Agricultural Investment Analysis using Input-Output Tables

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Abstract

The situation in Russian agricultural investment is difficult. We do not have enough money, but some officials believe that the agricultural investment is sufficient for this time. To analyze investment impact on Russian economy we use Input-Output tables (1995-2000). Agricultural direct input coefficients are stable and it means that agricultural technology does not change. Thus we need to invest more carefully and distribute money to real agribusinesses to change technology.

Media summary

By using Input-Output tables it is possible to analyze agricultural investment impact on Russian economy.

Key Words

Leontief model, agricultural direct input coefficients

Introduction

In the time since the breakup of the Soviet Union, Russia has been evolving into a free society, a free market economy. Along the way Russia has made many difficult choices, and changed fundamentally the way it relates both to her own citizens and to the rest of the world. These changes are positive.

We are seeing the beginning of private ownership of agricultural land. We are seeing private investment in food processing, and even in higher education. Perhaps more important, we are seeing the beginnings of debate over the direction of Russia's national agricultural policy. There are multiple farm bills in the Russian Parliament, and the debate within the agricultural community over what Russian agriculture should look like in the 21st century.

There are endless economic policy questions demanding answers today in Russian agriculture. How much machinery does Russian agriculture need? The combine park is down to a little over 80,000 combines today, compared to over five times that number a couple of decades ago. What is the optimal number, what is the optimal ownership model, and how do farmers know how much equipment they need? It is possible to answer these questions using the Input-Output tables.

Standard Leontief model and its implementations to different spheres of economy (definitions and formulas of calculations) are well known all over the world, but the paradox is that these notions are very little known in Russia.

Work carried out of State Committee of the Russian Federation on Statistics by construction of Input-Output tables (IOT) of Russia for 1995 was presented on XII International Conference on Input-Output Techniques in New York 1998 [2]. The recommendations of SNA'93 UN [3] were used as methodological principles of Russian Input-Output tables. Methodical features of some analysis are interpreted in [1].

The Input-Output System of Russia includes two symmetric Input-Output tables (product-byproduct, at basic and purchasers' prices), Supply table and the whole complex of matrixes, used for transition from purchasers' prices to basic prices. Working level of aggregation of the Input-Output System for 1995-2000 has 205 products, including 22 market services and 8 non-market services. In this paper the empirical

estimations are based on aggregated IOT at purchasers' prices, which include 22 sectors, seven final demand categories and six elements of value added.

Analysis of agricultural direct input coefficients

There is the feature of direct requirements estimations in the Input-Output analysis practice of Russia. The direct input requirements are calculating by IOT at purchasers' prices, moreover in this case purchasers' prices includes double account of margins: besides margins, included in inputs of goods, are added the realization margins on corresponding domestic products by transport and trade rows. It means that intermediate inputs and outputs include trade and transport margins consumed in amount of inputs on production and margins related with realization of goods to consumers.

Agricultural direct input coefficients are shown below (Table 1).

Table 1. Agricultural direct input coefficients, rubles

Products	1998	1999	2000
1. Electricity	20,80	10,51	10,02
2. Fuel	25,29	24,94	32,28
3. Coal	1,43	1,10	0,91
4. Other fuel industries	0,29	0,22	0,16
5. Ferrous metallurgy	0,26	0,22	0,33
6. Non-ferrous metallurgy	0,00	0,00	0,00
7. Chemical and petrochemical industry	19,28	19,31	17,68
8. Machine building and metalworking industry (incl. repairs)	42,11	38,49	37,37
9. Timber, woodworking, pulp and paper industry	1,31	0,99	0,88
10. Building and construction materials	3,36	2,42	2,08
11. Light industry	1,42	1,25	1,25
12. Food industry	37,44	30,73	27,81
13. Other industries	32,76	34,70	35,50

	1998	1999	2000
14. Construction	5,08	4,19	4,58
15. Agriculture and forestry	280,86	242,72	220,56
16. Transport and communication services	29,91	22,68	20,94
17. Trade, intermediation and restaurant services	40,11	33,77	37,76
18. Other activity of goods and services productions	0,46	0,29	0,44
19. Housing, communal and households services	2,33	0,97	1,21
20. Education, health care, culture, art	0,12	0,10	0,05
21. Science and scientific services	2,15	0,06	0,14
22. Administration, finances, credits, insurance, services of membership organization	0,31	0,77	0,88
Total	547,09	470,42	457,71

The weight of all coefficients are shown below (Table 2).

Table 2. The weight of agricultural direct input coefficients, %

Products	1998	1999	2000
1. Electricity	3,80	2,33	2,19
2. Fuel	4,67	5,3	7,05
3. Coal	0,28	0,23	0,19
4. Other fuel industries	0,50	0,05	0,03
5. Ferrous metallurgy	0,50	0,05	0,07
6. Non-ferrous metallurgy	0	0	0
7. Chemical and petrochemical industry	0,03	4,1	3,86

8. Machine building and metalworking industry (incl. repairs)	7,69	8,2	8,16
9. Timber, woodworking, pulp and paper industry	0,24	0,21	0,19
10. Building and construction materials	0,61	0,51	0,45
11. Light industry	0,26	0,26	0,27
12. Food industry	6,84	6,53	6,07
13. Other industries	5,99	7,37	7,75
14. Construction	0,93	0,89	1,00
15. Agriculture and forestry	51,33	51,59	48,18
16. Transport and communication services	5,47	4,82	4,57
17. Trade, intermediation and restaurant services	7,33	7,17	8,24
18. Other activity of goods and services productions	0,08	0,06	0,09
19. Housing, communal and households services	0,42	0,20	0,26
20. Education, health care, culture, art	0,02	0,02	0,01
21. Science and scientific services	0,39	0,01	0,03
22. Administration, finances, credits, insurance, services of membership organization	0,06	0,16	0,19
Total	100	100	100

The most significant coefficients are: Agriculture and forestry (in 1999 – 51,59%; in 2000 - 48,18%); Transport and communication services (in 1999 – 4,82%; in 2000 - 4,57%); Trade, intermediation and restaurant services (in 1999 – 7,17%; in 2000 - 8,24%); Food industry (in 1999 – 6,53%; in 2000 - 6,07%); Electricity (in 1999 – 2,33%; in 2000 - 2,19%); Fuel (in 1999 – 5,3%; in 2000 - 7,05%); Machine building and metalworking industry (in 1999 – 8,2%; in 2000 - 8,16%).

Conclusions

If we analyze the previous three years (from 1995), we can see that all the agricultural direct input coefficients are stable, without any significant changes. Unfortunately, we do not have more data. It is necessary to mention that stability of direct input coefficients is a sign that technology is the same. It does not change. The agricultural investment could not change the situation. Russian officials say that we need more and more investments, but we need to know how to use them. We need to concentrate the agricultural investments to change technology. Hence the primary task of agricultural policy is changing technology.

References

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