7	4.3	3.6	10.1	8.7	9.1	0.0	19.1
1984	0.1	3.8	3.9	3.0	3.8	−8.3	−4.5	−11.9
1985	−2.3	2.7	2.2	5.9	11.7	−15.4	−8.6	−22.2
1986	−2.4	0.8	1.5	4.0	−28.8	−11.8	13.3	−47.7
1987	0.1	−0.6	−1.5	6.6	1.5	2.4	3.7	−1.6
1988	−0.3	6.3	6.0	6.5	15.8	−21.5	−13.3	−48.1
1989	8.9	4.2	4.2	5.7	1.9	34.6	−0.8	−87.7
1990	5.4	0.8	...	...	...	23.5	...	...

Sources: CIS Komstat and USSR Goskomstat.

declines to a figure of 28% while the share of industry goes up to 43%. It should be noted that agricultural subsidies for the entire FSU, which were negligible in the 1960's, began to show a remarkable increase from the beginning of the 1980's.

The next problem inherent in the Soviet national income statistics concerns whether the global growth rate is consistent with the sectoral growth rates of national income in each republic of the FSU. Table 1.5 suggests a serious inconsistency between the global and sectoral figures. The column 'e' of the table shows the national income produced calculated by using

FIGURE 1.6. STRUCTURE OF NMP PRODUCED IN UZBEKISTAN (at nominal basis), 1960–1990

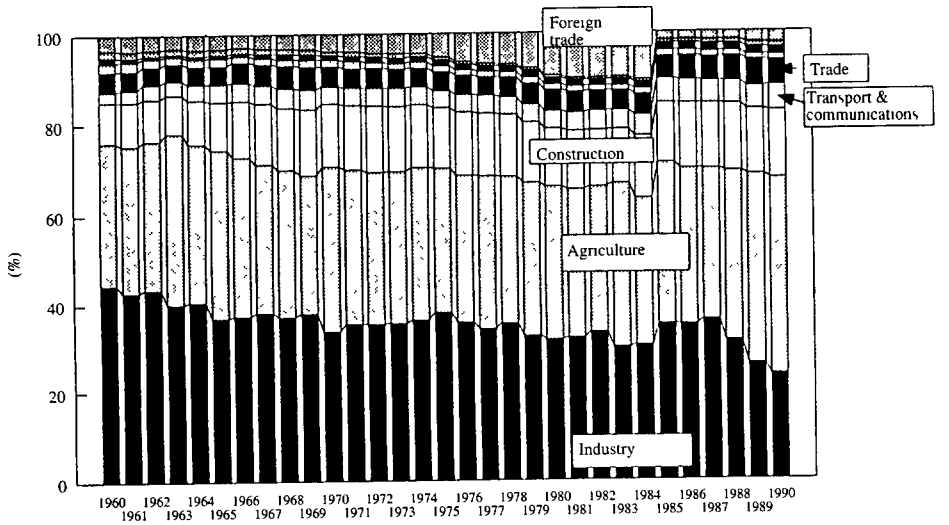
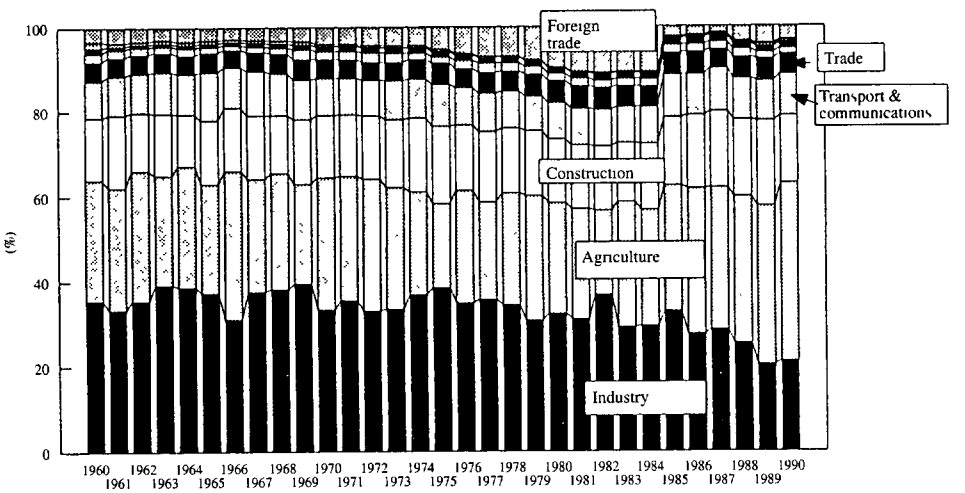


FIGURE 1.7. STRUCTURE OF NMP PRODUCED IN KAZAKHSTAN (at nominal basis), 1960–1990



the 1960 national income in current prices as the initial base (Table 1.2A) and the official global growth rates (Table 1.2B). The time series in column 'e' constitutes the global national income figures with 1960 as the reference base. On the other hand, the column 'f' in the table shows the global national income time series with 1960 as the reference base which were calculated by using the 1960 sectoral national income in current prices and the sectoral real growth rates. The deviation of the global national income based on the macro data from that

FIGURE 1.8. STRUCTURE OF NMP PRODUCED IN KYRGYZ REPUBLIC
(at nominal basis), 1960–1990

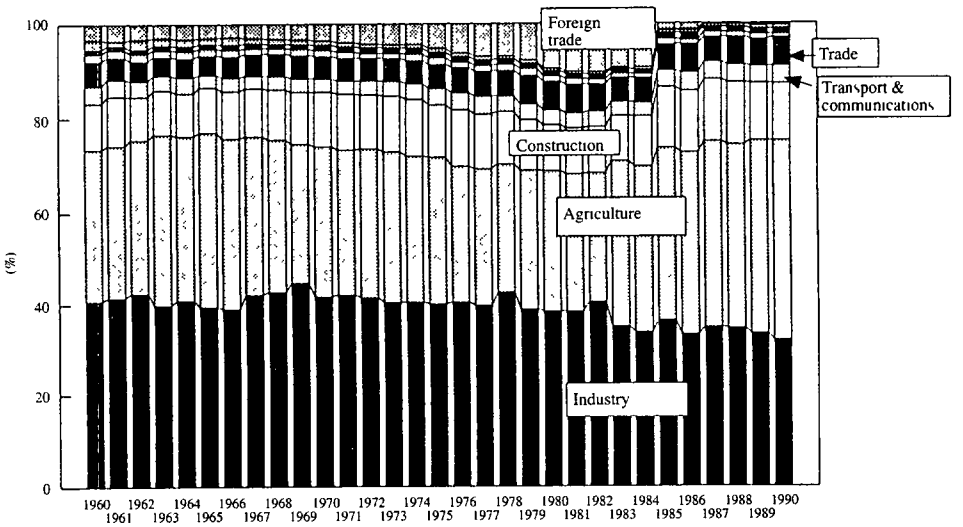


FIGURE 1.9. STRUCTURE OF NMP PRODUCED IN TAJIKISTAN
(at nominal basis), 1960–1990

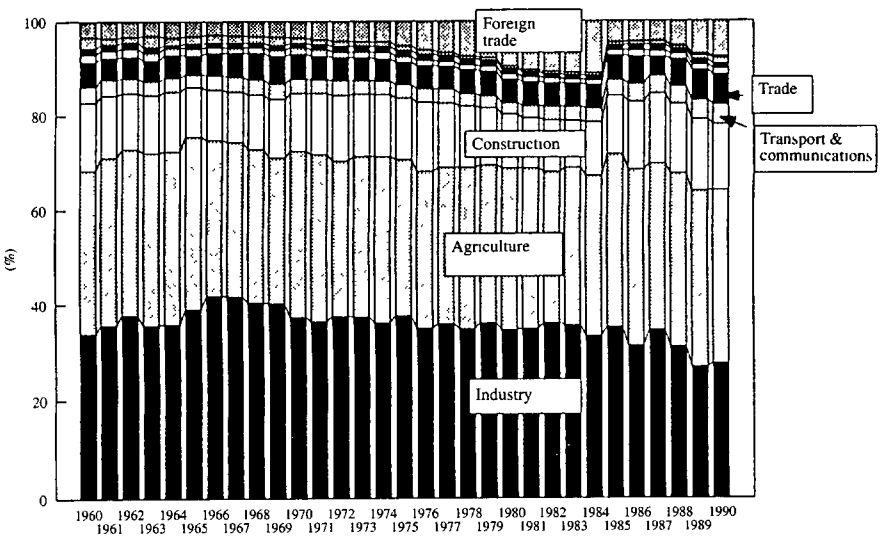
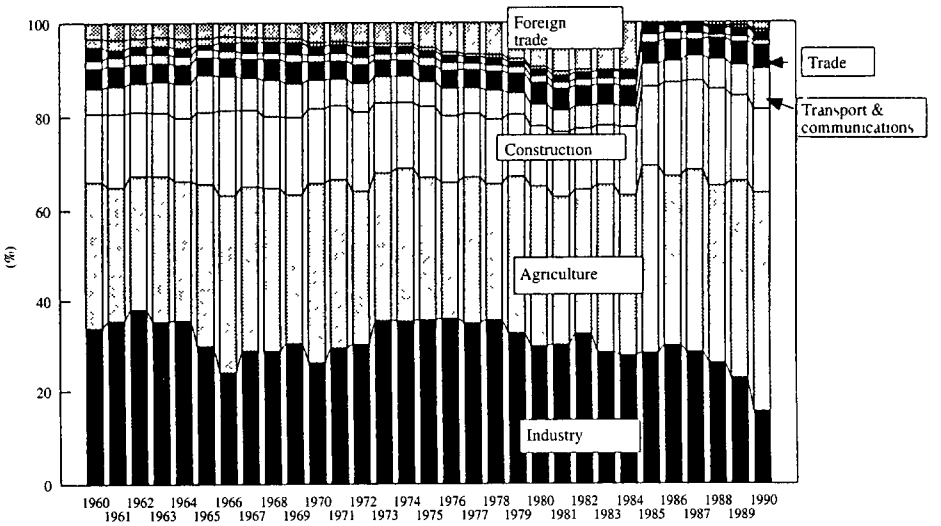


FIGURE 1.10. STRUCTURE OF NMP PRODUCED IN TURKMENISTAN (at nominal basis), 1960–1990



based on sectoral data shows a low value in the neighborhood of the reference year while it shows a rather high value after 1966, particularly after 1975. This kind of deviation can be seen in all the Central Asian official data irrespective of the choice of the reference year. Therefore, we can state that the official national income statistics of each republic of the FSU reveals serious 'internal' contradictions.

TABLE 1.4. REARRANGEMENT OF AGRICULTURAL SUBSIDIES IN UZBEKISTAN NATIONAL ACCOUNTS, 1988

	NMP produced,official mil. rubles	(%)	:In which subsidies mil. rubles	NMP produced,revised mil. rubles	(%)	:In which subsidies mil. rubles
1 Electricity	402.9	(1.9)	0.0	402.9	(1.9)	0.0
2 Oil and gas	481.5	(2.3)	0.0	481.5	(2.3)	0.0
3 coal	4.5	(0.0)	−20.1	4.5	(0.0)	−20.1
4 Other fuels	0.0	(0.0)	0.0	0.0	(0.0)	0.0
5 Ferrous metallurgy	26.6	(0.1)	0.0	26.6	(0.1)	0.0
6 Nonferrous metallurgy	255.3	(1.2)	0.0	255.3	(1.2)	0.0
7 Chemical industry	366.5	(1.8)	−60.3	366.5	(1.8)	−60.3
8 MBMW	1448.3	(7.0)	−26.2	1448.3	(7.0)	−26.2
9 Wood and paper	166.0	(0.8)	0.0	166.0	(0.8)	0.0
10 Construction materials	636.3	(3.1)	0.0	636.3	(3.1)	0.0
11 Light industry	1515.7	(7.3)	−1323.1	2838.8	(13.7)	0.0
12 Food industry	979.4	(4.7)	−1032.9	2012.3	(9.7)	0.0
13 Industry n.e.c.	237.8	(1.1)	0.0	237.8	(1.1)	0.0
Industry, total	6520.9	(31.4)	−2462.6	8876.9	(42.8)	−106.6
14 Construction	3052.1	(14.7)	0.0	3052.1	(14.7)	0.0
15 Agriculture	7822.8	(37.7)	0.0	5466.8	(26.4)	−2356.0
16 Transport and communications	1047.6	(5.1)	0.0	1047.6	(5.1)	0.0
17 Trade	1738.3	(8.4)	0.0	1738.3	(8.4)	0.0
18 Other material branches	196.2	(0.9)	0.0	196.2	(0.9)	0.0
NMP at I-O accounts	20377.9	(98.2)	−2462.6	20377.9	(98.2)	−2462.6
Foreign trade earnings	365.1	(1.8)	0.0	365.1	(1.8)	0.0
NMP at national income and product accounts (NIPA)	20743.0	(100.0)	−2462.6	20743.0	(100.0)	−2462.6

Sources: Uzbekistan Statistical Commission, *Uzbekistan Input-Output Table for 1988*.

TABLE 1.5. CONSISTENCY BETWEEN OFFICIAL AND CALCULATED NMP SERIES : Case of Uzbekistan

	NMP produced official data	NMP produced calculated from sectoral data	Deviation	NMP produced calculated from macro data	NMP produced calculated from sectoral data	Deviation	NMP produced calculated from macro data	NMP produced calculated from sectoral data	Deviation
	growth rates %			reference year 1960=100			millions rubls at reference year 1960		(f−e)/e*100
	a	b	a−b	c	d	c−d	e	f	%
1960	...	...	...	100.0	100.0	0.0	3998.4	3998.4	0.0
1961	1.9	2.1	−0.2	101.9	102.1	−0.2	4075.2	4081.7	0.2
1962	7.7	7.9	−0.2	109.7	110.1	−0.4	4387.8	4403.7	0.4
1963	9.1	9.1	0.0	119.7	120.1	−0.4	4785.2	4802.3	0.4
1964	8.3	8.7	−0.4	129.6	130.6	−1.0	5182.4	5221.4	0.8
1965	12.3	12.2	0.1	145.6	146.5	−0.9	5819.8	5856.4	0.6
1966	5.2	6.9	−1.7	153.1	156.5	−3.4	6122.9	6258.6	2.2
1967	9.7	11.3	−1.6	168.0	174.2	−6.3	6715.3	6966.2	3.7
1968	4.6	4.8	−0.2	175.6	182.6	−7.0	7022.4	7301.1	4.0
1969	−0.9	1.1	−2.0	174.1	184.6	−10.6	6959.8	7382.5	6.1
1970	16.0	13.1	2.8	201.9	208.9	−7.0	8071.4	8352.6	3.5
1971	5.6	7.4	−1.8	213.2	224.3	−11.2	8523.4	8970.2	5.2
1972	6.7	7.5	−0.8	227.4	241.1	−13.8	9090.4	9640.9	6.1
1973	7.8	8.0	−0.2	245.0	260.4	−15.4	9796.1	10413.2	6.3
1974	10.3	11.2	−0.9	270.2	289.7	−19.5	10804.9	11583.1	7.2
1975	3.9	6.8	−2.8	280.8	309.3	−28.5	11228.3	12366.4	10.1
1976	8.9	8.4	0.5	305.7	335.2	−29.5	12223.6	13404.4	9.7
1977	4.7	4.2	0.5	320.1	349.2	−29.2	12797.3	13963.6	9.1
1978	1.8	3.6	−1.8	325.8	361.8	−36.0	13026.5	14465.3	11.0
1979	4.5	4.0	0.5	340.5	376.3	−35.8	13615.9	15045.4	10.5
1980	8.5	8.1	0.4	369.5	406.7	−37.2	14773.5	16260.3	10.1
1981	3.8	5.3	−1.5	383.6	428.2	−44.7	15335.9	17121.3	11.6
1982	5.6	6.5	−0.8	405.1	455.8	−50.8	16196.7	18225.9	12.5
1983	4.1	4.3	−0.2	421.6	475.5	−53.9	16857.7	19012.1	12.8
1984	−2.2	−1.0	−1.1	412.5	470.6	−58.1	16493.9	18818.4	14.1
1985	3.8	5.7	−1.9	428.1	497.4	−69.3	17116.4	19886.8	16.2
1986	−0.2	−0.4	0.3	427.4	495.4	−67.9	17090.2	19806.7	15.9
1987	0.5	1.7	−1.3	429.4	503.9	−74.5	17168.3	20147.2	17.4
1988	9.7	8.8	0.9	471.1	548.4	−77.3	18836.2	21927.1	16.4
1989	3.1	10.4	−7.3	485.9	605.4	−119.5	19428.2	24206.1	24.6
1990	4.3	0.1	4.2	507.0	606.2	−99.3	20270.3	24240.2	19.6

Notes: Calculated or given by Table 1.2A and 1.2B.

II. *An Alternative Estimate of Growth of National Income Produced in Postwar Central Asia*

Methodology

This section presents an alternative estimate of national income growth in postwar Central Asia where the macro global growth is consistent with the sectoral growth rates. The procedure employed by the present author to estimate postwar growth of Central Asian countries is similar to the manner described by Eq. (1.1), Eq.(1.2) and Eq.(1.3) and is summarized as follows:

1. The republican 1960 national income produced by sector, in current prices, was selected as the reference base data. $Y_i(1960)^{(k)}$ is given by Tables 1.2A, 1.3A, 1.4A, 1.5A and 1.6A. Given $Y_i(1960)^{(k)}$, we proceeded to derive $Y_i(t)^{(k)}$, $t=1961, 1962,...,1990$ with $t=1960$ as the reference year by using independently-estimated sectoral real growth rates, $g_i(t)^{(k)}$, namely

$$Y_i(t)^{(k)}=(g_i(t)^{(k)}+1)\ Y_i(t-1)^{(k)}\quad t=1961,1962,.....,1990. \tag{3.1}$$

2. The global national income produced in terms of the 1960 reference base, $Y(t)^{(k)}$, and its growth rate, $G(t)^{(k)}$ in the country k at the t-th period, were computed as

$$Y(t)^{(k)}=\Sigma_i\ Y_i(t)^{(k)},$$

and

$$G(t)^{(k)}=(Y(t)^{(k)}-Y(t-1)^{(k)})/Y(t-1)^{(k)}.\quad t=1961,1962,.....,1990. \tag{3.2}$$

3. Sectoral real growth rates, $g_i(t)^{(k)}$, were estimated directly by employing the following official data:

For $i=1$ (industry): Table 2.1; i.e., republican industrial gross output indexes;
For $i=2$ (agriculture and forestry): Table 2.2; i.e., republican gross agricultural output indexes in 1983 prices;
For $i=3$ (construction): Table 2.3; i.e., republican indexes of gross value of construction output;
For $i=4$ (transportation and communications): Table 2.4; i.e., republican indexes of gross value of output of transportation and communications;
For $i=5$ (trade, procurement and MTS): Table 2.5, i.e., republican indexes of gross value of output of distribution;
For $i=6$ (other material branches): the sectoral NMP growth rates given by Table 1.2B, which were employed due

TABLE 2.1. GROWTH OF INDUSTRIAL OUTPUT IN CENTRAL ASIAN REPUBLICS (%)

	Uzbekistan	Kazakhstan	Kyrgyz Rep.	Tajikistan	Turkmenistan
1951	22.5	14.3	17.9	20.5	22.7
1952	5.8	9.5	6.7	6.8	10.4
1953	6.0	11.6	14.7	14.4	7.1
1954	7.7	11.5	13.1	13.5	7.9
1955	9.1	16.8	8.9	10.1	14.8
1956	2.3	9.3	11.1	10.0	0.5
1957	10.2	10.8	9.4	9.6	7.8
1958	5.7	10.9	10.0	7.6	7.1
1959	9.1	13.4	10.6	12.6	4.6
1960	9.9	14.2	10.0	6.3	7.5
1961	6.6	12.8	9.0	9.5	6.0
1962	7.2	11.7	11.0	12.4	3.9
1963	5.7	9.4	9.9	5.1	5.2
1964	14.2	7.2	10.0	11.9	10.7
1965	8.4	11.1	14.2	6.6	4.7
1966	8.5	8.4	14.3	10.1	9.8
1967	9.3	12.5	17.2	12.5	11.8
1968	4.3	9.0	11.1	5.4	5.5
1969	0.2	6.1	7.5	4.6	2.0
1970	9.5	10.5	15.1	9.5	13.4
1971	11.8	8.0	11.3	9.8	11.5
1972	6.0	7.0	8.0	3.9	5.5
1973	7.6	7.1	8.1	6.1	9.2
1974	8.8	8.4	8.2	5.5	7.5
1975	8.6	6.0	8.0	8.7	11.8
1976	5.4	2.9	4.9	3.2	1.3
1977	5.0	4.2	3.6	5.4	2.1
1978	5.2	4.2	6.4	5.6	3.6
1979	2.6	2.6	4.8	6.9	−0.4
1980	6.6	3.1	4.4	5.6	4.8
1981	6.0	4.2	4.6	6.7	2.6
1982	3.4	1.1	3.8	1.9	1.3
1983	5.3	4.6	4.6	2.9	2.9
1984	2.1	3.8	6.5	3.9	4.3
1985	6.9	3.6	3.7	2.9	1.9
1986	5.9	5.1	4.3	1.7	4.8
1987	2.6	4.3	1.4	5.0	3.1
1988	3.3	3.7	6.8	5.5	4.3
1989	3.6	2.5	5.2	1.8	3.3
1990	1.8	−0.8	−0.6	1.2	3.2
1991	1.5	−0.9	−0.3	−3.6	4.8
1992	−6.7	−13.8	−26.4	−24.2	−14.9
1993	3.6	−14.8	−25.3	−7.8	4.0
1994	1.6	−28.1	−28.0	−30.8	−25.0
1995	0.2	−7.9	−12.5	−5.1	−6.9

Sources: CIS Komstat and USSR Goskomstat.

TABLE 2.2. GROWTH OF AGRILTURAL OUTPUT IN CENTRAL ASIAN REPUBLICS (in 1983 constant prices, %)

	Uzbekistan	Kazakhstan	Kyrgyz Rep.	Tajikistan	Turkmenistan
1961	0.4	−4.0	−2.5	13.8	0.5
1962	−1.1	6.3	10.8	−4.5	−3.3
1963	14.1	−9.8	11.2	13.9	16.0
1964	−3.2	38.0	2.9	2.3	−4.7
1965	10.8	−26.8	4.2	11.7	17.1
1966	3.6	46.0	10.1	0.3	10.7
1967	3.4	−12.5	4.2	5.0	5.2
1968	1.4	7.0	1.0	1.0	2.5
1969	−6.7	−0.6	−5.0	−7.0	−12.7
1970	25.3	13.5	11.4	25.8	32.4
1971	−1.1	−0.4	1.9	9.0	3.4
1972	6.3	12.0	7.1	−2.3	−2.6
1973	5.8	1.8	5.4	6.6	13.8
1974	7.0	−9.7	−0.9	10.6	8.5
1975	−1.4	−12.9	1.2	−0.1	0.2
1976	8.1	23.9	1.7	3.0	−1.9
1977	5.7	−6.1	3.3	2.5	8.1
1978	−1.5	15.1	1.6	5.5	−3.0
1979	5.1	4.8	2.0	1.7	14.4
1980	7.4	−0.4	0.3	5.3	−1.7
1981	−1.7	−3.5	3.4	−0.9	−2.5
1982	1.1	−9.6	−6.1	−0.6	3.1
1983	4.7	12.7	12.2	1.9	4.4
1984	−3.6	−8.7	2.0	0.0	−0.7
1985	0.9	9.0	−2.9	4.2	10.1
1986	−2.0	12.6	7.9	3.7	−1.8
1987	0.3	−2.6	1.5	−7.0	5.0
1988	8.8	4.4	4.1	9.4	8.6
1989	−4.3	−7.3	2.5	−10.8	0.3
1990	6.3	6.8	1.3	2.8	7.0
1991	−1.1	−10.4	−10.0	−4.4	−4.2
1992	−6.0	1.0	−5.0	−27.0	−9.0
1993	1.0	−5.0	−10.0	−4.0	8.0
1994	−8.0	−20.0	−18.0	−25.0	−11.0
1995	−3.0	−28.0	−2.0	−28.0	−10.0

Sources: CIS Komstat and USSR Goskomstat.

to the lack of the appropriate alternative indexes;

For $i=7$ (foreign trade earnings): the sectoral NMP growth rates given by Table 1.2B due to the lack of the appropriate alternative indexes.

It should be noted that Tables 2.1 covers the complete official statistics of republican industrial output for 1950–1995 and that 2.2 displays the complete official time series of republican agricultural output for 1960–1995.

TABLE 2.3. GROWTH OF CONSTRUCTION OUTPUT (GVO) IN CENTRAL ASIAN REPUBLICS (%)

	Uzbekistan	Kazakhstan	Kyrgyz Rep.	Tajikistan	Turkmenistan
1961	5.7	25.7	11.1	6.2	3.8
1962	5.5	−7.3	3.0	1.6	−2.4
1963	4.9	3.5	21.9	11.4	11.9
1964	14.7	−2.5	1.2	10.9	1.6
1965	15.2	13.8	11.4	19.9	−5.5
1966	17.8	9.3	16.1	8.7	20.7
1967	20.6	8.7	6.1	5.6	7.0
1968	6.7	6.6	13.3	8.1	8.8
1969	−0.3	2.6	2.2	8.1	1.2
1970	15.7	5.2	12.9	4.2	9.4
1971	7.0	11.5	8.9	17.0	6.4
1972	4.8	6.3	3.0	1.8	6.1
1973	10.0	5.5	7.8	3.9	8.6
1974	2.3	12.6	0.3	−1.0	5.6
1975	2.7	0.4	−2.1	7.0	4.5
1976	8.5	−1.2	5.7	4.0	−5.9
1977	2.1	0.8	−1.4	2.3	2.6
1978	5.0	5.7	4.8	1.3	0.9
1979	3.7	2.0	3.2	−2.7	8.0
1980	6.0	2.9	−0.7	10.6	−3.2
1981	5.1	3.1	6.1	−4.3	9.8
1982	2.3	0.2	1.7	1.4	10.9
1983	3.1	1.7	13.1	0.0	4.0
1984	−0.1	2.0	0.0	4.2	1.0
1985	−3.0	2.5	1.8	4.4	5.0
1986	1.9	−2.6	1.1	11.4	12.0
1987	0.0	−2.6	1.1	11.4	12.0
1988	6.3	9.2	7.9	4.5	6.1
1989	−3.3	3.6	−2.5	−2.6	−12.7
1990	4.4	−10.9	3.1	−10.5	1.7

Sources: CIS Komstat and USSR Goskomstat.

Main Results

The main results of our computation for Uzbekistan are demonstrated in Tables 2.6, which show the author's alternative estimates of growth rates of republican 'national income (NMP) produced' in constant prices at the 1960 reference base for the period from 1960 to 1990. For other Central Asian countries see Kuboniwa (1996).

Figures 2.1, 2.2, 2.3, 2.4 and 2.5 compare the official and the estimated growth rates of 'national income produced' in each Central Asian republic. As is seen from these figures, the estimated time series of global growth rates for each republic is rather close to the official time series, although the estimated sectoral rates are quite different from the official sectoral growth rates.

TABLE 2.4. GROWTH OF OUTPUT (GVO) OF TRANSPORT AND COMMUNICATIONS IN CENTRAL ASIAN REPUBLICS (%)

	Uzbekistan	Kazakhstan	Kyrgyz Rep.	Tajikistan	Turkmenistan
1961	7.5	8.6	−4.4	5.3	4.6
1962	22.8	6.6	4.9	1.4	14.0
1963	7.3	5.5	7.7	10.2	18.6
1964	20.2	9.0	9.3	8.7	9.4
1965	9.7	21.2	−9.4	10.0	8.3
1966	10.4	3.7	5.1	10.6	5.1
1967	7.7	9.4	4.6	12.0	9.4
1968	12.9	2.3	13.0	4.5	15.2
1969	5.4	3.8	7.4	7.3	−0.6
1970	10.0	9.6	13.3	10.3	8.5
1971	11.9	7.2	7.5	14.6	6.1
1972	8.3	6.8	10.0	4.4	8.5
1973	11.3	12.4	9.6	1.7	9.3
1974	8.4	2.6	11.6	8.4	9.4
1975	6.1	5.1	8.8	8.8	6.4
1976	12.2	5.0	6.9	4.0	5.4
1977	7.8	−1.5	5.5	4.2	2.6
1978	7.1	9.2	4.6	8.0	13.6
1979	7.4	4.1	3.0	5.5	−8.7
1980	5.4	9.2	3.7	4.0	−3.0
1981	9.4	3.9	5.6	7.5	5.5
1982	3.8	0.9	3.3	4.7	4.4
1983	5.1	6.7	4.3	5.9	10.8
1984	5.6	3.5	−0.7	3.9	−1.5
1985	4.2	4.7	0.0	9.0	2.4
1986	−6.7	0.9	5.4	10.6	3.5
1987	−2.8	3.9	1.8	−4.2	18.5
1988	4.5	3.5	8.2	5.9	16.4
1989	2.8	1.3	−0.8	−2.8	3.4
1990	2.0	6.0	6.8	11.8	29.1

Sources: CIS Komstat and USSR Goskomstat.

Table 2.7 summarizes the difference between the official growth and the estimated growth. According to this table, annual average deviation of the estimated global growth rate from the official rate falls within the range of 1.9% for Uzbekistan, 3.4% for Kazakhstan, 2.2% for Kyrgyz Republic, 1.8% for Tajikistan and 2.6% for Turkmenistan.

The estimated cumulative growth of each republic is higher than the official cumulative growth. The estimated cumulative growth for the thirty years from 1960 to 1990 is 5.2 times the 1960 level in Uzbekistan, which is very close to the official growth of 5.1 times. In Kazakhstan estimated growth is 4.6 times the 1960 level, which is much greater than the official growth figure of 3.7 times. This may be due to an underestimation of growth of agriculture in the official national income statistics of Kazakhstan. In Kyrgyz Republic the estimated result is 5.7 times the 1960 level, which is not far from the official growth estimate of 5.1 times. In Tajikistan estimated growth is 4.9 times the 1960 level, which is rather near the

TABLE 2.5. GROWTH OF OUTPUT (GVO) OF DISTRIBUTION (TRADE ETC.) IN CENTRAL ASIAN REPUBLICS (%)

	Uzbekistan	Kazakhstan	Kyrgyz Rep.	Tajikistan	Turkmenistan
1961	3.0	8.0	2.3	3.4	1.2
1962	5.7	9.6	8.7	7.2	3.4
1963	5.4	6.0	9.2	7.1	7.0
1964	6.8	6.8	8.8	9.3	7.1
1965	12.0	10.0	12.6	13.2	8.3
1966	10.5	8.1	10.4	12.2	11.3
1967	9.6	8.8	10.3	11.3	12.2
1968	8.4	7.2	9.4	8.7	9.3
1969	6.0	7.4	7.7	7.4	6.9
1970	9.6	8.6	9.4	10.2	8.6
1971	9.1	5.8	8.0	8.0	7.9
1972	6.7	6.7	7.0	6.4	6.7
1973	7.3	6.2	7.5	6.8	7.5
1974	8.4	7.8	7.9	6.2	6.7
1975	9.0	7.4	7.8	9.7	8.8
1976	5.9	3.6	5.2	6.2	5.5
1977	6.1	4.4	4.1	5.9	5.5
1978	5.7	4.7	5.0	5.9	5.5
1979	6.6	4.0	4.8	5.7	5.3
1980	8.6	5.3	5.2	5.8	5.7
1981	7.5	3.8	4.3	9.6	5.7
1982	5.6	1.0	1.1	1.8	2.6
1983	4.9	2.7	3.5	5.3	5.4
1984	1.9	4.4	5.8	6.0	5.1
1985	1.0	3.7	1.2	4.7	0.7
1986	3.7	0.0	0.9	3.2	6.4
1987	1.4	2.0	4.4	1.9	1.8
1988	8.3	6.8	8.6	8.4	9.8
1989	9.8	8.5	8.8	7.5	7.2
1990	9.1	8.7	8.6	9.0	8.9

Sources: CIS Komstat and USSR Goskomstat.

official growth figure of 4.5 times. In Turkmenistan estimated growth is 5.1 times the 1960 level, which is far from the official growth estimate of 3.1 times. This may be caused by an underestimate of growth in both industry and agriculture in the official statistics and particularly by the difference between the official growth rate (10.8%) and the estimated growth rate (20.9%) in 1988 which in turn owes much to the marked increase in the contribution of '(special) foreign trade earnings' to the global growth in 1988.

TABLE 2.6. AN ALTERNATIVE ESTIMATE OF GROWTH OF NATIONAL INCOME IN UZBEKISTAN

	NMP produced 1960=100	NMP produced annual growth rates (%)
1960	100.0	...
1961	104.5	4.5
1962	109.2	4.5
1963	117.2	7.4
1964	127.2	8.5
1965	139.9	10.0
1966	150.4	7.5
1967	164.0	9.0
1968	172.1	5.0
1969	171.1	−0.6
1970	194.2	13.5
1971	212.6	9.5
1972	225.8	6.2
1973	241.6	7.0
1974	259.7	7.5
1975	277.1	6.7
1976	298.0	7.5
1977	312.5	4.9
1978	326.9	4.6
1979	342.9	4.9
1980	371.7	8.4
1981	390.8	5.1
1982	406.6	4.0
1983	427.9	5.2
1984	435.8	1.8
1985	453.6	4.1
1986	461.0	1.6
1987	473.3	2.7
1988	497.1	5.0
1989	523.4	5.3
1990	518.4	−1.0

TABLE 2.7. COMPARISON OF ESTIMATED GROWTH WITH OFFICIAL GROWTH

	Official 1990 a (1960=100)	Estimated 1990 b (1960=100)	Cumulative Deviation (b−a)/a*100 (%)	Annual average rate deviation of estmated growth from official growth (%)
Uzbekistan				
Total NMP produced	507.0	518.4	2.2	±1.9
Industry NMP	858.5	580.5	−32.4	±2.8
Agriculture NMP	169.9	253.7	49.3	±3.0
Kazakhstan				
Total NMP produced	369.1	457.7	24.0	±3.4
Industry NMP	465.0	588.9	26.6	±4.3
Agriculture NMP	65.0	198.3	205.1	±9.5
Kyrgyz Republic				
Total NMP produced	510.0	573.3	12.4	±2.2
Industry NMP	861.7	875.4	1.6	±3.1
Agriculture NMP	155.0	255.1	64.6	±4.1
Tajikistan				
Total NMP produced	448.5	490.4	9.3	±1.8
Industry NMP	676.2	576.6	−14.7	±3.3
Agriculture NMP	191.9	266.6	38.9	±2.4
Turkmenistan				
Total NMP produced	310.0	512.2	65.2	±2.6
Industry NMP	182.1	474.3	160.5	±4.9
Agriculture NMP	201.8	345.5	71.2	±3.4

FIGURE 2.1. OFFICIAL AND ESTIMATED GROWTH RATES OF NATIONAL INCOME (NMP) PRODUCED IN UZBEKISTAN

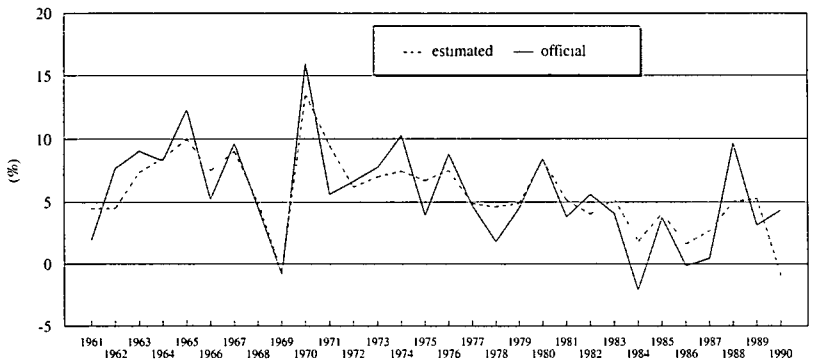


FIGURE 2.2. OFFICIAL AND ESTIMATED GROWTH RATES OF NATIONAL INCOME (NMP) PRODUCED IN KAZAKHSTAN

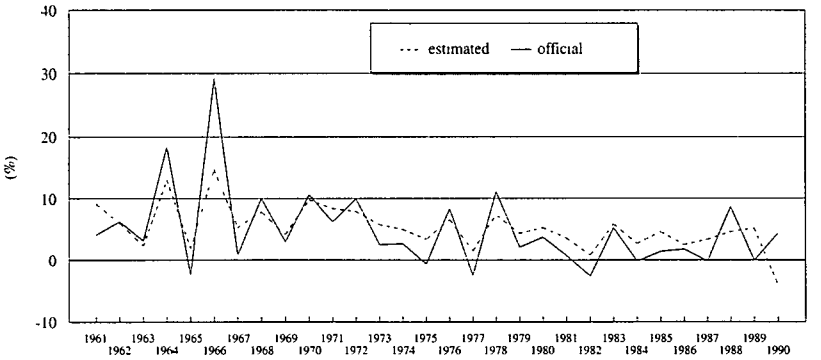


FIGURE 2.3. OFFICIAL AND ESTIMATED GROWTH RATES OF NATIONAL INCOME (NMP) PRODUCED IN KYRGYZ REPUBLIC

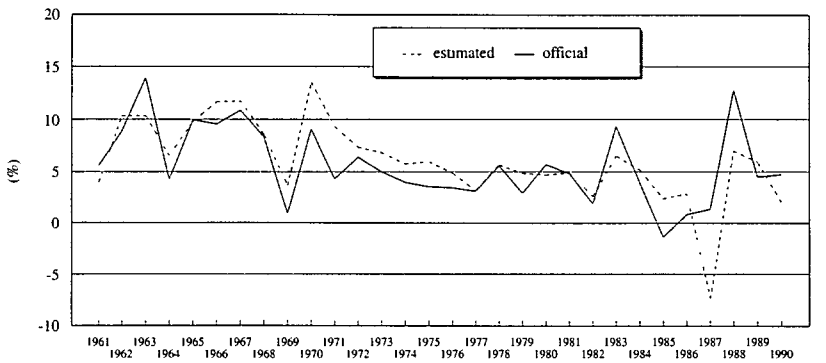


FIGURE 2.4. OFFICIAL AND ESTIMATED GROWTH RATES OF NATIONAL INCOME (NMP) PRODUCED IN TAJIKISTAN

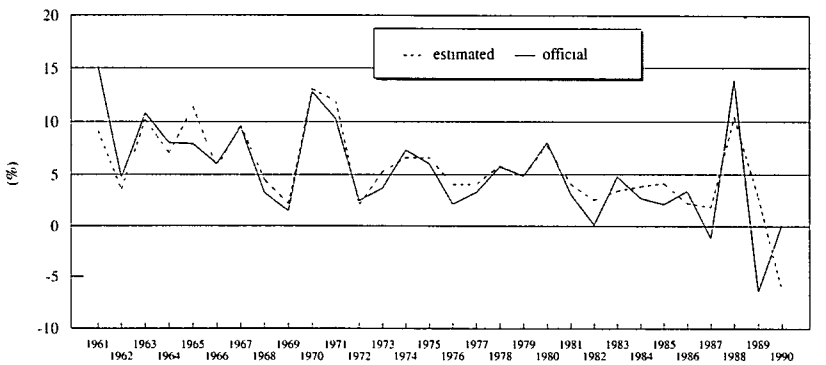
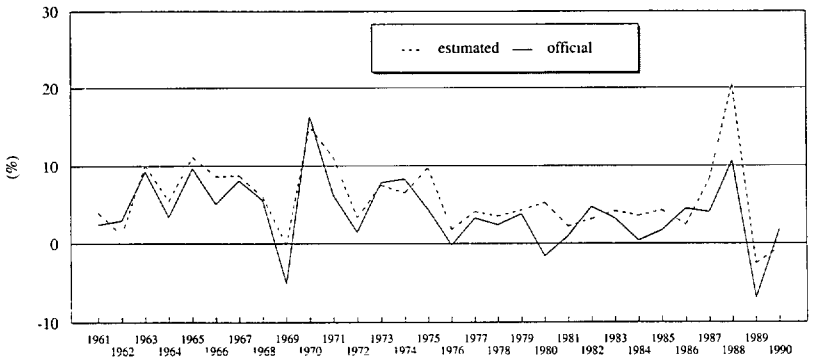


FIGURE 2.5. OFFICIAL AND ESTIMATED GROWTH RATES OF NATIONAL INCOME (NMP) PRODUCED IN TURKMENISTAN



III. *Estimating Growth of GDP in Postwar Central Asia*

Methodology

The formula for estimation is similar to that in Sections 1 and 2. Due to the limited data availability, the year 1990 was selected as the reference base for Uzbekistan, Kyrgyz Republic, Tajikistan and Turkmenistan, while the year 1993 was selected for Kazakhstan. To estimate the growth of the service sectors employment data were used. The official data on employment numbers in Uzbekistan are shown in Tables 3.1A, while the official data on employment growth are shown in 3.1B, where 'services' denotes both material and non-material services. Bench-mark GDP compositions by sector, or $\omega_i(t)^{(k)}$ with t as the reference base in the Central Asian republics, are shown in Table 3.2. To avoid ambiguity resulting from the growth of indirect taxes we approximate GDP by the concept of gross value added (GVA). This approach can be employed in estimating the real growth rate series of GDP in the FSU countries. However, information on the bench-mark GDP compositions is not complete except for the Uzbek case.

Sectoral real growth rates, $g_i(t)^{(k)}$, were estimated directly by employing the following official data:

(1) For all the Central Asian republics:

For $i=1$ (industry): Table 2.1; i.e., republican industrial gross output indexes;

For $i=2$ (agriculture and forestry): Table 2.2; i.e., republican gross agricultural output indexes in 1983 constant prices;

For $i=3$ (construction): Table 2.3; i.e., republican indexes of gross value of construction output for 1960–1990, and the fixed capital investment indexes for 1991–1994;

(2) For the Uzbek and Kyrgyz cases:
For $i=4$ (transportation and communications): Table 2.4; i.e.,
republican indexes of gross value of output of transportation and communications for 1960–1990, and the physical indexes of transportation for 1991–1994 given in various issues of CIS Statistical Yearbook;

(3) For the Kazakh, Tajik and Turkmen cases:
For $i=4$ ('services'): employment data for 'services';

For the Uzbek case:
For $i=5$ (distribution): employment data for distribution;

For the Kyrgyz case:
For $i=5$ (distribution and 'other'): aggregated employment data;

(4) For the Uzbek case:
For $i=6$ ('other'): employment data for 'other'.

It should be noted that the Russian Statistical Commission, in cooperation with the World Bank, employed a method which is similar to the author's method when it revised the official growth rate estimates for 1991–1994 in October, 1995 [Goskomstat RF and World Bank (1995)].

Main Results

The estimated growth figures in Uzbekistan are shown in Tables 3.3. Figures 3.1 to 3.5 display the estimated growth rates for 1961–1995 and the republican official growth rates for 1991–1995 (note that no official data was available for Turkmenistan).

Cumulative GDP growth in 1990 is 3.7 times the 1960 level for Uzbekistan, 3.1 times for Kazakhstan, 3.9 times for Kyrgyz Republic, 3.5 times for Tajikistan, and 3.4 times for Turkmenistan. The estimated values of cumulative GDP growth in Central Asian economies are much lower than those of the official NMP growth figures except for the Turkmen case.

The estimated annual growth rates and cumulative growth for the years 1991 to 1994 in Uzbekistan and Kyrgyz Republic are rather close to the official GDP figures, owing to the very moderate development of service sectors in these countries. The estimated growth level in 1994 is 84.3 in Uzbekistan and 53.0 in Kyrgyz Republic (1990=100), while the official level is 83.3 in Uzbekistan and 53.6 in Kyrgyz Republic. The estimated growth levels for Kazakhstan in 1994 and 1995 (1990=100) are 66.9 and 61.9, respectively, both much higher than the official growth figures; the levels are 49.8 in 1994 and 45.4 in 1995. This suggests that the official growth statistics underestimated the growth of services, particularly for 1994. The estimated growth levels for Tajikistan in 1994 and 1995 (1990=100) are 60.1 and 52.7, respectively, but no official data is available.

TABLE 3.1A. EMPLOYMENT BY SECTOR IN UZBEKISTAN

(thousands)

	Total	Industry	Construction	Agriculture	Services			
						Transport and communications	Distribution	Other
1958	3,017.4	389.1	192.5	1,744.9	690.9	121.2	131.5	438.2
1959	3,087.9	401.5	198.7	1,747.1	740.6	129.4	146.4	464.8
1960	3,131.7	424.5	207.1	1,716.1	784.4	140.3	151.5	492.6
1961	3,155.5	448.3	212.7	1,639.6	854.9	151.4	163.5	540.0
1962	3,270.6	467.8	222.5	1,663.3	917.0	163.9	173.5	579.6
1963	3,347.9	482.1	228.4	1,658.1	979.3	171.3	184.8	623.2
1964	3,439.1	506.1	243.8	1,656.0	1,033.2	179.7	195.5	658.0
1965	3,535.7	533.7	258.8	1,636.2	1,107.0	193.6	208.7	704.7
1966	3,634.9	559.1	284.5	1,625.1	1,166.2	207.2	221.2	737.8
1967	3,777.3	580.0	311.1	1,640.7	1,245.5	218.1	235.8	791.6
1968	3,906.1	601.1	322.0	1,655.6	1,327.4	230.7	252.1	844.6
1969	4,048.0	615.0	334.9	1,699.5	1,398.6	243.8	264.0	890.8
1970	4,135.0	622.6	352.4	1,707.9	1,452.1	254.5	273.0	924.6
1971	4,282.1	641.8	368.3	1,751.7	1,520.3	269.6	282.6	968.1
1972	4,427.2	655.0	384.5	1,806.8	1,580.9	275.7	296.2	1,009.0
1973	4,563.1	680.8	394.7	1,836.7	1,650.9	285.1	313.7	1,052.1
1974	4,734.5	711.4	403.1	1,898.0	1,722.0	294.4	322.1	1,105.5
1975	4,896.5	739.1	412.1	1,926.1	1,819.2	312.1	338.6	1,168.5
1976	5,045.6	760.8	420.2	1,959.7	1,904.9	326.9	350.5	1,227.5
1977	5,205.7	784.5	428.8	1,993.7	1,998.7	344.6	367.9	1,286.2
1978	5,382.4	807.9	436.3	2,057.8	2,080.4	366.0	376.3	1,338.1
1979	5,615.3	834.5	449.9	2,156.8	2,174.1	380.1	391.0	1,403.0
1980	5,751.7	864.0	463.9	2,154.9	2,268.9	398.6	405.8	1,464.5
1981	5,991.6	903.7	489.3	2,244.2	2,354.4	414.0	419.2	1,521.2
1982	6,224.3	932.6	501.2	2,358.6	2,431.9	428.3	427.4	1,576.2
1983	6,389.4	966.9	511.9	2,406.3	2,504.3	440.5	431.4	1,632.4
1984	6,498.4	995.9	519.0	2,424.3	2,559.2	455.8	435.6	1,667.8
1985	6,619.1	1,015.1	516.7	2,445.9	2,641.4	464.9	443.6	1,732.9
1986	6,780.8	1,091.4	542.5	2,455.3	2,691.6	466.5	453.9	1,771.2
1987	7,107.7	1,137.4	565.7	2,643.4	2,761.2	461.0	457.7	1,842.5
1988	7,312.2	1,162.2	556.6	2,749.7	2,843.7	466.0	471.3	1,906.4
1989	7,624.1	1,183.8	689.5	2,876.2	2,874.6	390.5	453.6	2,030.5
1990	7,940.8	1,201.4	710.0	3,055.4	2,974.0	401.5	458.6	2,113.9
1991	8,322.8	1,213.1	679.6	3,490.9	2,939.2	369.0	511.5	2,058.7
1992	8,271.4	1,202.1	588.9	3,592.4	2,888.0	356.4	476.3	2,055.3
1993	8,259.0	1,222.1	556.5	3,602.2	2,878.2	336.0	521.3	2,020.9
1994	8,150.3	1,106.2	526.2	3,541.2	2,976.7	341.7	559.7	2,075.3
1995	8,157.5	1,100.0	520.0	3,550.0	2,987.5			

Sources: CIS Komstat and USSR Goskomstat.

TABLE 3.1B. EMPLOYMENT BY SECTOR IN UZBEKISTAN

(1960=100)

	Total	Industry	Construction	Agriculture	Services			
						Transport and communications	Distribution	Other
1958	96.4	91.7	93.0	101.7	88.1	86.4	86.8	89.0
1959	98.6	94.6	95.9	101.8	94.4	92.2	96.6	94.4
1960	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1961	100.8	105.6	102.7	95.5	109.0	107.9	107.9	109.6
1962	104.4	110.2	107.4	96.9	116.9	116.8	114.5	117.7
1963	106.9	113.6	110.3	96.6	124.8	122.1	122.0	126.5
1964	109.8	119.2	117.7	96.5	131.7	128.1	129.0	133.6
1965	112.9	125.7	125.0	95.3	141.1	138.0	137.8	143.1
1966	116.1	131.7	137.4	94.7	148.7	147.7	146.0	149.8
1967	120.6	136.6	150.2	95.6	158.8	155.5	155.6	160.7
1968	124.7	141.6	155.5	96.5	169.2	164.4	166.4	171.5
1969	129.3	144.9	161.7	99.0	178.3	173.8	174.3	180.8
1970	132.0	146.7	170.2	99.5	185.1	181.4	180.2	187.7
1971	136.7	151.2	177.8	102.1	193.8	192.2	186.5	196.5
1972	141.4	154.3	185.7	105.3	201.5	196.5	195.5	204.8
1973	145.7	160.4	190.6	107.0	210.5	203.2	207.1	213.6
1974	151.2	167.6	194.6	110.6	219.5	209.8	212.6	224.4
1975	156.4	174.1	199.0	112.2	231.9	222.5	223.5	237.2
1976	161.1	179.2	202.9	114.2	242.8	233.0	231.4	249.2
1977	166.2	184.8	207.0	116.2	254.8	245.6	242.8	261.1
1978	171.9	190.3	210.7	119.9	265.2	260.9	248.4	271.6
1979	179.3	196.6	217.2	125.7	277.2	270.9	258.1	284.8
1980	183.7	203.5	224.0	125.6	289.3	284.1	267.9	297.3
1981	191.3	212.9	236.3	130.8	300.2	295.1	276.7	308.8
1982	198.8	219.7	242.0	137.4	310.0	305.3	282.1	320.0
1983	204.0	227.8	247.2	140.2	319.3	314.0	284.8	331.4
1984	207.5	234.6	250.6	141.2	326.3	324.9	287.5	338.6
1985	211.4	239.1	249.5	142.5	336.7	331.4	292.8	351.8
1986	216.5	257.1	262.0	143.1	343.1	332.5	299.6	359.6
1987	227.0	267.9	273.2	154.0	352.0	328.6	302.1	374.0
1988	233.5	273.8	268.8	160.2	362.5	332.1	311.1	387.0
1989	243.4	278.9	332.9	167.6	366.5	278.3	299.4	412.2
1990	253.6	283.0	342.8	178.0	379.1	286.2	302.7	429.1
1991	265.8	285.8	328.2	203.4	374.7	263.0	337.6	417.9
1992	264.1	283.2	284.4	209.3	368.2	254.0	314.4	417.2
1993	263.7	287.9	268.7	209.9	366.9	239.5	344.1	410.3
1994	260.3	260.6	254.1	206.4	379.5	243.5	369.4	421.3
1995	260.5	259.1	251.1	206.9	380.9			

Sources: CIS Komstat and USSR Goskomstat.

TABLE 3.2. BENCH-MARK GDP COMPOSITIONS

	GDP							
		Industry	Agriculture and forestry	Construc-tion	Services			
						Transport & commu-nications	Distribu-tion	Other
Uzbekistan (1990)	100.0	21.2	34.5	11.0	33.3	6.1	4.0	23.1
Kazakhstan (1993)	100.0	33.0	11.9	8.8	46.3	...	...	...
Kyrgyz Rep. (1990)	100.0	32.4	29.3	10.3	28.0	4.7	23.2	
Tajikistan (1990)	100.0	23.6	27.9	8.1	40.3	...	('other' is included) ...	...
Turkmenistan (1990)	100.0	16.5	32.2	13.3	38.0	...	...	...

Sources and *Notes*:

Uzbekistan (1990): Computed from gross value added (GVA) in World Bank (1993d, p.709).
Kazakhstan (1993): Figures of GVA in CIS Komstat, *Stastical Yearbook 1994*, p.23.
Kyrgyz Rep. (1990): Computed from GVA in World Bank (1993d, p.325).
Tajikistan (1990): Computed from GVA of World Bank DB (1996 version). The total of industry and construction GDP was distributed to industry and construction in proportion to respective sectoral GMP (material depreciation plus NMP produced). Sectoral GMPs were calculated from data of depreciation and NMP data in World Bank (1993d).
Turkmenistan (1990): The same sources and methodology as in Tajikistan (1990) were employed.

TABLE 3.3. AN ESTIMATE OF GROWTH OF GDP IN UZBEKISTAN

	Estimated GDP 1960=100	Estimated GDP 1990=100	Official GDP 1990=100	Estimated GDP growth rates (%)	Official GDP growth rates (%)
1960	100.0	26.8	...	...	...
1961	104.1	27.9	...	4.1	...
1962	107.6	28.8	...	3.4	...
1963	118.5	31.7	...	10.1	...
1964	122.9	32.9	...	3.7	...
1965	134.8	36.1	...	9.7	...
1966	143.2	38.3	...	6.2	...
1967	153.5	41.1	...	7.2	...
1968	160.1	42.9	...	4.3	...
1969	158.2	42.3	...	−1.2	...
1970	181.7	48.6	...	14.9	...
1971	188.6	50.5	...	3.8	...
1972	199.3	53.3	...	5.6	...
1973	212.4	56.8	...	6.6	...
1974	225.5	60.4	...	6.2	...
1975	232.0	62.1	...	2.9	...
1976	248.4	66.5	...	7.1	...
1977	260.9	69.8	...	5.0	...

	Estimated GDP 1960=100	Estimated GDP 1990=100	Official GDP 1990=100	Estimated GDP growth rates (%)	Official GDP growth rates (%)
1978	266.6	71.4	...	2.2	...
1979	278.6	74.6	...	4.5	...
1980	295.9	79.2	...	6.2	...
1981	303.3	81.2	...	2.5	...
1982	310.6	83.1	...	2.4	...
1983	323.7	86.6	...	4.2	...
1984	323.4	86.6	...	−0.1	...
1985	331.4	88.7	...	2.5	...
1986	334.1	89.4	...	0.8	...
1987	338.8	90.7	...	1.4	...
1988	357.9	95.8	...	5.6	...
1989	358.8	96.0	...	0.3	...
1990	373.6	100.0	100.0	4.1	...
1991	375.4	100.5	99.5	0.5	−0.5
1992	343.6	92.0	88.5	−8.5	−11.1
1993	334.1	89.4	86.3	−2.8	−2.4
1994	314.8	84.3	83.3	−5.8	−3.5
1995	...	...	82.5	...	−1.0

Sources: Own estimate and CIS Komstat, *Statistical Yearbook 1994*; *Statistics Bulletin*, 1996, No.2.

FIGURE 3.1. ESTIMATED GROWTH RATES OF GDP IN UZBEKISTAN

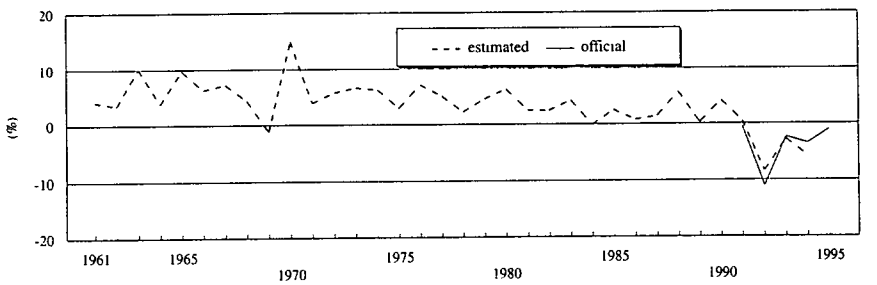


FIGURE 3.2. ESTIMATED GROWTH RATES OF GDP IN KAZAKHSTAN

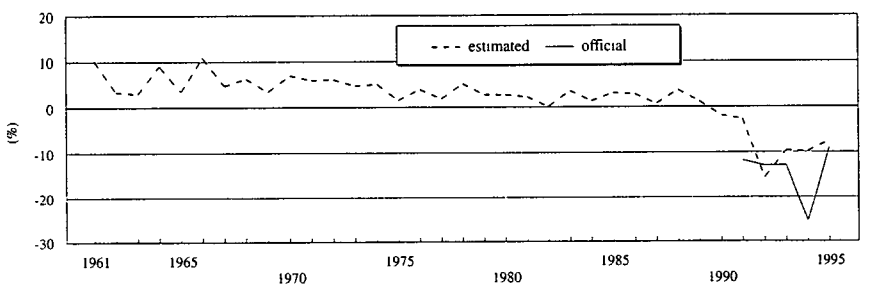


FIGURE 3.3. ESTIMATED GROWTH RATES OF GDP IN KYRGYZ REPUBLIC

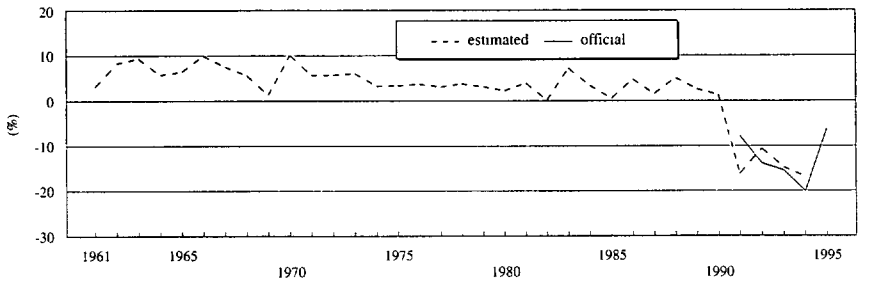


FIGURE 3.4. ESTIMATED GROWTH RATES OF GDP IN TAJIKISTAN

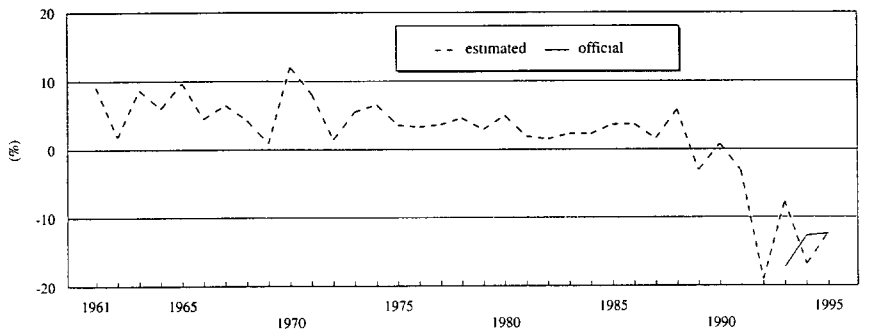
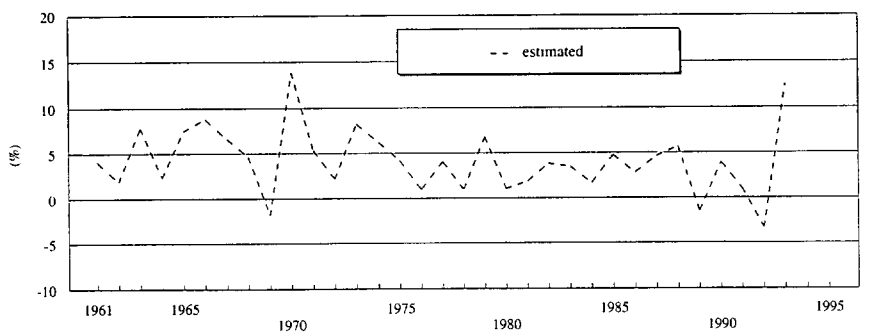


FIGURE 3.5. ESTIMATED GROWTH RATES OF GDP IN TURKMENISTAN



IV. *Concluding Remarks*

In this report I have presented the official data on national income in postwar Central Asia together with the official data on output and employment, which were needed to estimate real growth rates of national incomes and GDPs from the production side. I have also adopted a pioneering spirit in attempting to present the base-line estimates of growth of national income and GDP. Numerous tasks remain to be performed, including estimating growth from the expenditures side, perfecting the complete SNA of the Central Asian countries, and inquiring into the quality of the official output and employment data. However, it should be noted that further research on estimating national income and GDP statistics in Central Asia would require much toil and would also be accompanied by higher degrees of uncertainties in estimates.

Acknowledgment: The author thanks the staff of the CIS Komstat for their cooperation in preparing the official statistics for this work. The financial support of the Ministry of Education and Science (grant-in-aid for COE and basic study C) is also gratefully acknowledged.

HITOTSUBASHI UNIVERSITY

REFERENCES

Goskomstat RF and The World Bank (1995), *Russian Federation: Report on the National Accounts*, Moscow and Washington, D.C.

Kuboniwa, M. (1993), "Output and Price Structure of the Russian Economy ," *Economic Systems Research*, 5(2).

Kuboniwa, M. (1996), *National Income in Post-war Central Asia*, COE Discussion Paper (No. D96–6), IER Hitotsubashi University.

Odaka, K. (1996), "The Purpose of the Asian Historical Statistics Project," *Newsletter of the Asian Historical Statistics Project*, No.1.

The World Bank (1993a), *Uzbekistan: An Agenda for Economic Reform*, Washington, D.C.

The World Bank (1993b), *Kazakhstan: The Transition to a Market Economy*, Washington, D.C.

The World Bank (1993c), *Kyrgyztan: The Transition to a Market Economy*, Washington, D.C.

The World Bank (1993d), *Statistical Handbook 1993: States of the Former USSR*, Washington, D.C.

Treml, G.V. and Hardt, J.P ed. (1972), *Soviet Economic Statistics*, Durham.