

Capital Stock Conference
March 1997
Background paper

CONFERENCE ON MEASUREMENT OF CAPITAL STOCK

Canberra 10-14 March 1997

BACKGROUND PAPER

**Some Peculiarities of Capital Stock Reproduction in
Russia in 1993-1996**

SOME PECULIARITIES OF CAPITAL STOCK REPRODUCTION IN RUSSIA IN 1992-1996

In 1994-1995 the growth of the economic potential of the Russian Federation slowed down. The volumes of the capital stock in the most important branches of the economy by the beginning of 1996 were in comparable prices at approximately the same level where they were by the end of 1996, or somewhat below (see annex 1). On the whole, in 1991-1995 the volume of the capital stock in constant prices increased inconsiderably - only by 2.3 per cent (see annex 2). The share of the newly introduced stocks per annum in their total volume (the co-efficient of renewal) went down from 5 per cent in 1991 to 1.7 per cent in 1994 and to 1.9 per cent in 1996, and the share of the liquidated per annum stocks in their total volume (the co-efficient of liquidation) that was diminished from 2 per cent in 1991 to 1.1 per cent in 1992 afterwards increased up to 1.9 per cent in 1995 (see annexes 3 and 4).

According to the capital stocks revaluation data for the period of 1992-1996, the extent of the wear and tear continued to grow: from 46.7 to 47.8 per cent for the industrial enterprises and from 34.3 to 40.9 per cent for the agricultural enterprises; this tendency was felt still more distinct for the active part of the capital stocks - machinery, equipment, means of transport (see annex 5).

The high rate of inflation in 1991-1993 led to depreciation of amortization assets and actual discontinuation of the depreciation mechanism that should be the most important source of investment. Only the revaluation of capital stocks in 1992-1996 allowed in a certain degree to rectify the situation. The ratio of the depreciation levied on the main capital stocks to the gross domestic product diminished from 14.6 per cent in 1990 to 4.2 per cent in 1991 and to 1.3 per cent in 1992 and increased again to 9 per cent in 1995. The share of expenditure for depreciation of the capital stocks in the volume of industrial output changed from 10.2 per cent in 1990 to 9.7 per cent in 1993 and to 9.1 per cent in 1996; and in the expenditure for production it went down from 12 per cent to 0.9 per cent and to 10 per cent respectively (see annex 6).

It is necessary to pay attention to another very serious problem. It is known that the technical level and, accordingly, the effectiveness of production depends in many ways on the value and dynamics of the age characteristics of capital stocks and, first of all, their active part - machinery and equipment. Regrettably, the results of the complex elaboration of information accumulated over a lasting period and coming in recent years from different statistical sources put one very much on the alert, as they display signs of a sharp slowing down (or even cessation) of the process of renewal of capital stocks, especially after 1990.

Thus, the analysis of the age characteristics of the production equipment in the industry of the Russian Federation based on the data from 1970 through 1995 has shown the following:

1. Over the last 25 years, the dynamics of the age structure and the average age of the equipment pool has been formed in the following way:

Table 1

Age of industrial machinery and equipment: by age groups (percentage)

Years	Total	under 5	6 - 10	11 - 20	20+	Average age
1970	100	40.8	30.1	20.9	8.2	8.42
1975	100	37.5	29.7	23.8	9.0	37.5
1980	100	35.5	28.8	25.1	9.6	35.5
1985	100	33.1	28.2	25.8	12.9	33.1
1990	100	29.4	28.3	27.3	15.0	29.4
1991	100	26.6	28.8	28.5	16.1	26.6
1992	100	22.8	29.4	30.2	17.6	22.8
1993	100	19.0	29.5	32.3	19.2	19.0
1994	100	14.7	29.8	34.5	21.0	14.7
1995	100	10.0	29.8	37.0	23.2	10.0

During the period under review, the equipment pool on the whole in Russia's industry has increased 4.2 times. However, over the same years the volume of equipment in the age of up to 5 years has not practically changed, although in the age group of 11-20 years it has grown 7.4 times, and in the age group of over 20 years it has grown 11.8 times (out of which, over 40 years old- 20 times). As the result, the share of the new equipment aged under 5 years has decreased more than four (!) times - from 40.8 to 10 per cent, and the average age of the equipment on the whole for 25 years has grown almost twofold - from 8.42 to 14.25 years (the normative value of this indicator being under 7 years).

2. The unsatisfactory dynamics of the age structure of the equipment pool was formed mainly under the influence of two factors: the decrease in the rates of introduction of new equipment and the inadequate elimination of the obsolete equipment. Indicators showing this process are displayed in

Table 2**Renewal indicators of Industrial machinery and equipment**
(average annual values)

	Renewal rate*	Depreciation rate**
1966-70	11.60	2.73
1971-75	10.58	2.52
1976-80	9.81	2.40
1981-85	8.95	2.32
1986-90	7.80	3.09
1991	4.79	2.22
1992	3.31	1.61
1993	2.30	2.58
1994	1.53	3.51
1995	1.03	2.88

* Renewal rate is defined as the ratio of equipment installed to at the end of a year

** Depreciation rate is defined as the ratio of << insert text >>

The co-efficient of renewal for the period under review has sharply plunged down- more than tenfold (mainly, after 1990). As a consequence, the inflow of new equipment could not compensate for the natural ageing of the pool. Such negative changes, especially in the older age groups could have been balanced off by intensive outflow (elimination) of the obsolete equipment. However, until 1985, the absolute volumes of the outflow were small and decreased in relative terms as well. Although in 1986-1990 the values of the co-efficient of elimination were on the increase, this was not sufficient to suspend the growth of the average age of the pool.

Moreover, during the inflation period of the 90ies, as is seen from Table 2, the introduction of equipment decreased so sharply (in a comparable assessment) that, for the first time in the 50 years elapsed since the Patriotic War, the pool of production equipment discontinued its growth and started diminishing; having reached the maximum volume by the end of 1992, afterwards (when the elimination exceeded the inflow) it went down 4 per cent by the beginning of 1997.

3. An important age characteristic could be represented by the indicator of the average term of service, determined by a number of years to be served by the production equipment introduced in a given year, under the current procedure of equipment elimination.

The data in Table 3 below reflect the changes in the actual terms of service of equipment and their relation to the normative terms (calculated by depreciation deductions resulting in full renewal).

Table 3

Renewal indicators of Industrial machinery and equipment
(average annual values)

1970	25.01		2.73			16.55	
1975	26.75	3.08	2.52	0.83	+1.74	14.13	1.89
1980	28.13	2.73	2.40	0.88	+1.38	13.10	2.15
1985	29.20	2.55	2.32	0.95	+1.84	12.83	2.28
1990	27.36	2.65	3.09	1.16	-1.07	12.81	2.14
1995	28.26	2.80	2.56	0.91	+0.90	12.40	2.26

The change of the average term of service depends practically on the amount of elimination in every year (or in a five-year period), and more exactly, on the relation of elimination to such a rated (stabilising) volume of elimination that was necessary to maintain the term of service attained by the beginning of a given year (or a five-year period). As is seen from Table 3, in order to preserve in 1971-1975 the actual term of service of production equipment achieved by the beginning of 1971 (January 25) it was required to annually eliminate, during the indicated 5 years, an average 3.08 per cent available equipment. The actual co-efficient of elimination was equal to 2.52 per cent, that is, 0.82 of the required stabilising volume. In this connection, the term of service by the end of 1975 increased by 1.74 years and attained the level of 26.75 years, thus exceeding the norm 1.89 times. And in the next five-year periods (in 1976-1980 and in 1981-1985) the actual outflow (elimination) again did not reach (0.88 and 0.01) the stabilising values, and therefore the average actual term of service by the beginning of 1986 exceeded 29 years, that is, it became 2.28 times more than the norm (12.83 years).

Only in one five-year term (1986-1990), the average actual elimination (3.09 per cent) exceeded 1.17 times the stabilising volume (2.65 per cent). Owing to this, the average actual term of service diminished by 1.84 years, down to 27.36, but it still exceeded the norm more than twofold.

Over the latest five-year period (1991-1995), the average actual term of service started to grow, and by the beginning of 1997, judging by preliminary data, no improvement occurred in the situation under review.

The continuing, regrettably, intensive ageing of the pool of production equipment in Russia's industry at present, possibly, is not so perceptible in the real conditions of reduced volumes of industrial production. However, with the beginning of the production growth, there will be urgently needed huge multi-billion investmen for restoration of the required technical potential in industry.

Appendix 1

Fixed assets value: by industries

(at fixed 1990 prices; as to the end of a year; milliard rubles)

	1991	1992	1993	1994	1995
Fixed assets, total	1,991	2,028	2,039	2,033	2,036
<i>including:</i>					
fixed assets of industries					
producing commodities	982	1,000	1,001	982	973
<i>out of which:</i>					
industry	675	687	692	693	694
agriculture	228	229	226	207	199
construction	75	78	78	77	75
fixed assets of industries					
rendering services	1,009	1,028	1,038	1,051	1,063
<i>out of which:</i>					
transport and communications	286	295	293	294	295
trade (incl. wholesale, retail and foreign trade) and catering	57	57	58	57	58
housing	386	375	385	389	389
public utilities and personal services	89	90	91	91	91
healthcare, fitness, social welfare, education, culture and art	152	150	149	128	126

Appendix 2

Fixed assets value indices: by industries

(at fixed prices; in per cent to previous year)

	1991	1992	1993	1994	1995	1995 in % to 1991
Fixed assets, total	103.4	101.9	100.5	99.7	100.2	102.3
<i>including:</i>						
fixed assets of industries producing commodities	103.8	101.8	101.1	99.0	99.1	99.1
<i>out of which:</i>						
industry	104.0	101.9	100.7	100.1	100.1	102.8
agriculture	102.9	101.1	98.4	95.6	96.0	87.6
construction	105.3	103.3	99.8	98.7	98.3	101.1
fixed assets of industries rendering services	103.0	102.0	101.0	100.4	101.1	105.5
<i>out of which:</i>						
transport and communications	102.6	101.9	100.5	100.3	100.3	103.1
trade (incl. wholesale, retail and foreign trade) and catering	102.2	101.0	100.5	99.5	100.6	101.6
housing	104.0	102.0	102.5	101.1	102.4	108.3
public utilities and personal services	107.4	101.4	100.1	100.2	101.2	102.9
healthcare, fitness, social welfare, education, culture and art	100.5	98.5	99.3	86.1	98.2	82.8

Appendix 3

Fixed assets renewal rates: by industries (at fixed prices; percentage)

	1991	1992	1993	1994	1995
Fixed assets, total	5.0	3.2	2.1	1.7	1.9
<i>including:</i>					
fixed assets of industries producing commodities	5.7	3.1	1.7	1.6	1.5
<i>out of which:</i>					
industry	5.2	2.8	1.8	1.7	1.6
agriculture*	5.9	3.1	1.1	0.8	0.6
construction	9.3	5.4	3.0	2.7	2.1
fixed assets of industries rendering services	4.5	3.3	2.5	1.9	2.3
<i>out of which:</i>					
transport and communications	4.2	2.6	1.3	1.6	1.5
trade (incl. wholesale, retail and foreign trade) and catering	6.4	5.1	2.5	2.3	3.2
housing	4.0	2.9	3.4	3.1	3.2
public utilities and personal services	2.9	2.0	1.2	0.4	1.6
healthcare, fitness, social welfare, education, culture and art	6.3	4.6	2.9	0.5	1.5

* excluding value of cattle

Annex 4

Coefficients of removal of fixed assets
(in constant prices; excluding the value of livestock; in per cent)

	1991	1992	1993	1994	1995
Total fixed assets including:	1.6	1.1	1.4	1.7	1.6
fixed assets of good-producing branches of them:	2.0	1.1	1.3	2.2	1.9
industry	1.5	0.8	1.0	1.8	1.5
agriculture	2.8	1.5	1.8	2.9	2.8
construction	4.7	2.1	2.6	4.0	3.8
fixed assets market & non market services rendering branches of them:	1.2	1.2	1.5	1.1	1.1
transport and communications	1.2	0.7	0.7	1.5	1.2
trade (wholesale, including trade by production assets, retail trade, foreign trade) & public catering	2.4	1.3	1.9	2.7	2.7
housing	0.7	0.9	1.0	1.2	0.8
communal, public utilities, and non-production domestic services rendered to households	0.9	0.7	1.1	0.3	0.8
health care, physical culture, social security, education, culture and art	1.4	2.4	3.4	0.5	1.6

Degree of wear and tear of fixed assets by basic types of activity

	in per cent			
	as of 1 st June 1992	as of 1 st January 1994	as of 1 st January 1995	as of 1 st January 1996
Industrial enterprises - total	46.7	46.4	45.8	47.8
including:				
buildings, construction and transmission devices	34.0	37.9	39.0	40.5
of them:				
buildings	28.8	28.7	30.1
construction	37.1	...	46.8	48.8
transmission devices	48.7	...	51.6	52.9
machines and equipment	55.6	61.0	62.1	63.7
means of transport	42.9	44.0	47.6	48.5
Agricultural enterprises (farms) - total	34.3	34.3	37.4	40.9
including:				
building, construction and transmission devices	31.5	33.5	35.8	38.8
of them:				
buildings	30.9	...	34.7	37.3
constructions	32.1	...	37.4	41.1
transmission devices	37.7	...	40.7	44.2
machines and equipment	44.6	46.0	50.5	55.6
means of transport	44.0	39.9	45.6	49.6
Construction organizations - total	40.2	36.1	36.3	36.8
including:				
buildings, constructions and transmission devices	28.4	24.2	27.8	26.8
of them:				
buildings	29.5	...	28.8	31.1
constructions	26.3	...	26.0	22.5
transmission devices	41.1	...	46.8	47.9
machines and equipment	54.0	58.0	59.1	61.7
means of transport	46.2	42.5	48.0	49.6
Transport organizations - total	40.6	43.0	41.0	40.6
including:				
buildings, construction and transmission devices	33.4	36.0	36.6	35.1
of them:				
buildings	30.1	...	32.9	33.7
constructions	32.9	...	36.1	33.9

transmission devices	46.9	...	49.4	51.3
machines and equipment	54.4	62.5	59.9	62.4
means of transport	42.1	43.3	42.3	44.1
Trade enterprises and enterprises of public catering-total	39.0	33.0	32.1	34.1
including:				
buildings, constructions and transmission devices	35.6	31.6	30.9	33.1
of them:				
buildings	35.3	...	30.9	32.7
constructions	42.2	...	34.2	39.7
transmission devices	46.1	...	42.2	46.3
machines and equipment	51.9	45.2	41.8	40.1
means of transport	35.5	31.2	31.4	34.1

Annex 6

Costs share for depreciation of fixed assets by basic activity

Indicator	1990	1991	1992	1993	1994	1995	1996*
Cost share for depreciation of fixed assets in volume of products (works, services)							
Industry - total	10.22	2.43	1.84	0.67	5.23	5.32	9.10
of them:							
Electric power industry	22.78	4.16	3.29	0.73	4.98	4.80	9.32
Fuel industry	21.86	6.57	2.44	1.05	9.67	10.46	13.98
including:							
oil extracting	40.59	13.57	4.08	1.97	18.14	17	17.87
oil refining	7.11	1.32	0.37	0.13	1.30	1.57	3.50
gas	17.59	6.18	5.02	1.74	10.33	14.25	26.17
Chemical and petrochemical industry	12.69	3.14	2.03	0.79	5.50	5.30	8.45
including							
chemical	14.03	3.47	2.62	0.96	6.17	6.22	10.03
Machine-building	9.25	2.42	1.92	0.74	5.20	4.62	8.73
Building materials industry	14.60	2.99	2.74	0.82	4.88	4.97	8.54
Light industry	2.85	0.57	1.03	0.39	4.33	4.77	9.84
Cost share for depreciation of fixed assets in costs of production							
Industry - total	12.05	3.00	2.59	0.89	6.19	6.36	9.88
of them:							
Electric power industry	27.24	5.18	4.07	0.92	5.98	5.71	10.3
Fuel industry	26.34	7.9	3.44	1.25	10.4	12.6	15.65
including:							
oil extraction	46.69	15.55	6.08	2.34	18.65	21.13	21.36
oil refining	8.01	1.46	0.51	0.16	1.53	1.96	4.05
gas	29.15	8.53	6.9	2.2	12.53	16.5	25.9
Chemical and petrochemical industry	14.99	3.92	3.17	1.09	6.94	6.42	8.88
including:							
chemical	16.31	4.32	4.1	1.38	7.79	7.43	10.46
Machine-building	10.96	2.91	2.77	1.05	6.27	5.46	9.44
Building materials industry	16.41	3.72	3.39	1.08	5.73	5.74	9.2
Light industry	3.34	0.73	1.44	0.53	4.98	5.47	9.44

* Data on January-September 1996, the totals in a year as a whole will be in July 1997

Relation of charged depreciation to GDP (in per cent)

Years	Fixed assets - total	including: industrial fixed assets
1990	18.2	14.6
1991	5.1	4.2
1992	9.6	8.7
1993	1.6	1.3
1994	8.8	7.5
1995	11.2	9.0