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Chapter Title: Productivity and the Increase in National Product

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Productivity and the Increase in National Product

The nation's product or real income – the terms are interchangeable – may be said to have grown through increase in the volume of resources available for use in production, and through increase in productivity or the efficiency with which these resources are turned into product. Measurement of these two sources of increase in product suggests their relative importance over the past sixty-eight years:

Each year's increase in productivity accounted, on the average, for about half of the year's increase in product. The other half reflected, of course, increase in resources – labor and tangible capital.

Productivity increase accounted for a larger fraction – about nine-tenths – of each year's increase in per capita product, with the rise in per capita resources contributing the other tenth.

Prior to World War I, both per capita resources and productivity grew significantly, and thus both contributed to the rise in per capita product. Since World War I, per capita resources have fallen slightly, but productivity has risen even more rapidly than before – rapidly enough, in fact, to keep per capita product growing at an average rate not far below the rate for the earlier period.

The full set of statistics for the private domestic economy is set forth in Chart 3, and the average annual rates are given in Table 5.[12]

These results – and the results presented earlier – can be properly understood only if certain qualifications are kept in mind.

It is evident, to begin with, that the relative contributions to growth of product, of productivity on the one hand and of resources on the other, that emerge from these and similar calculations, depend on what is included in product and what is included in resources. More exactly, they depend on the importance and relative growth of the borderline items that are or are not included in each of these. What is in fact included is in part influenced by convention and in part by the availability of statistical data.

With respect to output, we have already noticed the question of governmental services. Similar questions arise with respect to certain expenditures by families – trade union fees and costs of getting to work are examples; and with respect to certain expenditures by

[12]The decline in labor input per capita during the period 1919-57, which may appear puzzling, is due largely to a decline (0.6 per cent per annum) in hours per employed worker.

TABLE 5

Average Rates of Increase in Output, Input, and Productivity, 1889-1957
Private Domestic Economy

	Average Annual Percentage Rates of Change		
	1889-1957	1889-1919	1919-1957
Total Output and Input			
Physical output	3.5	3.9	3.1
Labor input (weighted manhours)	1.4	2.2	0.8
Capital input (weighted tangible capital)	2.5	3.4	1.8
Total input (weighted manhours and tangible capital)	1.7	2.6	1.0
Per Capita Output and Input			
Physical output	1.9	2.1	1.8
Labor input	—0.1	0.5	—0.5
Capital input	1.0	1.6	0.5
Total input	0.2	0.8	—0.3
Productivity			
Output per unit of total input	1.7	1.3	2.1

Source: Table A, and the census estimate of population growth as extrapolated to 1889 by Simon Kuznets.

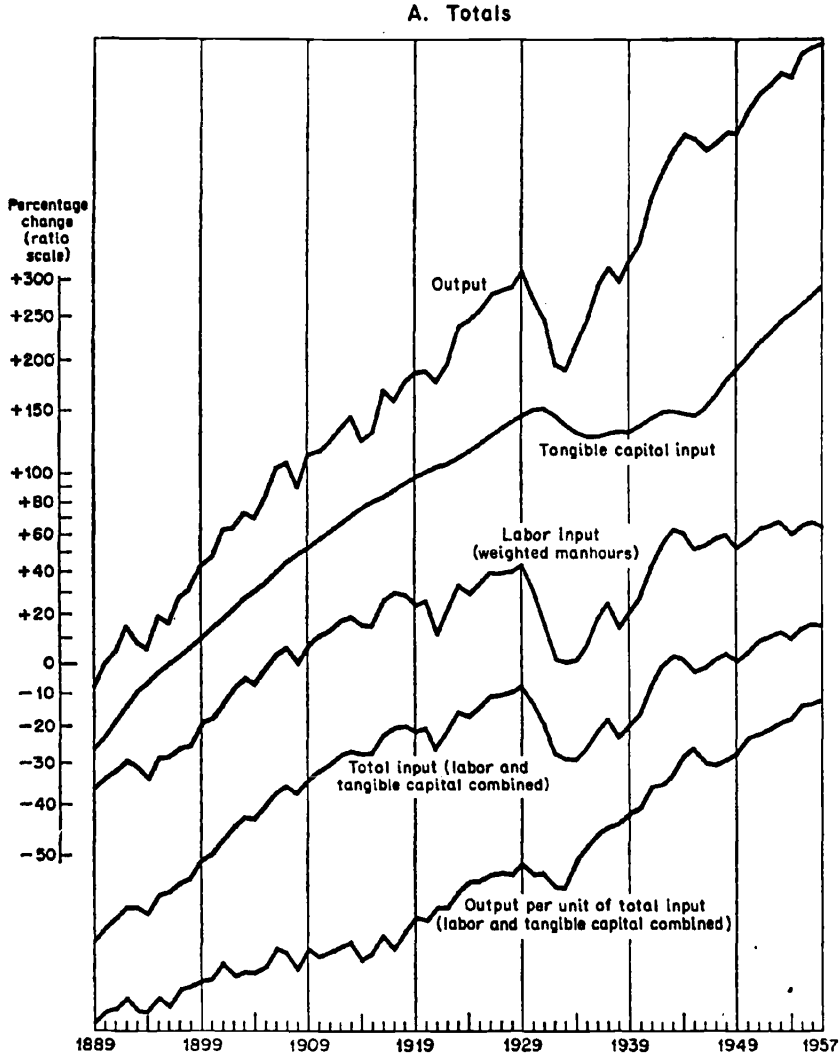
business – for example, subsidies to factory cafeterias, "expense accounts," and medical services provided employees.[13] The main problem, however, appears to be with respect to defense expenditures by government (which has reached large proportions), and for this reason we have presented estimates that differ in its treatment (Table 1). Because the results turn out to be fairly similar, however we measure output inclusive of governmental services (and input inclusive of the labor and capital employed by government), I have not taken the space to show the trends. They will be given in detail in Kendrick's report.

More important seems to be the definition of resources. We have measured these by weighted manhours of work done and tangible capital available, and have thus largely excluded intangible capital. This results in some understatement of the contribution of resources, for it is likely that intangible capital has risen in relation to the resources we include. There is a corresponding overstatement of the rise of productivity. It is possible that the upward shift in the

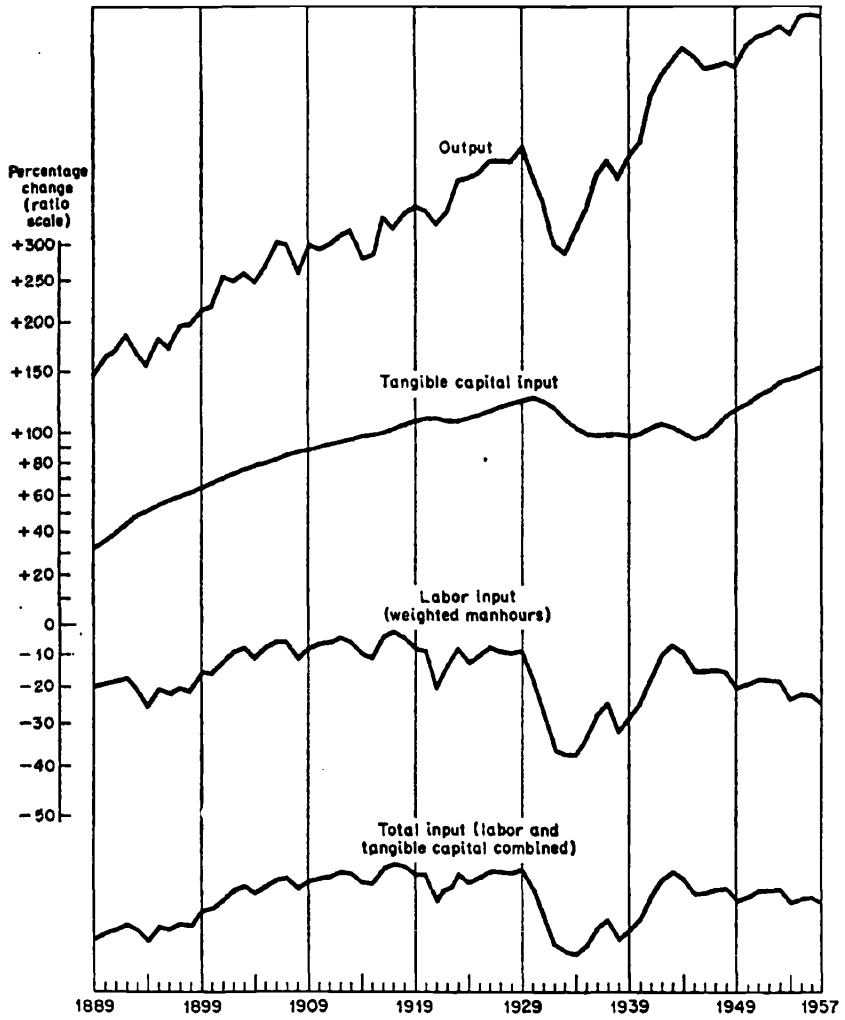
[13]For recent discussions, see *A Critique of the United States Income and Product Accounts*, Studies in Income and Wealth, Vol. 22, and *The National Economic Accounts of the United States: Review, Appraisal, and Recommendations*, both issued by the National Bureau in 1958.

CHART 3

Output, Input, and Productivity, 1889-1957
Estimates for the Private Domestic Economy



B. Per Head of the Population



rate of growth of productivity after World War I, and the downward shift in the rate of growth in per capita tangible capital at about the same time, reflect some substitution of investment in intangible capital for investment in tangible capital.

In an important sense, society's intangible capital includes all the improvements in basic science, technology, business administration, and education and training, that aid in production – whether these result from deliberate individual or collective investments for economic gain or are incidental by-products of efforts to reach other goals. If intangible capital were so defined, it would probably follow that much (not all) of the increase in product would reflect increase in resources. But so wide a definition of intangible capital would get us no closer to determining the causes of increase in product.

With the statistics presently available we have been able to measure the direct effects, on output, of increase in labor time and increase in volume of tangible capital. The indirect effects of the increases in these resources, and the effects of all other causes, we have been forced to lump together under the heading of productivity and to measure as a whole. The residue includes the contributions of the several forms of intangible capital mentioned; the economies resulting from increased specialization within and between industries, made possible by growth in the nation's resources and its scale of operations generally; the improvement (or falling off) of efficiency in the use of resources resulting from change in degree of competition, in volume, direction and character of governmental subsidies, in the nature of the tax system, and in other government activities and regulations; and the greater (or smaller) benefits resulting from change in the volume, character, and freedom of commerce among nations.

The simple calculation presented in this section does no more than suggest the high relative importance of the factors grouped under productivity. But that is significant. It is, as Abramovitz has pointed out, a "measure of our ignorance" concerning the causes of economic growth, and an "indication of where we need to concentrate our attention."[14] It is well to know how far short we are of determining the sources of increase in national product.

[14] *Resource and Output Trends in the United States since 1870,* National Bureau of Economic Research, Occasional Paper 52 (1956), p. 11.