PROVIDING THE ECONOMIC FOUNDATIONS FOR OUR REGIONS: THE IMPACT OF PUBLIC SECTOR EMPLOYMENT ON REGIONAL LABOUR MARKETS AND ECONOMIES

A REPORT COMMISSIONED FOR THE SOUTH COAST LABOUR COUNCIL

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UNIVERSITY OF WOLLONGONG AUSTRALIA

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About This Report

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NSW Teachers Federation
Public Service Association of NSW
Independent Education Union
Community and Public Sector Union
Australian Workers Union
Transport Workers Union
Police Association of NSW
Australian Manufacturing Workers Union
NSW Nurses and Midwives Association
United Services Union
NSW Fire Brigade Employees Union
National Tertiary Education Union
Maritime Union of Australia
Electrical Trades Union
Australian Services Union
Rail Tram and Bus Union

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Foreword

These last 2 years will be indelibly etched in our history as a time of crisis, tragedy and disruption. In our regions, on the South Coast and Tablelands of NSW, Covid – 19 was the last in a series of crises following the "Black Summer" fires and floods. The toll on people and property, the destruction and disruption has been on a scale not witnessed since the second world war. Throughout this period regular economic activity was essentially frozen. The private sector, for the most part, was put on ice as our emergency, public and community services were stretched beyond their limits to save lives and livelihoods. Our communities will be forever grateful to these workers for their courage, commitment and sacrifices.

What may not be so readily apparent is the economic significance of the public sector workforce in these regional communities at any time but in particular in times of crisis and disruption. This was the motivation behind this report, to quantify the economic impact of these workers and their incomes on their local and regional communities. To put a number against their contribution to the Gross Regional Product of their local economy and do it for each of the 9 Local Government Areas in the remit of the South Coast Labour Council.

To this end the report and research conducted by Associate Professor Martin O'Brien from the *Centre for Human and Social Capital Research* at the University of Wollongong will no doubt have a massive impact itself. Not only does it reveal the great and disproportionate economic significance of this sector in these communities but it does so with the depth and granularity that will blaze a trail for future research into regional communities across the country. We now have a number for the economic contribution of these workers and that number is a big one. The question that remains is whether our Governments, local state and federal will recognize that significance and that the impact of wage and salary movements is not simply a matter for those workers and their families, it is a critical one for the communities they live in as well.

Arthur Rorris
Secretary
South Coast Labour Council

15th November 2021

Executive Summary

This report documents the contribution and impact of public sector employment to regional labour markets and economic activity in nine Local Government Areas (LGAs) of New South Wales, covering the Illawarra, South Coast and Capital regions. In particular, the paper focusses on the extent to which public sector employment and workers' spending patterns plays a counter cyclical, or even counter seasonal, influence on these regions' economies using the recent bushfire and COVID-19 periods as case studies. The research uses a mixed methods approach, with statistical analyses of secondary data complemented by interviews with public sector workers. Analyses presented show that public sector employment represents a significantly larger proportion of total employment in most regional labour markets compared to Greater Sydney or Australia in general. Similarly, further analyses demonstrate both the disproportionately large and essential contribution of public sector income and spending to regional economic activity. The main finding of this research is that public sector employment provides an important foundation and stability to regional economies, many of which are affected by frequent fluctuations in economic activity due to tourism or weather events. This vital role has been amplified more so in recent years with bushfires and COVID-19 having a sustained negative impact on regional economies, with the contribution of the public sector to regional economic activity increasing in relative size and importance in these challenging times.

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1. INTRODUCTION

Nurses, teachers, border force, child protection workers, social security customer service operators, police and fire fighters are all diverse occupations but share the common attribute of playing important roles in society in protecting or enhancing our health, education or safety. As well as assuming important roles in the community, they also share another common feature in belonging to public sector employment. Rather than being employed by private business, governments at local, state and federal levels have long recognised the need and responsibility for these occupations' employment and in turn the public goods they deliver. However, what is not so well known about these roles is their economic impact, such as their contribution to labour markets and economic activity.

Regional communities and economies have faced numerous employment challenges over recent years and decades. With employment concentrated geographically in particular industries such as agriculture, tourism or manufacturing, the fortunes of some regional economies can be disproportionately impacted by seasonal fluctuations, natural disasters such as drought and bushfire, and globalisation forces and structural changes to industry employment (Spoehr 2014, Coelli et al. 2021). It is therefore common in Australia to see employment policies directed specifically at regional employment creation in those areas suffering mass industry job losses in recent years such as the Illawarra (BlueScope), Geelong (Ford) and areas of Tasmania (forestry) (O'Brien and Burrows 2019).

In contrast to private sector employment which is derived from profit seeking behaviour, public sector employment levels are largely determined by the government of the day and therefore not generally susceptible to economic fluctuations associated with regular seasonal changes, natural disasters, business cycle, or globalisation forces that may influence the dominant private sector industries in regional economies. It is therefore of interest to analyse the role that public sector employment plays in regional labour markets and economies, particularly in periods of economic instability affecting the private sector.

In this study we focus on nine regional economies and communities in the South East of New South Wales. Many of these regions were heavily affected by the bushfires of 2019/20, leaving little time for recovery before all regions were affected by COVID-19's economic impact. We start with the quantification of baseline regional economic measurements, first estimating the relative magnitude or size of public sector employment as a proportion of the regional labour market. Second, we estimate the contribution of public sector income, and by proxy

consumption expenditure, to regional economic activity (gross regional product). Finally, the focus shifts to how this public sector employment impact has changed or transformed during recent times of crises as we have witnessed from 2019/20 bushfires and COVID-19.

The underlying hypothesis of this report is that the impact or contribution of public sector employment to regional economies increases in size, importance and dimensions in times of economic downturn and crisis. That is, the impact of public sector employment on regional economic activity is countercyclical; increasing in periods of economic downturn and subsiding in periods of rapid growth when private sector economic activity surges. This hypothesis implies that public sector employment, and in turn their income and spending, provides a solid and stable foundation to regional economies that are often disproportionately affected by seasonal variation in tourism, prolonged climate events such as drought, as well as unpredictable crises such as bushfire and COVID-19. The public sector employment base provides the foundation for a relatively constant financial injection into the regional economy when other (private employment) sectors are affected by seasonal fluctuations or more sustained downturns connected to crisis events. Furthermore, we document how many public sector employees' workload and impact on communities increase in times of crisis, using the bushfires and COVID-19 as case studies.

The study uses a mixed methods approach, using statistical modelling and estimation techniques on available data, as well as interviews of public sector workers. The report proceeds with the presentation of some basic geographic, demographic and economic characteristics of the included regions in Section 2, followed by a discussion of the methodologies employed in the research in Section 3. The empirical findings are presented in Sections 4 to 8, followed by a summary and conclusions in Section 9.

2. BACKGROUND ON THE REGIONS ANALYSED

This study focusses on nine local government areas (LGAs) contained within the Illawarra, South Coast and Capital regions in South Eastern NSW. Specifically, Bega Valley, Eurobodalla, Snowy Monaro, Queanbeyan-Palerang, Shoalhaven, Wingecarribee, Kiama, Shellharbour and Wollongong LGAs (shown in Figure 1.).

Figure 1. Local Government Areas (LGAs) of Interest to the Study

Source: OFO Maps

Selected demographic and labour market characteristics of the LGAs are displayed in Table 1. The first observation is the wide variation in population size, with over 200,000 residents in Wollongong and over 100,000 in Shoalhaven, compared to approximately 20,000 in Snowy Monaro and Kiama.

However, the second observation is that all LGAs share the common characteristic of having higher median ages than both Greater Sydney[2] and Australia in general. Likewise, all labour force participation rates and median incomes for our selection of LGAs are lower than that of Greater Sydney, with the exception of Queanbeyan.

Finally, there is a close relationship between median age, labour force participation rates and median income, with bivariate correlation rates of over 0.8. At the one extreme we have Bega Valley, Eurobodalla and Shoalhaven with the highest median age but lowest labour force participation rates and income. At the other extreme is Queanbeyan, Shellharbour and Wollongong with the lowest median age but highest labour force participation rates and median income.

Table 1. Selected Demographic and Labour Market Statistics of LGAs

	Population[1]	Median Age[2]	Labour Force Participation Rate (%)[3]	Median Income[4]
Bega Valley	34,727	51.2	49.7	$38,318
Eurobodalla	38,952	54.4	43.7	$37,455
Snowy Monaro	20,997	43.8	60.9	$44,582
Queanbeyan-Palerang	62,239	38.2	68.0	$63,094
Shoalhaven	107,191	47.5	46.7	$40,880
Wingecarribee	51,760	46.8	54.4	$44,375
Kiama	23,685	46.4	55.6	$47,586
Shellharbour	74,622	38.5	58.0	$49,780
Wollongong	219,798	37.8	56.9	$50,484
Greater Sydney	5,367,206	35.8	61.6	$52,665
Australia	25,697,298	37.4	60.3	$49,805

Reference year: [1] – 2020, [2] – 2019, [3] – 2016, [4] - 2018

Source: ABS (2021a)

[2] Greater Sydney is defined by the Australian Bureau of Statistics as comprising the following areas: Central Coast, Baulkham Hills and Hawkesbury, Blacktown, City and Inner South, Eastern Suburbs, Inner South West, Inner West, North Sydney and Hornsby, Northern Beaches, Outer South west, Outer West and Blue Mountains, Parramatta, Ryde, South West, Sutherland (ABS 2016a)

3. METHODOLOGY

The project consists of a number of tasks aimed at measuring the magnitude of economic activity derived from public sector employment in regions. In general, these tasks encompass the contribution of public sector employment to regional labour markets and public sector income to regional economic activity. Once baseline estimates are calculated, we investigate sustainable economic growth risk factors in each regional economy, the impact of bushfires and COVID-19, and how the impact of public sector employment adapts to these crisis periods. The empirical analysis is split into the following broad tasks:

1. Baseline calculation of public sector employment contribution to regional labour market (Section 4).
2. Baseline calculation of public sector income contribution to regional economic activity (Section 5).
3. Sustainable economic growth risk factors in regions (Section 6)
4. Effect of bushfires and COVID-19 on regional economic activity (Section 7)
5. Dynamic impact of public sector on regional economies in times of economic downturn and crisis (Section 8)

Each of the above tasks primarily lend themselves to quantitative analysis using available data and statistical methods. However, the project also employs qualitative analysis, with interview and focus group data.

The details of the methodology employed for each task is presented in Appendix A.

4. BASELINE PUBLIC SECTOR EMPLOYMENT CONTRIBUTION TO REGIONAL LABOUR MARKETS

Table 2. presents the baseline measurements for the public sector employment contribution to regional labour markets. We can see an obvious difference in the relative importance of public sector employment in our regional LGAs compared to Greater Sydney and Australia in general. Whereas public sector employment makes up 13.36% of the Greater Sydney labour market and 15.37% of the Australian labour market, public sector employment exceeds 16% of Eurobodalla, 17% of Snowy Monaro and Shoalhaven, 20% of Kiama and Wollongong and 30% of Queanbeyan-Palerang labour markets.

In general, NSW state public sector employment is the largest public sector employer in the regions (over 10% of the labour market in Snowy Monaro, Kiama, Shellharbour and Wollongong LGAs), with Queanbeyan-Palerang being a notable exception due to its geographical proximity to Canberra and federal public sector employment. In most LGAs federal public sector employment exceeds that of local government, with the exception of Bega Valley and Eurobodalla.

A final observation is that some of the public sector workplaces are very large individual employers. For example, the University of Wollongong would account for over 2,500 direct employees (UOW 2020), before we factor in contractors on campus and other indirect employment flow on effects. Likewise, hospitals and high schools are large individual employers in the context of the regional labour market size.

> "…that's 500 nurses who work at the hospital. Public sector workers contribute to the local economy. They must have some sort of impact. Like, you wouldn't want to close the hospital and lose 500 people who could contribute to your local economy because I'm sure that would have an impact if you take those people out of the economic equation." NSW public sector nurse from Shoalhaven District Memorial Hospital[3]

[3] The quote attributions differ for various types of workers due to differing privacy requirements of the trade unions representing these workers.

Table 2. Public Sector Employment in Selected LGAs (Raw Count and % of Local Labour Market)

	Local		State		Commonwealth		Total Public sector	
LGA	Count	%	Count	%	Count	%	Count	%
Bega Valley	374	2.87	1069	8.22	198	1.52	1641	12.61
Eurobodalla	496	3.87	1223	9.55	360	2.81	2079	16.23
Snowy Monaro	327	3.35	996	10.21	375	3.84	1698	17.40
Queanbeyan-Palerang	313	1.08	2587	8.90	6633	22.82	9533	32.80
Shoalhaven	872	2.43	3424	9.56	2095	5.84	6391	17.82
Wingecarribee	347	1.71	1598	7.83	349	1.70	2294	11.24
Kiama	270	2.87	1394	14.81	374	3.97	2038	21.65
Shellharbour	550	1.88	3087	10.54	888	3.03	4525	15.46
Wollongong	1469	1.68	11304	12.95	4783	5.48	17556	20.11
Greater Sydney	**22207**	**0.99**	**199430**	**8.90**	**77614**	**3.46**	**299251**	**13.36**
Australia	**153,308**	**1.45**	**1,046,723**	**9.92**	**421,793**	**4.00**	**1,621,824**	**15.37**

Source: ABS (2016)

5. BASELINE PUBLIC SECTOR INCOME CONTRIBUTION TO REGIONAL ECONOMIC ACTIVITY

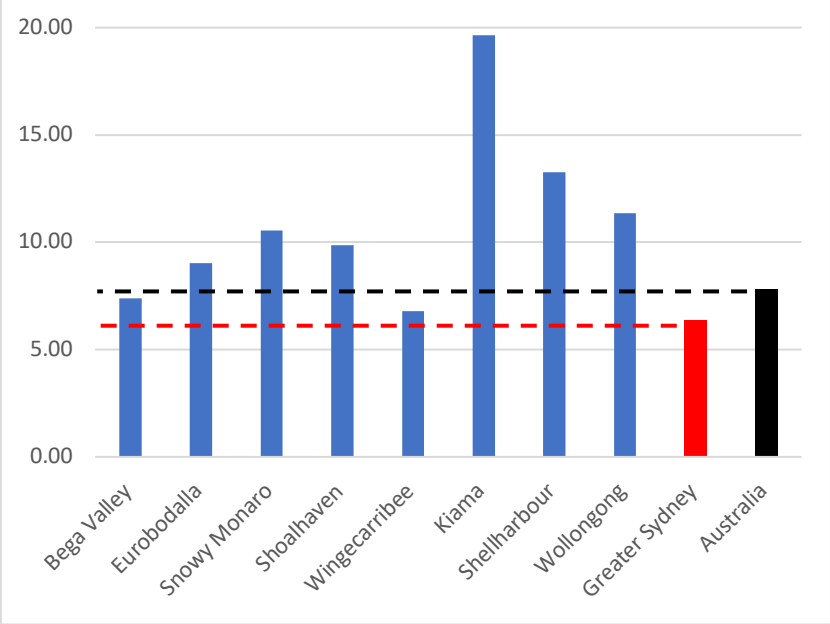
Fundamental economics tells us that employment is closely linked with income, expenditure and thus economic activity. Figure 2. shows the baseline estimates of public sector income as a percentage of gross regional product (GRP), being the regional equivalent of gross domestic product.

Consistent with the previous employment analysis, public sector income is a larger contributor to GRP in all our LGA economies compared to Greater Sydney[4]. Whereas, public sector income contributes approximately 6.37% to Greater Sydney GRP and 7.80% to GDP in Australia, our baseline estimates suggest public sector income exceeds 9% of Eurobodalla and Shoalhaven, over 10% of Snowy Monaro, Shellharbour and Wollongong, approximately 20% of Kiama and over 35% of Queanbeyan-Palerang GRP.

Given previous research in Australia establishing a multiplier of 1.5 for public sector expenditure (Weber 2012, Murray and Henderson 2018) these baseline estimates represent an underestimate of the true impact of public sector employment on regional economic activity as the stimulus provided by public sector expenditure on wages in turn has the overall effect of creating significant employment in other industries and further expanding economic activity in a region.

[4] The LGAs used by .id for GRP estimates are available at .id (2021a).

Figure 2. Public Sector Income - % Contribution to Gross Regional Product (baseline)



LGA	% of GRP
Bega Valley	7.39
Eurobodalla	9.02
Snowy Monaro	10.55
Queanbeyan-Palerang	35.94*
Shoalhaven	9.85
Wingecarribee	6.80
Kiama	19.63
Shellharbour	13.26
Wollongong	11.35
Greater Sydney	**6.37**
Australia	**7.80**

* Queanbeyan-Palerang (35.94%) not displayed to allow a better comparison

Source: ABS (2016b), .id (2021b), REMPLAN (2021), author's calculations

There are a number of positive flow on or multiplier effects from public sector employment and spending that imply that the impact of public sector on regional economies is undertested by the above estimates. The following issues were revealed in the interviews.

First, **most public sector workers spent approximately 80% of their income at local businesses**, indicating that their income and subsequent expenditure had a significant direct impact on the regional economy's circular flow. Many interviewees stated they avoided larger chain businesses and online shopping if they were able to purchase goods and services at a local small business, emphasising their purchase of local and sustainable produce or local service providers:

> "I think people go to great lengths to try and support local business owners. Everybody I know will always preference a local industry over another. My kids went right through school here, primary school, high school, and some of their friends are now small business owners. So, you go, "Oh, I'll go to that person because they're the local electrician or they're the local chippy." " NSW public sector worker (Communities and Justice)

Second, **some public servants' line or work provided them with insights to the direct benefits of spending locally** and supporting their labour market and economy:

> "I support local business and I would say people that do have APS jobs here are aware of that. We're very grateful for it because we can see how hard it is for people to gain employment in areas like this. Maybe it's because it's Centrelink too, because we do see the hard end of society, the difficult situations people are in. We're in work and there are a lot of people that are not in work or not in secure work." APS employee, South Coast region

Third, due to the seasonal nature of employment in some regions, **the relative stability of public sector employment and income throughout the year provides sustained stimulus to regional economies in months when business is traditionally slow**:

> "But yeah, outside of public service, there's very few people who get a regular set income that they know every second Thursday, this is how much is going in the bank. And so, I think it's whether it's Commonwealth public servants, police officers, teachers, whatever, that really do keep a lot of businesses viable because we're the guys that still get paid every fortnight, even though it's the middle of winter. So I will still go and spend money. I'll still take my wife out for dinner, I'll still spend that money regardless of the time of year." APS employee, South Coast region

Fourth, **public sector employment in regions encourages agglomeration, whereby other businesses derive their trade due to their close proximity to public sector location.** This phenomenon ranges from cafes and food outlets to more closely related businesses reliant on the public sector:

> "Centrelink's in (unnamed) Plaza now. I'm assuming that Centrelink being in the Plaza is the reason why all of the employment service providers also have offices in the Plaza. MAX Employment, Campbell Page, they've all set up in the Plaza." APS employee, South Coast region

Fifth, **resourcing large public sector organisations such as high school and hospitals in regions has a positive flow on effect to local business**:

> "I think about at the hospital, all their cars get serviced locally so there's that flow on there. Maintaining buildings and plumbers and all that stuff that goes around, even the buildings that we work in. That adds to the economy." APS employee, South Coast region

and

> "So through the school, we obviously have about $X million to run X High School[5] every year, recurrent funding, including salaries. And so that's the unique position that I'm in because I need to resource the school every year. And I can allocate that locally, and help stimulate that local economy, so that they can rely on that recurrent funding coming through

[5] Identity of High School and region supressed to protect respondent identity.

> to supply the services, all the augmented services and products that a school needs to function." Public School Teacher, Shoalhaven LGA

Finally, **the relocation of public sector offices to regional areas can have a widespread effect on a variety of sectors in the local economy**:

> "But I mean, just being able to live in this area and having the call centre built in his area increased the economy in Batemans Bay heaps anyway, because we had all these new people coming. They were coming to work. They bought houses. There was about 120 people that got jobs in the call center at that time. It attracted other people into the region as well. I know one lady moved up from Albury. We had people moving from Canberra. But it was also giving people jobs that live north of us in Ulladulla, within half an hour's drive or three quarters of an hour's drive. So it provided them employment too, in neighboring towns" APS employee, South Coast region

6. SUSTAINABLE ECONOMIC GROWTH RISK FACTORS

Why would regions suffer more extreme economic shocks and crises? Regional economies reflect the characteristics of both their geography and the people that reside within them. These diverse characteristics give rise to both comparative advantage in the production of certain goods and services as well as risks associated with dominant industries that may be impacted in times of crises. For example, Wollongong historically rose as a major centre for the manufacture of steel due to its close proximity to metallurgical coal mines and its coastal position allowing access to marine transport. However, the fate of the Wollongong and wider Illawarra labour market have also ridden on the fortunes of this industry. BHP (now BlueScope) at Port Kembla grew to become Australia's largest steel producer and in 1981 employed over 20,000 workers. At that time it was estimated that the steelworks employed over 70% of the local workforce, either directly or indirectly (Kelly, 1988). However, during the early 1980s the steel industry experienced a global crisis, and redundancies of approximately 7,000 employees contributed to an increase in local unemployment of 14,000. More recently, BlueScope operations were affected by the resources boom in Australia (the so-called Dutch Disease), whereby overseas demand for coal and iron ore dramatically increased steel input costs, while an appreciating AUD made Australian exports more expensive for overseas customers. The result being that BlueScope halved it production capacity by shutting down one of its two remaining blast furnaces and laying off 800 workers. While around a third of those of the displaced workers were still unemployed in the following months (O'Brien and Burrows 2018), others feared this would lead to the ultimate demise of steelmaking in the region and the loss of 10% of the region's labour market (Braithwaite et al. 2011).

The dominant employment generating industries in each region are presented in Table 3. The distribution of employment by industry at the aggregate Australian level is shown in the second column, followed by the deviation of each regional labour market from this aggregate distribution. A traffic light colour coding is used where green represents industry employment over-represention, red is under-representation, and yellow signifies a similar industry employment distribution to Australia. For example, Agriculture constitutes 2.53% of total Australian employment. However, in Bega Valley employment in Agriculture is 2.53 + 4.57 = 7.10% of regional employment, and 2.53 + 7.50 = 10.03% of Snowy Monaro employment. We observe dark shades of green in both cases. In contrast, Agriculture is 2.53 – 2.19 = 0.34% of Wollongong employment and we observe a dark red colour indicating that Agriculture is under-represented.

Looking more broadly across regions and industries we can see many of our regions have relatively high employment in Accommodation and Food Services (otherwise known as Hospitality). A strong green shade is observed in Bega Valley, Eurobodalla, Snowy Monaro, Shoalhaven, Wingecarribee and Kiama, all being regional areas known for their tourism.

Also widespread across our regions is the relatively high employment in Health Care and Social Assistance, with green shades observed in Bega Valley, Eurobodalla, Shoalhaven, Kiama, Shellharbour, and Wollongong. This would likely be affected by two main factors. First, the presence of large regional hospitals. Second, an expanding aged care sector, particularly for those regions with relatively high age profiles and / or sea change retirement destinations.

Construction is over-represented in Eurobodalla, Shoalhaven, Kiama and Shellharbour, which may be related to strong population growth and associated housing activity. Retail Trade is over-represented in Bega Valley, Eurobodalla, Shoalhaven and Shellharbour. Other industries over-represented in our local labour markets are Public Administration in Queanbeyan-Palerang and Shoalhaven, and Education in Kiama and Wollongong.

Table 3. Aggregate Australian Distribution of Employment by Industry and Deviation by Region

		Deviation from Australian Distribution									
Industry	**Aus %**	**Bega**	**Euro**	**Snowy**	**Quean**	**Shoal**	**Winge**	**Kiama**	**Shell**	**Woll**	**G' Syd**
Agriculture	2.53	4.57	0.33	7.50	-0.82	-0.41	0.80	-0.64	-2.08	-2.19	-2.09
Mining	1.68	-1.43	-1.42	-1.26	-1.45	-1.23	-0.58	0.11	0.64	0.30	-1.47
Manufacturing	6.48	1.67	-2.93	-2.84	-2.81	-1.22	0.57	-1.72	0.63	-0.66	-0.64
Utilities	1.10	-0.10	0.09	2.14	-0.02	-0.02	-0.22	-0.04	0.11	-0.07	-0.30
Construction	8.63	0.61	2.20	-1.05	1.55	2.40	1.47	2.88	2.64	0.25	-0.32
Wholesale	2.92	-1.06	-1.56	-1.04	-1.25	-1.53	-0.40	-1.43	-0.84	-0.88	0.72
Retail	9.99	1.73	3.93	-0.63	-1.82	1.94	-0.21	-1.86	2.43	-0.34	-0.53
Accom/ Food	7.00	3.86	4.01	6.78	-1.62	2.75	2.08	1.74	0.24	0.52	-0.22
Transport	4.73	-1.36	-1.22	-1.41	-1.24	-1.31	-0.36	-1.13	0.53	-0.16	0.38
IT	1.70	-0.83	-0.44	-0.81	-0.27	-0.94	-0.57	-0.95	-0.86	-0.47	1.13
Finance / Insurance	3.64	-2.28	-2.52	-2.63	-2.35	-2.21	-1.36	-1.16	-0.68	0.24	2.82
Real Estate	1.73	-0.33	-0.15	0.45	-0.19	-0.09	0.39	-0.08	-0.18	-0.28	0.25
Professional Services	7.35	-3.04	-3.32	-3.45	-0.53	-2.86	-0.62	-1.64	-3.72	-1.53	2.63
Admin Support	3.47	-0.17	0.63	-0.11	-0.62	0.74	0.52	-0.83	0.05	-0.04	0.17
Public Admin	6.76	-1.40	1.17	2.21	18.97	3.51	-2.34	2.30	0.33	0.50	-1.20
Education	8.77	-1.18	-0.63	-1.19	-1.50	-0.84	0.69	4.36	-0.93	3.13	-0.62
Health Care	12.80	1.77	1.97	-4.58	-3.13	2.13	-0.15	1.68	1.85	2.17	-1.05
Arts and Rec	1.67	0.00	0.10	3.52	-0.22	-0.25	-0.15	-0.01	-0.55	-0.14	0.02
Other Services	3.79	-0.23	0.31	-0.59	-0.12	0.04	0.34	-0.71	0.74	0.24	-0.18

Source: ABS (2016) Census, author's calculations

Distilling some of the main features from Table 3 and previous median age and income information from Table 1, an assessment of regional economies' industry profile and economic crisis risk factors is presented in Table 4. Farming is deemed important to those regions with high levels of Agriculture employment such as Bega Valley and Snowy Monaro. As such, they are judged as being susceptible to climate and natural disasters such as drought or climate change.

Many of the coastal and highlands / mountain regions have relatively high levels of Accommodation and Food Services associated with tourism (Bega Valley, Eurobodalla, Snowy Monaro, Shoalhaven, Wingecarribee, Kiama). Many in tourism make the majority of their annual income in the summer period:

> "At Christmas we have the big boom. We have half of Canberra come down the coast and stay for January, and they spend all their money. But then after they go home it's up to the locals to support the local businesses. And through winter if it wasn't for the locals supporting the businesses they'd go out of business. If you can survive a winter, then your business is going to survive here." APS employee, South Coast region

and

> "Well it's true and I guess also that casual workforce that you get with the tourism, that's ... All those people, they only work a few months every year and winter comes and either they stay or they go. If they stay, they're on the dole basically or they live on their savings. If they don't make enough over summer, well that's it, they really struggle." APS employee, South Coast region

This reliance on the generation of income in such a small window of time introduces a high level of seasonal variation in regions' economic activity. Furthermore, this economic activity is at great risk when other events may impede travel at this peak time.

Finally, those with higher age profiles and high representation of health and social care employment (Bega Valley, Eurobodalla, Shoalhaven) were classified as retirement havens and therefore exposed to issues affecting old age income (pension or superannuation) as well as retirement and aged care policies. Other regions with high levels of construction employment (Shoalhaven, Kiama, Shellharbour) are typically associated with inward migration of people looking for a sea change so would be affected by internal migration or housing market issues.

Table 4. Elementary Industry Economics Profile and Associated Sustainable Economic Growth Risks

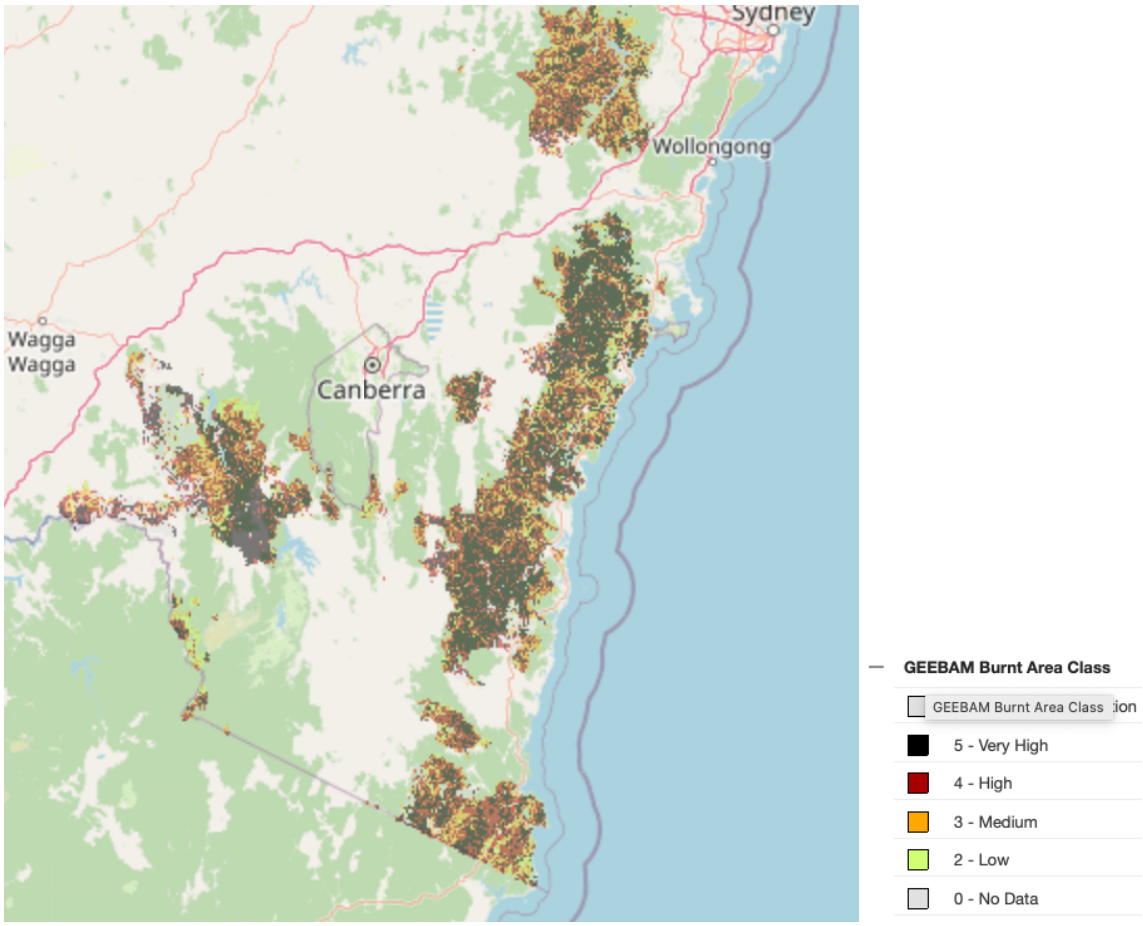
LGA	Elementary Industry Economic Profile	Associated Economic Risks
Bega Valley	Farming Tourism destination Retirement haven Health / aged care and retirement haven	Weather events (drought, flood) Travel impediments Superannuation / pension and retirement / aged care policy
Eurobodalla	Tourism destination Health / aged care and retirement haven	Travel impediments Superannuation / pension and retirement / aged care policy
Snowy Monaro	Farming Tourism destination	Weather events (drought, flood) Travel impediments
Queanbeyan-Palerang	Public service town	Public sector employment changes
Shoalhaven	Sea change (Construction) Tourism destination Health / aged care and retirement haven	Sea change / housing market trends Travel impediments Superannuation / pension and retirement / aged care policy
Wingecarribee	Tourism destination Few other distinguishing features from Australian profile	Travel impediments
Kiama	Sea change (Construction) Tourism destination Education Health / aged care and retirement haven	Housing market Travel impediments Superannuation / pension and retirement / aged care policy
Shellharbour	Sea change (Construction) Retail hub	Housing market Disposable income
Wollongong	Education and health hub	Student mobility Public policies on education and health

Source: Author's interpretation

7. ECONOMIC IMPACT OF CRISES – BUSHFIRES AND COVID-19

The 2019/20 bushfires have been described as unprecedented in their extent and intensity, with the fire ground in New South Wales covering 5.5 million hectares (7% of the State), including over 2.7 million hectares in national parks (38% of the NSW national park system) (NSW Department of Planning, Industry and Environment 2020). Figure 3 shows the areas affected by the bushfires, which covered most of the LGAs analysed in this report apart from Kiama, Shellharbour and Wollongong.

Figure 3. Areas of NSW Burnt by 2019/20 Bushfires



Source: NSW Department of Planning, Industry and Environment (2021)

Many of the public sector workers in these areas were directly impacted by the bushfires:

> "I've only experienced that once before and I was living overseas and had volcanoes erupting and that same complete darkness and ash. You feel like it's the end of the world" APS employee, South Coast region

and

> "So, sometimes I would leave to go to work really early in the morning and put the sprinklers on everywhere and just hope that the wind didn't change by the time I got home." NSW public sector worker (Communities and Justice)

The timing of these bushfires over the summer holiday period had a large impact on tourism with many businesses on the South Coast in particular reliant on tourist trade in the month from Boxing Day to Australia Day. This month of trade was effectively lost as tourists stayed away from bushfire zones or were otherwise advised by government not to travel there.

> "… he lost 80 grand worth of turnover. And what he was explaining to me was that he relies every year on getting that huge injection of capital, all that money comes in for four weeks. The way he would describe it to me, money just rolls in for four weeks. And that's his bank, if you like, that he relies on, for the other 11 months of the year to pay things like public liability insurance, electricity bills, et cetera. And that bank sort of gradually diminishes for 11 months and then Christmas rolls around again and he gets it back but this year he didn't get it back." APS employee, South Coast region

Apart from the direct and immediate effect on regional areas, there were longer term and ongoing harmful effects associated with contaminated water supplies which affected both domestic and agricultural users. Bushfire smoke affected peoples' health as well as agriculture busineses. For example, South Coast vineyards were unable to harvest their grapes for wine production. Other ongoing issues were summarised here:

> "And then the interesting thing about the produce is you have the flow on effect of the actual water. So the water that we're all using will be ash. Months afterwards, they couldn't use the water on the produce they were doing. So they had to spend dollars, thousands upon thousands of dollars to buy special filtration. Even the local dentist. The local dentist had to buy a specialised reverse osmosis sort of filtering process and install it into their business in order to start working again, because the water was contaminated from all the ash that had gone in there." Public School Teacher, Shoalhaven LGA

While some businesses bounced back and rebuilt, for others it meant permanent closure and loss of economic activity in the region:

> "Just on Mogo, because I'm a little bit familiar with that, we holiday there. Some of those businesses that had been there for years, they've not reopened. They decided not to. Particularly on the side of the road where everything was burned, so they're gone. And then there's other businesses that are sitting in like relocatable buildings in the car park, and they have reopened. But yeah, Mogo was dreadfully affected." Public School Teacher, Shellharbour LGA

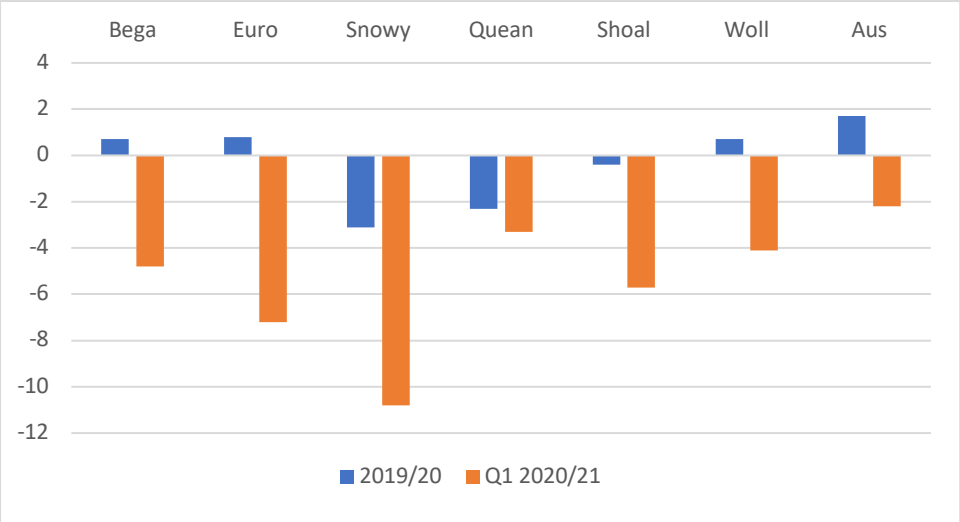
On the back of these bushfires was the health and economic challenges associated with COVID-19, particularly from March 2020 as borders were closed and various lockdowns occurred, preventing international, interstate and sometimes intrastate travel. Again, tourism

was a major casualty. Unemployment in Australia increased from 5.2 to 7.5% between April and July 2020, with Australia entering its first recession since 1991 (Lim et al 2021).

GRP growth rates presented in Figure 4 demonstrate the potential effect of bushfires and COVID-19 events on regional economic growth. Compared to analogous GDP growth rates for Australia, the GRP growth rates were worse in all LGAs in both 2019/20 and the first quarter of 2020/21. Of the LGAs that recorded positive economic growth in 2019/20, all were relatively weak with growth of less than 1%. Of particular concern were the regions of Snowy Monaro, Queanbeyan and Shoalhaven, which all experienced economic decline in 2019/20 prior to the subsequent economic impact of COVID.

The most recent regional data for the first quarter of 2020/21 show all our regions suffering more extreme economic decline compared to the aggregate Australia level. Most regions suffered an economic contraction at least twice the size of that observed at the aggregate Australian GDP level (in % terms).

Figure 4. GRP Growth Rates 2019/20 and Q1 2020/21[1,2]



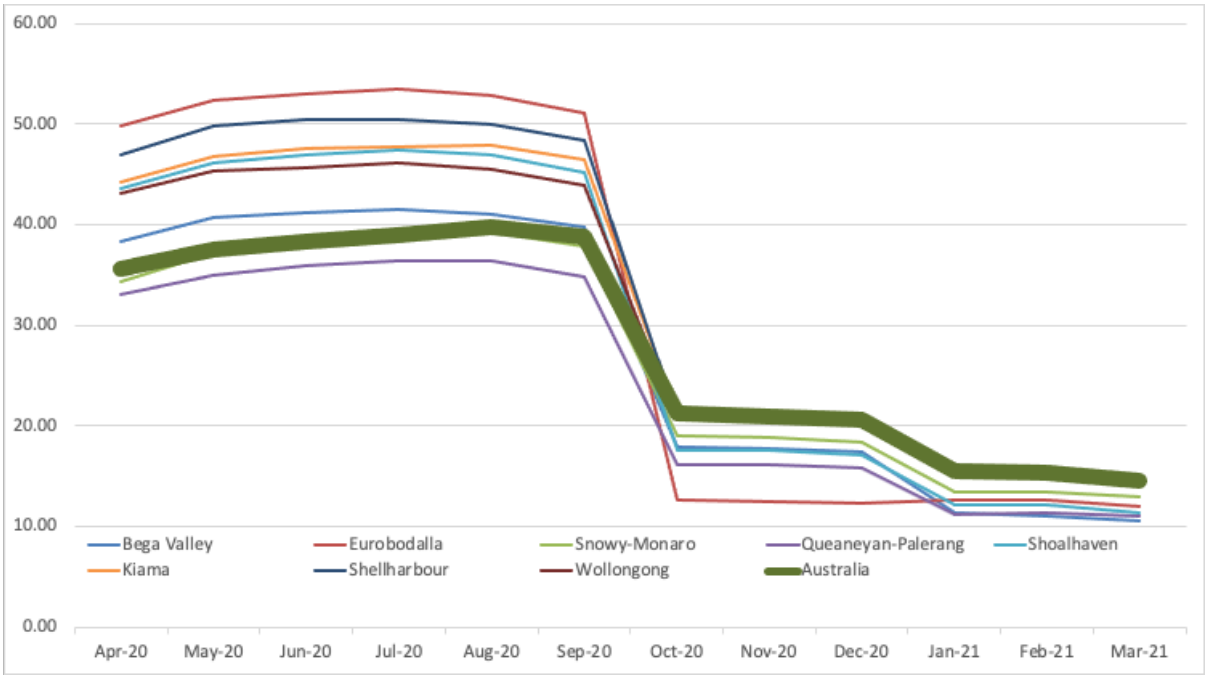
[1] Q1 2020/21 compared to Q1 2019/20
[2] Comparable data for Wingecarribee, Kiama and Shellharbour not available
Source: .id (2021b)

To give a further indication of the greater impact of COVID-19 on regional businesses, the proportion of businesses receiving JobKeeper is displayed in Figure 5. In the first phase of JobKeeper from April to September 2020 we can see that up to 40% of businesses Australia-wide accessed the wage subsidy. However, this proportion was greater in all of our LGAs except Snowy Monaro and Queanbeyan. More than half of businesses in Eurobodalla and

Shellharbour received JobKeeper, while over 46% of Wollongong businesses, and 47% of Shoalhaven and Kiama businesses accessed the scheme.

Statistics available elsewhere showed that while 29% of Australian workers received JobKeeper in its first phase, a significantly higher 35% of Southern Highlands and Shoalhaven workers, and 37% of Wollongong workers were in receipt of this payment on the first 6 months of COVID-19 (Grattan 2021).

Figure 5. Prevalence of JobKeeper Receipt (% of Local Businesses)



Source: Treasury (2021), ABS (2021b)

One of the obvious contributors to the poor regional economic performance over recent times is the acute impact of bushfires and COVID-19 on the tourism sector in our regions. Many businesses in Accommodation and Food Services were forced to remain closed in the initial period of COVID. Various lockdowns since have further prevented domestic travel. In many South Coast areas the traditional tourist season over summer has been lost in successive years, first because of the bushfires in 2019/20 and then lockdowns in Victoria over the 2021 new year period. As one public sector worker reflected:

> "I actually cried, for the first time. A lot of caravan parks, all the people in the tourist industry, that this was happening to them again. They were all hopeful for this recovery and then for the second summer in a row they were losing all their customers, all their income. And for places like Tathra, it was third time around for them because they'd had the fires two years before that. So yeah, it was pretty hard." APS employee, South Coast region

8. THE DYNAMIC IMPACT OF PUBLIC SECTOR ON REGIONAL ECONOMIES IN TIMES OF ECONOMIC FLUCTUATION AND CRISIS

To some extent the economic fortunes of regions are tied to uncontrollable external factors such as bushfires and COVID-19, while others are more predictable frequent and regular fluctuations. Regardless of the source, this volatility is tempered by the presence of the public sector. We have observed in Table 2 that public sector employment makes up a greater proportion of total employment in the majority of our regions compared to Greater Sydney or the employment patterns at the aggregate Australian level. Further analysis in Tables 3 and 4 showed the relatively high level of employment in areas such as Education, Public Administration or Health Care in different regions. Consistent with these findings, the GRP analysis presented in Figure 2 showed the relatively higher contribution of public sector employee income to our regional economies.

While the various job descriptions and roles for public sector employment vary widely, one of the main features is that most of these workers will be paid a relatively constant income 52 weeks of the year, while those in the private sector may be subject to both regular seasonal fluctuations as well as the irregular shocks associated with crisis events. In addition to income stability, public sector income is relatively high in some regions with reference to the median income statistics in Table 1. This observation was also confirmed in interviews:

> "We're either a Commonwealth public servant, or a police officer, a school teacher, a council employee, it's somebody who one way or another is being paid out of the public purse, or a public purse. We're really the only ones who are replied upon to have a regular income, week in week out. There's a few exceptions to the rule, but look, the biggest percentage of people are either in hospitality or retail in this part of the world." APS employee, South Coast region

and

> "So we're one of the best sources of income in terms of wages to put into the community. We've had a lot of drought here over the years, so during the drought, no farm income either. We're the ones still buying stuff when others can't." APS employee, South Coast region

and

> "And we always have that (income), it's that constant thing that we also provide those services constantly. Schools don't close. Hospitals don't close. Police stations don't close. We're always there, it's a constant. And our wages, obviously, are a constant in that community." Public School Teacher, Shellharbour LGA

This hypothesis that public sector employment and income forms a stable base or foundation to regional economies implies that the economic importance of the public sector is countercyclical. That is, in times of rapid growth the contribution of public sector employment

and income decreases in relative importance as the private sector expands. However, in times of economic contraction or recession the role of the public sector increases in terms of its relative contribution to employment and economic activity. In technical terms public sector employment is exogenously determined by government policy, whereas private sector employment is endogenously determined by the business cycle or other factors influencing private sector demand.

In testing this hypothesis, we need to extend our baseline calculations of the contribution of public sector income to GRP from Section 5 (which was based on 2016 Census data). Using updates of GRP, public sector employment and wage data, we present a time series of the public sector contribution to GRP estimates from 2015/16 to the first quarter of 2020/21 in Table 5. The traffic light colour coding system is used where red represents a relatively low contribution to GRP, and green is high.

The hypothesis that the importance of public sector income to regional economies increases in times of economic crises is confirmed in Table 5. We generally observe a light shade of green in 2019/20 followed by a dark shade of green in 2020/21 in all LGAs (with the exception of Shellharbour[6]). This confirms that the contribution of public sector income to GRP has increased noticeably in our regions in the two most recent periods characterised by the bushfire and COVID-19 crises. Generally, the contribution has increased by at least 1.5% in most regions, up to 4.5% for Queanbeyan-Palerang. Furthermore, it would appear that the hypothesis is restricted to regions only, as the pattern is muted for Greater Sydney (increase of only 0.78%) and an opposite pattern is observed for Australia as a whole where the contribution of public sector income to GDP declined by 0.28%.

[6] This result for Shellharbour was largely the result of rapid economic growth after 2015/16 that outpaced public sector income growth.

Table 5. Public Sector Income Contribution to Gross Regional Product (2015/16 to Q1 2020/21)

LGA	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21*	Difference
Bega Valley	7.39	7.91	8.60	8.33	8.54	9.07	1.68
Eurobodalla	9.02	9.31	10.03	9.65	9.88	10.77	1.75
Snowy Monaro	10.55	10.94	11.98	11.86	12.63	14.36	3.81
Shoalhaven	9.85	10.29	10.24	10.22	10.56	12.05	2.20
Queanbeyan	35.94	37.60	39.18	38.15	40.40	42.96	4.45
Wingecarribee	6.80	6.78	6.76	7.29	7.45	7.83	1.03
Kiama	19.63	19.36	19.43	19.89	20.67	21.76	2.13
Shellharbour	13.26	11.46	11.54	11.77	12.23	12.87	-0.39
Wollongong	11.35	11.25	11.37	11.73	12.18	12.88	1.53
Greater Sydney	6.37	6.28	6.30	6.39	6.74	7.15	0.78
Australia	7.80	7.53	7.37	7.16	7.24	7.51	-0.28

* Q1 / Sept Qtr 2020/21

low medium high

Source: ABS Census (2016), ABS National Accounts (2021), .id (2021), REMPLAN (2021), NSW Premier and Cabinet (2019, 2021), NSW Industrial Relations Commission (2017), NSW Public Service Commission (2016, 2017, 2018, 2019, 2020), Australian Public Service Commission (2021), author's calculations

Notably, the contribution of public sector employment and income to regional economic activity would have been higher if not for the public sector wage austerity measures, such as the 0.3% wage rise for NSW public sector employees in 2020/21, when the previous norm had been annual increases of 2.5%. In fact, Reserve Bank of Australia Governor Philip Lowe was on the record as calling for 3% p.a. increases to public sector income (Karp 2019). Simulating a hypothetical increase in public sector income of 3% in 2020/21, the public sector income contribution to GRP would have had a relatively higher impact on regional NSW economies. Whereas a 3% increase in NSW public sector wages would have increased public sector contribution to GRP by an additional 0.13% for Greater Sydney and Australia (GDP) as a whole, the GRP stimulus from the public sector would have increased by an additional 0.16% for Wingecarribee, 0.17% for Bega Valley, 0.18% for Shoalhaven, 0.20% for Eurobodalla, 0.23% for Wollongong, 0.25% for Snowy Monaro and Shellharbour, 0.28% for Queanbeyan and 0.41% for Kiama LGA compared to the estimates presented in Table 5.

In addition to the increased contribution of public sector income and expenditure to GRP in these times of economic downturn and crises, many public sector employees documented the

additional hours and responsibilities in their roles during the bushfire and COVID-19 times. For example, Services Australia staff assisting those who lost homes during the bushfires with financial assistance:

> "…being one of the people in town that sort of stayed at work probably longer than you wanted to, because you're mindful of the fact that there were others in the community that were sort of relying on you because the needed to get their payments processed. They needed to make sure they had a few dollars in their pocket. Which in that sort of situation, people do still need money. I mean, if you've got to get out of town, you still need money to buy petrol. If you do find yourself camped in an evacuation center, you still need money for life's essentials." APS employee, South Coast region

Or Department of Communities and Justice staff setting up the evacuation centres:

> "So, we set up every evacuation center anywhere across the state. That was community services workers that did that, DCJ workers that did that. And so, when the fire started, the first big fire that we required an evacuation center for, was at (south coast town), and I was down there the first night. It had been set up by local staff from (south coast town), but (south coast town)'s a really small place and many of them actually lived at the fire front. So, they needed to knock off after probably a 20 hour shift. And I went down there and then bush fire response never stopped for me and never stopped for many of my colleagues who were also managing their other work, their child protection caseload work. And yeah, so that work doesn't take a holiday because you are fighting fire." NSW public sector worker (Communities Justice)

While many lost businesses or jobs in the bushfire period, or were displaced from their homes, some public sector workers were working extremely long hours:

> "And especially, if we go back to the bush fires during that bush fire period, there was lots of just hours that we dedicated because you couldn't leave, you felt you couldn't leave. We had hundreds and hundreds of people in evacuation centers, staffed usually by two caseworkers, and we had lots of frail aged people. We had lots of people who were left in our evacuation centers by their children who were going back to their home to fight the fire. And so, they'd be in our evacuation center for two days.
>
> ….Oh, well look, if I look here and say the period ran for two months, say from December to January, I would say easy, every single person, whether they were working in an evacuation center or whether they were back in the office doing the other work that other people weren't in the office to be able to do, I'd say we easy put in an extra maybe 15 hours a week, every week." NSW public sector worker (Communities and Justice)

Moving to COVID-19, Services Australia staff experienced the queues of people down the street lining up for Job Seeker assistance at the beginning of the pandemic. A lot of retraining occurred as COVID-19 stretched on, with the move to online services. The move to online mode of work was especially time-consuming for NSW teachers, who shifted to online teaching virtually overnight. Many commented they worked 10 to 15 hours of unpaid overtime

each week at this time. Those teaching to low SES students had to contend with families not having access to computers or internet. Many conducted online classes at the same time as preparing lessons in hard-copy format for those unable to access the required technology. The move to online learning was also hampered by the poor internet connections in many regional locations. Finally, escalating student behavioural issues became another concern when school returned to face-to-face teaching. Summing up some of these issues:

> "I said that I worked well and truly almost 10 hours a day. And that was between troubleshooting, ringing parents over the phone, trying to help them get digital access to their kid's Google Classroom, and troubleshoot for that. Trying to make sure that there were work packs, and there was an alternative for the kids that couldn't access the internet. As well as professional learning, as well as trying to figure it out myself.
>
> … and not only that, also the parents then had access to me a lot more than just school hours. So I was not just doing the work, and the teaching, and the learning, and professional learning for myself. I was also having to be interrupted at certain times of the night when a parent would decide to call me to find out what was going on tomorrow. And so it's not just about the physical work. It's also about the mental switch-off time, because we're constantly being contacted by parents and schoolwork outside of school hours as well." Public School Teacher, Shoalhaven LGA

9. SUMMARY AND CONCLUSION

Our LGA regions of analysis are diverse in geography, demography and in economic activity. However, a number of general conclusions can be made. Public sector employment makes both a larger contribution to regional labour markets as well as regional economic activity compared to that for Greater Sydney or Australia as a whole. Whereas public sector employment comprises 13% of total Greater Sydney employment and 15% of Australian employment, public sector employment exceeds 16% of Eurobodalla, 17% of Snowy Monaro and Shoalhaven, 20% of Kiama and Wollongong and over 30% of Queanbeyan-Palerang labour markets. Similarly, public sector income is a larger contributor to GRP in all our LGA economies compared to Greater Sydney. Whereas public sector income contributes approximately 6.37% to Greater Sydney GRP and 7.80% to GDP in Australia, our baseline estimates suggest public sector income exceeds 9% of Eurobodalla and Shoalhaven, over 10% of Snowy Monaro, Shellharbour and Wollongong, approximately 20% of Kiama and over 35% of Queanbeyan-Palerang GRP. This contribution to GRP increases if we incorporate spending multipliers, agglomeration effects and other positive spillovers to local businesses.

The underlying hypothesis that the impact of public sector employment is countercyclical in nature and takes on a larger and more important role for regional economic activity in times of economic downturn was supported by both quantitative and qualitative evidence. Many regions

face frequent fluctuations in economic activity due to reliance on tourism or agriculture, while the disproportionate industry composition places other at risk of economic crises. Public sector employment, income and in turn expenditure provides a stable base to these regional economies. Public sector workers work, earn and spend all year round. Furthermore, in times of severe or prolonged crises such as bushfires and COVID-19 the contribution of public sector workers to both the economy and community increases. First, the contribution of public sector income as a proportion of GRP increases significantly. Secondly, public sector employment continues when others lose their jobs or homes. Often, work hours and unpaid overtime also increase. Finally, public sector work roles often increase in importance in communities' time of need, from processing disaster payments or JobSeeker applications, opening and operating evacuation centres, or maintaining community members' safety, health and schooling.

Public sector employment forms the foundation of region economies and communities. However, there is uncertainty whether this important role will be maintained in the future. Job security is often at risk from privatisation or centralisation of departments and roles. Furthermore, the stimulus to regional economies from public sector employment and income in times of crises, when many are working longer and often unpaid hours, is also at risk from government imposed wage freezes imposed in these same times under the guise of austerity.

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APPENDIX A DETAILS OF METHODOLOGY

A.1 Baseline calculation of public sector employment contribution to regional labour market (Section 4)

Finding appropriate reliable data at the regional level is the main challenge in quantifying the impact of public sector employment on regional labour markets and economies. To address the aims of this research project we need employment and income data at the LGA regional level, disaggregated by public vs private sector, as well as data capturing regional economic activity Unfortunately, Labour Force Survey data produced by the Australian Bureau of Statistics (ABS) and widely used for monthly unemployment rates is only available at higher Statistical Area Level 4 level (Illawarra, Southern Highlands and Shoalhaven, and Capital region) and furthermore is not disaggregated by public vs private sector. In comparison, small area labour market data from the Department of Employment available at the LGA is released quarterly, but is not disaggregated by industry, let alone public and private sector. Public sector employment and earnings data is reported annually by the ABS, and disaggregated by local, state and federal levels but contains no regional level data.

This leaves us with ABS census data which is available at LGA level and disaggregated by industry, as well as public and private sector. Furthermore, census data contains both employment and earnings data. The most recent census data is for 2016. A more recent census was conducted in August 2021 but the data will not be released in time for analysis in this project.

The baseline contribution of public sector employment to the regional labour market is calculated as:

$$\text{PSEmp} = \frac{\sum(local+state+federal\ public\ sector\ employment)_{i,2016}*100}{total\ employment_{i,2016}}$$

Where i = LGA (Bega Valley, Eurobodalla, Snowy-Monaro, Queanbeyan-Palerang, Shoalhaven, Wingecarribee, Kiama, Shellharbour, or Wollongong)

The baseline public sector employment contribution estimates were adjusted in later years using available data on regional public sector trends (NSW Public Service Commission 2016, 2017, 2018, 2019, 2020).

A.2 Baseline calculation of public sector income contribution to regional economic activity (Section 5)

Gross Regional Product (GRP) is the regional equivalent of Gross Domestic Product measuring economic activity. While Gross Domestic Product and Gross State Product are compiled and released by the ABS, this is not the case for GRP. The (federal) Department of Infrastructure, Regional Development and Cities (2019) discuss the many difficulties in accurately measuring GRP, especially at the LGA level. Nevertheless, local governments have a thirst for data describing their region and thus GRP estimates are produced by a number of private sector economics organisations. In our case, GRP statistics for the LGAs covered by this study were available for the financial years 2015-16 to 2019-20, and for the first quarter of 2020-21, from .id (.id 2021) or REMPLAN (REMPLAN 2021).

The baseline calculation of public sector income contribution to regional economic activity is calculated as:

$$PSGRP_i = \frac{\sum(local+state+federal\ public\ sector\ income)_{i,2016}*100}{GRP_{i,2016}}$$

Where: GRP_i = Gross Regional Product of LGA_i

It should be stressed that the baseline estimates represent a lower band or minimum threshold for the contribution of public sector employment to regional labour markets and economies. Public sector employment is associated with the direct spending of the employees in the local region as well as expenditure of the agencies and departments they work for which would have a "multiplier effect" to create other jobs. For example, Cook and Mitchell (2009) cite research in Australia that estimates between 24 to 46 additional jobs being created in other industries for every additional $1 million spent in the public sector. A consensus has emerged of a multiplier of 1.5 associated with public expenditure, meaning that any increase government of $1 will lead to an overall increase of $1.50 in economic activity (Weber 2012), although Murray and Henderson (2018) contend that the multiplier would be greater for public sector employment expenditure which affects income and consumption spending directly, compared to more capital intensive government purchases. However, estimating an exact multiplier effect is fraught with difficulty due to data requirements and the many shortcomings of the input-output method from which the multiplier is derived. These considerations are even more extreme when attempting regional level multipliers (Gunton et al. 2020). The abuse of multipliers to inflate the employment benefits of specific projects has been common in Australia government departments are wary of their use by private sector economic consultants

(Western Australia Department of Treasury and Finance 2002, Gretton 2013). Due to these reasons the ABS no longer publish input-output multipliers (ABS 2010). Multipliers will not be directly estimated in the current research project.

However, the qualitative analysis does provide insights into public sector multipliers. Questions were asked about public sector employees' spending patterns, businesses directly supported by public sector workers, or businesses that deliberately locate near public sector places or work.

A.3 Sustainable economic growth risk factors in regions (Section 6)

Economic crises such as mass job losses or recessions are caused by a wide variety of causes. Some emanate offshore from global events such as the global financial crisis (GFC) or COVID-19. Others may originate from domestic weather events such as drought or bushfires. Regardless of the cause, economic crises typically affect industries disproportionately (Chetty et al. 2020). For example, the GFC caused widespread job loss in Banking, Insurance and Finance sectors (ILO 2009), drought from 2017 to 2020 had an acute impact on Agriculture, while COVID-19 has affected Construction, Retail, Food and Accommodation Services, as well as the Arts and Recreation Services more than other industries (Lemiex et al. 2020). Other economic crises are more local in nature, and affect specific regions either due to natural events within their geography (eg. bushfires) and / or economic events affecting industries concentrated in the region (eg. rising exchange rates or globalisation forces affecting the manufacturing of certain goods such as cars or steel). Thus, the concentration of industry employment or the nature of its distribution within regions can reflect of both a comparative advantage and a risk factor to economic crises.

In order to assess the risks to sustainable growth or economic crises in regions, an investigation of the concentration or distribution of industry employment is undertaken. This is achieved by comparing the distribution of employment by industry for each region with the industry distribution for Australia as a whole. The deviation of each region's industry employment distribution from that of Australia is calculated as follows:

$$\text{INDDEV}_{ij} = \frac{INDEMP_{ij}}{TOTEMP_i} - \frac{INDEMP_{AUSj}}{TOTEMP_{AUS}}$$

Where: INDDEV_{ij} = deviation of LGA *i* industry *j* representation with Australian industry *j* representation

INDEP_{ij} = LGA *i* industry *j* employment

INDEP_{AUSj} = Australian industry *j* employment

$TOTEMP_i$ = total employment LGA *i*

$TOTEMP_{AUS}$ = total employment Australia

A traffic light colour code is used to present these results, where green represents an over-representation of employment in industry, yellow is neutral and red is under-representation.

A.4 Effect of 2019-20 bushfires and COVID-19 on regional economic activity (Section 7)

The latest public data for Gross Regional Product growth rates in 2019-20 and the first quarter of 2020-21 are presented for regions and compared to analogous rates for GDP at the national level, to determine the potential effects of bushfires and COVID-19 on the regional economies. In addition, postcode level JobKeeper statistics released by The Treasury have been combined with business level data from the ABS to estimate the proportion of businesses in receipt of JobKeeper assistance by LGA.

$$JOBKEEPER_{it} = \frac{\sum JOBKEEPER\ BUSINESS_{ijt}}{\sum BUSINESS_{it}}$$

Where JOBKEEPER BUSINESS represents the number of business in postcode *j* within LGA *i* in time period *t* in receipt of JobKeeper (Treasury 2021)

BUSINESS represents the number of businesses within each LGA (ABS 2021b)

The JobKeeper statistics are presented on a monthly basis from April 2020 to March 2021, encompassing the first phase of the program from April to September 2020 and the subsequent extension under revised eligibility criteria.

A.5 Dynamic impact of public sector on regional economies in times of crises and economic downturn (Section 8)

In order to demonstrate/investigate the possible dynamics of the impact of the public sector on regional economies at different points in time the baseline public sector income figures from Section 5 were updated in later years for employment changes, as well as available wage increases (NSW Public Service Commission 2016, 2017, 2018, 2019, 2020, NSW Industrial Relations Commission 2017, 2019, NSW Premier and Cabinet 2019, 2021, Australian Public Service Commission 2021). Similarly, the baseline GRP estimates were updated for later years (.id 2021, REMPLAN 2021). The contribution of public sector income to regional economic activity were presented for years 2015/16 to 2019/20 and the first quarter of 2020/21, representing the latest available data. Of particular interest are the estimates from 2019/20 and Q1 2020/21, representing the periods affected by bushfires and COVID-19. The hypothesis that public sector employment impact is countercyclical implies that the relative size and

importance of public sector employment and contribution to regional economic activity increases as regions face economic downturns or crises. A traffic light colour coding system is used for each region, with red representing relatively low public sector impact and green representing relatively high impact.

In addition to the quantitative analysis, qualitative data from interviews is used to provide a narrative of public sector contribution to regional economies and communities in general during the bushfire and COVID-19 periods.