ECONOMIC MEASUREMENT: INTRODUCTION

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Innovation in economic measurement is fundamental to a better understanding of how our changing economy works and for whom. The ESCoE Conference on Economic Measurement is a new forum to promote research on economic measurement and increase dialogue between academic economists, national statisticians and statistics users to improve economic measurement. A joint venture between the UK Economic Statistics Centre of Excellence (ESCoE) and the UK Office for National Statistics (ONS), the 2019 conference was hosted at King's College London, 8–10 May. This issue of the *National Institute Economic Review* includes six papers focusing on research emerging from the conference. The articles address a wide range of topics in economic measurement, focusing in particular on issues pertinent to the measurement of welfare and to measurement in an increasingly digital and global economy.

In the first article of this issue Andrew Aitken provides a thorough overview of some of the key developments in the measurement of GDP and welfare over the last century, highlighting the tensions created by the appeal of giving GDP a welfare or well-being interpretation. GDP is a measure of economic output that was developed in conjunction with a system of national bookkeeping during the 1930s and 1940s. The deficiencies of GDP as a measure of welfare have long been known, but gained renewed attention with the establishment of the Stiglitz-Sen-Fitoussi Commission and the publication in 2009 of their report *Mismeasuring Our Lives: Why GDP Doesn't Add Up*. Aitken reviews recent thinking on measuring welfare beyond GDP, drawing in particular on research presented at the ESCoE Conference on Economic Measurement 2019. This research is focused on three broad areas: incorporating information on the distribution of income, consumption and wealth in the National Accounts; considering individuals' time use in the development of a measure of welfare; and the welfare consequences of goods and services that are free at the point of use, e.g. goods and services that are publicly provided and 'free' digital products. He concludes that composite well-being measures require further theoretical underpinning, that there is scope to include broad ranging aspects of well-being in such composite measures, and that these measures should be constructed for different population groups to better reflect the heterogeneity of peoples' experiences.

GDP has undergone many developments since its inception many years ago. The most recent revisions to international guidance on national accounting (System of National Accounts, 2008; European System of Accounts, 2010) included a change to the recommended treatment of R&D expenditures in the National Accounts. These expenditures are now treated as investment rather than as intermediate purchases for the purposes of production. But there are many other 'intangible' investments that are not counted as such in the National Accounts. This affects measured magnitudes of both investment and GDP, and, ultimately, our ability to understand productivity developments. In the second article of this issue, Josh Martin discusses the active research agenda at ONS to better measure intangible investment. He focuses on some of the key assumptions that are made in deriving estimates of intangible investment in the academic literature. These are often based on relatively scant or outdated evidence. By and large, the evidence presented by Martin corroborates some of the less substantiated assumptions that are often employed. He also provides new methods for estimating own account branding investments. These methods result in estimates that are significantly larger than those previously found

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and challenge existing practice. Finally, he highlights some of the key weaknesses in the evidence base and how these might be addressed. One suggestion is to adapt accounting regulations to better reflect business practice in the modern and digital economy.

Cloud computing services are an increasingly important feature of the digital economy. According to industry estimates, the global market for cloud computing services was similar in size to the global consultancy market in 2018 and is predicted to nearly double in size in terms of annual revenue over the next few years. In the third article of this issue, David Nguyen and Diane Coyle explore the challenges that cloud computing services present for economic measurement. In some ways the rise of cloud computing is akin to the rise of intangible assets as a key source of value creation and poses similar issues for economic measurement. But there are differences, for one because of the way that these services are provided. The authors develop a quality-adjusted price series for cloud services, which has been falling rapidly over the past decade, a phenomenon that is not captured by deflators used in official statistics. The authors argue that the falling costs of cloud have enabled process and business model innovation, facilitating the transfer of intangible inputs and value within and between companies and across borders. Much of this activity is not captured in existing economic statistics, and challenges how we currently measure the value of data and the distribution of economic activity across countries and sectors.

With the rising digitalisation of the economy, the need to develop appropriate price series for digital goods and services has become ever more urgent for economic statisticians. In the fourth article of this issue, David Byrne considers 'the mysterious cross-country dispersion in mobile phone price trends'. Comparing mobile phone consumer price indices (CPIs) constructed by national statistical agencies (NSIs) across twelve countries, he finds large differences in price trends, ranging from more than 20 per cent declines per annum to no change on average 2008–18. Since mobile phones are a seemingly homogeneous good manufactured in globally integrated supply chains, differences in production costs are unlikely to explain cross-country differences in such trends. Byrne argues that, although differences in mark-ups and preferences across countries may account for some of the observed dispersion in price trends, differences of this order of magnitude raise concern that quality adjusted CPIs may be constructed inconsistently across NSIs. This conclusion is corroborated by the much smaller variation in trends in the Harmonized Index of Consumer Prices across countries and suggests more attention to international harmonisation of measurement methods is needed.

Novel data sources yield a wealth of opportunity to enhance economic measurement. In the fifth article of this issue, Alex Bishop and Juan Mateos-Garcia create a measure of emergent technological activity in 218 UK Travel-to-Work Areas (TTWA) using a combination of text from 1.5 million UK business websites, obtained from the big data start-up Glass, and CrunchBase, a technology company directory. The analysis of these datasets yields different digital technology 'eras' beginning with social networks and smartphones in 2008 and developing into AI, Blockchain and crypto-currencies. Indicators of emergent technological activity at the TTWA level are constructed by mapping geographically companies mentioning these terms. Contrasting these new data with indicators of economic complexity developed from business micro-datasets, the authors find that high complexity areas show a stronger propensity to develop economic activities involving emergent technologies. High complexity areas with much emergent activity also tend to have better economic outcomes, pointing to the potential power of these measures to improve understanding of local economic development.

An increasingly globally integrated production network has spurred the construction of Trade in Value Added (TiVA) data. TiVA data adjust gross export flows for imports that are embedded in the production of exports. This adjustment allows a better picture of the value added (and jobs) generated by a country's exports, issues of current relevance given ongoing trade negotiations and tensions. In contrast to TiVA, re-exports, whereby imports essentially pass through a country with very little modification, is a relatively understudied topic in the analysis of economic interdependencies through trade. In the sixth paper of this issue, Oscar Lemmers and Khee Fung Wong develop a new approach to estimating the share of imports destined for re-export, which provides a more accurate picture of cross-country trade dependencies and challenges understanding of current trading relationships. They illustrate their method using detailed micro-data for Dutch firms; the Netherlands is a major re-exporter. They find that non-European member states export 10 billion euros of commodities to the Netherlands that are destined for re-export to the United Kingdom. The authors discuss how these methods can be applied to better understand trade dependencies in other countries and for detailed sectors.