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Summary

The United States agricultural plant—i.e. land and buildings, implements and machinery, livestock, and crop inventories, valued at 1910–1914 prices—increased by 172 per cent in the eighty years between 1870 and 1950. But the rate of increase was far from uniform. The first fifty years, roughly speaking, were a period of sustained and rapid expansion, while the next thirty witnessed a more moderate rate of growth and some periods of shrinkage (Chart 1). The average annual increase from 1870 to 1920 was 3.0 per cent, while from 1920 to 1950 it was only .26 per cent.¹

In the fifty years after 1870 settlement pushed steadily westward, and the lengthening railway network brought vast new land areas within easy reach of produce markets. In this period, despite falling agricultural prices until around 1900, farm acreage, the number of farms, the number of farm workers (until 1910) and physical farm assets all grew rapidly. During the early 1920's, and again in the early 1930's, both periods of deflation, physical capital used in farming decreased slightly, but during the 1940's the wartime and postwar demand for agricultural products stimulated another wave of expansion.

The composition of physical farm capital changed in some significant ways over the eighty-year period. Most noteworthy was the rising share of investment in machinery in relation to the total, from 3 per cent in 1870 to 12 per cent in 1950 (based on values in current prices). In this period the share of land and buildings, valued on the same basis, decreased from 78 to 70 per cent of the total. Horses and mules accounted for .5 per cent of the whole in

¹ The year 1920 should be regarded as a convenient vantage point for observing the two major phases of agricultural growth, not of course as an exact boundary. Labor used in agriculture began to drop about 1910, while the growth of capital was sharply retarded about 1920.

1870, but in 1950 for less than 1 per cent, as work animals had been replaced in large part by machines. The proportion for other livestock increased slightly, while that for crop inventories showed little change.

Regional Shifts in Capital Investment

Because of historical and geographical factors, the general expansion described above proceeded at very different rates in different parts of the country. This is evident when the over-all figures are broken down into ten major agricultural regions (black and white map).

The regional figures bring into sharp focus the steady westward movement which characterized the expansion of agriculture. In 1870, settlement in the West had barely begun, and the southern states had neither recovered from the havoc of the Civil War, nor made any marked change in the system of hand labor by which cotton had been produced under a slave economy. Hence, in 1870, more than four-fifths of the country's farm capital was concentrated in the eastern half of the United States, north of the Delta and Southeast regions. In 1950 the same area could claim little more than half of the total. The Corn Belt alone possessed 44 per cent of all farm capital in 1870; by 1950 its share had been reduced to 28 per cent. The West and Southwest, which in 1870 had owned only 10 per cent of all farm capital, in 1950 accounted for no less than 41 per cent. Only the Southeast and Delta regions were unaffected by this general shift in the distribution of capital assets; their share of total farm capital in 1950 was 7 per cent, just what it had been in 1870.

Variations among the rates of growth in the different regions tell a similar story. Between 1870 and 1900 real farm capital grew by 104 per cent in the country as a whole, but among the ten regions the rate varied from a 7 per cent increase in the Northeast to a fifteenfold increase in Texas-Oklahoma. The next twenty years (1900-1920) witnessed an actual decline in physical farm assets in one region, the Northeast, moderate gains in most other regions, and a spurt of 120 per cent in the Mountain states. After 1920, when little new land remained to be exploited, regional variations in the rate of capital growth were less extreme. Nevertheless,

the factors underlying such historical variations among the regions, as well as new factors peculiar to certain areas or types of farming, must be taken into account in any attempt to forecast future capital requirements in agriculture.

Rise in Ratio of Capital to Labor

While farm capital rose by 172 per cent between 1870 and 1950, the number of persons engaged in farming increased by only 1 per cent. Farm labor, indeed, reached its peak in 1910, after which the movement was steadily downward, especially during the 1940's. Every region shows the same trend, though the peak years are different. The result was a steady increase in capital investment per worker throughout the eighty-year period, which occurred in all regions except the Pacific. In 1870 capital per worker (in 1910-1914 dollars) was valued at \$2,900; by 1950 it had risen to \$7,800. This increase accelerated notably after 1910 with the onset of World War I, and it was particularly sharp in the 1940's, the period of World War II.

Here again the regional analysis helps to disclose some of the factors underlying the rate of growth of capital per worker. Among these are the following:

The Extent of Settlement. The smallest gains in capital per worker were in the Northeast and Appalachian regions, already well settled and developed by 1870. The largest gains were in the Great Plains and Mountain regions, where land was abundant and population sparse.

The Type of Agriculture. Products like range livestock, small grains, hay, and, more recently, corn made large amounts of capital investment profitable where these products were grown. In the South, cotton and tobacco were more resistant to mechanization than the staple crops of other regions.

The Supply of Workers. Competition for labor from the large industrial centers in the Northeast, the Corn Belt and the Lake States encouraged farmers to invest in labor-saving equipment. The more meager opportunities for nonfarm employment in many parts of the South contributed to the slow rate of growth of capital per worker.

The Availability of Credit. In the less prosperous farming regions, low income often made it impossible for farmers to acquire, either by cash or by credit, capital that might have raised the productivity and the income of farm workers.

The Scale of Farming

As in the case of farm labor, the number of farms in the United States rose sharply from 1870 until about 1910. It reached its peak about 1935, after which there was a substantial decline. Meanwhile physical capital continued to increase. Hence we find that the amount of capital invested per farm (in constant prices) fell slightly from 1870 to 1900, then rose slowly until 1940; during the 1940's it grew very rapidly.

There was considerable regional variation, however. In three north central regions capital investment per farm rose steadily throughout the eighty-year period, while in the South and on the Pacific coast the trend was downward until the 1930's. In Texas-Oklahoma the movement was generally downward until 1910, when it turned upward, and in the Mountain region the same was true after 1890. No clear trend can be discerned in the Northeast.

Effect of Price Fluctuations

The findings on secular growth and regional shifts in the volume of physical assets used in farming have been based on value figures reduced to a common basis in constant prices (1910-1914 average). Such figures, however, do not tell the whole story. When these values are measured in current prices, a somewhat different picture emerges. For example, in 1870 the current-price value of capital per worker was \$1,700, and in 1950 it was \$15,600.

The fluctuations of current prices profoundly affected capital formation in agriculture. When the prices of farm products were high, farmers had the cash or could borrow money to invest in their farm plants. The coincidence of the periods of high and rising farm prices and of high rates of growth in physical capital shows that the farmers and their financiers were quickly persuaded that expansion would be profitable. The sharp spurt of capital growth in the 1940's reflects a prospect of high profits as well as the farmers' unusual ability to pay for additional physical capital.

By contrast, when prices were unfavorable and the outlook bleak, as in the early 1920's and 1930's, the stock of farm capital declined. Expenditures for durable assets like buildings and machinery did not keep pace with depreciation.

The marked shifts in the current-price value of agricultural capital have another importance in this inquiry. Capital expansion must of course be financed in current, not in constant, prices, and the current-price record will be the better measure of agriculture's demand for capital compared with that of other sectors of the economy at any particular time. Study of the changing relationship between the current-price and constant-price valuations of capital assets over the period of this study should yield a better guide to future requirements for agricultural capital than the constant-price record alone.

What do these preliminary findings tell about the future capital requirements of agriculture? Among other things, they indicate a continuing growth in the importance of capital compared with labor, a reflection of the widespread adoption of technological improvements. Because the scope and effectiveness of the new techniques can be expected to increase, there is good reason to believe that the trend to ever higher amounts of capital per worker has not yet run its course.

Perhaps an equally important generalization about capital requirements in this sector is the presence of marked regional variations. The factors underlying these regional differences will bear close scrutiny by those interested in the future trend of capital formation. Some of them may be more affected by change than others. To name only one example, will the rapid industrialization of the South affect the supply of farm labor and the demand for labor-saving equipment? In this study an attempt has been made to provide facts that may help answer the basic question of what factors were influential in the growth of capital and of what this suggests for the future.

Appendixes

