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Deflating Intangible Investment: Some new ideas and estimates

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As economies shift from tangible to intangible investment, how to deflate intangibles becomes a more important issue in practice. The standard methodology of measuring a product of unchanged quality from one month to the next is difficult to apply to innovation, where activities are inherently different from one period to the next. A solution is to use either a general price deflator, such as the PCE or GDP deflator, which captures the opportunity cost of the resources that go into intangible investment, or input price deflators (which posits zero productivity growth) and add back in a measure of productivity. Here we critique the latter method, which is the one used in practice in the U.S., in two ways.

First, input price deflators may be poorly measured We will present a number of instances in which input prices into innovation fall dramatically but are not captured in existing deflators. These rapid price declines are generally not captured by price indexes.
Alternatively, one could use the rate of obsolescence of intangibles as a method of deflation, arguing that the rate of obsolescence must approximate the rate of technological progress. Or one can directly measure improvements in quantifiable dimensions of a group of intangible inputs or outputs and attempt to extrapolate to the total.

Finally, one can look to the stream of outputs of the intangibles and the expected present value of the stream of consumer and producer surplus that the intangibles result in.

A further difficulty arises because the social and private values of intangible assets diverge over time. A new method for accomplishing a goal permanently raises productivity, even if the patent that gives the inventor temporary monopoly rights over the product expires. Another illustration of the divergence between private and social value is open source software, which is available freely but may embody considerable private value as well as distinct social values.

Further interesting issues arise because large data sets are increasingly recognized as intangible asset. Data may be of value for a prolonged period of time, or data may be perishable.

In this paper, I build upon the results in Nakamura (2020), ("Evidence of Accelerating Mismeasurement of Growth and Inflation in the U.S. in the 21st Century," _Philadelphia Fed Working Paper 20-41, October 2020) to provide examples to illustrate these measurement methods and issues and to provide some very crude estimates of the impact of implementing these on the growth rate of US investment output and inflation.