

The Lack of Invariance of GDP to Digital Business Models

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Digital activities and business models are affecting the measurement of GDP, on existing national accounts definitions, in multiple ways. In this paper I explore the possibility that digital change is causing a wide range of substitutions within the production boundary (as currently defined). The focus in this paper is the lack of business model invariance of measured GDP and the implications of quality change across a wide range of goods and services for price indices. In the context of a taxonomy of the range of potential measurement artefacts arising from digital innovations, I consider the effects of substitutions occurring within GDP due to business model and other behavioral changes.

The paper explores the scope of new digitally-enabled business models and a consequent lack of business model invariance in GDP as currently defined. In addition to the new salience of well-known problems such as sampling in statistics collection and outlet substitution bias, the changes include for example: ad-funded free digital goods and services; cross-border value chains, the location of intangible investment, and its treatment in imports and GDP; the switch from high street to online retail and other services; the growth of second hand sales replacing new sales. In such cases there are substitutions within the production boundary from paid-for to free or lower priced goods, with a scope with significant implications for the interpretation of the price deflator. The long-understood challenge of treating new goods in price indices has come to the fore again due to the scope of digital innovation; consider for example the number of products now substituted by a smartphone app.

Furthermore, in many of these examples, the conventions about the distinctions between intermediate goods (netted out of GDP) and final goods in conventional supply chains, or between domestic investment and imports in the case of cross-border production, do not map well onto the creation of digital value added.

A further important issue is whether the improved quality of digital goods and services is adequately captured in measuring prices. The challenge of hedonic adjustment of prices for products that are improving rapidly in quality is well-known, particularly in the case of technology products. In their case, though, as there have been rapid improvements for a long period, hedonic adjustment is unlikely do much to explain the observed productivity slowdown in the more recent past. However, I argue that the scope of quality change in products, and introduction of new products, is perhaps wider than previously considered. It is therefore likely nominal GDP is being over-deflated, and real GDP growth and productivity under-stated. However, there is also a question about the extent to which changes in goods and services consumed are measurable quality changes it makes sense to adjust for in marketed output as opposed to inherently hard-to-measure increases in consumer surplus. The distinction between these is not clear.