



RBA/ESA Economics Competition 2014

SECOND PRIZE

Angus Gibbs
The University of Sydney

Australia's Declining Multifactor Productivity

Australia's Declining Multifactor Productivity

The most effective measure of productivity in an economy is multifactor productivity (MFP), which is used to measure 'the efficiency with which combined labour and capital inputs are transformed into outputs,' (ABS 2012). Put simply, an increase in MFP suggests that more output is being achieved from the same amount of input (Crafts 2007). MFP growth is essential as it's widely regarded as the central factor in maintaining a high standard of living. However, in the past decade Australia has experienced a deceleration of MFP growth, even experiencing negative growth in most years since 2005 (refer to figure 1).

One of the driving factors responsible for promoting productivity growth within an economy is innovation. The development of new and better production methods pushes out the limit of the output capability within an economy; this is often referred to as the 'productivity frontier' and is represented by the PPF1 curve in figure 2.

The rate of technological innovation determines the limit of economies productivity; however it's the speed with which new technology is integrated and adopted by businesses which determines where an economy is placed relative to the frontier. This is demonstrated in figure 3; technological innovation can extend the frontier from PPF1 to PPF2, however the actual productivity of an economy can only move from point A to point C (closer to the frontier) as businesses integrate this new technology into their own production processes.

Reasons for decline in productivity

Australia has experienced a rapid decrease in multi-factor productivity since the 1990's, through analysing figure 1 we can see that in the past 10 years Australia has actually experienced negative MFP growth. Prominent economist Saul Eslake's (2011) research paper states that multifactor productivity in the Australian economy has declined 0.2% throughout the 2000's compared to a 1.6% p.a rise in the 1990's. Whilst it's widely accepted that some of the slowdown in productivity growth is due to the fading impact of the structural reforms of the 1980's and 90's (Eslake 2011) it is important to understand the other factors that have had such a pertinent impact on the productivity of the Australian economy.

Firstly, it's important to note that Australia has not been alone in its decrease of productivity growth in the past decade. Of the 28 OECD countries for which there is sufficient data available only 3 nations (Israel, Iceland and Japan) experienced faster productivity growth in the 2000's than in the 1990's (Eslake 2011). This data is reflected in figure 4 which charts the declining productivity growth of the world's developed economies. The technology boom of the 1990's is one of the major reasons attributed to this global downturn in MFP; whereby rapid innovation in ICT throughout the 1990's pushed the productivity frontier outwards by boosting production and labour productivity (Carmody 2013). However these developments in ICT have not been able to consistently provide ongoing contributions to productivity growth as their impact on growth has gradually decreased; a concept consistent with the theory of diminishing returns (Gordon 2010).

Through examination of Australia's multifactor productivity on an industry by industry basis we can identify more specific and intrinsic trends within the national economy. By analysing figure 5 we can see that whilst productivity growth has decreased in all sectors since the start of the 2000's it is the agricultural and mining sectors which are responsible for more than half of the drop in productivity growth (Productivity Commission 2008). The effect of the mining boom on the Australian economy has been two fold; whilst the increased demand for Australia's mining resources has increased employment and GDP in the economy it has simultaneously decreased the productivity of the sector. The high levels of demand in the mining sector attracted large levels of capital investment; between 2000 and 2007 real annual investment in the mining sector increased five-fold (Australian Treasury 2009), however this growth in inputs has not yet been reflected in increased output volumes. Despite the increased investment and 50% increase in employment in the mining sector the total output of the sector had only increased by 37% in the decade to 2010. This is largely due to the 'long lead times entailed in bringing modern mining projects to full production,' (Eslake 2011). Furthermore the historically high prices for resources have made it economically viable to mine lower quality minerals which require higher input of labour and capital. Whilst at normal prices these metals would have remained untouched the

demand driven prices have made it a profitable activity which has unfortunately further decreased the productivity of the mining sector (Eslake 2011).

Agriculture is another industry in which the productivity has decreased significantly in comparison to the 1990's. This decline is visually represented in Figure 5 which shows that the MFP of the agricultural sector has fallen at an average rate of 1% per annum throughout the 2000's as opposed to average annual rises of over 3% p.a. in the 1990's (Australian Treasury 2009). With reference to Figure 6 we can see that growth in the last 15 years has significantly slowed specifically in the cropping and mixed crop livestock industries (Hughes et al. 2011). This slow growth has been widely attributed to adverse seasonal conditions as a result of one of the worst decades of drought in Australia's history as well as stagnating investment in agricultural research and development (Gray et al 2014).

The utilities sector has also dramatically decreased its productivity since the turn of the century and between 2003 and 2011 the industry as a whole experienced MFP growth of negative 4.7% (D'Arcy and Gustafsson 2012). The main driving force behind this significant slump is similar to one of the factors impacting upon the mining sector's MFP – large scale investment in the industry. Following structural reform in the 1990's electricity and gas businesses have had to increase investment to meet growing demand, replace ageing infrastructure and meet government mandated energy targets (Eslake 2011). Whilst many of these investments will provide environmental benefits and also ensure long term supply, in the short term they have not resulted in higher quantities of output and have consequently resulted in decreased multifactor productivity (D'Arcy and Gustafsson 2012). This decline is illustrated by the graph in Figure 7 which demonstrates the similar patterns of decline in productivity between the utilities and mining sectors.

Short and Long-run implications

The decrease in Australia's productivity throughout the 2000's was offset by a resource boom driven by a historically high terms of trade. This allowed the Australian economy to experience the unusual trend of fast national income and employment growth despite negative productivity growth (D'Arcy and Gustafsson 2012), a phenomenon which is illustrated in figure 8. However this is unlikely to continue due to declining levels of Chinese economic growth reducing demand for Australia's mining resources and consequently

lowering Australia's terms of trade; as illustrated in figure 9. Many analysts expect that with the terms of trade declining in the short term, real income growth will also slowdown as there is no longer a buffer to protect national incomes from the drop in productivity (D'Arcy and Gustafsson 2012).

Parkinson (2011) postulated that 'in the long run, productivity growth is the only sustainable way for future generations to enjoy higher living standards.' In the long term Australia's real national income growth will converge to reflect productivity growth in the economy.

Assuming that the current negative productivity growth continues Australia will experience long term negative income growth manifesting in rising unemployment as businesses leave to more productive economies.

Government Policy

Government policy can play a critical role in increasing productivity in the economy through removing market distorting regulation and sharpening incentives to increase competition (Turnbull 2014). The Productivity Commission (2005) found that the National Competition Policy directly contributed to increasing Australia's GDP by 2.5%. Furthermore an IMF study found that Australia's removal of trade tariffs and labour market reform in the 80's and 90's lifted multifactor productivity by between 0.5% and 0.9% throughout the 1990's (Salgado 2000). These figures demonstrate the importance of good government policy in navigating productivity growth however as Eslake (2011) postulated 'many of those past reforms were, intrinsically, once offs and once reduced to minimal levels can't be cut or removed again.' As a result it's difficult to accurately evaluate which new policies should be used to address productivity however the main areas in which policy should be focussed are innovation, infrastructure and education (Treasury 2009).

The most important drivers of productivity in an economy are innovation and the ability for businesses to take up new technology in order to stay close to the frontier. One of the central economic theories which underpin the actions of government in promoting innovation is the idea of 'creative destruction' (Schumpeter 1954). This theory works on the view that rather than simply offering tax concessions and grants to businesses for R&D, that by removing unnecessary regulation governments can promote competition. Increased competition in the market will naturally encourage firms to be more creative and firms that

do not adapt or innovate successfully risk losing their market share to firms that do (Productivity Commission 2008). It is for these reasons that the government needs to look at removing some of the red tape measures that have placed Australia as 128th on the 'burden of government regulation' scale in the Global Competitiveness Report (ABC 2014). The areas of greatest burden are shown in figure 10. It is important to note that some current regulation plays an important role in protecting the rights of workers and the environment; however there are certainly areas of regulation which could be reviewed. One example of this is to streamline the payroll tax regulation to create a single national system rather than splitting it up by state, this could allow businesses to submit information once and save on administration costs (Hu and Toth 2014).

Through investing in infrastructure, governments can facilitate more efficient methods of trade and promote more efficient spatial allocation of activity (Australian Treasury 2009). Recent research by the OECD suggested that investments into infrastructure benefit long term output more than any other type of investment (OECD 2009). However the most efficient method of increasing productivity through infrastructure is to make better use of existing infrastructure rather than increased spending in areas that don't bring a 'demonstrable yield in social benefit' (Eslake 2011). Some good examples of current investments in Australia's infrastructure to address areas of weakness include the implementation of the national broadband network as well as the proposed development of a second airport in Sydney's west which is expected to facilitate an increase in GDP of \$24 billion by 2060 (Abbott 2014).

The final key area to be addressed by government policy is the need to train and educate the Australian workforce with the skills necessary to improve productivity and participation in the workforce. The focus areas of reform in education should be on ensuring that the skills in the labour force match the demand from the labour market. This can be achieved through improving the flexibility of tertiary education institutions to allow them to quickly respond to changes in the market (Australian Treasury 2009).

There have been a wide range of macro and microeconomic factors that have caused Australia's sudden deceleration in multifactor productivity growth since the 1990's. Thus far the effect of this decline has largely been offset by a historically high terms of trade.

However, if the drop is allowed to continue national incomes and standards of living will inevitably converge to mirror the decline in MFP growth. In order to navigate a more stable level of productivity growth for the next decade government should be focusing on policy to increase market competition. Whilst targeted fiscal expenditure focused on improving Australia's infrastructure and increasing the flexibility of the education system will also ensure long term productivity growth.

Appendix 1

Figure 1 – Graph of Australia's Multifactor productivity

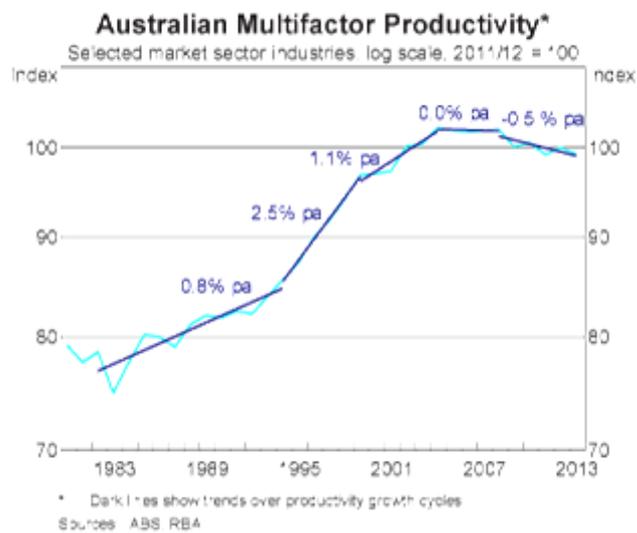


Figure 2 – Production Possibility Frontier

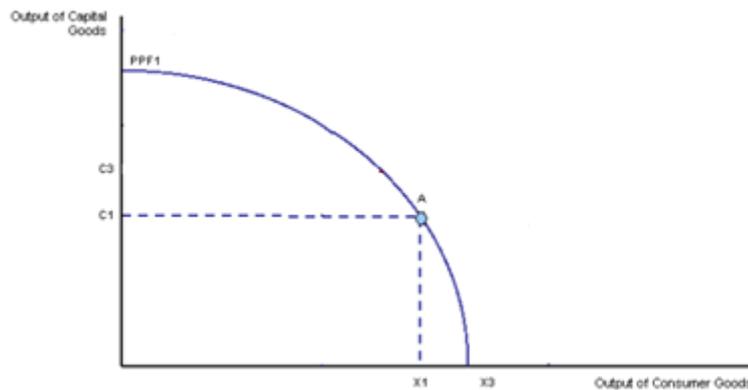


Figure 3 – Outward movement of productivity frontier

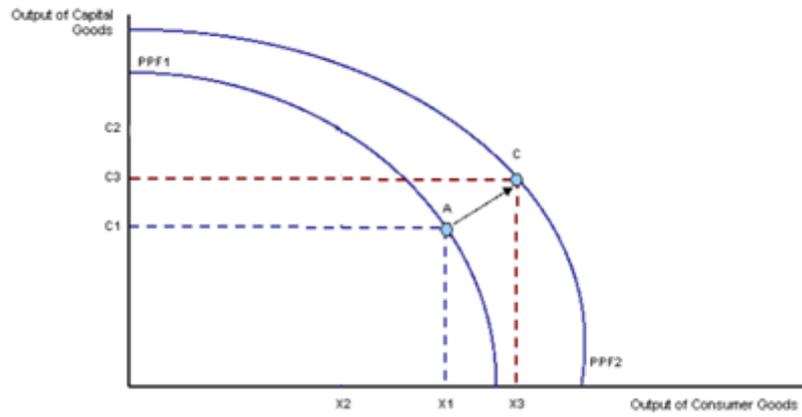
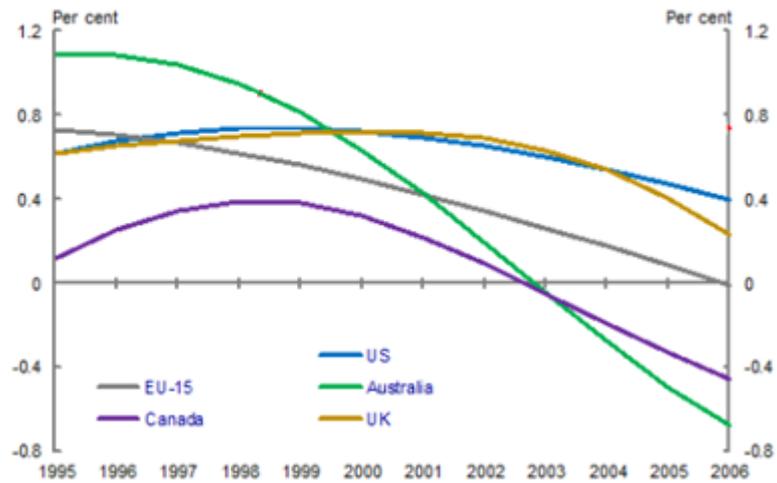
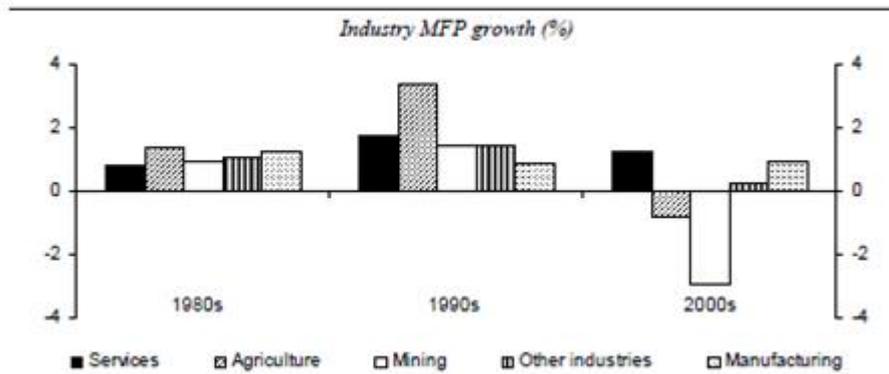


Figure 4 – Multifactor Productivity Growth in Developed Economies



Source: OECD 2008

Figure 5 – Multifactor Productivity in Broad Industry Groups



Source: Productivity Commission 2008

Figure 6 – Agricultural Productivity Growth by Period

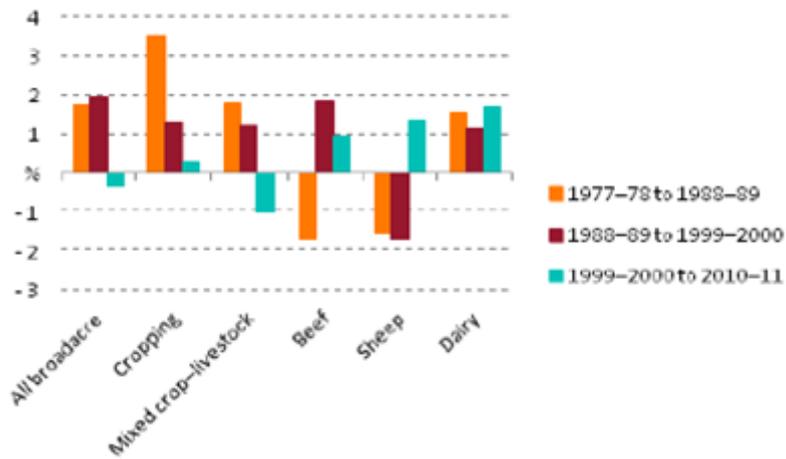


Figure 7 – Multifactor Productivity Utilities and Mining Comparison

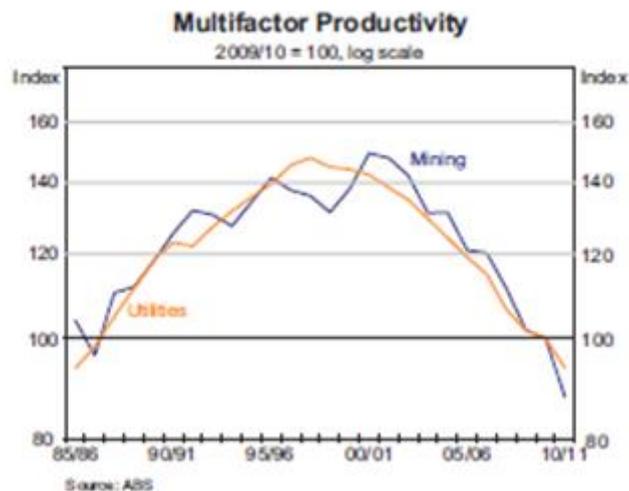


Figure 8 – Components of real GNI growth in the Australian Economy



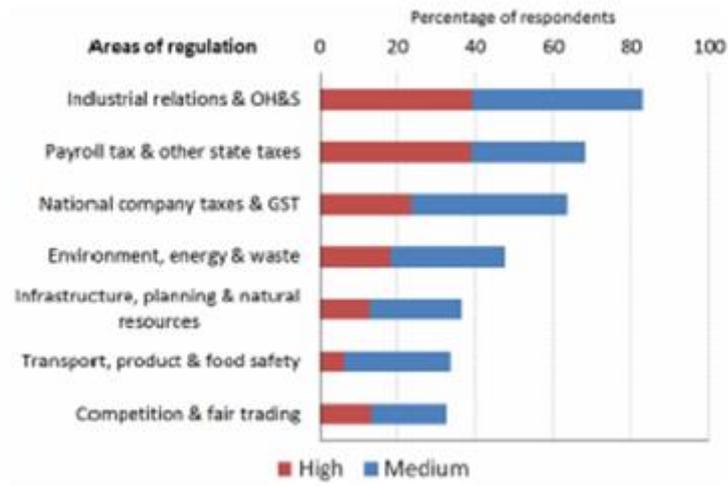
Source: ABS Catalogue Number 5206.0 and Treasury.

Figure 9 – Australia's Declining Terms of Trade



SOURCE: WWW.TRADINGECONOMICS.COM | AUSTRALIAN BUREAU OF STATISTICS

Figure 10 – Expected Degree of regulatory burden in 2014



Source: Ai Group, 2014.

References

Abbot, T 2014, 'Western Sydney Airport to Deliver Jobs and Infrastructure', *Department of the Prime Minister*, viewed 2 July 2014, <<https://www.pm.gov.au/media/2014-04-15/western-sydney-airport-deliver-jobs-and-infrastructure>>

ABC 2014, 'Global Competitiveness, government regulation and productivity growth: Where does Australia rank?', *ABC News*, 9 April, viewed July 14 2014, <<http://www.abc.net.au/news/2014-04-09/competitiveness-regulation-productivity-where-australia-ranks/5359694>>

ABS (Australian Bureau of Statistics) 2012, 'Measures of Australia's Progress: Summary Indicators', ABS, viewed 21 June 2014, <<http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1370.0.55.001~2012~Main%20Features~Productivity~20>>

Australian Treasury 2009, *Raising the level of productivity growth in the Australian Economy*, viewed 26 July 2014

Carmody, C 2014, 'Economic Roundup Issue 2: Slowing Productivity Growth – A Developed Economy Comparison', Australian Treasury, viewed 25 July 2014, <<http://www.treasury.gov.au/PublicationsAndMedia/Publications/2013/Economic-Roundup-Issue-2/Economic-Roundup/Slowing-productivity-growth>>

Crafts, N 2008, 'What creates multifactor productivity?', Proceedings of The Creation of Economic and Corporate Wealth in a Dynamic Economy conference, The Conference Board, viewed 26 June 2014, <http://www.ecb.europa.eu/events/pdf/conferences/cecwe_conf/Crafts_paper.pdf?5075dfddb0fe290c8437e56cbf5688f>

D'Arcy, P & Gustafsson, L 2012, 'Australia's Productivity Performance and Real Incomes', *Reserve Bank of Australia Bulletin*, June Quarter, pp. 23-35. Viewed 24 September 2013 <<http://www.rba.gov.au/publications/bulletin/2012/jun/pdf/bu-0612-3.pdf>>

Eslake, S 2011, 'Productivity: The Lost Decade', in H Gerard and J Kearns, *The Australian Economy in the 2000s*, Proceedings of a Conference, Reserve Bank of Australia, Sydney, pp 223–254.

Gordon, R 2010, 'Revisiting U. S. Productivity Growth Over the Past Century with A View of the Future', *NBER Working Paper 15834*

Gray, EM, Oss-Emer, M and Sheng, Y 2014, *Australian agricultural productivity growth: past reforms and future opportunities*, ABARES research report 14.2, Canberra, February. CC BY 3.0.

Hu, Y and Toth, J 2014, 'Burden of Government Regulation', *The Australian Industry Group*, viewed 1 July 2014,
<http://www.aigroup.com.au/portal/binary/com.epicentric.contentmanagement.servlet.ContentDeliveryServlet/LIVE_CONTENT/Publications/Reports/2014/Burden_of_Government_Regulation_Mar_2014.pdf>

OECD 2009, *Economic Policy Reforms: Going for Growth, 2009*, OECD, Paris

Parkinson, M 2011, 'Sustaining Growth in Living Standards in the Asian Century', Address to the Melbourne Institute and The Australian Economic and Social Outlook Conference 2011 'Growth Challenge: Riding the Resources Boom to Lasting Prosperity', Melbourne, 30 June–1 July.

Productivity Commission 2008, Annual Report 2007-08, Annual Report Series, Productivity Commission, Canberra

Salgado, R 2000, 'Australia: Productivity Growth and Structural Reform', in 'Australia – Selected Issues and Statistical Appendix', IMF Country Staff Report No 00/24, pp 3–35.

Schumpeter, J 1954, *History of Economic Analysis*, Oxford University Press, New York.

Turnbull, M 2014, 'Mobility Drives Productivity', *Malcolm Turnbull MP*, web blog post, 3 April, viewed 27 June 2014, <<http://www.malcolmtturnbull.com.au/media/mobility-drives-productivity>>