Economic statistics and analysis strategy

Office for National Statistics

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Introduction

In order to give a focus to prioritisation of ONS work on economic statistics, this is the first edition of an **Economic Statistics and Analysis Strategy (ESAS)**. ONS has already produced a strategy for the National Accounts and the ESAS encompasses this and goes wider to cover all economic statistics. This strategy will be reviewed and updated annually in the light of changing needs and priorities, and availability of resources.

Making explicit ONS's perceived priorities will allow greater scrutiny and assurance that these are the right ones. In addition, this ESAS will allow research and development priorities to be laid out, making it easier for external experts to see the areas where ONS would be particularly keen to collaborate.

The strategy is being published for consultation and ONS welcomes responses from all users of ONS economic statistics and other interested parties, including those in government, academia, and the private sector. Comments on this strategy should be sent to ESAS@ons.gov.uk .

Overview

The main focus of ONS's strategy for economic statistics and analysis over the period to 2021 will be in the following areas:

- Taking forward the programme set out in the latest national accounts work plan to meet international reporting standards according to the agreed timetable; and to improve the measurement of GDP through the introduction of constant price supply and use balancing, the adoption of

double deflated estimates of output and improved use and specification of price indices

- Working toward delivering the improvements described in the Bean Review (2016) to reflect the modern economy, investigating means of improving measurement of services sector activity, including potential for new services enquiry (SERVCOM)

- Keeping abreast of measurement issues resulting from the rapid pace of change in the economy, including the digital economy, globalisation, and the role of intangible assets

- Responding to the recent consultation and review of consumer prices – in particular "Consumer Price Statistics: A Review" – led by Paul Johnson – and the 2015 consultation on measuring consumer prices

- An ambitious programme of work to provide comprehensive flow of funds statistics to improve coverage, quality and granularity of financial accounts data in the national accounts (including fuller counterparty 'from whom to whom' information)

- Meeting the growing demand for statistics at regional and other sub-national geographies

- All these changes will enable the ONS to also improve productivity statistics and help support key users to answer the 'productivity puzzle'

- Continuing development of broader measures of social welfare to complement GDP figures, including regular production of household satellite accounts, development of estimates of natural capital, and more timely information on the distribution of incomes

- Meet a wider agenda to improve and extend the provision of microdata to users.

Vision

The vision for economic statistics is:

"ONS will establish itself as the centre of excellence for the collection, production, compilation, analysis and dissemination of economic statistics in the UK."

Strategic context

This document sets out plans and priorities for the future development of economic statistics. In particular, for a number of different themes, it sets out:

a) ONS's long term vision and where it wants to be in 5 years' time and beyond
b) the priority areas for development during the intervening period
c) specific plans for the work to be undertaken over the next 12-18 months
d) the associated research agenda and areas for potential collaboration with others with relevant expertise
e) broad indications of the scale of the intended work - high, medium or low resource requirements

Implementation of the strategy naturally has to run alongside the continuing production of a large volume of regular outputs that are published on a monthly, quarterly and annual basis. ONS will continue to ensure that these are produced on time and to high quality, that they are clearly understood and explained, and that they meet evolving user needs.

This strategy should also be read in the context of a number of other recent reports, including those shown in the list of references at the end of this document.

The document "Economics at ONS: increasing openness, improving capability", published at the end of 2015, provides the background to the strategic direction that will be taken by ONS in the field of economic statistics. It sets out the framework by which ONS will meet its objectives of improving economic statistics and keeping pace with the rapidly changing nature of the economy. As well as reflecting this direction in methodologies and modes of production, ONS will also aim to deliver greater insight into the economics statistics it produces, and to ensure that the economic story behind these statistics is drawn out accurately and clearly.

The National Accounts strategy and medium term work plan documents show future plans for the National Accounts. These are consistent with the ESAS, and shown in greater detail than is covered here.

The strategy set out here should also be considered in the light of the Spending Review settlement announced in November 2015, which laid out the resources available to ONS during the period 2016/17 to 2019/20, and the subsequent announcements in the Budget in March 2016 following publication of the final report from Professor Sir Charles Bean's independent review of UK economic statistics.

How ONS will work to deliver the strategy

In order to deliver on the priorities for economic statistics, ONS has identified the need to enhance its economic capability. In part, this will be achieved by significantly increased recruitment of high quality, in-house economists - and this process is already under way - as well as raising the skills of existing staff. But in addition, increased engagement and active collaboration with external experts is a critical part of the mix.

In particular, ONS will work closely in partnership with individuals and organisations that can help to deliver the agenda that is set out here. This will involve substantially enhanced partnerships with outside academic and other experts, including a new scheme for ONS Fellowships (the first three of which have already been announced) and recently agreed proposals to establish an Economic Statistics Centre of Excellence.

Open and effective engagement with users of all kinds, and with other stakeholders, is therefore a pre-requisite for understanding user needs and deciding how best to meet them. ONS acknowledges the obligation to support the research community where it is able to do so. Greater partnership working with the research community will offer better two-way communication so that this can be done more effectively.

Economic statistics: issues, priorities and plans

The strategy articulates 10 themes that represent the key issues and priorities for ONS in the future evolution of economic statistics. The themes – which are interdependent and overlapping - are:

1. Measurement of gross domestic product (GDP)
2. Measurement of services sector activities
3. Information below whole economy level
4. Measurement of the labour market
5. Measurement of prices
6. Measuring the modern economy – the digital revolution
7. Beyond GDP – broader measures of welfare and activity
8. Enhanced analytical capability to interrogate and understand large underlying datasets
9. Understanding the productivity puzzle
10. Exploiting administrative data and a wide range of other data sources

Under each theme, a brief discussion of the key issues is followed by a list of potential areas of research that are relevant to ONS goals and where ONS is seeking to harness the input of interested partners. There is then a brief workplan and timeline for each theme, setting out a long run vision, medium term goals and detailed plans for the next 12-18 months.

Where possible, this is accompanied by information on the associated scale of resource requirements. In this context, the letters (H), (M), (L) denote that the estimated resource requirements are likely to be high, medium, or low respectively.

1. Measurement of GDP

The Bean Review's final report identifies a number of challenges to the robust measurement of the UK economy. Some of these are long-standing, others have arisen over a period of time, while new challenges are emerging continually.

Some of the longer-standing challenges lie in the difficult area of measuring GDP, reflecting its conceptual complexity as well as the large number of independent data sources required to compile robust estimates. This generates the need to reconcile and balance information that is available at different times and from a vast range of sometimes conflicting sources.

The challenges to be addressed include:

- How best to balance the information from the three different estimates of GDP – income, output and expenditure – at different points in the production cycle in order to reflect the relative content and quality of the available data sources
- It is widely recognised that the absence of double deflated estimates of value added – taking account of differential movements in input and output prices – could be a source of potential UK GDP (and therefore productivity) measurement error in certain circumstances
- The absence of a recent Purchases Survey means that changes in the pattern of businesses' consumption of goods and services have not been captured over the last decade or more. This may have led to biases in the weighting used to derive estimates of intermediate consumption
- Supply and use balancing in constant prices is recognised good practice and users have for some time sought the additional rigour that its introduction in the UK would bring to GDP estimates – including, importantly, the GDP deflator
- Users have been clear about the need for longer runs of consistent time series for the main economic statistics.

Areas for research

- Are current methods able to capture adequately the timing of turning points in the economy and the amplitude of business cycles?
- Reconstruction of historic data for the UK's sector and financial accounts
- As an essential element of constant price balancing, improvements to the quality of existing price deflators and development of new and conceptually relevant price indices
- How best to incorporate double deflation in UK GDP estimates in a timely and effective manner
- Development of new methods and data sources for estimating improved construction deflators
- Exploitation of a new information portal on micro-businesses (ie those too small to be registered for VAT or PAYE) to facilitate calibration of adjustments for under-reporting

Priorities and timetable

- A long term aim for the UK's National Accounts has been to develop annual, volume-based, balanced supply and use tables (SUT) using previous year's prices (PYP) as a route to balancing different estimates of GDP in constant prices. This is considered international good practice and is supported by the NSQR as well as being a requirement under ESA2010. The aim is to develop these tables and incorporate them into the production process to support Blue Book 2018 (H)

- Closely aligned to SUT-PYP is the introduction of "double deflation" which requires the separate deflation of inputs to and outputs from the production process. An overall deflation strategy is being developed to provide a strategic, underpinning framework for this work, and this will also consider the methodology for double deflation (H)

- To enable the development of supply and use tables at previous year's prices, ONS will improve the statistical and conceptual quality of its price deflators. Key components of this are improved survey methodology across business prices, increased use of hedonic quality adjustment to keep pace with quality changes in the economy, and the development of deflators for sectors such as construction and banking (H)

- ONS continues to update its analysis of GDP growth revisions performance on a regular basis, and makes available a database of successive vintages of GDP estimates to allow users to conduct their own analysis (L)

- A new Purchases Survey was introduced from early 2016 (relating to reference year 2015) with first new data to be used in full in Blue Book 2018, and emerging estimates to help inform Blue Book 2017 (H)

- The process for aligning the output measure of GDP (GDP(O)) with annual expenditure is under review, in particular how to align all sectors with the annual balance to more accurately reflect the expanded service sector within the UK economy (M)

- The National Accounts medium term work plan 2016-2018 sets out in detail the priorities for the next three years in that area. A key element

is the work necessary to meet the UK's legal obligations under the ESA 2010 programme (M)

- The UK trade development plan, published March 2016, sets out a range of priorities for trade statistics for the period 2016-2019. Key aspects of the plan cover improved quality assurance, more analysis of the underlying volatility in trade data and improvements to production systems (M)
- Improved construction deflators implemented in Blue Book 2017 (M)
- ONS will continue to explore the re-development and publication of long-term historic time series of data, expanding on recent improvements to the set of historic data which is already published in line with Blue Book 2015 (M)
- A further article on historic data will be published on 23 May 2016
- ONS will continue a joint project with the Bank of England, in collaboration with interested academics, to try to reconstruct the historical data on sector financial accounts and balance sheets in the UK.

2. Measurement of services sector activities

The UK economy is predominantly based around services activities, which accounted for almost 80% of total output in 2012, compared with less than 50% in the 1950s. Despite this, economic statistics are still focused more towards things that are easier to measure, such as the output of manufactured products, especially in terms of the degree of granularity of the data. The UK is probably ahead of many advanced economies in its measurement of services - particularly in the short-term estimates - but there are rightly calls for ONS to improve measurement and to provide finer breakdowns of services activities to allow better quality analysis.

The challenges to better measurement of services are considerable.

- Conceptually, it is much harder to measure and aggregate the output of services activities than it is the production of manufactured items
- Current data offers a much less rich disaggregation of services output than manufacturing

- There is no detailed survey of services (such as the PRODCOM equivalent for manufacturing) to enable business-to-business transactions to be weighted appropriately, which may impair the quality of associated volume output measures
- The growing impact of digital activities in enabling the provision of services, including overseas trade in services, can only exacerbate existing measurement challenges
- The identification of quality changes in many services activities is potentially important but also difficult in times of rapid change
- Measurement of financial services faces a number of particular difficulties, including the treatment of risk and the calculation and application of "financial intermediation services indirectly measured" (FISIM)

Areas for research

- Research into alternative ways of measuring FISIM
- Development of a "SERVCOM", the equivalent survey for services that currently exists for production (PRODCOM), in order to weight business-to-business services prices appropriately
- Identifying new sources of information on services sector activities
- Assessment of how well digital services are currently measured and actions for improvement
- Research into improved methods and data sources for short-term statistics on services output

Priorities and timetable

- FISIM article on the treatment of risk – summer 2016 (L)
- Improved data on education-related travel from new sources - for higher education and further education tuition fees from the Higher Education Statistics Agency, and for independent school fees from the Independent Schools Council (completion in 2017) (M)

- Increased frequency and detail of trade in services, potentially incorporating data from two new sources from HMRC - the EC Sales List which is a timely record of services traded with the EU and the new information on cross border e-commerce (M)
- Annual reports will continue to be produced on the short term output indicators research programme, with individual industry reports published regularly on a rolling basis - professional services, social care and financial services are currently under investigation (L)
- To improve the quality of GDP estimates, and a range of service industry and product related statistics (including productivity), and to inform users better about the digital economy and knowledge economy, ONS is considering a number of recommendations, including:

  o Develop an annual SERVCOM-type survey covering all of the construction, distribution and service industries - and products to eg 6-digit classification of product by activity (CPA) level - complementing the present PRODCOM survey covering the manufacturing industries. The 2016 Budget provided funding to commence a SERVCOM survey, commencing in 2017/18 (H)

  o Expand the number of price indices for the construction, distribution and service industries and develop outputs similar to manufacturing PPIs such as input price indices (H)

  o Expand export and import price indices for goods to cover fully the imports and exports of services by detailed product (M)

Public service productivity and efficiency

Measuring public services output in the absence of a market price also poses problems. At a time of fiscal stringency, the efficiency with which the public sector performs and public services are generated is inevitably subject to scrutiny. Policymakers therefore require up to date information, indicators and performance measures to track progress. In addition, the public sector accounts for nearly a quarter of the total economy. So measuring and

understanding its productivity is a crucial element of the whole economy picture.

Areas for research

- Development of a framework for the production of efficiency measures for individual government departments, including distributional aspects and unit/geographic breakdowns
- Expanding the range of measures to cover not just the efficiency and productivity of public services output contributing towards GDP, but also the efficiency and effectiveness of government transfers - ie the payments, as well as the administration, of social security
- A comprehensive review of methodologies used to produce government output and productivity measures in order to take account of policy changes and changes to delivery practice over recent years, including treatment of quality changes in public services
- Review and development of existing ONS statistics on public service productivity, including treatment of quality changes in public services. For example, the quality of adult social care is of key interest, given the ageing population and the demands being made on these services
- Improvements to the "nowcasting" methods used to produce the new, more timely, experimental estimates of public service productivity
- Development work to decompose productivity into input inflation and changes in costs per unit of output, with reference to trends in pay costs and productivity, and using a similar approach to goods and services procurement

Priorities and timetable

- ONS will build on its earlier work in measuring public service productivity and efficiency, carried out by UKCeMGA between 2005 and 2011, and reinforce its activities in this domain. This will start with a comprehensive review of methodologies used to produce public service output and productivity. In addition, work will be carried out on new

and improved measures of quality and developments of new productivity measures for areas previously measured using the inputs=output approach (H)

- In order to support policymakers, ONS will use "now-casting" techniques to produce more frequent and timely experimental estimates of public service productivity (as described in article published April 2016) (M)

- During 2016, ONS will work with government departments to assemble the building blocks they need to underpin their efficiency and effectiveness measures and decisions (H)

- Work on input price inflation and changes in costs per unit of output will be taken forward and will be used to improve work on government deflators in GDP (M)

- Development of methodologies to calibrate the quality adjustment of adult social care, and improvements to education quality measures (Spring 2017) (M)

3. Information below whole economy level

The underlying rationale for what ONS does, including publication of its economic statistics, is that they help decision makers make better decisions. If they are to continue to fulfil that role, such statistics must keep pace with changes in the requirements of decision makers. Different users will have different needs, which can only be met by providing information at below the aggregate level.

Such changes pose challenges in a number of areas, including the need for:

- better local, regional and country data to support the associated key agendas
- better understanding of the inter-linkages between different parts of the economy in the wake of the financial crisis
- information on the distribution of outcomes within the aggregate totals, eg distribution of incomes

<u>Better local, regional and country data</u>

Improved and expanded regional and local data will be needed to underpin public debate and decision making in the context of devolution, decentralisation, local growth (including the new city-regions) and matters such as large infrastructure projects. With any move towards more devolved powers to sub-national administrations, there is a need to provide an evidence base upon which policy decisions can be made at that level.

ONS has always provided information of this kind, although often in a less timely and comprehensive manner than national UK data. ONS will need to meet changing priority needs by improving granularity, quality, timeliness and flexibility of local area statistics.

There are a number of ways that existing sub-national economic statistics can be enhanced. First, there is the potential to increase the range of data available; second, to improve significantly the timeliness of key data; and third to increase the flexibility with which outputs can be used to respond to evolving geographies and policy developments.

Producing more timely statistics at a more disaggregated geographical level is potentially resource intensive. Traditionally many ONS surveys are scaled to produce optimum sample sizes for UK figures in aggregate, and would therefore be too small to produce viable estimates at more local levels. In addition, local statistics have a wide range of potential uses, and typically different users will want different breakdowns to suit their purposes. However the possibilities opened up by better exploitation of available administrative data in this area are considerable.

Areas for research

- Constructing robust regional estimates of GDP in volume terms requires the input of regional price information. Greater use of administrative data may offer a way forward for producing regional price estimates
- Use of "big data", administrative data and new statistical techniques to provide either new and better or more granular estimates for cities, regions and other sub-national geographies

- Understanding the drivers of regional and local productivity
- Understanding the occurrence of inequalities and deprivation within regions or cities

Priorities and timetable

- ONS will produce a balanced measure of regional gross value added (GVA), combining income and production measures, by end-2017. This will underpin the dissemination of greater industrial detail (2-digit SIC level) at the NUTS1 and NUTS2 levels in both nominal and real terms, and greater detail of the nominal components of income down to the NUTS3 level (M)

- ONS is developing annual regional estimates of household final consumption expenditure and the household saving ratio, thereby extending the information on the economic impact of households in different parts of the UK (by 2018) (M)

- Regional quarterly output indicators for English regions (including GDP in volume terms and a 2- and 3-digit SIC breakdown) will be delivered by 2018 (H)

- Regional accounts will provide a mechanism for compiling estimates for non-standard, flexible geographical areas by breaking down existing regional measures (mainly at NUTS3 level) to smaller areas, using indicator datasets, and building back up to customised area specifications of existing economic statistics (by 2019) (H)

- Overarching this is the exploration of the use of administrative data to increase the quality and timeliness of published estimates (M)

- ONS plans to produce estimates of annual UK public sector finances by country and region, to be first published in 2017, subject to the current consultation exercise. ONS will also continue to work with devolved administrations to provide them with the underlying data to allow them to produce their own country specific fiscal statistics (as is currently done with Scotland) (M/H)

- ONS is working with bodies responsible for administering devolved taxes to ensure that as taxation powers are devolved there is no drop in the timeliness or quality of tax data reported in the monthly public sector finances bulletin (L/M)

- ONS will publish experimental estimates of exports of services by region and country of the UK, supplementing existing HMRC information on trade in goods by region (summer 2016) (L)

- ONS is working on an enhanced programme of stakeholder engagement. A recent UK Statistics Authority event on city-region statistics is to be followed by a programme to increase engagement with those interested in the newly devolved city regions. The first ONS Economic Forum events outside London were recently held in Manchester, Cardiff and Edinburgh, and plans have been drawn up for an ongoing programme of similar events in different countries and regions of the UK (L)

- ONS will combine estimates of regional and subregional productivity, currently published in separate outputs, into a single output published within the ONS Productivity bulletin (L)

- ONS will increase the range and timeliness of published small-area data. This will include improvements to the small area income estimates publication together with a new publication providing small area poverty estimates. ONS will also continue to publish small area house price statistics on a quarterly basis (L/M)

Understanding financial inter-connectedness

Enhanced financial statistics - sometimes referred to as "flow of funds" statistics - are necessary to support policymakers, in both the UK and international institutions, on matters relating to financial stability. By providing information on the financial inter-connectedness of the economy, the data could support sound decision making in order to minimise the risks of a new financial crisis. The work should provide a greater degree of granularity

than hitherto possible, providing information on counterparties to transactions as well as additional disaggregation of financial sectors and instruments.

Such information should also improve the quality of the sector and financial accounts, including balance sheet information, thereby aiding understanding of the behaviour of the economy for other purposes.

Flow of funds data will need to be maintained and developed on a continuing basis in order to cope with the rapid pace of change in the financial sector, as new institutions, instruments and funding channels develop.

Throughout the course of the project, ONS will engage robustly, using a variety of mediums, with a wide range of users.

Areas for research

- Improving the quality and coverage of the UK financial accounts by:
    - seeking administrative, regulatory and commercial micro data (i.e. record-level) sources, to replace and enhance existing survey data wherever possible
    - implementing more detailed sector and financial instrument breakdowns than are currently required by our legal requirements for compliance with ESA10, informed by international initiatives (Special Data Dissemination Standards plus (SDDS+) and the G20 Data Gaps Initiative (DGI)) and the Bank's requirements for improved monetary policy and financial stability analysis
    - introducing counterparty (from-whom-to-whom) information
- Learning from leading edge exemplars in other countries. Whilst positive steps have been made, this is a priority area to address given the importance and size of the UK's financial sector

Priorities and timetable

- Over the course of the next five years the ONS will progress work to enhance the financial accounts of the UK. The main objective of the full set of enhanced financial accounts will be to improve the quality,

coverage and detail of the UK's financial accounts, including the development of improved counterparty information (H)

- Improving flexibility in responding to new or ad hoc demands for financial statistics (M)

2016/17

- Initial exploration of potential data sources (H)
- Working in partnership with the Bank of England to scope and pilot a securities database (H)
- Understanding the resource and capability required to complete the project (H)
- Understanding existing technological solutions for processing large datasets, including those run by non-government sources (H)
- Understanding the infrastructure and system solutions available (H)

2017/18

- Further exploration of potential data sources (H)
- Publication of experimental statistics as new data become available (H)
- Commence development of a securities database (subject to a successful pilot and funding) (H)

2018 onwards

- Deliver the International Monetary Fund's (IMF's) Special Data Dissemination Standard Plus (SDDS+) and G20 Data Gaps Initiative requirements in full for the UK (by 2021) (H)
- Integration of new data sources into the National Accounts (H)
- Publication of full counterparty information (H)
- Priority areas include other financial intermediaries (OFIs), debt securities, equity & investment shares / units

Information on the distribution of outcomes

While the national accounts figures tell the story of movements in aggregate living standards across the whole population, policymakers wish to take decisions on the basis of more granular information, for instance how the headline changes are distributed between different types of households.

Data is of most use for decision-making if it is timely, rather than being compiled as a document of record well after the event. ONS will respond to this need by greater use of "now-casting", as seen in the recent experimental release of provisional estimates of the distribution of household incomes for 2014-15.

Areas for research

- Developing methodologies and techniques to allow distributions to be compiled and published for key statistics
- Producing more timely statistics on the distribution of household income, including the continued development of early estimates of key indicators through the use of 'nowcasting' techniques
- The reconciliation of micro and macro estimates of household income, consumption and saving, and using microdata to produce distributional analysis of National Accounts aggregates
- Opportunities for developing data and analysis of income, consumption and wealth together, including the harmonisation and integration of survey data sources, as well as the potential for greater use of administrative data

Priorities and timetable

- ONS will publish experimental "nowcast" estimates for indicators of the distribution of household income for financial year 2015/16 (summer 2016) (M)
- ONS will engage with interested parties (summer 2016) on opportunities for improving the coherence and quality of ONS household financial surveys/data and outputs (L). It is intended that this will lead into work to integrate survey sources as well as make use of administrative data when available for use (H)
- Identify priority areas for better reconciliation between micro and macro estimates of income and consumption in order to improve experimental estimates of distribution of National Accounts aggregates (M)

- Contribute to ongoing work of Eurostat, OECD and other international organisations on development of statistical standards for income, consumption and wealth microdata (L)

4. Measurement of the labour market

The labour market is measured by a combination of household surveys, which measure the supply of labour (e.g. employment and unemployment), and business surveys, which measure the demand for labour (e.g. jobs and vacancies) and earnings. A good range of labour market data is available. But there are some clear areas for further development.

Changes to the composition of the labour market

Since the recent economic downturn there have been a number of changes affecting the labour market from a variety of sources. Two examples are:

- Ageing population: Since 2010, the state pension age for women has been increasing to bring it in line with that for men and further rises across the board are planned. The increase in women's pension age has increased the proportion of women aged 50-64 in employment. However, as the population ages, the proportion of people working beyond 65 continues to increase with over 1 in 10 people now employed in this age group.

- Self-employment: The number and proportion of people who are self employed in their main job has increased over the last five years. There are now over 4.5 million self employed people. However, there is little timely information about the income for these people and others in "non-standard" forms of employment (e.g. the "gig" economy – where temporary and short-term assignments are a much more prevalent feature of the labour market – and the sharing economy)

Dynamics of the labour market

The structure of the Labour Force Survey allows for estimates to be produced of flows between, for example, unemployment and employment. These are published every quarter and have recently been enhanced by the introduction

of "job-to-job" flows, where someone has moved to a different job, broken down by reasons for the move. While further exploitation of this data may be limited by the available sample, ONS will consider how these statistics could be developed.

Income and earnings

In recent years, employee pay growth as measured by the Average Weekly Earnings indicator has remained subdued and has shown some discrepancies with the annual structural earnings survey (Annual Survey of Hours and Earnings). Some of this may be due to the changing structure of the workforce and ONS has produced analysis on the impact of gender and job tenure on pay. However, further work on the impact of type of job and qualifications could provide more insight.

Areas for research

- ONS is aware of the lack of information relating to the self-employed (particularly around timely measures of income) and those participating in other "non-standard" forms of employment (e.g. the "gig" and sharing economies) and is looking at how more information could be obtained to fill this gap.

- While ONS has a significant amount of information on the level and type of current employment, it has relatively little regarding the types (e.g. occupation, skill level) and location of available vacancies. Further research on this area and how employees' skills match with their occupation would provide insight into potential development of the labour market and the potential impact on earnings.

Priorities and timetable

- ONS will be investigating how administrative data could be used to supplement its current labour market surveys to provide more granular analysis. This will initially be PAYE income tax records but ONS will also

work with the Department for Work and Pensions (DWP) to exploit the data available from the developing Universal Credit system (M)

- During 2016, ONS will publish experimental single month Labour Force Survey estimates using a modelling approach to account for survey design effects. The main aim of producing these statistics is to have a better and more timely indication of the latest movements in the labour market than that conveyed by the current rolling quarterly estimates. It is also intended that the approach will provide a way of measuring discontinuities in LFS time series that may arise as a result of the planned modernisation of survey methods, such as the move to online data collection (M)

- During 2016, ONS will continue to increase the range of data regularly published relating to emerging policy areas, for example, children in long-term workless households and NEETs – those not in employment, education or training - who have never worked (L)

5. Measurement of prices

Price statistics are an important indicator of how the economy is behaving and this is reflected in the attention attracted by the suite of price indices published by ONS. The National Statistician, in March 2016, published a letter outlining decisions to shape the future of consumer inflation statistics in the UK following a consultation in 2015. The consultation followed a comprehensive review of how inflation is measured in the UK by Paul Johnson. Inflation statistics were also considered further in the Bean Review of economic statistics. In light of this, there is a challenging work programme to ensure the measurement of UK inflation meets the expectations of those who use the data. ONS will draw on the expertise of the Advisory Panel for Consumer Prices in taking this forward.

As well as having value in its own right, information on prices is vital in helping to determine movements in the price deflators which divide nominal magnitudes (such as turnover) into their price and volume components. Errors in the measurement of prices, or in their application to the national accounts,

will therefore produce corresponding inaccuracies in the measurement of the volume of GDP growth.

Areas for research

- The Bean Review identified the use of alternative data sources as a priority. ONS has made good progress in this area through the development of web scraping techniques and subsequent publication of preliminary price indices using these data (June 2015). Further work is required in this area to widen the scope of the data collected via web scrapers, to secure access to point-of-sale scanner data, and to develop the methods and capabilities within ONS to utilise these sources of data.

- The concept of a Household Inflation Index (HII) was submitted as a response to the 2015 consultation on consumer prices, following which, the National Statistician decided that ONS will conduct research into the concepts and issues raised by a HII. ONS will research this concept further, making use of advice offered by the two advisory panels on consumer price statistics and considering similar work undertaken by other national statistical institutes and academics.

Priorities and timetable

- ONS will address the recommendations raised in the UK Statistics Authority Assessment Report on CPIH and take the actions needed for CPIH to regain its National Statistics status. This will include strengthening the quality assurance of private rental sources, better explaining concepts and methods used in the production of CPIH and effectively engaging with users. This work will take place during the summer of 2016 (L/M)

- ONS will continue the research into the use of alternative data sources and publish updated results later in 2016 (L/M)

- ONS will continue to ensure compliance with European regulations for the production of inflation estimates. The UK CPI is also the UK's Harmonised Index of Consumer Prices (HICP), a measure of inflation produced by all EU member states. To ensure compliance in a number of areas ONS will introduce a lower level of aggregation (called COICOP5) (early 2017), address compliance issues related to the use of a double chain link in the production of CPI/CPIH (early 2017) and implement a temporal sample for certain food items (early 2018) (M/H)

- ONS will publish proposals and a timetable for the development of a Household Inflation Index (HII) in mid-2016 in response to user feedback from the 2015 consultation on consumer prices (M)

- Review quality adjustment methods used in the production of inflation statistics and provide more detail on how quality adjustment is monitored. The treatment of quality change was raised in the Johnson Review, the Bean Review and by users in response to the 2015 consultation. This work will take place during 2017 (M)

- Review the quality and implement improvements to the suite of producer price indices. In particular, during 2016/17 ONS will make improvements to the samples and methodology underpinning the services producer price indices and trade price indices (M)

- ONS will continue (during 2016) to investigate options for improving the measurement of construction output prices, leading to improvements in the current interim indices (H)

- ONS will finalise the methodology to be used in the calculation of a single, official house price index (HPI) that will replace the current HPIs published separately by ONS and the Land Registry. The new HPI will be produced by ONS and published jointly with the Land Registry in mid-2016 (M/H)

6. Measuring the modern economy – the digital revolution

The rapid pace of innovation and technological change in the UK has important consequences for measurement of the economy.

The Bean Review identified three consequences of the digital revolution:

(1) Technologically-induced disintermediation, the resulting fall in transaction costs, and unconventional business models are blurring the boundaries between work, domestic activity (home production) and leisure. The nature of the resulting transactions means that they may not be picked up in conventional approaches to measurement of the economy, or that it is difficult to observe market prices at which they take place.

(2)The rapid pace of change creates difficulties in accounting for quality changes - for instance in judging how to cater for replacement of products in price indices.

(3) Classification systems of economic activity, for instance the Standard Industrial Classification (SIC) that is used to define industry groupings, are typically updated only periodically. They therefore cannot keep up with rapid changes in the structure of the economy, and they may not provide the granularity necessary to cater for changing needs of users. This is a long-standing issue, but is especially pertinent in the context of rapid changes as a result of the digital revolution.

There is also a need to consider and make progress in the measurement of other new forms of economic activity. Value added is increasingly generated not through production of physical goods or even of services as traditionally understood but through production of knowledge of intellectual capital and other forms of "intangibles". The recent capitalisation of research and development spending within the National Accounts is a step towards recognition of this issue. But this is only one of a number of steps necessary to move towards adequate measurement.

In similar vein, it is important to continue to develop the measurement of so-called "missing capitals" – for example, human capital, or natural and environmental capital. These are increasingly important in driving economic growth and productivity increases in a modern economy, and good statistical

information is essential to underpin public debate about aspects of sustainability. This is discussed in greater detail in section 7 "Beyond GDP".

The behaviour of multi-national corporations adds to the challenges to reliable measurement of the movement of people and economic activity (eg digital activities) across international borders.

International collaboration is of increasing importance. In some cases, other statistical agencies have made progress from which the UK can learn - developments in flow of funds statistics using administrative data to improve quality that have been accomplished by Portugal and Austria are a case in point. Further, some issues with economic statistics that arise from increased globalisation can only sensibly be addressed bilaterally or multilaterally.

Areas for research

- Measuring those (intangible) capital-generating activities not already incorporated into the National Accounts, including the role of management and organisational capital in firm/economy performance and productivity
- Building on the recent ONS response (April 2016) on the sharing economy – both conceptual and measurement aspects
- Determining how to include home production in productivity calculations to identify a consistent series over time (i.e. a measure of productivity change which shows what would have happened if the same outputs had continued to be produced in the market rather than the household sector)
- Implementation of the new Frascati manual in order to improve estimates of R&D spending
- Building on recent work to link a range of data sources to enable the analysis of global trade, particularly contributing to the international debate about the extent of trade in value added (TiVA) - where value is added by organisations in one country combining parts in a production process that have largely been sourced (imported) from another country and then exporting the combined product at a higher value than the component parts

Priorities and timetable

- ONS will hold a workshop with interested parties to aid its understanding of activities which may be affecting the split between the market and household sectors, its scope and scale, and the implications for measurement of GDP and other economic aggregates (L)
- ONS will conduct regular horizon scanning workshops to identify issues that raise measurement challenges (L)
- ONS will engage actively in discussions in international fora in order to influence the future direction of change in the international conventions that bear on the measurement of economic activity (L)

7. Beyond GDP – broader measures of welfare and activity

While GDP is an internationally accepted measure of the size of the economy, its limitations are widely acknowledged. In particular, for a number of reasons it is flawed as a measure of broader social welfare. For instance, headline GDP estimates include the impact of population changes on aggregate economic activity, but they do not capture what this means at the individual or household level.

There is therefore value in compiling and publishing a wider range of information rather than GDP alone. ONS now publishes on a quarterly basis a suite of measures to complement the GDP data, including GDP per capita, net national disposable income per capita, and information about the distribution of income.

GDP does not capture activities where no market transaction takes place, for instance time spent by households on "production" activities such as childcare, transport, etc. In addition, the fall in marginal costs of using IT platforms resulting from technological improvements has led to households undertaking more transactions themselves, eg booking holidays.

Conventional GDP estimates make no allowance for the depletion of natural resources that may be inherent in many forms of economic activity. ONS

publishes regular environmental accounts for the UK, and the information contained therein can be developed to form the basis of an estimate of GDP that is adjusted to reflect the consumption of natural resources.

A project is in place to produce innovative ecosystem accounts, for incorporation into the environmental satellite accounts. The accounts value and record changes in the extent and condition of the UK's natural resources and also the services provided by nature, such as carbon storage and climate regulation.

By valuing natural capital, it is possible to measure the gains and losses in nature that would otherwise go unrecorded, and thereby support economic decision making. The accounts aim to provide consistent and comparable data sets which allow economic and environmental information to work together.

Areas for research

- Building on the recently published household satellite accounts (HHSA) to include internet-based activities e.g. booking holidays at home rather than at the travel agent
- Development of natural capital accounts

Priorities and timetable

- Update recent household satellite account estimates making use of time-use survey data (from the Centre for Time Use Research) to value time spent on home production (autumn 2016) (M)
- ONS will publish household satellite accounts on a regular basis to meet user-demand (ongoing) (L)
- Development of natural capital accounts - in partnership with the Department for the Environment, Food and Rural Affairs (Defra) and supported by the Natural Capital Committee - with the aim of inclusion in the environmental satellite accounts by 2020 (H)

8. Enhanced analytical capability to interrogate and understand large underlying datasets sources

In order to understand the statistics that ONS produces, and to explain them to users, it is necessary to develop additional capability to interrogate underlying datasets and draw appropriate inferences. For ONS, this enables the investigation of economic and statistical puzzles – for instance where economic statistics do not conform to prior expectations in a way that is easy to explain or interpret.

Increasingly users of statistics also want to look behind the headline numbers themselves in order to assess what is happening at a more detailed level.

Economic micro-data, anonymised as appropriate, is the key to progress in understanding economic developments in many areas. Improvements to the VML (Virtual Micro-data Laboratory: the mechanism through which ONS makes micro-data available to approved researchers in a secure environment, either directly or as a source for the UK Data Service's Secure Data Service) – or other means of making micro-data available to researchers - will help users to conduct their own analysis of ONS surveys and other datasets. ONS publishes additional analysis to provide more disaggregated levels of information – for instance in its monthly Economic Review.

- The **Virtual Micro-Data Laboratory (VML)** team at the ONS have commenced work to improve the documentation and meta-data labelling of micro-data databases held in the VML - these are made available on a continuous basis. ONS is also investigating how to simplify error-reporting by VML users to help improve the accuracy of the data more quickly.

- ONS commissioned the University of the West of England to review and update the Annual Respondent Database (ARD) - a principal dataset for microdata analysis in the VML. This work has focussed on the following areas:

    i.   Updating the ARD and ARD Register Panel to include the most recent business and employment surveys and establishing a

       simplified process for regular and timely annual updates going forward.

    ii.   Updating the firm level capital stocks variable using a PIM model

    iii.   Clarifying the data sources for the labour variables currently in the ARD /IDBR, and better describing these to ensure their origins are reflected in the meta-data.

    iv.   Improving the meta-data, labelling and documentation for the ARD, especially for derived variables.

    v.   Making marginal changes to GVA measures, removing some identified coding errors

- Further to rigorous quality assurance of the revised version of ARD (called ARDx) and capital stock data in the VML, ONS intends to augment the dataset to enable robust productivity analyses based on the growth accounting framework. This involves:

  a. Developing estimates of firms' intangible investments and assets in ARDx

  b. Developing estimates of firms' capital services in ARDx

  c. Linking-in new data on management practices from the Management Practices Survey (MPS)

  d. Providing indicators of firms' multi-factor productivity

- ONS will explore and encourage the potential uses of the ARDx for use in projects on productivity and other economic issues. ARDx will play an increasingly important role in the systematic review and triangulation of published industry level productivity estimates with microdata estimates as a quality assurance, exploratory and explanatory tool. The dataset will also be made available to the wider research community in the VML and Secure Data Service

- ONS will work closely with external researchers to test the capability of ARDx to provide new insights and will seek to make improvements to the dataset if required

- ONS will continue to improve the documentation made available to researchers and to help them to understand better the datasets and any future changes. Improvements include:
    - Documentation made available to researchers in the VML environment has been updated and documents with FAQs are being created
    - A variable catalogue for each single dataset, listing all variables for all years of data
    - Variable names are being made consistent through time and all variables will be labelled fully
    - A standard metadata template is being rolled-out across VML datasets. The new metadata document aims to hold detailed information relevant to microdata users

9. Understanding the productivity puzzle

Many of the topics already discussed have a bearing on the so-called productivity conundrum - the persistent weakness of productivity since 2008, which is at odds with previous experience. This is one of the key features of the UK economy (and other developed economies) in recent years.

There is a twin agenda here: first, to understand to what extent measurement issues might have a bearing on apparent experience; and secondly to advance the understanding of what underlies recent experience. Given its importance, and the substantial programme of research that is planned – in partnership with other institutions and researchers - productivity is considered as a separate agenda item in this document.

The key strands of the workplan are:

- Re-developing the multi-factor productivity methodology using a growth accounting framework to better accommodate new inputs – natural capital, infrastructure, management capital, and dividing capital into

tangible and intangible capital - to deliver a quarterly output. This will involve the development, as identified in the Bean review of quarterly volume index of capital services (VICS) and quality adjusted labour indices (QALI). ONS will also review whether ONS can adjust QALI estimation to take into account sectoral and health related factors as well as skill/educational levels. Within this ONS will develop a publication in relation to infrastructure statistics (H)

- Driving forward double deflation as a key mechanism for identifying whether gross value added estimates are unbiased, in particular around identifying appropriate deflators for intermediate inputs (H)

- Working with the Institute of Engineers and Technology (IET), Ofcom, Cabinet Office and academics from Imperial College London, London School of Economics (LSE) and University of Manchester to investigate quality adjustment of prices in technology products (M)

- Developing a programme of micro-data driven deep-dive assessments at the industry level, using firm-level micro-data to identify hypotheses for potential sources of measurement error and providing evidence to resolve these (H)

- A pilot Management Practices Survey in the manufacturing sector is currently in the field. ONS will merge this data into the microdata in the VML to enable analysis to allow comparative analysis with other countries (H)

- ONS will work with leading academics at LSE and Stanford University to cognitively test management practices surveys to cover the market service sector, working with ESRC to establish a regular survey (H)

Areas for research

- Establishment of a work programme to form a founding pillar of the research programme for the Economics Statistics Centre of Excellence
- Specifying hedonic models for further goods to investigate whether these have a significant effect

Priorities and timetable

- **June 2016** – ONS/IET meeting on quality adjustment of prices in technology products
- **July 2016** – publication of timely public sector productivity statistics in the Productivity bulletin
- **August 2016 –** commencement of cognitive testing of management practices questions in the services sector
- **October 2016 –** Productivity bulletin, including International Comparisons of Productivity.
- **January 2017 –** Productivity bulletin, including analysis of Management Practices Pilot Survey
- **2017 –** Management Practices Pilot Survey (Services)
- **2016-17** – Ongoing development of double deflation project

10. Exploiting administrative data and a wide range of other data

Technical and other advances open up possibilities of compiling economic statistics at lower cost, whilst offering higher quality by virtue of using a wider range of data sources, including administrative data or "big data" sources. It is crucially important for ONS to pursue such possibilities, although protection of confidentiality has of course to be a central consideration.

The ONS will seek to gain access to data sources from three key sectors:

- other government departments
- regulatory bodies
- businesses and other private sector organisations

These newly developed data sources will benefit ONS by allowing the replacement of existing sources with more comprehensive and more detailed datasets.

Additional data will also lead to improvements to existing sources by enabling better quality assurance of survey returns and the potential to reshape existing surveys to focus on collecting detail not always available from external datasets. It also has the potential to lead to a reallocation of funds away from

existing surveys and towards the collection of information not available from external sources but required to meet key measurement priorities.

The benefits of external data extend beyond the improvement of ONS's statistical outputs and will also lead to the production of new statistics and richer economic analysis of larger micro economic data.

However the quality of each data source and its relevance for ONS economic statistics, as well as any resulting problems of consistency and coherence, will need to be evaluated on a case-by-case basis.

Areas for research

- Dataset specific research - establishing how each data source can be used best across ONS
- Development of administrative data processing and estimation methodology
- Investigation of HMRC datasets to analyse further variables for their potential deployment, including trade purchases, PAYE data
- Greater use of administrative data, together with information from private sector sources ("big data"), may offer a way forward for producing regional price estimates

Priorities and timetable

- Continue to explore the full potential of administrative and big datasets to streamline existing data collections from businesses and individuals, reducing data collection burdens, increasing sample sizes and improving accuracy. Electronic data collection to reduce the costs of data collection further will also play a key role (H)
- Take opportunities to streamline and simplify data sharing powers (L/M)
- Undertake analysis and investigation in order to make full use of HMRC data for variables such as VAT, PAYE and corporation tax (H)

- ONS will work collaboratively to integrate regulatory data from the Bank of England and the Financial Conduct Authority in order to produce enhanced financial accounts (H)
- ONS will develop improved measures of consumer prices from web scraping and scanner data, incorporating them into official statistics subject to robust quality checks (M/H)
- Where appropriate, purchase products from big data collection and aggregation agencies in the private sector, such as credit rating agencies and monitors of financial markets (H)
- Whenever external sources provide higher quality information or significantly reduce costs of collection and respondent burden, ONS will rebalance its data sources and develop smaller more focussed surveys (L)
- Replacement of parts of the Monthly Business Survey (MBS) sample with VAT turnover data – pilot from 2016 or 2017, with phased approach thereafter resulting in full integration by Blue Book 2019 (H)
- Make use of HMRC EU sales data to improve estimates of trade in services (H)

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