Yugoslavic Agricultural Development Policy:
A Comparative Historical Analysis of Aggregate, Social Farm, and Private Farm Productivity

By

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Abstract

This paper examines the effects of this policy shift on Yugoslavic

agricultural Development. During 1955-67 Yugoslavia invested heavily in

human capital and physical capital in the social farming sector. However,

during 1968-83, a shift in policy brought about a decline in the level of

physical investment on the social farms leaving the human capital with

little to work with.

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Introduction

There exits much published research on the relationship between
agricultural productivity and basic inputs for western world countries for
which ample primary data is available. However for countries in the mixed
economies, such as Yugoslavia, less is known. This is due to many factors,
not the least of which is a lack of reliable data. More importantly not
much is known about the relationship between agricultural productivity and
the changing investment and basic resource allocation strategies of such
mixed economies.

The purpose of this paper is to present an evaluation of the development
of the Yugoslav agricultural base over the time period 1955 to 1983. This
research will provide estimates of the impact of investment and labor use
on Yugoslav agricultural productivity. The analyses considers Yugoslav
agriculture in aggregate, and traces the relative productivity of the
social cooperative farms and the privatized farms.[1] The analysis
considers the time period 1955-1983 and two sub-periods - 1955-1967 and
1968-1983. The early period 55-67 represents a time of rapidly increasing
gross investment and labor in the social cooperative sector. The second
period 68-83 represents a stronger orientation toward private sector
agriculture in Yugoslav. In particular, the later period makes a
substantial shift in gross investment toward the private sector at a time

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[1] Private farming agriculture accounts for approximately 56% of total
marketed agricultural output. This has decline from 68% over the
last 30 years.

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when the skilled human capital has been invested in the social cooperative farm sector. The result is a lack of capital investment in the sector most responsible for productive growth in Yugoslavic agriculture and an excess of capital in the least productive farming sector.

The research is based on recently published data (Tomic',1987). The recent availability of this data provides the necessary detail with which to provide a reliable analysis of Yugoslav agricultural productivity and basic input use. The paper is structured along the following lines. First a brief historical review of Yugoslavic agricultural development policy over the period 1955 through 1983 is presented. Next, the relationship between labor and investment inputs and agricultural output is explored using a simple logarithmic production function is presented. This analysis estimates simple output elasticities for Yugoslav agriculture in total, and for the social cooperative farms and the private farm sectors. In the final section policy conclusions are drawn and final remarks presented.

Development Strategy of Agriculture in Yugoslavia

After World War II, the level of the economic development in Yugoslavia was low. The main aim of government economic policy was industrialization. This industrialization policy was adopted as a method to achieve quicker economic development. The agricultural sector represented a source of value added to be utilized in the process of industrial development. This was accomplished by means of low agricultural prices of agricultural products, high prices for raw materials for agricultural production, agricultural tax policy, etc.

During the period of 1945 to 1952, the concept of state collectivization, similar to the process in the Soviet Union, was adopted as the method of the agricultural development and was widely practiced.

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This method was soon discarded and the original concept of the agricultural social cooperative was formed. This concept embodied the ideology that the social cooperative sector would function as the nucleus for increased agricultural productivity in Yugoslavia. Along with this was the belief that there would occur a gradual socialization of the means of production, labor, and land of the private farms. This concept was created and implemented between 1953-1959 and is the official concept of agriculture development in Yugoslavia today.

In the period of 1946-1956, the rate of growth of the agricultural production was very slow (1.5%).[2] In that period, industrial development was dynamic. The number of total and urban population, personal income per capita, demand consumption for the agricultural-food products were increasing faster than agricultural production. Agricultural imports were growing and the exportable surplus declining. For example, 1955 and 1956, agricultural imports equaled 421 mil.(3 dinar = 1 $USA). while exports totaled 223 mil. din.[3] The consequence of this agricultural trade imbalance was a stagnation of the Yugoslav economic development.

The turning point in the process of Yugoslav agricultural development started when the Resolution of the Federal People's Parliament (1957) and the Programme of the Yugoslav League of Communists (1958) were passed. After 1957 the process of modernization of the social cooperative sector started with increased capital and labor investment.

In particular, the number of educated or trained laborers entering the social cooperative sector increase significantly during the period 1957 –

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[2] Dr. D. Tomic'. Jugoslovenska Agrarna Teorija i Politika, Centar za kulturu, obrazovanje i informisanje, Backa, Topola, 1985, p. 37.

[3] Source: S G. J. Beograd, 1963, p. 216. $ USA = 3,00 din

1965. After some downward adjustment in the period 1965-68, the trend continued upward from 1968-83. At the same time the level of human capital entering the private farming sector declined steadily over the entire historical period.

In general the index of physical agricultural productivity increased by about three times over the 1947-1983, which implies an average aggregate rate of growth of 3.15%, social cooperative farms rate of growth of 8.44%, and individual farms 1.8%.[4](1954-1983).

Cultivable land in Yugoslav agriculture increased during the subperiod 1946-1964 at an average rate of growth of 0.53%. During the period 1965-1983 cultivated land experienced a decline of 0.21%. Cultivated land held by the social cooperative sector, increased 2.55%[5] during the period 1955-83 while the cultivated land base for private farms declined over this same period.

Total agricultural population has declined, at an average rate of 2.55% (period 1948-1981)[6] and the number of permanently employed in the social cooperative sector has increased, in the period 1954-1983, an average annual rate (8.46%)[7]

Gross investments in total agriculture has increased, at an average annual rate of 4.55% and in the social cooperative farms 3.91%, while in the private one 5.72%[8] Technical and technological progress began more to

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[4] D. Tomic', K. Cobanovic, Dj Kukic' Trendovi Razvoja Jugoslovenske poljogrivrede, Privredni Pregled, Beograd, 1987, p. 195.

[5] D. Tomic and Assoc. Op. cit. p. 22 u 23.

[6] D Tomic and Assoc., Op. cit, p. 14.

[7] D. Tomic and Assoc. Op. cit. p. 23.

[8] D. Tomic and Assoc. Op. cit. p. 196.

apply to the social farms after 1955. This same statement cannot be made for the private farm sector. Technical progress does not seem to have been effective in the private farming sector. This increase in gross investment signaled a shift from labor intensive to more capital intensive agriculture in Yugoslavia. However, as we shall see, there does not appear to be a rational policy guiding the allocation of investment funds.

Economic analysis of Agricultural Productivity

The economic relationship between Yugoslav agricultural productivity and available measures of productive inputs can be addressed by consideration of a simple logarithmic output function.[9] The factor/product relationships are estimated for i) aggregate agricultural output YTA, ii) social farm output YSF, and iii) private farm output YPF. The dependent variable is the index of physical productivity per hectare for each enterprise type. The independent variables are i) the quantity of agricultural labor (LABOR), ii) the value of gross investment (G-INVST) in constant units of currency, and iii) a linear time trend to capture technical change (TECH). Each variable being defined relative to the sector under consideration and on a per hectare basis. The estimated production functions are given in Table 1. These relationships are shown graphically in Figures 1 - 5. An evaluation of the estimated output elasticities along with visual inspection of the graphs helps provide substantial insight into the past and current state of Yugoslavic agricultural development.

The estimated parameters are the direct elasticities of each sectors output with respect to each independent variable. What can be noticed from the basic estimated relationships depicted in Table 1. and the general

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[9] More complex models are difficult to implement because of the lack of necessary data. The models presented here will serve to identify the required factor/product relationships.

trends depicted in Figures 1 - 5?

Focusing first on output per hectare, Figure 1, it is apparent that the most rapidly growing sector over the entire period is the social cooperative sector. Growth of total agriculture and the private farm sector is positive relative to 1955, but not as nearly pronounced as that which occurred in the social sector.

It is apparent that the relationship between the level of agricultural labor and agricultural productivity is positive and significant in Yugoslavic agricultural in aggregate, and on the social farms, over the period 1955-1983. There does appear to be a substantial increase in labor productivity for the social farm sector 1968-83 relative to 1955-67. This reflects a combined response to three factors significant in Yugoslav agricultural development policy.

First, there was a general neglect for the position of agricultural development in the general economic development scheme in Yugoslavia (Tomic',1985). Second, during this period, there existed a general decline in the overall economic condition within Yugoslavia (Tomic',1985). Third, there was a slowing down of the diffusion of new technology into the agricultural sector in general(Tomic',1985).

TABLE 1: Estimated Relationship between Yugoslav Agricultural Productivity,
Investment, Labor and Technology

	TOTAL PERIOD 1955 - 1983 Index of Agricultural Output			SUBPERIOD 1 1955 - 1967 Index of Agricultural Output			SUBPERIOD 2 1968 - 1983 Index of Agricultural Output		
	Total Agric. YTA	Social Farms YSF	Private Farms YPF	Total Agric. YTA	Social Farms YSF	Private Farms YPF	Total Agric. YTA	Social Farms YSF	Private Farms YPF
Variables									
constant	-4.66	-1.01	-4.67	-5.29	-2.74	-4.03	-4.4	0.31	-4.23
	-80.22	-6.44	-23.48	-38.34	-4.65	-18.71	-12.21	0.44	-7.45
LABOR	0.36	0.3	0.11	8.5	0.065	-1.58	0.011	0.63	-0.21
	4.39	8.88	0.97	4.8	0.77	-0.71	0.049	2.86	-0.65
G-INVST	0.18	-0.132	0.02	0.3	0.31	0.26	0.14	-0.15	0.057
	4.85	-2.5	0.3	8.73	2.26	2.26	2.01	-1.05	0.92
TECH (T)	0.31	0.4	0.02	0.14	0.081	0.013	0.015	0.026	0.0048
	13.03	19.12	4.83	6.03	5.37	0.81	1.03	4.93	0.22
ADJ-R2	0.95	0.95	0.85	0.95	0.92	0.81	0.92	0.91	0.84
D/W	1.75	1.92	1.93	2.5	1.18	1.89	1.53	1.89	1.26

** All data are specified in logarithms, parameters are
estimated factor elasticities.

— "t" Statistics given directly below parameter estimates

FIGURE 1: Productivity per Hectare
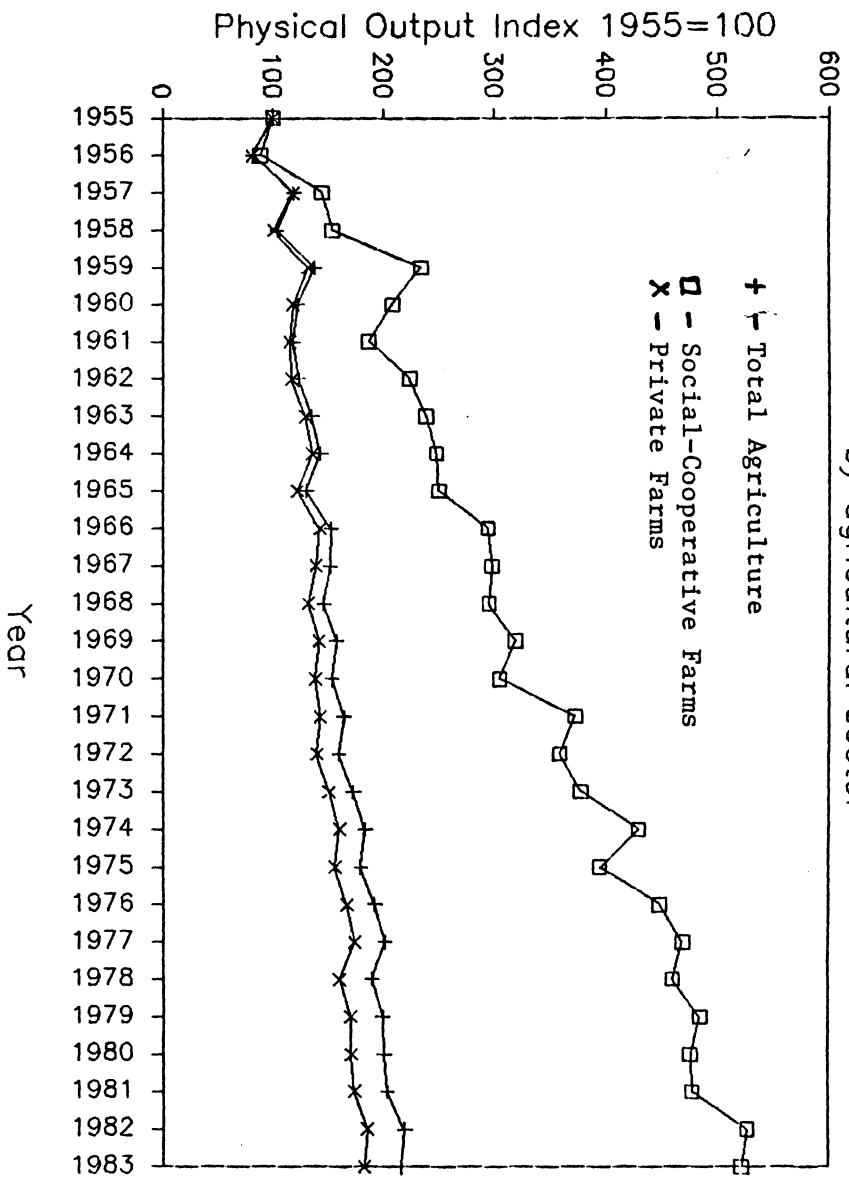by agricultural sector

Physical Output Index 1955=100

+ — Total Agriculture
□ — Social-Cooperative Farms
✗ — Private Farms

Year

FIGURE 2: Labor per Hectare
by agricultural sector

Labor Input Index 1955=100

+ — Total Agriculture
□ — Social-Cooperative Farms
✗ — Private Farms

Year
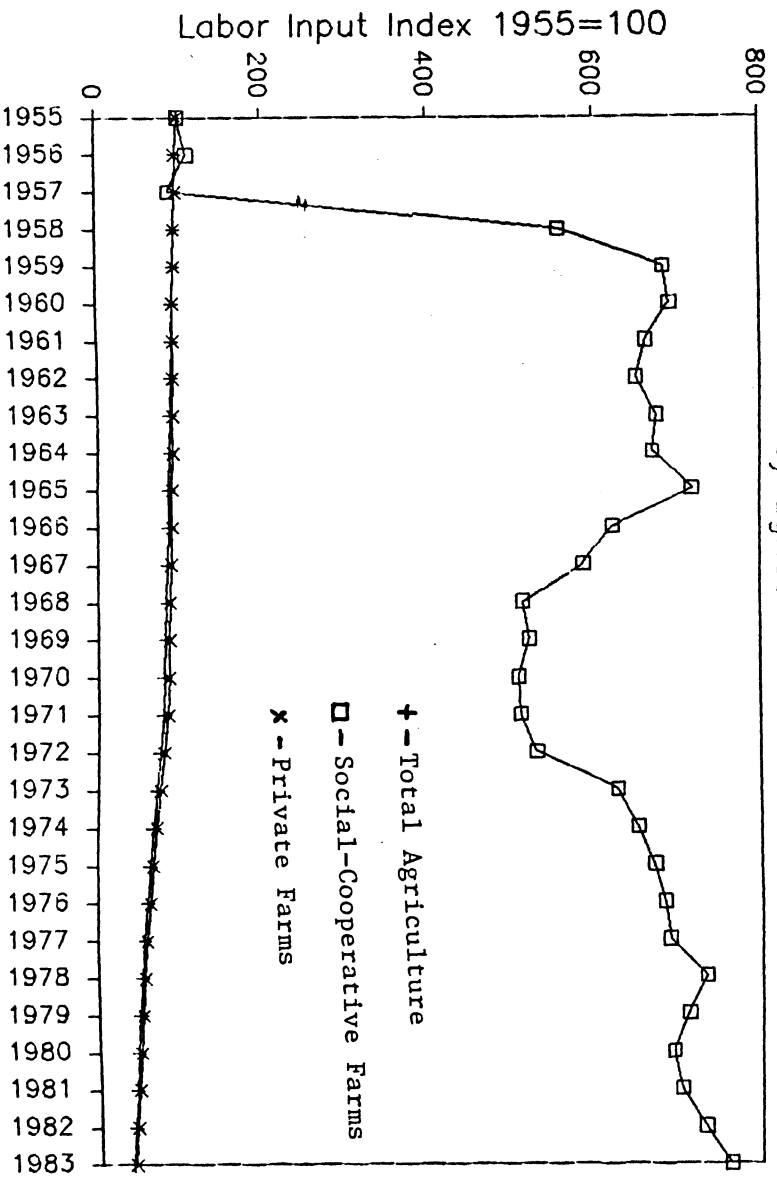
FIGURE 3: Gross Investment per Hectare
by agricultural sector

+ – Total Agriculture
□ – Social-Cooperative Farms
✗ – Private Farms

Investment Index 1955=100
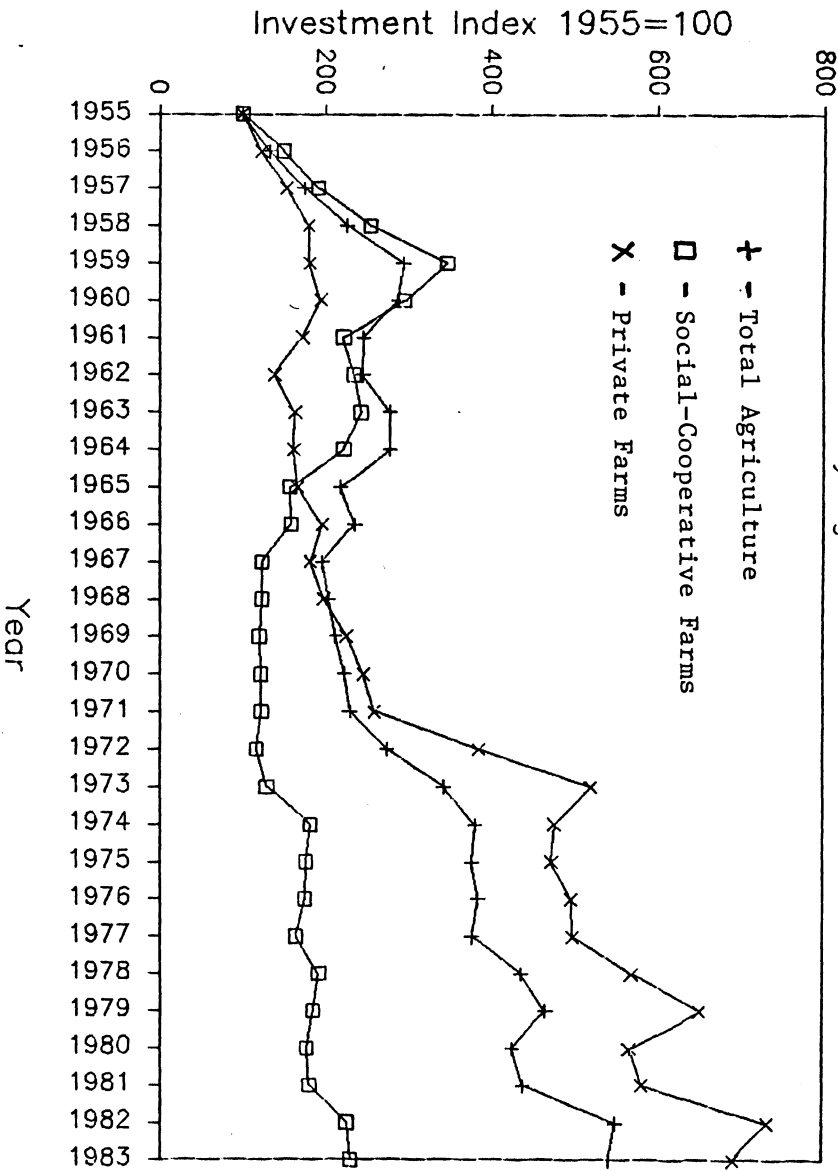
FIGURE 4: Investment per Labor Unit
by agricultural sector

+ – Total Agriculture
□ – Social Cooperative Farms
✗ – Private Farms

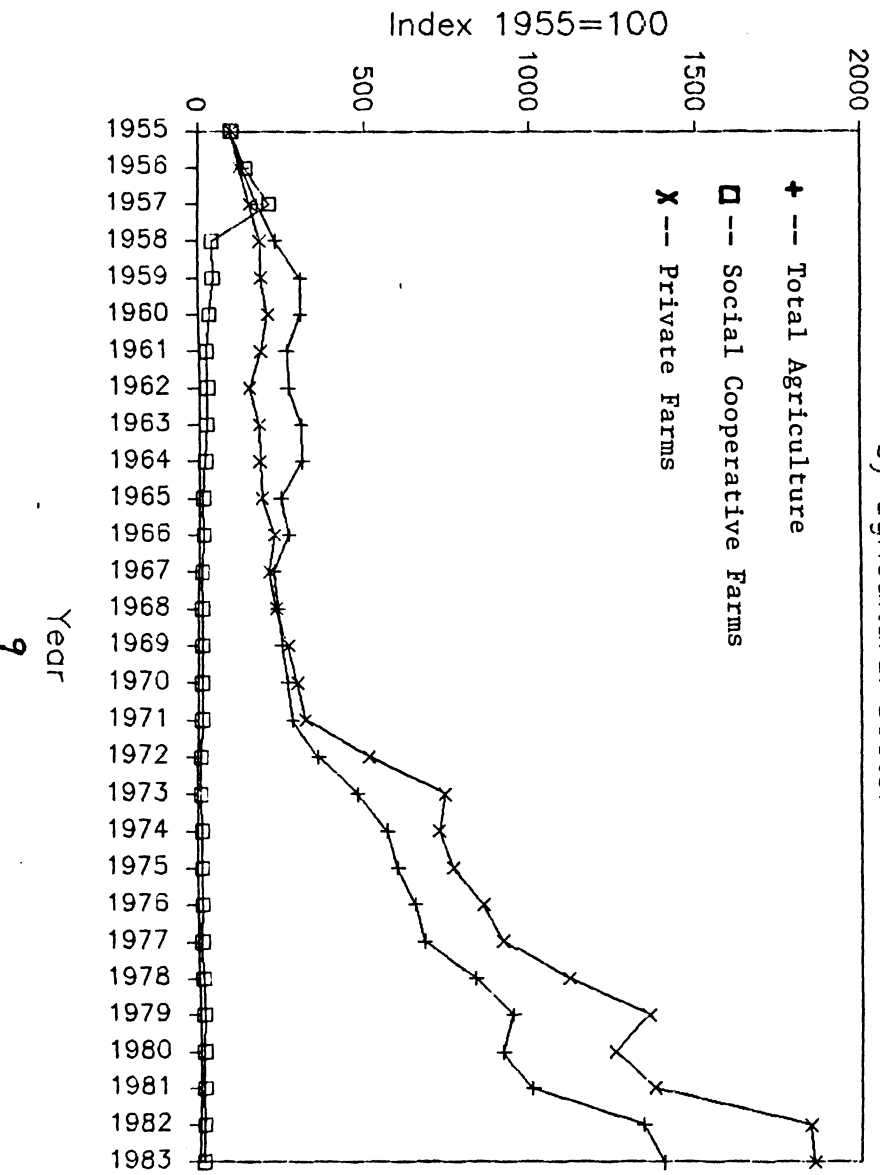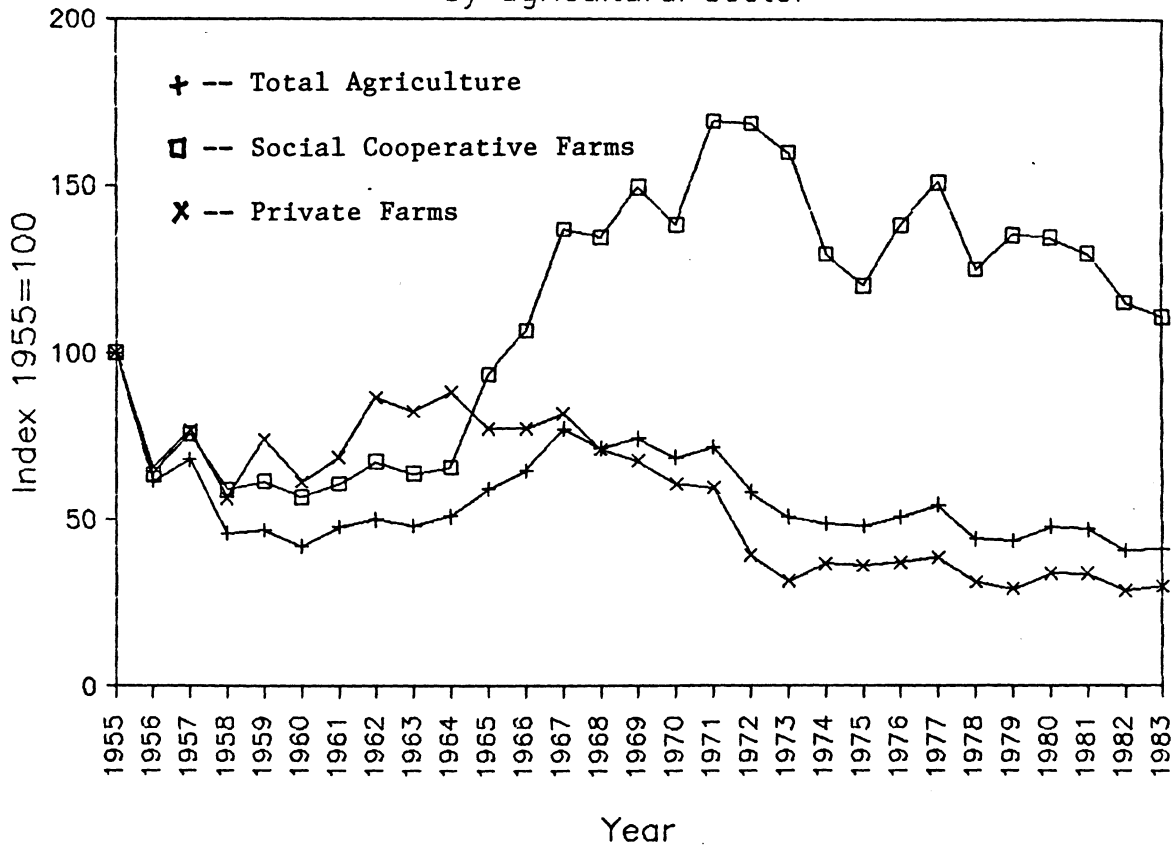Index 1955=100

Year

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Figure 5: Physical Output per Labor
by agricultural sector

The impact of gross investment on Yugoslavic agricultural productivity appears positive and significant in the aggregate, Figures 3 and 4. The estimated elasticity is +0.18 for this period. However, when considering this on an enterprise basis the picture is somewhat different. While agricultural investment on social farms has a significant positive effect on output per hectare during the 1955-67 period, it appears that this investment has become less productive during the later years 1968-83. Private farm investment is effective in the 1955-67 period, but much less so in the later period.

The behavior of the estimated elasticity of technical change may provide

additional insight as to the declining productivity of agricultural investment in Yugoslavia over the period 1955-83. This elasticity declines from +0.14 in the period 1955-67 to +0.015 during 1968-83. This decline in technical advance is apparent for the social farms as well, declining from +0.081 to +0.026. Private farms appear to have experienced little or no technical advance during the entire period even though this sector now receives a disproportionately large share of the physical capital investment!

Concluding Remarks

What conclusions can be drawn from the estimated labor and investment elasticities and an inspection of Figures 2 through 5? It seems reasonable the conclude that during the period 1955-67 Yugoslavia invested heavily in both human capital and physical capital in the social cooperative farming sector. However, during the period 1968-83, a shift in policy brought about a dramatic decline in the level of physical investment in the social cooperative sector leaving the human capital with little to work with. The concomitant rise in investment in the private farming sector coupled with a low level of human capital did not bring about sufficient agricultural productivity and Yugoslavic agricultural development stalled. This point is made clearly evident in Figure 5.

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