

Cold shower on economics of global warming

Analysis of the economic impacts of climate policy is becoming a feature of the 2019 election campaign. Much of this analysis ignores Australia's recent experience with carbon pricing, economic literature and the basic fact that avoiding global warming brings major economic benefit. Inaction on climate change could cost Australia \$131 billion per year, excluding natural disasters that already cost Australia over \$18 billion per year.

Briefing note

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Introduction - Summary

Australia's 2019 election campaign has already seen a strong focus on the economic impacts of climate policy. Much of the content so far has missed three key points:

- Australia has recent experience of carbon pricing and emissions reduction, during a period of economic growth. Any analysis that projects significant economic impact from future emissions reduction policy must explain why there was no significant impact in the 2012-14 period.
- There is a considerable literature of economic analysis suggesting economic impacts of climate policy will be minor. Analysis forecasting major impacts cannot ignore this literature, or worse still, cherry pick parts of analyses that suits particular conclusions.
- Climate change itself imposes huge economic costs. In avoiding these costs, emissions reduction brings economic benefit. Analysis that excludes these benefits to only focus on costs is misleading.

Real world experience - emissions reduction 2012 to 2014

Australia's carbon tax applied 2012 and to 2014. During that period, Australia's carbon emissions declined from 535 to 524 million tonnes.¹ That period also saw growth in GDP and employment, as shown in the Table 1 below:

Table 1: GDP and GDP per capita by year

	GDP \$millions	Change in GDP %	GDP per capita	Change in GDP per capita
Jun-2010	1,461,958	2.1	66,870	0.2
Jun-2011	1,497,962	2.5	67,569	1.0
Jun-2012	1,556,396	3.9	69,115	2.3
Jun-2013	1,597,107	2.6	69,667	0.8
Jun-2014	1,638,132	2.6	70,322	0.9
Jun-2015	1,676,400	2.3	70,921	0.9
Jun-2016	1,724,123	2.8	71,893	1.4
Jun-2017	1,764,512	2.3	72,381	0.7
Jun-2018	1,814,535	2.8	73,267	1.2

Source: ABS (2018) National Accounts,

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5204.02017-18?OpenDocument>

¹ Department of Environment and Energy (2018) *National Greenhouse Gas Inventory*, <http://ageis.climatechange.gov.au/>

Table 1 shows that in the two years Australia had a carbon price, GDP increased by almost \$82 billion dollars or over 5 percent. GDP per capita grew by over \$1,200 per person, or almost two percent. The years immediately before and after the carbon price show that there was no significant impact on these key economic indicators.

The carbon price and related emissions reduction had no discernable impact on employment. As shown in Table 2 below, employment grew and unemployment remained lower than in the years following the carbon price's repeal:

Table 2: Employment and unemployment by year

	Employment (millions)	Unemployment (%)
2010	11.02	5.2
2011	11.21	5.1
2012	11.34	5.2
2013	11.45	5.7
2014	11.53	6.1
2015	11.76	6.0
2016	11.97	5.7
2017	12.24	5.6
2018	12.58	5.3

Source: ABS (2019) Labour Force,

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6202.0Mar%202019?OpenDocument>

Table 2 shows that employment numbers increased by around 200,000 people during Australia's carbon pricing period. While unemployment increased during those two years, it continued to increase after the carbon price's repeal.

Given Australia's experience with carbon pricing and emissions reduction during benign economic conditions, any analyst or commentator claiming major negative impacts in the future must explain why Australia's lived experience of emissions reduction and economic growth will not be repeated. Modelers should include in their analysis model runs based on this past experience and confirm that their models correspond with the experience of these years.

Literature and cherry picking

A substantial literature exists suggesting that economic impacts of climate action are likely to be minor and that the benefits of climate action outweigh its costs. The 2006 Stern Review found:

the benefits of strong and early action far outweigh the economic costs of not acting. ... Climate change will affect the basic elements of life for people around the world.²

The Intergovernmental Panel on Climate Change confirmed in its recent special report that weak climate action will only cost far more to correct in the future, as more costly and drastic reductions in emissions are required while covering the dramatic increase in the costs of unwanted impacts of climate change.³

In short, the literature finds that the cost of action is far smaller than the cost of inaction.

However, some studies appear designed to distract the public from this fact. One example is Energy Minister Angus Taylor's analysis released on 24 April 2019. It claims to be based in part on carbon price estimates from Nicholas Stern. Yet Stern's consistent conclusion that the benefits of climate action outweigh its costs are ignored in Taylor's analysis.⁴

Another example comes from Brian Fisher of BAEconomics. Fisher's recent report claims to find the cost of a 45% emissions reduction target by 2030 would be very large and much larger than the cost of a 26% target.⁵

Fisher's study includes a section titled "literature review" that cites a study that finds Australia can cut emissions by more than 26% only minor economic impact. The study by Vandyck et al considers current pledges (such as the Government's 26% target) and pledges aligned with a 2 degree scenario (such as the Opposition's 45% target). They find that Australia could comply with a 2 degree scenario with a change of just 0.25% of GDP.⁶ Fisher himself wrote:

² Stern (2006) *Stern Review on the Economics of Climate Change* – Executive Summary http://www.hm-treasury.gov.uk/d/CLOSED_SHORT_executive_summary.pdf

³ Intergovernmental Panel on Climate Change (2018) *Special Report into the impacts of global warming at 1.5 degrees above pre-industrial levels* https://www.ipcc.ch/site/assets/uploads/sites/2/2018/07/SR15_SPM_version_stand_alone_LR.pdf

⁴ Taylor (2019) Background note: The Cost impact on Queensland of Labor's reckless safeguards policy

⁵ Fisher (2019) *Economic consequences of alternative Australian climate policy approaches* <http://www.baeconomics.com.au/wp-content/uploads/2019/03/Climate-Policy-Report-14March19.pdf>

⁶ Vandyck et al (2016) A global stocktake of the Paris pledges: Implications for energy systems and economy, <https://www.sciencedirect.com/science/article/pii/S095937801630142X>

Global GDP losses [in Vandyck et al's study] under both scenarios are small (-0.42 per cent and -0.72 per cent respectively), but the gap between required emissions reductions under the two scenarios is significant.

In other words, Vandyck maintains it is only a small cost involved to make much large emissions reductions which in turn, would drastically reduce climate impacts. Yet Fisher's conclusions are very different.

Fisher's literature review also cites a 2018 study by Kompas et al, economists at ANU, University of Melbourne and CSIRO projecting rising economic costs of climate change. Fisher writes:

The variance in results between the 4°C (baseline with no policy) and 2°C (Paris Agreement scenario) is used to calculate the assumed benefits of compliance with Paris at around US\$17,489 billion per year in the long run (year 2100)⁷

In other words, Kompas et al find the costs of inaction are enormous, over US\$17 trillion per year. This study deserves closer attention, as it includes a breakdown of economic costs from climate change to specific regions – including Australia. Again, Fisher ignores to include this in his report.

The cost of inaction

The 2018 study by Kompas et al. looks at economic impacts of climate change in 2 degrees, 3 degrees and 4 degrees of global warming, over coming decades and in the long term.⁸

Australia's climate policies have resulted in emissions increase and are on track to miss the modest emission reduction target of 26% by 2030. Australia's current policies are more consistent with the 4 degree scenario.

The report Fisher cites, but ignores the cost to Australia of such policies as estimated by Kompas et al:⁹

⁷ Ibid

⁸ Kompas et al. (2018) *The Effects of Climate Change on GDP by Country and the Global Economic Gains from Complying with the Paris Climate Accord*. *Earth's Future* 6(8), 1153–1173.
<https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018EF000922>.

⁹ Kompas et al. (2018) *The Effects of Climate Change on GDP by Country and the Global Economic Gains from Complying with the Paris Climate Accord*. Table A1

- In the 4 degree world, Australia would experience a long-run reduction of \$164 billion of GDP per year.¹⁰
- In the 2 degree world, the cost is \$33.7 billion of GDP per year.
- The cost of unmitigated climate change to Australia is therefore projected to be the difference between the different trajectories of around **\$130.5 billion of GDP per year.**

The difference in the projected cost to Australia's economy of weak emission reduction targets in line with a 4 degree global temperature increase (such as 26%) and a stronger emission reduction target (such as 45%) in line with the 2 degree Paris Agreement goal is **\$130.5 billion each year.**

Damages start lower but increase over coming decades and reach this level of impact by 2100. This is within the lifetime of children alive today.

It is also important to note this estimate is intentionally conservative. It excludes the costs of natural disasters becoming more severe under climate change.

Intentionally conservative Projection

The Kompas et al. estimate is based on an assessment only of certain climate change impacts including "[sea level rise], losses in agricultural productivity, temperature effects on labor productivity and human health".¹¹ It ignores impacts on the energy system and tourism losses.

Crucially, the model explicitly leaves out "the effects of natural disasters or more extreme weather events that occur year to year". The authors say elsewhere they are extending the model to include disasters:

Early results for the effects of tropical storms alone indicate that global economic damages increase significantly, at all temperature ranges, and more than double the more than US\$23trillion [AU\$32trillion] in global economic damages at 4 degrees Celsius found in the current paper.¹²

There are a number of further conservative elements in the study:

¹⁰ Converted from USD at 1USD = 1.4 AUD on 23 April 2019

¹¹ Kompas et al. (2018) *The Effects of Climate Change on GDP by Country and the Global Economic Gains from Complying with the Paris Climate Accord*

¹² Kompas et al. (2018) *The Great Climate Depression* <https://pursuit.unimelb.edu.au/articles/the-great-climate-depression>

- The model also ignores co-benefits including from managing “air pollution, losses in biodiversity, the spread of invasive species, changes in energy mix, and the costs of significant migration”. A recent Brookings Institute report, co-authored by Warwick McKibbin, finds the co-benefits of climate policies make substantial climate action in the self-interest of individual countries.¹³
- The model includes perfect economic adaptation (e.g. investment decisions) in foresight of rising impacts. This is over-optimistic given uncertainty involved and common barriers to adaptation.
- The model ignores social and political dynamics. Large impacts, especially impacts on essential resources like food and water, may fuel conflict.
- Impacts on Australia are significantly smaller than other regions. There are catastrophic impacts in Sub-Saharan Africa, India, and Southeast Asia. This not only raises serious moral claims on Australia. There are also serious geopolitical implications.

These comments are not meant as criticisms. Rather they are made to emphasise that the projections are inherently and intentionally conservative.

Natural disasters

As noted above, the Kompas et al. projections above do not include disaster costs.

The cost of recent natural disasters in Australia has been estimated by Deloitte Access Economics, in a report for the Australian Business Roundtable, at group of major Australian businesses. The report found the total economic cost of natural disasters in Australia over the decade to 2016, averaged \$18.2 billion per year.¹⁴

The cost of individual natural disasters that make up these costs is high. For instance, the Queensland 2011 floods alone were estimated to have imposed financial costs of around \$14 billion, and the Victorian Black Saturday bushfires \$7 billion. Such events are already being fuelled by climate change, which will intensify if adequate policies are not implemented further increasing these costs.

Note that disaster costs would increase even if climate change did not increase. The Deloitte report considers climate driven events to date, but does not consider

¹³ Liu et al (2019) *Global economic and environmental outcomes of the Paris Agreement*
<https://www.brookings.edu/research/global-economic-and-environmental-outcomes-of-the-paris-agreement/>

¹⁴ Deloitte Access Economics (2017) *The economic cost of the social impact of natural disasters*
http://australianbusinessroundtable.com.au/assets/documents/ABR_building-resilience-in-our-states-and-territories.pdf

increased intensity or incidence of climate related disaster in the future. Yet even without this, disaster costs are expected to more than double in present value terms by 2050.

Greatly increased climate impacts will drive an even greater total disaster cost, stretching response capacities and resilience even further.

Australian Bureau of Meteorology (BOM) has found that “pacific rainfall disruptions” that include floods and drought in eastern Australia have already increased in frequency by 30 percent as a result of climate change, and are projected to increase by 90 percent by mid-century and 130 percent by 2100.¹⁵

The BOM and CSIRO have also found that the frequency and intensity of extreme fire weather has increased significantly over much of Australia over recent decades and that climate change is contributing to these changes.¹⁶

Given the high cost of individual disasters, the projected increase in the frequency and intensity of these events will have a large impact on the overall cost of natural disasters in Australia.

For example, if “rainfall disruptions” causing a \$14 billion flood or a \$12.5 billion drought occur twice as often, there will be double the cost to the community.

Conclusion

Immediate and sustained action to reduce greenhouse gas emissions is needed to avoid the most dangerous climate impacts. The cost of action should not be exaggerated to try to distract from the large and increasing cost of inaction.

The government’s 26% emission reduction target, and policies inadequate to meet it, are aligned with a dangerous increase in global temperatures to 4 degrees.

Achieving the Paris Agreement goals could represent an increase in Australia’s GDP of \$130 billion per year. Disasters are already costing Australia more than \$18 billion a year and the rainfall disruptions and fire conditions that cause them are projected by BOM to increase dramatically. Serious impacts are likely in agriculture and infrastructure sectors show how wide-spread and devastating climate inaction can be.

¹⁵ BOM (2017) *Droughts and flooding rains already more likely as climate change plays havoc with Pacific weather* <http://www.bom.gov.au/climate/updates/articles/a023.shtml>

¹⁶ BOM (2019) *State of the Climate 2018* <http://www.bom.gov.au/state-of-the-climate/>

The costs of climate change are borne by Australian households and businesses. Many costs are borne by individuals absorbing uninsured losses. Even when losses are insured, they are ultimately paid for by the community through rising insurance premiums. Some of the costs are covered by governments, including emergency services and relief and reconstruction of essential infrastructure. This spending is ultimately provided by increasing taxes or reducing services in other areas such as health or education.

Discussion of the cost of climate action must not distract from the reason for this discussion: the large and increasing cost of climate inaction.