ABS submission – Productivity Inquiry 10 Feb 2017

The ABS welcomes the announcement of five yearly inquiries into Australia's productivity performance, given the important role productivity plays in economic growth and living standards.

The ABS understands the scope of the current inquiry is, in many cases, much broader than can be analysed using current ABS statistics. For example the inquiry seeks to look at the impact of free goods and services, and the productivity of leisure time.

The Productivity Commission (PC) paper accompanying the call for submissions outlines many of the ongoing and emerging challenges which accompany the compilation of economic and productivity statistics. These include the changing nature of economies (such as the increasing use of digital technologies), adjusting prices for changes in quality and measuring output in the non-market sector.

This submission has been prepared to provide a roadmap for the PC (and other stakeholders) of productivity data availability, as well as the current and forward work program of the ABS in the productivity measurement space. Work underway which may, in the future, result in data which is relevant to the scope of this inquiry has also been included.

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1. INTRODUCTION

1. The Australian Bureau of Statistics (ABS) welcomes the opportunity to contribute to the Productivity Commissions' Productivity Review, announced in 2016.

2. The ABS is Australia's official national statistical agency. The role of the ABS is to assist and encourage informed decision-making, research and discussion within governments and the community by providing high quality, objective and responsive statistics.

3. This submission focuses on three main areas: current productivity statistics, recent developments made in the measurement of productivity, and the ABS forward work program which seek to further enhance productivity statistics in coming years.

4. There are three key messages from this ABS submission.

5. First, ABS productivity statistics are compiled employing the best international practices and as a key international contributor in this field, the ABS is among the leading statistical agencies in terms of the quality of its productivity statistics.

6. Second, there remain many measurement issues and challenges when compiling economic statistics, including productivity, despite years of research.

7. Third, the ABS has made significant progress in improving its productivity statistics, and has a significant forward work program that aims to further this progress. This will ensure that official productivity statistics remain fit for purpose.

2. PRODUCTIVITY MEASUREMENT

8. Measuring productivity is an important work program for statistical agencies. The OECD has produced a number of handbooks and manuals for 'best practice' in productivity measurement.

9. ABS multifactor productivity statistics are compiled on the basis of the standard growth accounting framework, which has been widely adopted and recommended by the OECD.

10. For a detailed description of the growth accounting framework, see Chapter 19 Productivity Measures in the *Australian System of National Accounts: Concepts, Sources and Methods* (ABS cat. no. 5216.0).

Data availability

11. Quarterly estimates of labour productivity for industries comprising the market sector and the whole economy are published in the Australian National Accounts: National Income, Expenditure and Product (ABS Cat. no. 5206.0).

12. The ABS produces annual indexes of labour productivity (LP), capital productivity (KP) and multifactor productivity (MFP) for the market sector (including growth cycle analysis). These are published in the *Australian System of National Accounts* (ABS Cat. no. 5204.0). Data are available on both an hours worked basis, and a quality adjusted hours worked basis. LP indexes for individual industries are also available.

13. Individual industry level data are available in in *Experimental Estimates of Industry Multifactor Productivity* (ABS Cat. no. 5260.0.55.002) for market sector industries. In addition to industry estimates of LP, KP, MFP and growth cycles, various input data are also published, including labour input and capital services indexes, capital rental prices income shares for value added based MFP and productive capital stock for both incorporated and unincorporated enterprises. Supplementary tables of industry's contribution to market sector labour productivity growth are also available.

14. Experimental KLEMS productivity estimates are also published in ABS cat. no. 5260.0.55.004: *Experimental Estimates of Industry Level KLEMS Multifactor Productivity* (see Chapter 3 for further information). These productivity statistics include intermediate inputs, allowing analysis of Energy, Materials and Services intermediate use on an industry basis.

Key assumptions and data limitations

15. In practice it is difficult for statistical agencies to derive perfect measures of productivity. The following is a brief discussion of key assumptions and data limitations in the measurement of productivity statistics.

16. Global best practice used to compile national accounts and productivity estimates assumes constant returns to scale and perfect market competition (such that the marginal products of capital and labour are equal to their respective real market prices). These assumptions are unlikely to always hold in practice. If there are scale efficiencies, then these will be captured as an increase in MFP. This possibility is likely of firms operating in an environment of increasing returns to scale, particularly over short periods.

17. The growth accounting framework assumes that producers behave efficiently (i.e. they minimise costs and/or maximise revenue), which does not always hold in practice.

18. While these assumptions are not always met, they do provide a reasonable approximation by which to construct productivity estimates.

19. The ABS, using standard practice adopted by statistical agencies, makes the assumption that capital services are proportional to capital stock. This simplifying assumption does not capture the fact that business cycle fluctuations result in fluctuations in the rate of utilisation of existing machines, equipment and other capital assets. It also does not capture the impact of significant capital investment that takes several years of development before becoming productive (as has been seen in the Mining industry recently). The assumption that utilisation of capital is constant means that, when there is idle capital stock included in productivity measurement, productivity growth is lower than if idle capital stock was excluded from the calculations.

20. A key limitation in current productivity estimates relates to coverage of MFP data, which is confined to industries in the market sector. The Australian System of National accounts (ASNA) defines the non-market sector to be Health and social services, Education and training, and Public administration and safety, with the market sector comprising all other industries. In practice, there are non-market elements in many industry classifications (for example the Australian Bureau of Statistics is classified in the Professional, Scientific and Technical services industry), while elements of the non-market sector have private sector components (e.g. private schools). However the three industries comprising the non-market sector predominantly comprise organisations which provide goods and services at a greatly subsidised price, making output difficult to measure. Chapter 3 contains details of work underway by the ABS to improve the measurement of health output in the National Accounts, with the aim of producing productivity statistics in the future.

21. For market sector industries, important data limitations remain. To measure real output, statisticians need information on the quantity of all goods and services produced, along with average prices received for each of these goods and services. In practice, what is usually available are estimates of revenue totals in current dollars, from which real output measures are derived by dividing current value totals by price indexes. As a result, the quality of real output measures critically depends on the quality of the available price data. Adjusting for quality changes and the appropriate inclusion of new goods and services in constructing good price indexes requires an ongoing research effort from statistical agencies.

22. Aggregating heterogeneous labour inputs is also challenging. The standard method of accounting for quality changes in labour inputs is to disaggregate hours worked by education, potential work experience and gender. This accounting method is confined only to generic human capital skills (such as educational attainment and working experience). Firm specific and task specific human capital skills are still left unaccounted. While occupation and industry information could be useful for doing this, it is extremely difficult to define homogeneous occupational and industrial classes over even moderate periods of time.

23. Another challenging component in productivity measurement is to measure capital input. The construction of a capital stock series, based on a cumulated function of past investment expenditures (the perpetual inventory model (PIM)), critically depends on the availability of constant quality price indexes and assumptions regarding the capital decay process. There is an on-going body of work to examine the assumptions and data sources used in the PIM to ensure that assumptions remain appropriate and data is reliable. Importantly, changes in capital stock estimates will only impact significantly on productivity estimates if changes to the growth rate of capital stock occur.

24. The rate of return on capital assets is a key variable for estimating rental prices with which to aggregate all types of capital services to form a measure of capital inputs. Researchers and practitioners are still divided on the relative merits of alternative approaches (endogenous versus exogenous) in deriving rates of return to capital assets. Consequently productivity of capital inputs are assumed to be constant across all industries, thus there are no productivity changes as a result of movement of one type of capital between industries. This issue has increased in importance with the trend in compiling more granular productivity statistics, such as at the industry or state level. The treatment of business income taxes is another complex issue in the construction of user costs of capital.

25. Given the various assumptions and measurement issues discussed above, and the lack of perfect methods for addressing them, it is inevitable that ABS measures of productivity growth reflect a mix of factors, such as economies of scale and scope, reallocation effects of labour and capital, climate and water availability, measurement error and other factors. Caution therefore needs to be exercised in interpreting productivity measures, particularly when looking at year-to-year changes. The ABS advises users to examine productivity changes over an extended period to look through short-term volatility. Growth cycles provide ones means for undertaking analysis of this kind.

The digital economy

26. The global slowdown in productivity growth has led to speculation that mismeasurement of the digital economy within the National Accounts may be responsible. However, low global wage growth would appear to support low productivity growth estimates.

27. While there is no agreed definition of the digital economy in the literature, the G20 have recently defined it as "economic activity that includes using digitised information and knowledge as the key factor of production".

28. Most 'mismeasurement' issues raised relating to digital economy activity are not new – they are all well-known issues, presented through a different lens.

29. The ABS view is that conceptually, the activities of the digital economy are included in the Australian System of National Accounts (ASNA) framework. If the enterprise operating in the digital economy is engaged in the Australian tax system, then the activity is captured in Australia's GDP data. Other, less regular sources of data (such as the Household Expenditure Survey) will capture expenditure and production relating to the digital economy (albeit with a lag).

30. Increasing digitalisation may also provide many solutions to adequately capturing source data (e.g. scanner data is now incorporated into the ABS CPI dataset), while 'web-scraping' is being progressively integrated into CPI data.

31. Arguments have been made that the official ASNA and productivity estimates do not include increases in consumer surplus, which is where much of the productivity impact of the digital economy can be seen (e.g. paying bills via a bank app create additional leisure time for the consumer). This is true. The National Accounts framework measures production, not consumer surplus. Indeed most household production for own use has never been captured in the National Accounts (such as domestic cleaning, cooking etc.).

32. Another view is that the ASNA framework should be extended to include output which had been traditionally included, but is now being undertaken by the consumer (e.g. consumers now booking holidays on line instead of going to a travel agent). This again falls into the category of household production for own use, and should not be included in National Accounts.

33. That is not to say that data regarding these activities should not be compiled in the form of satellite accounts, should there be a strong case for use in policy development and analysis).

34. There are two main areas of concern regarding the digital economy, both of which are ongoing concerns, particularly in the service industries:

35. Classifications: the digital economy is not visible in current industry classifications used by the ABS, or other NSOs. This is often the case where a sector contains elements of different ANZSIC industry classifications.

36. Deflators: The deflators used to arrive at volume data may not be appropriate for digital economy activity. For example, the deflator that is currently used for taxi and other ride sharing services sector may not be the appropriate deflator for Uber if Uber has different pricing and quality attributes compared to taxi services (i.e. a different production

function). If the growth rates of the two different units are substantially different, this would impact productivity growth.

37. The OECD Working Party for National Accounts has formed an advisory group to advance the measurement of the digital economy agenda. The work of the group, of which ABS is a member, will help to shape the discussion on quantifying the effects of the digital economy on the economy and productivity measures.

38. Specifically the group is tasked with the following four issues:

    - Clarify the statistical concepts relevant to the digital economy (products, industries, potential data sources, new opportunities to collect data, potential indicators etc.)
    - Quantify potential mismeasurement issues, including the adequacy of price indexes and investment due to the partial use of consumer durables as business assets
    - Quantify the value of 'free' goods and services
    - Quantify cross border digital economy related trade, including e-commerce, digital services and IP products.

39. An interim report is due in November 2017, with the final report to be presented at the 2018 Working Party of National Accounts meeting (November 2018).

40. In the interim, the ABS National Accounts plans to undertake its own research work to investigate the size of the GDP gap which would be necessary to bring total productivity growth to rates seen in the 1990s. Further, analysis of digital intermediate input use will be investigated using annual data. This research work has not yet commenced.

3. RECENT IMPROVEMENTS TO PRODUCTIVITY STATISTICS

41. The ABS continues to devote considerable effort to extending and enhancing its measures of productivity. The forward work program is discussed with key stakeholders at the Productivity Measurement Reference Group, which meets annually. Given that MFP is calculated using many data sources, improvements in the measurement of output or inputs will enhance the quality of productivity statistics.

42. In 2015 the ABS expanded its suite of productivity indicators, releasing a new KLEMS database. KLEMS is presented on a gross output basis (rather than on a value added basis used in all other productivity estimates), and thus allows the separation of inputs into primary (Capital and Labour) and Intermediate (Energy Materials and Services) inputs. KLEMS is a useful tool in addressing the challenge of developing more detailed industry performance indicators for the formulation and evaluation of policies involving long–term growth, efficiency and competitiveness. The KLEMS approach provides a more detailed statistical decomposition regarding the inputs contributing to output growth, and production efficiency. This helps policy makers and economists to identify factors associated with economic growth, such as structural changes in an industry's input mix, particularly with regards to the relative contribution from the intermediate inputs. This also facilitates a disaggregated analysis of the industry origins of aggregate productivity growth, such as changes in the relative importance of input components over time.

43. The ABS released industry level productivity growth cycles in 2016 (see ABS cat. no. 5260.0.55.002). These estimates allow analysis at the industry level of productivity growth between growth cycle peaks, thus abstracting from the assumption of constant capital utilisation.

44. In 2014, the ABS also released experimental supplementary tables of contributions to market sector labour productivity by industry, facilitating analysis of key industry drivers of market sector labour productivity growth. Using the growth accounting framework, direct and reallocation effect contributions are explicitly identified, as well as the contributions to labour productivity from capital deepening (partitioned into IT and non-IT contributions). The supplementary tables also include an experimental Mining growth account quantifying the modelled contribution from mineral and energy resources.

45. The ABS has made significant progress in improving its measures of capital investment and stocks in the National Accounts. Better use of annual business survey data to split aggregates by industry has seen some investment reclassified, resulting in a growing profile for non-mining investment over recent years that is more consistent with survey measures of business conditions and capacity utilisation. Private investment in software was revised based on annual business survey data, resulting in somewhat stronger growth in the past couple of years. These improved estimates feed into measures of productivity.

4. FORWARD WORK PROGRAM

47. There are several regular and planned revisions and improvements to economic statistics that will impact productivity estimates over the next two years.

48. A major historical revision for National Accounts is scheduled in 2017. While each annual National Accounts release revises the most recent three years data, approximately every five years or so the full history of the series is opened up to allow new data sources, concepts and methods to be introduced. The 2017 revision has been timed to incorporate benchmarks from detailed industry surveys, census data and household income and expenditure weights. This will change GDP estimates, and thus impact productivity estimates.

45. Final updates stemming from 2016 Census data will be incorporated into Estimated Resident Population mid-2018. These updated data will flow through to the Labour Force Survey, National Accounts and productivity statistics (in the form of updated hours worked data) in 2018.

46. Transaction data has been incorporated in the CPI since 2014. Transaction data (including scanner data) can produce prices both more accurately and more efficiently. Its use will grow over time, and will narrow the role of CPI Field Officers to areas of the CPI that are difficult to price, say due to quality adjustment (e.g. motor vehicles).

47. Analytical work has demonstrated that moving to annual reweighting of the CPI based on National Accounts household expenditure weights can materially reduce the substitution bias in the CPI (which leads to an overestimation of the pace of inflation). This also improves the alignment of the CPI with international standards. From 2018, the ABS will move from 6 yearly re-weighting of the CPI to annual re-weighting.

48. Reductions in manufacturing product detail in the Input Output tables (from 1267 to 917 products) will result in lower processing costs and provider burden and make resources available to do more in depth surveys and analysis of service industries. Better output information for service industries will result in higher quality productivity statistics in these industries. The trade-off is less detail in manufacturing products.

49. The following projects cover in more depth ongoing research projects that have the potential to increase quality or scope of productivity estimates.

Producer Price Index service sector coverage and quality adjustment

50. The principle purpose of the PPIs is to support National Accounts compilation. The PPIs achieve this purpose through measuring price change by industry, providing a major input to price deflators that enable output and productivity growth by industry to be measured accurately in volume terms. Development of service producer price indexes commenced in the late 1990s, and work has accelerated over the past five years with the 2011 New Policy Proposal (NPP) to improve Macroeconomic Statistics. This NPP recognised the

need to improve productivity measurement through expanding coverage of PPI's in Services industries. Improving Services PPI's is now a rolling part of the PPI work program, and has to date resulted in the development of:

- Division E Construction - Class 3109 Other Heavy and Civil Engineering Construction
- Division G Retail Trade (margins)
- Division I Transport, Postal, Storage and Warehousing; Division M Professional, Scientific and Technical Services; Division N Administrative and Support Services; Division S Other Services - various ANZSIC classes

51. The project has also improved the robustness, timeliness and quality of existing services PPIs.

52. The forward work program for services PPI development gives priority to three areas of the service economy:

    - Division J Information Media and Telecommunications - telecommunication services, beginning with households and small-to-medium enterprises
    - Division P Education and Training - domestic primary, secondary and higher education; international trade in services for secondary and higher education, and technical and vocational education and training.
    - Division Q Health Care and Social Assistance - initial focus on utilising Medical Benefits Scheme administrative data, but consideration also being given to public and private hospital patients, allied health and aged care services.

53. The forward work program also includes a fourth project to develop a PPI measuring domestic oil and gas extraction prices. This is a response to the rapid expansion of the LNG export market and the possible impacts this will have on domestic supply and prices.

State productivity estimates

54. The development of experimental state capital stock estimates facilitates the development of state productivity estimates. Productivity estimates by state have been a key data gap in the suite of productivity estimates. Estimates of LP, KP and MFP are under development, and an information paper containing the experimental estimates will be released in 2017. This paper will seek feedback and comments from stakeholders regarding methodology and assumptions used in the compilation process.

55. State productivity estimates will remain experimental as long as the state capital stock measures remain experimental in nature.

Non market sector output and productivity

56. The current suite of productivity statistics do not extend to the non-market sector. Indeed, meaningful measures of productivity growth for the non-market sector are available for very few countries. Health and Education are among the most important services

industries of interest to governments and understanding the performance of these industries is important to informing policy formulation.

57. The ABS plans to develop estimates for two of the non-market industries, starting with the health subindustry, before moving to the education industry, and finally tackling social services.

58. Two concurrent projects are underway to further develop output measures in the health sector to facilitate the development of productivity statistics in the future; the first has a short term objective, while the second a longer term focus. The first is to quality assure current measures of health and social assistance output in the National Accounts against detailed data from a range of sources. The second project is scoping the feasibility of moving to a measure of health output on the basis of completed courses of treatment rather than the current practice of summing procedures administered. The project seeks to allocate health care services expenditure, construct price indexes and output by disease.

59. The ABS plans to conduct further research on how to include new health output measures in official productivity statistics in future. This will involve investigating the best international practices in these fields and assessing the relevance and quality of available data. Should time allow, it will also involve identifying potential data sources which would provide a rich source of information about activity in the non-market sector once integrated (for example state administrative health data).

60. There are no current plans to develop estimates for public administration and safety, although the ABS recognises the importance of this industry in driving productivity in all other industries.

61. Given the exponential growth in expenditure on health services in Australia, the economic statistics produced through the project will assist policymakers to better understand the nature of increases in health expenditure in terms of quantity growth or pure price growth. The results of the project support more effective targeting of government resources for Australia's health industry.

Time Use Survey

62. Time use surveys (TUS) can be used to augment official productivity statistics, particularly within the non-market sector, providing a more complete picture of economic activity, prosperity and productivity.

63. The discussion paper released by the PC noted that data regarding time spent in road congestion or technological advances which free up greater amounts of leisure time are not captured in official statistics. This is true from a National Accounts and macro

productivity perspective, however data is available from the TUS. For example, data on time spent travelling to work is collected in this survey[1].

64. The ABS currently has no plans to conduct another Time Use Survey (within its current resources), but recognises that there are many clear and relevant uses for time use information.

65. The ABS ran a TUS in 1992, 1997 and 2006, collecting a two day 24-hour activity diary from a nationally representative sample of households. Time use diaries provide a direct measure of the time household's use for such things as paid and unpaid work, education, consumer purchases and services, eating and drinking, socialising, leisure, volunteering, civic obligations, and travel. The data highlights the way people use their time on multiple activities and how activities are spread within households. The advantages of the diary method are that the respondent does not need to understand what is meant by unpaid work, (or any other category of activity), nor to add together periods of activity that tend to happen in an interrupted way. Time use surveys are a 'count once, use many times' collection, as the data collected can be used in multiple ways for multiple purposes.

66. TUS data can inform productivity analysis in many ways. For example the value of unpaid work falls outside of the current conventional measures of production, as captured by the Australian System of National Accounts (ASNA). However, measuring the value of unpaid work is a worthwhile pursuit, for when the results are combined with traditional measures of production, an augmented picture of the nation's activity is attained. The ABS has used time use data in the compilation of household satellite accounts, most recently in 2014 (see ABS Cat. No. *5205.0: Spotlight on National Accounts, 2014*). This paper shows the impact of extending the production boundary to include unpaid work on the estimates of Gross Domestic Product (GDP).

67. Internationally, time use data has been used to better understand policies around service delivery, transport, labour force participation, household productivity, gender equality and how people engage in productive activities during non-working time. It can also provide an important basis for ongoing maintenance and development of key macroeconomic statistics, such as GDP. Data can also show the way people use their time on multiple activities at once (e.g. child minding while undertaking work), as well as how activities are spread within households.

68. More broadly, TUS data inform the developments in the productivity of leisure time, atypical or flexible working arrangements, duration of work spells, and method and modes of working (for example, online working, volunteering and service use).

[1] Additionally, the Household Use of Information Technology, Australia, 2014-15 (8146.0) captures household's hours spent online, as well as the proportion of goods and services purchased over the internet. Useful infrastructure indicators are also available from Department of Infrastructure and Regional Development in their *State of Australian Cities* publication.

69. A future TUS could potentially be used to measure aspects of the digital economy, such as goods and services bought and sold online, amount of time spent managing online businesses, and amount of time saved by using online rather than face to face services (as well as what people are doing with the time they save).

Labour Accounts

70. Combining industry detail from business surveys of hours paid for with the better coverage of hours worked from the Labour Force Survey will result in more accurate productivity statistics by industry, average employee incomes and unit labour costs. Publication of experimental annual labour accounts is intended in early 2017 and quarterly labour accounts in late 2017.

71. The Labour Account will provide a single source of macro-economic labour statistics with an industry focus and time series dimension. The Labour Account will support user's awareness of multiple labour statistical sources and the extent of both real and apparent inconsistencies.

72. The labour account is macroeconomic in scope, building on the International Labour Organisation (ILO) fundamentals and expanding them to ensure consistency with the Australian System of National Accounts (ASNA). The Labour Account will extend the analytic capacity of national accounts data by providing a labour-specific lens, and is intended for industry analysis of labour growth and performance in terms of people, jobs, hours and income.

73. The Labour Account will provide a conceptual framework through which existing labour market data from diverse sources will be confronted and integrated, with the aim of producing a coherent and consistent set of aggregate labour market statistics. The Labour Account will consist of four quadrant tables: persons, jobs, hours and payments, plus a summary table. Data in each table will be available annually and for each of 19 high level industry groupings.

74. The Labour Account will provide a time-series data on employment, hours and earnings that is conceptually aligned with the ASNA data. This should assist in improving the reliability of macro-economic analysis. Consistent data on employment, hours and incomes will in turn assist in assuring the quality of national accounts production and income data, and the improved alignment of hours worked with production (gross output and gross value added) at an industry level should improve the reliability of both labour and multi-factor productivity statistics.

75. Integration of hours worked data into productivity statistics will go some way to resolving the inconsistency in industry classification often found between business and household surveys (as noted above). The ABS plans to release an information paper in 2017 outlining the impact that Labour Accounts hours worked will have on industry level productivity estimates.

Business Longitudinal Analytical Data Environment (BLADE)

76. Recent years have seen a dramatic increase in international studies on productivity that use longitudinal micro level data, for example, as a means to understand the underlying drivers of productivity growth at the firm level. Such studies enhance the understanding of productivity, beyond simple aggregate measures. The ABS BLADE (previously EABLD) facilitates such analysis.

77. In partnership with the Department of Industry, Innovation and Science, the ABS has built the Business Longitudinal Analysis Data Environment (BLADE) that links administrative and survey data over the period 2001-02 to 2013-14 for all active businesses in Australia. This integrated data environment enables analysis of businesses over time and includes numerous micro-economic variables.

78. The administrative data primarily sourced from the Australian Tax Office contains the core information necessary to estimate productivity at the firm level; that is, proxies for output, intermediate use, labour and capital. ABS survey data linked to date encompass characteristics such as innovation, use of information technology and research and development expenditure.

79. Analysis conducted on BLADE by the Department of Industry so far includes assessing the determinants of employment growth, assessing the determinants of high growth firms and investigating the impacts on firms of participation in government programmes[2]. Analysis using BLADE has revealed that innovation active businesses outperform non-innovation active businesses and that the frequency of innovation matters, as the positive impact of innovation gets stronger when businesses innovate more frequently[3].

80. Of particular relevance to the current PC inquiry, BLADE can be used to identify the patterns of high and low productivity firms - both in terms of levels and growth - and as such can be used to compare recent international research into the characteristics of laggard and frontier firms. Further, once these firms have been identified, the survey data can be utilised to provide greater insight into the business characteristics of these firms over time to examine the factors affecting aggregate productivity growth in Australia.

81. There is potential to integrate any administrative data set with an ABN or any ABS survey data. Further development of BLADE and integration of additional datasets will be dependent on user funding.

82. A BLADE governance committee has been formed that will advise on key policy priorities, agreeing on a high level future work program including the key data sets to be integrated and resolving investment issues. Currently the following data are being

[2] see https://www.industry.gov.au/Office-of-the-Chief-Economist/Research-Papers/Pages/The-employment-dynamics-of-Australian-entrepreneurship.aspx

[3] see https://industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/Australian-Innovation-System/2016-Executive-Summary.pdf

considered for integration, including understanding the transformation required to be able to link it.

- ABS held Trade data
- ABS Employment, Earnings and Hours (EEH) and non-core Annual Industry Statistics (AIS) data e.g. division J.
- Department of Industry Innovation and Science (DIIS) programme data
- National Greenhouse Emissions Reporting Scheme (NGERS) data from the Clean Energy Regulator (CER)

83. Proposed further development includes the addition of employee information which will further enhance the suite of employee based information which can be made available for productivity analysis.

Linked Employer-Employee Database

84. In 2015, the ABS created for the first time a Prototype Linked Employer-Employee Database (LEED) and produced experimental statistical outputs released in an Information Paper: *Construction of Experimental Statistics on Employee Earnings and Jobs from Administrative Data, Australia, 2011-12* (cat. no. 6311.0). The Prototype LEED was constructed for the 2011-12 financial year using a combination of administrative data sourced from the Australian Taxation Office (ATO) and data held by the ABS. Spanning a single financial year, the Prototype LEED includes over ten million employees and over thirteen million jobs which are linked to over six hundred and eighty thousand employing businesses. As such, it captures information about the majority of employment in Australia throughout 2011-12.

85. A future longitudinal LEED, based on person and business level data would address a longstanding information gap in Australian labour statistics by providing a single database capable of addressing complex and varied questions about employer-employee relationships both at a point in time and longitudinally. Enabling a longitudinal view of linked employer and employee data would aid the analysis of drivers of labour market change, firm-level productivity, and sustainable regional economies. The ABS is currently exploring the integration of employee level information to the BLADE to achieve this outcome. Integration progress and feasibility will be assessed by the ABS in March 2017.

Data Integration

86. The ABS currently has a significant number of projects in the data integration space. Data integration has the potential to increase data quality and breadth, while at the same time decreasing respondent burden and cost of data collection.

87. Like many national statistical offices around the globe, the ABS has been adopting data integration techniques - subject to strict privacy and confidentiality safeguards - to increase the depth and breadth of information available to support research and public

policy in a way that is less costly and less intrusive on households and businesses than traditional data collection methods.

88. A vast amount of administrative data is generated by governments in the provision of services, particularly in the areas of health care, education and training, and through the tax and transfer system. As an Accredited Integrating Authority, the ABS is authorised to safely bring together Commonwealth data for statistical and research purposes in projects such as the Multi-Agency Data Integration Project (MADIP). MADIP brings together information on taxation, government payments, and health services usage, with detailed labour market and demographic information from the Census.

89. Integration of datasets such as those above has significant potential to enable improved analysis of productivity in the non-market sector. Integration of administrative and statistical datasets can provide timely and cost-effective outcome measures to examine the effects of government programs or other interventions, and can also provide information on how different programs interact or may be duplicated. Data integration may be particularly valuable in providing a fuller picture of efficiency in the non-market sector when different programs are delivered by different departments and agencies or different levels of government.

90. While BLADE has produced a significant data environment in which firm level analysis can be undertaken, there remains significant untapped potential to bring together information across the business and social domains. The ABS is actively exploring the integration of firm level data and person level data from administrative and statistical datasets that would allow researchers to understand how the characteristics of employees (such as age, level of education, previous experience, and personal health) relate to firm level productivity. This would provide a greater range of explanatory variables to better understand variation in firm performance as well as allow measures of firm-level human capital to be developed.

91. Data integration has the potential to improve productivity measurement by bringing together existing information about people, places, business or events to create new statistical and research datasets.

5. CONCLUSION

92. The ABS is committed to advancing work in economic statistics generally and specifically in the area of productivity measurement. While the ABS has made significant progress towards refining its productivity statistics in recent years, many challenges still remain. A range of enhancements to ABS productivity statistics are either planned or are already underway. Improving the quality of the suite of ABS productivity statistics and expanding the set of official productivity measures will require an ongoing commitment to sustained effort over a number of years.

93. The ABS looks forward to working with stakeholders to achieve this aim.

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6. REFERENCES

Below is a selection of publications, microdata products and information papers that may be of relevance to the Inquiry.

ABS, 2016, *Forward Work Program, 2016-17*, (cat.no. 1006.0).
http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1006.0~2016-17~Main%20Features~Strategic%20Priorities%20for%202016-2017~3

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