KPMG

cutting through complexity

Australian Regional Capacity Index

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Contents

In this report, KPMG explores how regional resilience has been measured and evaluated. Our thinking on how leading approaches can be applied to the Australian context is presented. We welcome ideas and insights on how the approaches applied in this analysis can be enhanced to support an ongoing evaluation of resilience at a sub-national level.

Introduction

Resilience is a concept traditionally associated with disciplines such as ecology, psychology and engineering, and more recently, in the context of a shock, a disaster or adversity. Australia's Prime Minister noted in a speech following Victoria's 2009 Black Saturday bushfires:

> *Australia – a nation of compassion. Courage and compassion. And the third of these great values: resilience.*[1]

However, this concept of resilience has started to emerge in the field of economics, driven largely by the recent economic crisis. The International Monetary Fund noted:

> *…the Australian economy has demonstrated considerable resilience in the face of the global financial crisis.*[2]

This statement is a good example of how this concept is currently thought of and incorporated in economic commentary. It implicitly encapsulates two elements associated with resilience: **resistance** – the differential ability of places to repel disruptive change; and **recovery** – the ability of a region to 'bounce-back' or 'come back' from a shock or disruption.[3]

Importantly, the notion of resilience is one that is dynamic, as it focuses on a region's ability to respond to shocks, either by maintaining a pre-existing state (consistent with the element of resistance) or by returning to its previous level or rate[4] of output, employment or population growth (consistent with the element of recovery).[5]

Resilience and related concepts of adaptation, adaptability and adaptive capacity[6] are now finding their way into academic debate and government policy documents in the context of regional capacity. That is, regional capacity contemplates how well placed local and regional economies are to adapt to factors, such as the rise of global competition for industries, unplanned major plant closures and technological innovation revolutionising current work practices.[7]

Adaptation, in this context, reflects a region's ability to respond to an economic shock by moving back to, at least in the short term, a preconceived model of regional or sectorial development that has been successful historically (that is, we will do what worked in the past and get better at it as we proceed). In contrast, adaptability reflects a region's propensity to make decisions to leave a path that may have been successful historically in favour of a new model of regional or sectorial development, elevating the economic outcomes onto a new, alternative trajectory.

Regional capacity contemplates how well placed local and regional economies are to adapt to external factors.

Regional resilience

Regions are complex, multi-faceted, and continually changing; therefore, defining and measuring regional resilience is challenging. Issues such as defining the concept (absolute or relative resilience?), cause (resilience to what?), scope (resilience of what?), and time (resilience by when?) complicate resilience research.[8]

In a publication released by the Brookings Institution Press, Dr Kathryn Foster introduced and defined the concept of regional resilience as 'the ability of a region to anticipate, prepare for, respond to, and recover from a disturbance'.[9] Foster postulates that a region has a 'pre-stress capacity for resilience' and that, when a region encounters a stress event, it reacts with a 'resilience performance'.[10]

Foster acknowledges that measuring 'resilience performance' is challenging in the context of specifying what to measure over a given time period, and how to ensure consistency of data across regions to allow for comparative assessment. Capacity, in the context of this analysis, relates to a range of resources, characteristics and attributes of regions that allow them to deal with future challenges. Foster broadly groups these into three dimensions:

1. Regional economic capacity;
2. Socio-demographic capacity; and
3. Community connectivity capacity.

While these dimensions provide a good mix of factors influencing a region's capacity to 'bounce back', it is also recognised that other factors such as environment and geography,[11] governance[12] and ability to respond to natural disasters are also likely to affect a region's resilience capacity. However, data for these types of indicators are rarely available and/or rarely reported on a consistent basis across regions.

It is important to recognise that economic resilience therefore not only reflects the pure economic characteristics of a region or area but also relies on the interplay of socio-demographic and community factors. Simply, the economy cannot function without individuals or without those individuals working together as a community to achieve social outcomes. The better a region is able to collectively enhance economic, socio demographic and community outcomes, the more likely it will be to withstand adversity and 'bounce back' in the shortest time possible.

Economic resilience also relies on the interplay of socio-demographic and community factors.

Measuring regional resilience

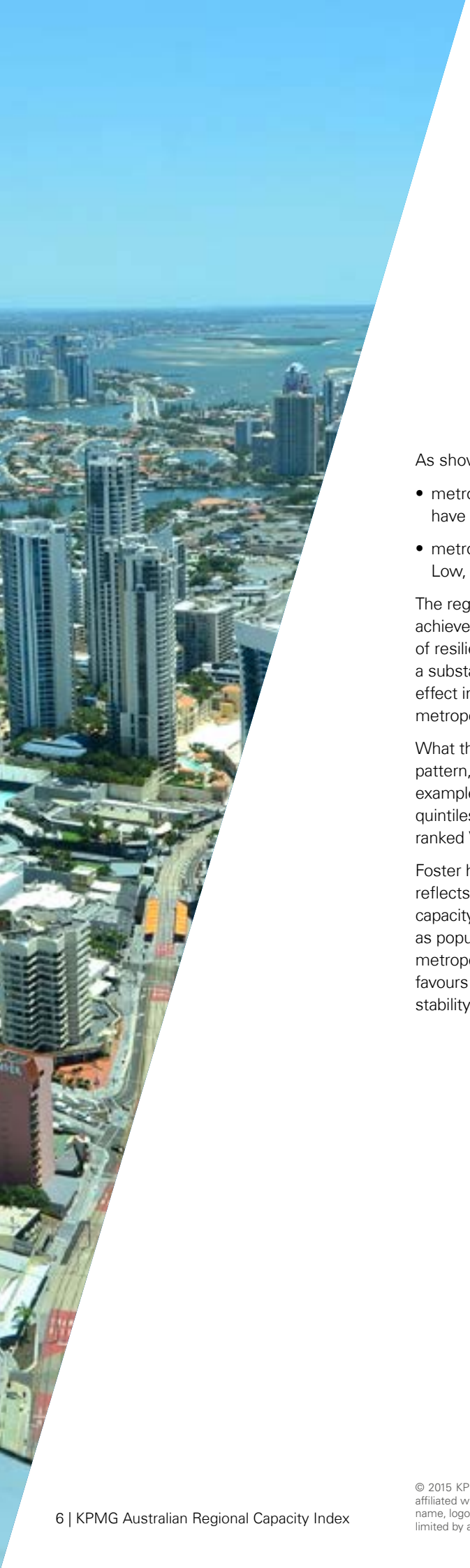
The University at Buffalo Regional Institute, State University of New York[13], in association with the Institute of Government Studies at the University of California Berkeley, developed a Regional Capacity Index for the United States of America (USRCI).The USRCI allows for comparisons across metropolitan regions in the United States and the identification of strong and weak conditions relative to other metropolitan regions.[14] The USRCI is a single statistic summarising a region's ability to bounce back from a future unknown stress.

The single statistic is made up of 12 equally weighted indicators, classified into one of three capacity types:

- regional economic indicators, which capture concepts of industrial diversification, business dynamics, regional affordability measured as a product of housing costs and income levels, and income equality
- socio-demographic indicators, which capture concepts of poverty, disability, educational attainment and the proportion of the region's residents with health insurance
- community connectivity indicators, which capture how familiar with and civically active a region's residents are as expressed by voter participation rates, home ownership, organisational density, and metropolitan stability (measured by resident tenure within the region.)[15]

The USRCI incorporates each of the 12 resilience capacity indicators, weighing each indicator equally, creating the effect that individual indicators are 'worth' the same as each other in the composite USRCI. Each indicator is shown as a z-score,[16] which represents by how many standard deviations a region's performance deviates from the average. The RCI for a metropolitan region is therefore the average of its z-scores for each of the 12 indicators.

The USRCI is a single statistic summarising a region's ability to bounce back from a future unknown stress.



As shown in Figure 1, the USRCI exhibits a clear geographic pattern:

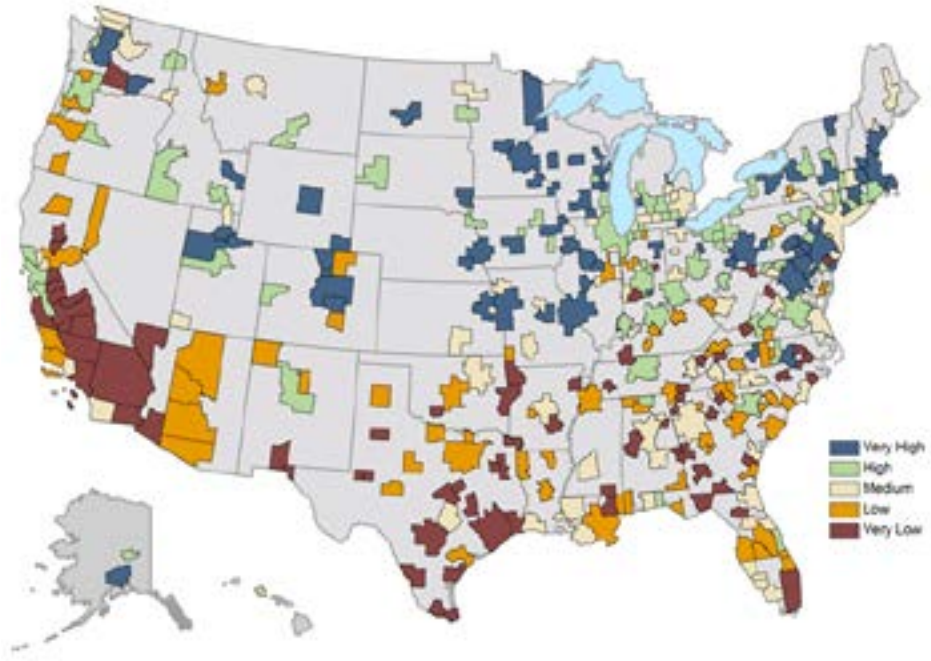
- metropolitan areas in the Northeast and Midwest regions have a tendency to have High, Very High, or Medium resilience capacity
- metropolitan areas in the South and Southwest regions tend to have Very Low, Low, and Medium resilience capacity.

The regions at the upper end of the resilience capacity spectrum generally achieve a high score in one or more indicators in each of the three categories of resilience. Places at the lower end of the spectrum have often experienced a substantial churn in their population base, which appeared to have a causal effect in relation to low levels of voter participation, home ownership and metropolitan stability.

What the analysis has also shown is that, beyond the distinct geographic pattern, there is a marked degree of variation within individual states. For example, Washington State has at least one metropolitan region in each of the quintiles, ranging from Seattle, which is ranked Very High and Yakima, which is ranked Very Low.

Foster has concluded that the geographic pattern associated with the USRCI reflects, in part, the composition of the measure, which is an indicator of capacity rather than of past performance. Traditional performance metrics, such as population or employment growth, yield rankings favouring fast-growing metropolitan regions in the South and West, whereas the USRCI measure favours attributes often found in slower-growing regions, such as metropolitan stability, regional affordability, home ownership and income equality.

Figure 1: United State Regional Capacity Index Map



Source: University of California Berkeley

Australian Regional Capacity Index

Applying the same methodology and techniques as those developed by the Institute of Government Studies at the University of California Berkeley, KPMG has calculated a regional capacity index for Australia.

To prepare this analysis, we sought to align the indicators used for each of the capacity types to Australian-sourced data. Data that allows for a regional capacity index to be constructed on a time series basis rather than just on a periodic basis was preferred, so that we can evaluate how resilience may have changed annually.

Table 1 identifies the datasets included in the draft Australian Regional Capacity Index (ARCI) and the USRCI.

Consistent with the USRCI methodology, the ARCI has been calculated on a z-score basis, with each of the indicators being equally weighted. A summary of each of the indicators, the basis for their inclusion and the source of data used is presented in the following pages.

The ARCI combines Australian data with the same methodology and techniques used to develop the USRCI.

Table 1: Datasets included in the Australian Regional Capacity Index (ARCI) and the USRCI

	ARCI	USRCI
Economic capacity	Income equality	Income equality
	Economic diversification	Economic diversification
	Regional affordability	Regional affordability
	Economic dynamics index[17]	Economic dynamics index[18]
Socio-demographic	Educational attainment	Educational attainment
	Female labour force participation	Disability rates[19]
	Poverty	Poverty
	Life expectancy	Health-insured
Community	Incarceration rates	Civic infrastructure
	Net overseas migration	Metropolitan stability
	Participation in sport	Home ownership
	Voter participation	Voter participation

Income equality

The more equal a region's distribution of economic resources, the more cohesive the response to a disturbance is likely to be.

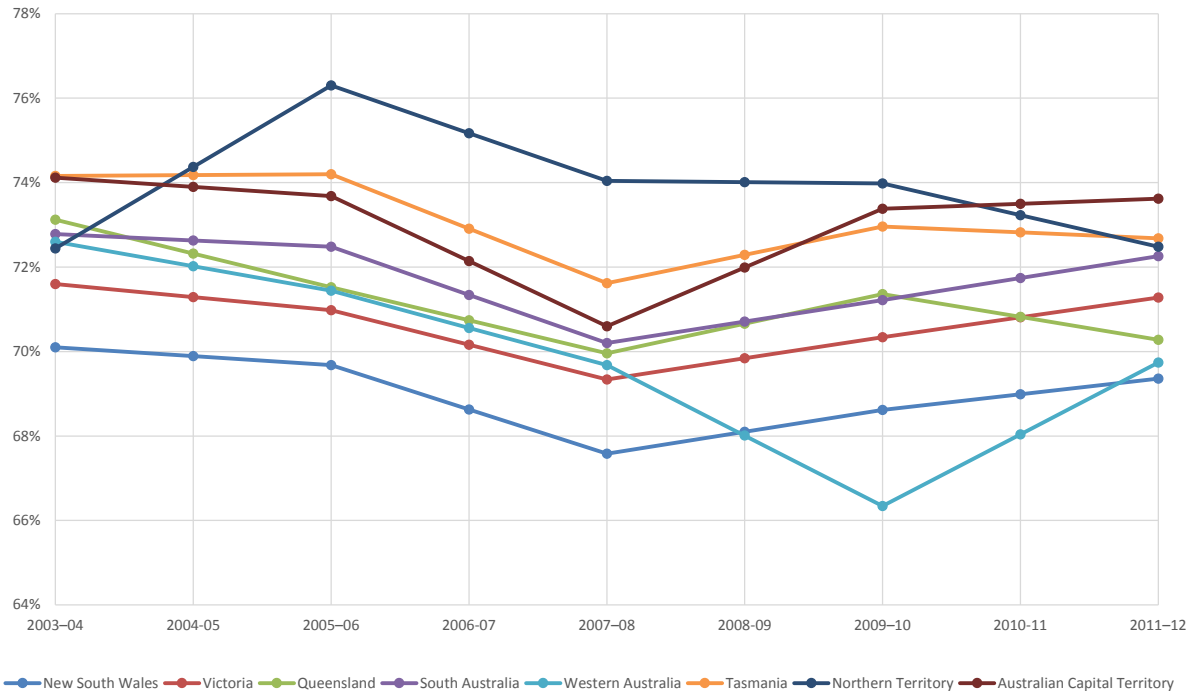
Income equality, as typically measured by the Gini coefficient,[20] is a measure of the distribution of income across a population. As noted by the Productivity Commission, 'variation in incomes is a feature of all economies. At any point in time, some individuals and households earn relatively less, while others earn relatively more, resulting in a distribution of different incomes.'[21]

Differences in individual incomes occur for a variety of reasons, including personal choices and innate characteristics (such as age, intelligence and choices made over work–life balance) as well as opportunities and inheritances. However, Cutter et al[22] has postulated that the more equal a region's distribution of economic resources, the more cohesive is likely to be the response to a disturbance is likely to be.

Income equality in the ARCI is based on calculating the Gini coefficient for each state using data on household income quintiles contained in the Australian Bureau of Statistics (ABS) publication 6523.0, *Household Income and Income Distribution, Australia*. Data for the financial years 2004–05, 2006–07, 2008–09 and 2010–11 has been estimated using the simple average of the data for the years immediately before and after. Consistent with the approach adopted in the USRCI, we have calculated the ARCI indicator as the inverse of the Gini coefficient so that high values signify high equality and high resilience.

Figure 2 presents the calculated Gini coefficients for each Australian state and territory.

Figure 2: Gini coefficient and the USRCI



Source: KPMG, 2014

Economic diversification

Economic diversification measures the degree to which a regional economy differs from the national economy.

A close linkage between economic diversification and sustainability has long been advanced in economic thought. A diverse economy – meaning one in which an array of sectors contribute to the profitability and growth of the economy – is important in enhancing the living standards of a nation, developing skills and knowledge, promoting innovation, delivering social and political stability, and therefore implicitly reducing economic risk.[23]

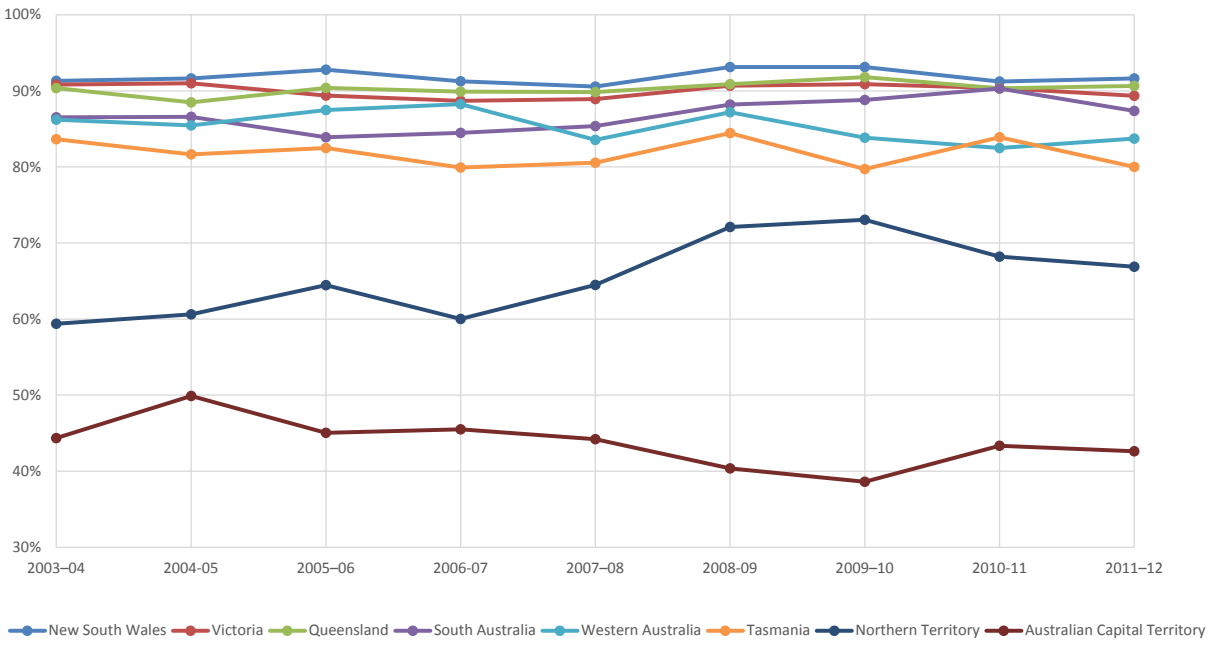
Regional economies with a disproportionately high concentration of economic activity in one or a few sectors are less diversified than economies with relatively little concentration of economic activity, as compared to a broad national economy.

Economic diversification in the ARCI measures the degree to which a regional economy differs from the national economy by the proportion of its jobs in goods-producing, service-producing and government sectors. Data for the ARCI indicator is from the ABS publication *Labour Force, Australia, Detailed, Quarterly*, cat. no. ABS 6291.0.55.003. Again consistent with the USRCI, the ARCI is calculated as the inverse of the sum of differences that is, 1 – sum of differences) between the regional economy and the Australian economy for the three nominated sectors.

That is, a region that exactly mirrors the national economy, and is therefore seen to be the most resilient, will have a sum of differences of zero, and then an RCI economic diversification score of 1 (or 100 percent).

Figure 3 presents the level of economic diversification for each Australian state and territory.

Figure 3: Economic diversification



Source: KPMG, 2014

Regional affordability

When housing represents a large proportion of a household's income, there is less flexibility for alternative investments in times of crisis.

Australian and international measures of housing affordability broadly suggest that, where home ownership repayment costs exceed 30 percent of a household's gross weekly household income, housing is considered to be 'unaffordable'.

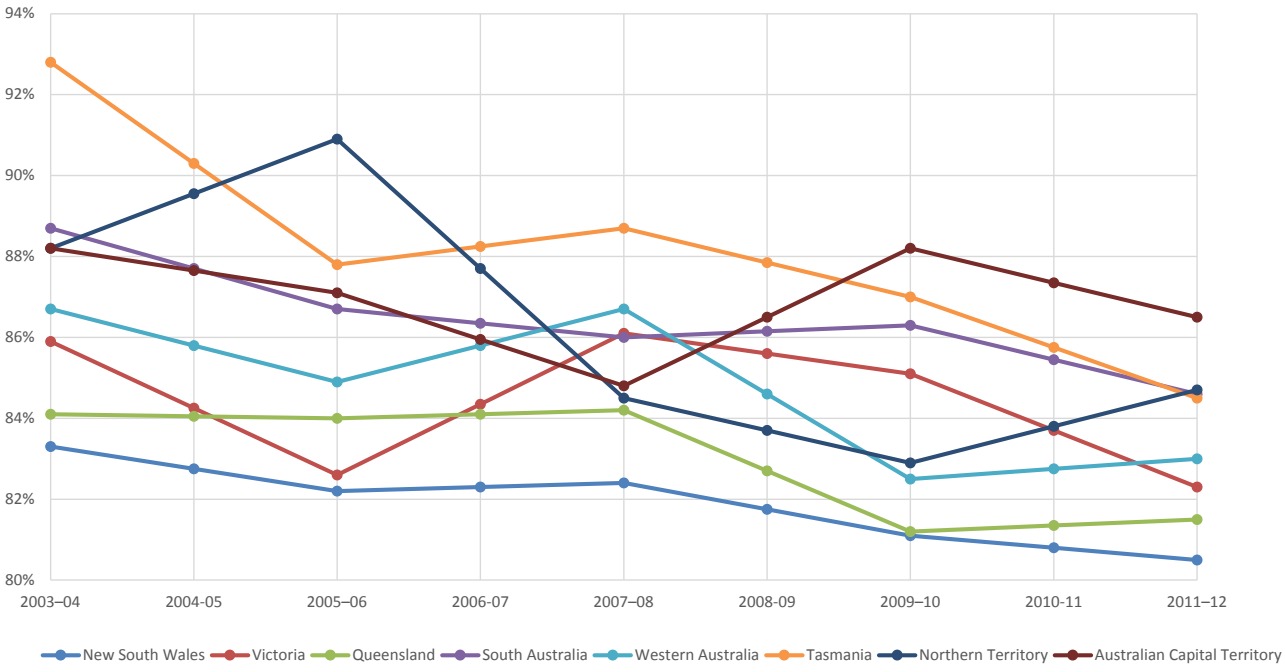
Affordability is a measure of regional economic security, as households spending more than 30 percent of their income on housing have proportionately fewer resources for other economic activity, including consumption and investment spending.[24] That is, there is a strong link between housing markets and consumer spending, which in turn feeds through to economic growth. Also, more volatile housing markets contribute to macroeconomic volatility, particularly when housing booms are followed by housing busts. A spatial mismatch between where people work and where they can afford to live can also create inefficient regional labour markets.

In the context of economic resilience, work completed by Pendall et al[25] suggests a link between a household's level of instability, measured in part by its housing cost burden, and resilience. When housing takes a proportionately large allocation from a household's income, the household has less flexibility for alternative investments in times of crisis.

The ARCI measures the percentage of households in each region spending up to 30 percent of their gross income on housing, accounting for both owners (mortgage costs) and renters (monthly rent costs). Data is sourced from the ABS publication *Housing Occupancy and Costs*, cat. no. 4130.0. Data for the financial years 2004–05, 2006–07, 2008–09 and 2010–11 has been estimated using the simple average of the data for years immediately before and after.

Figure 4 presents the calculated measure of housing affordability for each Australian state and territory.

Figure 4: Regional affordability



Source: KPMG, 2014

Economic dynamics index

The more capacity a region has for innovation and change, the more it may be considered dynamic,adaptable and resilient.

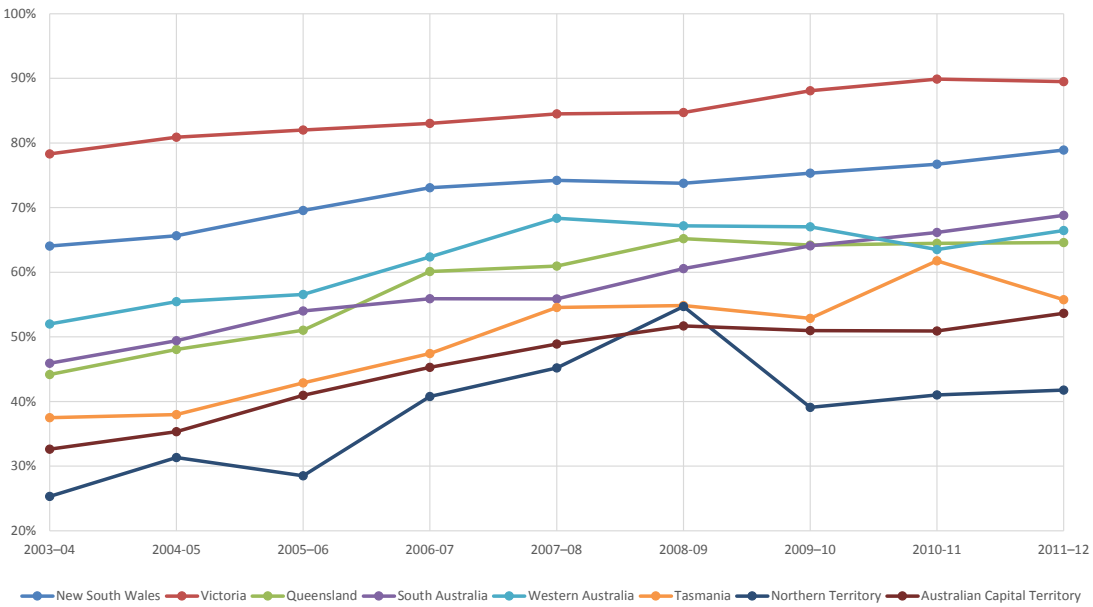
The USRCI included a measure of the business environment to capture the array of conditions influencing the dynamism of a regional economy. The measure it applied was the economic dynamics sub-index of the Innovation Index, which was developed by the Purdue Center for Regional Development and the Indiana Business Research Center[26] for the US Commerce Department. The Innovation Index enables the comparison of an individual region's innovation performance with that of the United States, a state, or other regions, and is designed to highlight factors that indicate whether a region is more or less ready to participate in the knowledge economy. The economic dynamics sub-index measures local business conditions and resources available to entrepreneurs and businesses, including targeted resources such as research and development funds that encourage innovation close to home or that, if not present, can limit innovative activity.[27]

Research for the Innovation Index found that an economically dynamic region is one with a proportionately high level of small businesses, high levels of business churn (starts and stops), residential high-speed internet connections, change in the number of broadband holding companies, and ample venture capital. Data for most of the sub-indicators used in the USRCI were available; however, information on venture capital and number of broadband holding companies was limited, so substitute datasets or different weightings to equivalent data were applied.

Table 2 compares the composition of the economic dynamics sub-index used in the USRCI with that developed for the ARCI.

Figure 5 shows the calculated economic dynamics sub-index for each jurisdiction.

Figure 5: Economic dynamics index



Source: KPMG, 2014

Table 2: Comparison of the economic dynamics sub-index in the ARCI and the URSI

ARCI		USRCI	
Indicator	**Weighting**	**Indicator**	**Weighting**
Research and development spend per $10,000 gross domestic product	25%	Venture capital Investment per $10,000 gross domestic product	25%
Annual establishment churn[28]	25%	Annual establishment churn	25%
Broadband connections per 1,000 households	25%	Broadband connections per 1,000 households	12.5%
		Change in broadband density	12.5%
Average large establishments[29]	12.5%	Average large establishments	12.5%
Average small establishments[30]	12.5%	Average small establishments	12.5%

Source: University of California Berkeley, KPMG

Educational attainment capacity

An educated and literate population is better equipped to respond effectively to stress, as individuals and as a community.

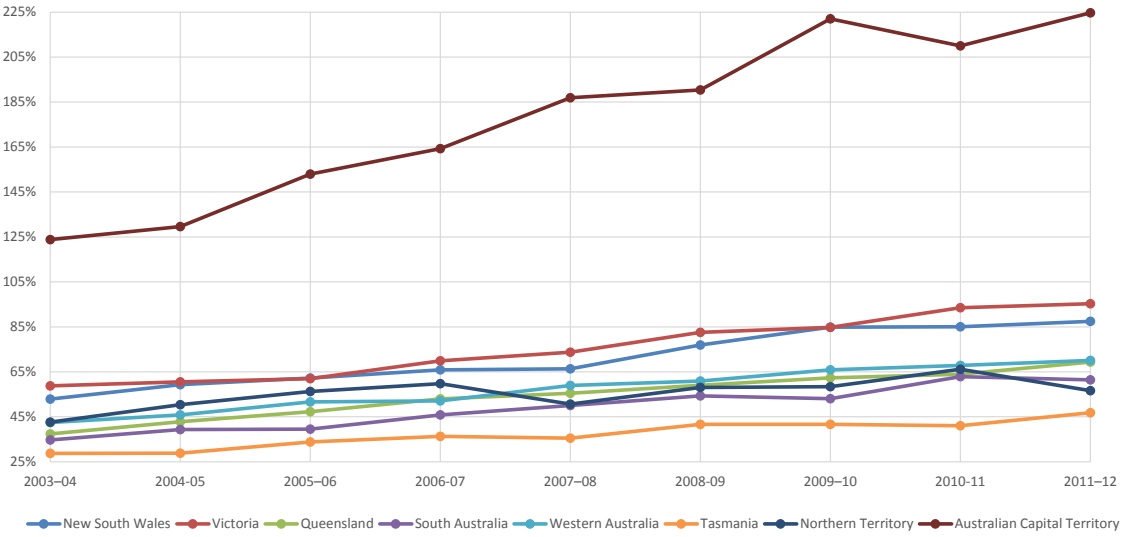
Research by Norris[31] has suggested that literacy and education assist in providing an effective individual and collective response to stress, be it economic, social or environmental. A frequently used measure of a population's literacy and education is educational attainment.

The USRCI calculates educational attainment using the percentage of the population aged 25+ with a Bachelor's degree or higher divided by the percentage of the population aged 25+ without a high school diploma or equivalent.

We have applied essentially the same calculation using data sourced from the ABS Survey of Education and Work (SEW), cat. no. 6227.0. The calculation applied to the ARCI is the percentage of the population of a region with a Bachelor's degree or higher divided by the percentage of the population with educational attainment of Year 11 or below. While the USRCI data is based on a population aged 25+, the ABS SEW provides annual information on a range of key indicators of educational participation and attainment of persons aged 15 to 74 years.

Figure 6 shows the educational attainment ratio calculated for each of the states and territories that is included in the ARCI.

Figure 6: Educational attainment



Source: KPMG, 2014

Female labour force participation

A nation's economic growth and well-being, and therefore resilience, is strongly correlated to women's economic participation.

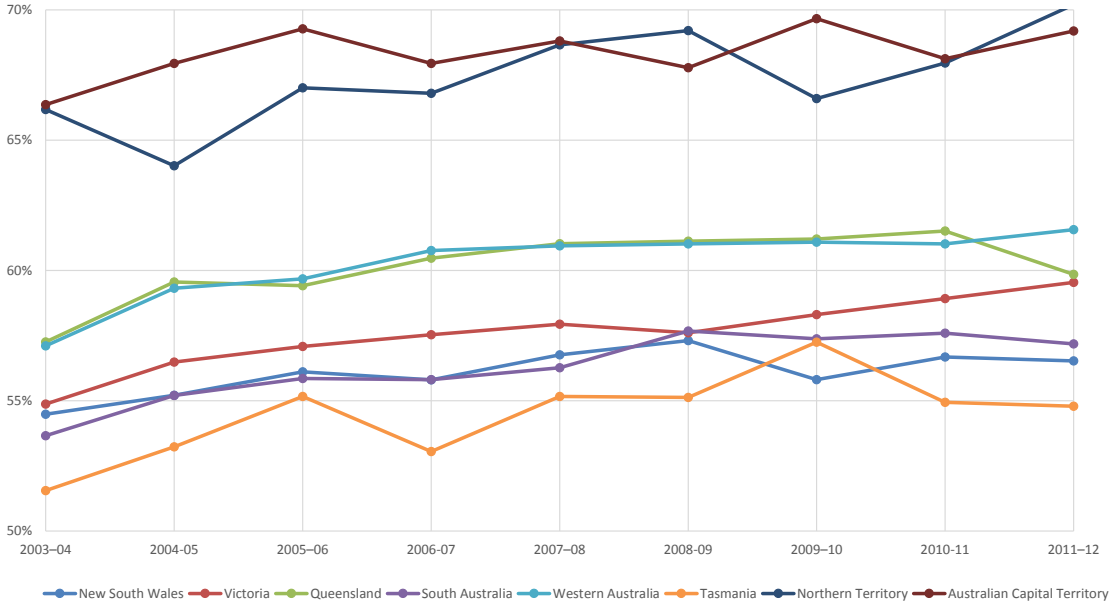
The OECD[32] has found that differences in female labour force participation (FLFP) between countries are, to some extent rooted in culture and social norms but also reflect economic incentives. That is, there is a strong correlation between women's economic participation and a country's general economic growth and well-being, and therefore resilience.

Discouraging women from working when they have children creates substantial inequalities later in life, particularly around relative advancement issues; confidence to re-engage in demanding roles; ability to find meaningful work; and financial independence in retirement.

FLFP is becoming an important issue in the context of aging populations, which is putting downwards pressure on labour supply, with negative implications for material living standards and public finances.

Data on FLFP is sourced from the ABS estimates of the civilian labour force derived from the Labour Force Survey component of the Monthly Population Survey, as presented in ABS cat. no. 6202.0. The following chart shows the FLFP rate for each of the states and territories included in the ARCI.

Figure 7: Female labour force participation



Source: KPMG, 2014

Poverty

The prevalence of poverty impacts on the ability of a community to regroup and deal with the challenges ahead.

Julian Page from the Livingstone Tanzania Trust has said of poverty and social resilience:

> *In thinking of poverty and a measurement of poverty there are various measurement tools, wealth, accessibility to power and to institutions, social invisibility and vulnerability. Within this context, social resilience is about elasticity, or 'bounce-back-ability'. The greater the poverty the less able a community is to regroup, deal with the challenges ahead.*[33]

Poverty status is a widely used measure of socio-economic vulnerability. Morrow,[34] consistent with the views expressed by Julian Page, has suggested that poverty links to resilience as a measure of constraint on the resources and options a person, household or region has to effectively mitigate, respond to and recover from a crisis.

Again, so that high scores translate to higher resilience, the USRCI measures the inverse of poverty – that is, 'out of poverty'.

In Australia, a measure of poverty is calculated each quarter by the Melbourne Institute of Applied Economic and Social Research[35] (the Melbourne Institute) and presented in the publication *Poverty Lines: Australia*. As explained in that publication:

> *Poverty lines are income levels designated for various types of income units. If the income of an income unit is less than the poverty line applicable to it, then the unit is considered to be in poverty. An income unit is the family group normally supported by the income of the unit.*
>
> *The poverty lines are based on a benchmark income of $62.70 for the December quarter 1973 established by the Henderson poverty inquiry.*

The benchmark income was the disposable income required to support the basic needs of a family of two adults and two dependent children. Poverty lines for other types of family are derived from the benchmark using a set of equivalence scales. The poverty lines are updated to periods subsequent to the benchmark date using an index of per capita household disposable income.[36]

The analysis presented in the Poverty Lines publication details, by household formation type, the amount of income required (including and excluding housing costs) for a household not to be deemed to be 'living in poverty'. The Melbourne Institute analysis is presented at an Australia-wide level, not a sub-national perspective. For the ARCI, we have adopted the poverty threshold including housing costs calculated by the Melbourne Institute, and applied the following adjustments to estimate the proportion of households in each jurisdiction 'out of poverty'.

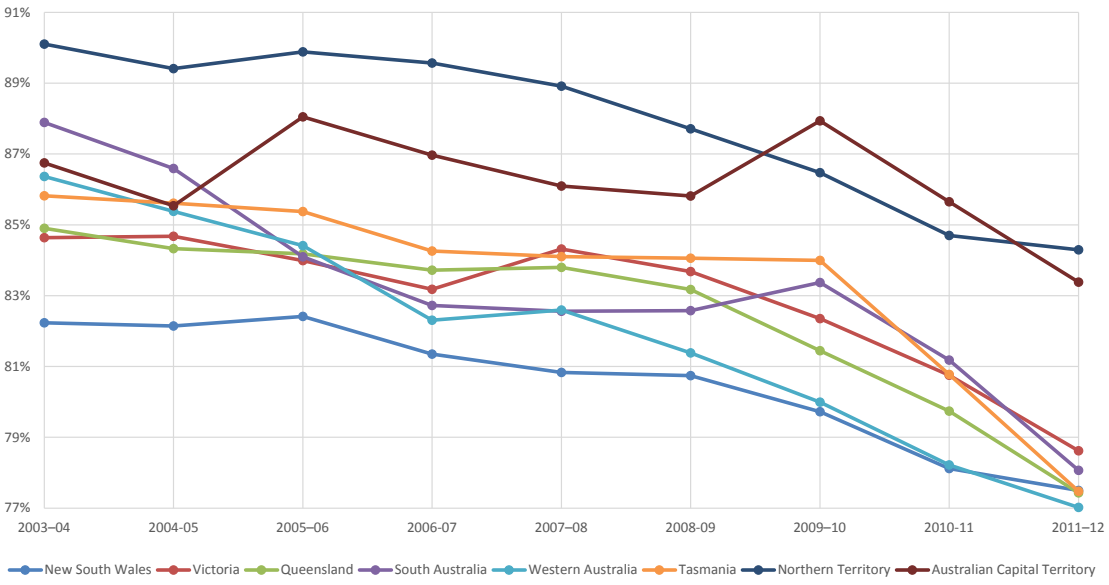
- Step 1 – Family composition by household is identified for each jurisdiction from ABS Household Income and Income Distribution, Australia, cat. no. 6523.0, Table 17(a).
- Step 2 – Family composition as per the ABS categories is matched as closely as possible to the Melbourne Institute categories presented in Poverty Lines, allocated by the employment status of the household head (i.e. either 'in the workforce' or 'out of the workforce').
- Step 3 – The regional poverty line is then identified by multiplying the proportion of households in each 'Poverty Line' category by the relevant Melbourne Institute 'Poverty Line' value, which has been weighted by relative differential in average weekly earnings achieved by each state and territory , thereby creating a weighted average weekly poverty line value for each region[37].

Poverty continued

- Step 4 – Household gross weekly income declines for each jurisdiction are sourced from ABS Household Income and Income Distribution, Australia, cat. no. 6523.0, tables 1.1(a) to 1.1(h). Data is not available for 2004 05, 2006 07, 2008 09 and 2010 11; therefore for these years, household gross incomes from the previous year have been uplifted by the gross state product (GSP) growth rate for that year.
- Step 5 – The weighted average weekly poverty line value is then compared to the household gross weekly income declines to identify what proportion of households earn disposable income above and below the identified poverty line.
- Step 6 – The percentage of households above the poverty line value for each region is then included in the ARCI as the 'out of poverty' indicator, which is then converted into a z-value for comparison purposes.

Figure 8 shows the percentage of households 'out of poverty' for each of the states and territories included in the ARCI.

Figure 8: Households 'out of poverty'



Source: KPMG, 2014

Life expectancy

Life expectancy measures how long a person is expected to live, based on current age and sex-specific death rates.

Richard Eckersley,[38] in his commentary on population resilience, observed:

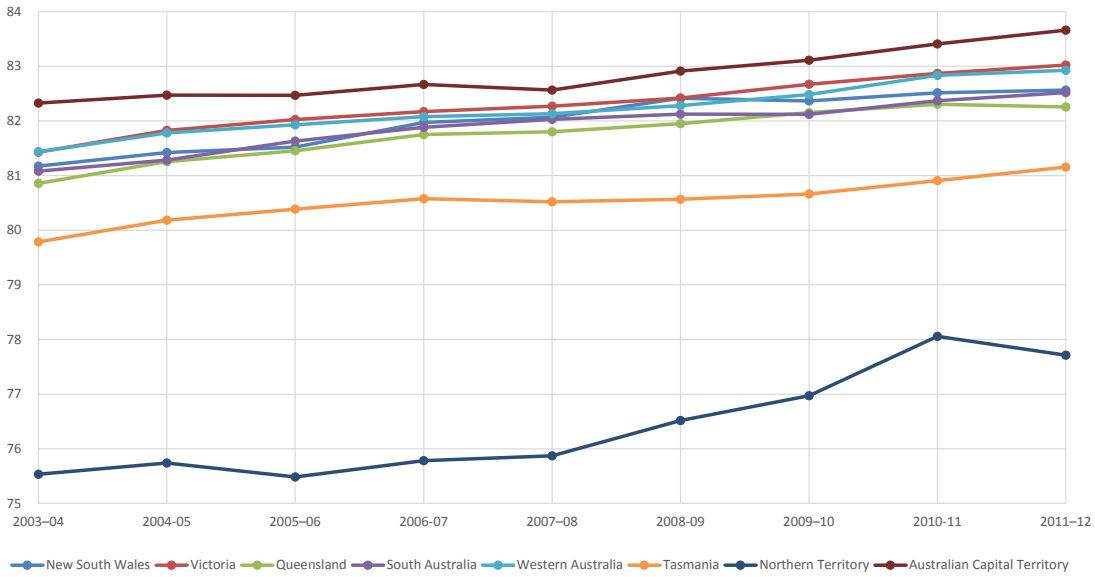
> *The health of populations is an important, but neglected, aspect of the resilience of societies. Not only does population health affect the ability of societies to withstand adversity, it can shape how they respond to it – whether in ways that make things better or worse.*

Life expectancy is the most commonly used measure to describe population health. Life expectancy measures how long, on average, a person is expected to live, based on current age and sex-specific death rates.[39] It is often expressed as the number of years a person born today is expected to live.

Life expectancy statistics for Australian states and territories from 1881 onwards for males and females are contained in ABS publication *Australian Historical Population Statistics*, cat. no. 3105.0.65.001. A life expectancy at birth value for each state and territory has been calculated using the average life expectancy at birth by gender, weighted by the population of males and females for each state and territory.

Figure 9 shows average life expectancy at birth for the population of each of the states and territories included in the ARCI.

Figure 9: Life expectancy (years)



Source: KPMG, 2014

Incarceration rates

Unequal societies are more punitive.

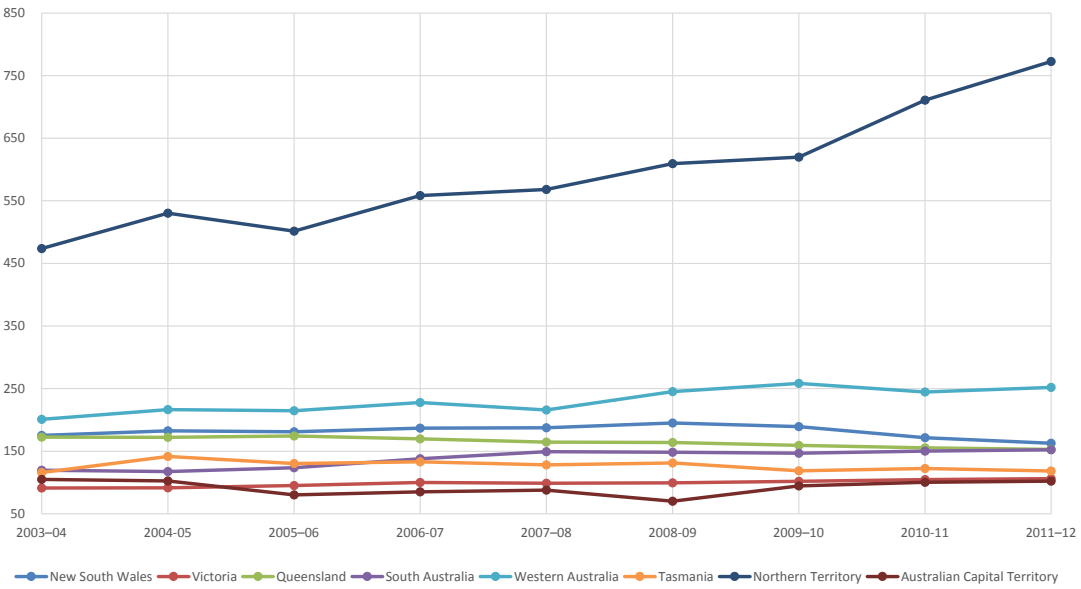
Unequal societies are more punitive, with people being five times more likely to be imprisoned in the most unequal societies than in the least unequal.[40]

It is recognised, however, that the imprisonment rates reflect a number of factors, including the number of offenders convicted and committed to prison terms; the length of time they serve in prison; and the rate of released prisoners who re-offend and are sent back to prison.

Data on the number and characteristics of prisoners is contained in the ABS publication *Prisoners in Australia*, cat. no. 4517.0. For the purposes of this analysis, we have included data on the number of prisoners (per 100,000 population aged 15 and older) held in custody in Australian adult prisons as at 30 June each year.

Figure 10 presents this information for the period under review.

Figure 10: Incarceration rate (prisoners per 100,000 resident population aged 15 years plus)



Source: KPMG, 2014

Net overseas migration

Migration helps catalyse connections between 'old' and 'new' communities.

Migrants can contribute to the development of social resilience in the communities of destination countries through expanded social networks. They can also incrementally advance economies through the transfer of knowledge, technology, incomes and other resources.

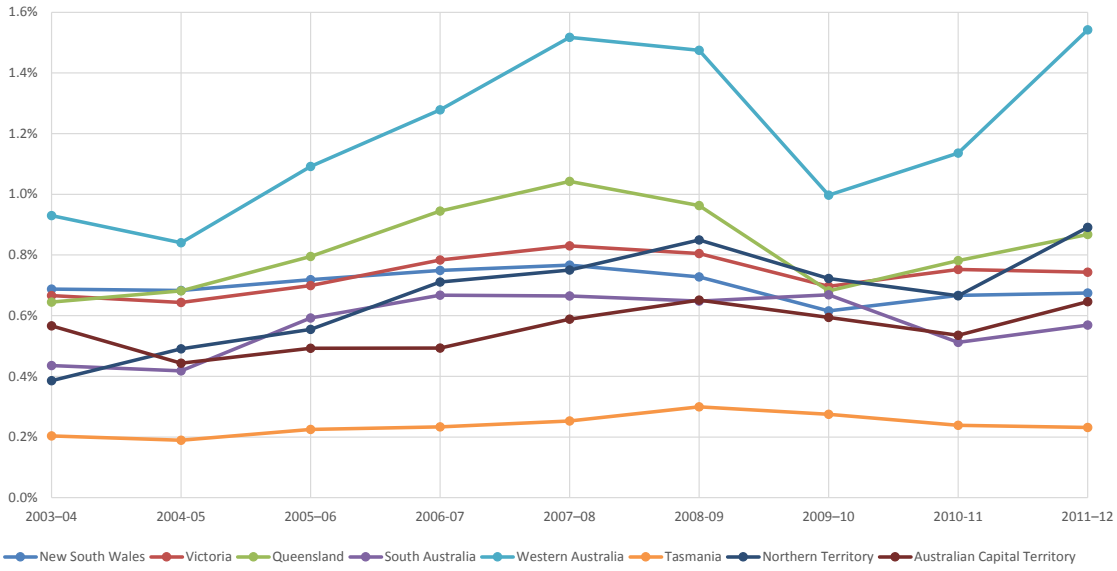
These impacts increase the flexibility, diversity and creativity of communities, and allow for new connections between 'old' and 'new' communities.[41]

For the ARCI we have included a migrant arrivals measure as a proxy indicator of the development of social resilience. Specifically we have included data on the number of migrant arrivals for each state and territory on the following entry basis:

- Temporary Work Visas (subclass 457)
- Permanent Visas
- New Zealand Citizen (subclass 444).

We have then calculated the number of migrant arrivals as a percentage of the existing population. Figure 11 presents this analysis for each Australian state and territory for the period under consideration.

Figure 11: Arrivals of overseas migrants (as a percentage of resident population)



Source: KPMG, 2014

Participation in sporting activities

By 'bridging' and 'bonding' communities, sport plays an important role.

Sport is often regarded as an important part of life in Australia, contributing to community identity, sense of place, social interaction and good health. The involvement of citizens in sport also has the potential to contribute to social capital, through both 'bridging' and 'bonding' communities.[42]

Research by Tonts found:

> *Sport was a focal point of community life that brings people together and creates an opportunity for meaningful social interaction. The role of bonding capital was particularly evident, with numerous people discussing the way in which sport creates a sense of local pride and forms the basis of a 'tight knit' community. This was particularly evident when local teams played against those from other communities.*[43]

The ABS periodically collects data on participation in sport and physical recreation, generally as part of its Multi-Purpose Household Survey (MPHS). Data is collected on the number and characteristics of people aged 15 and over who participate in a range of sports and physical recreational activities.

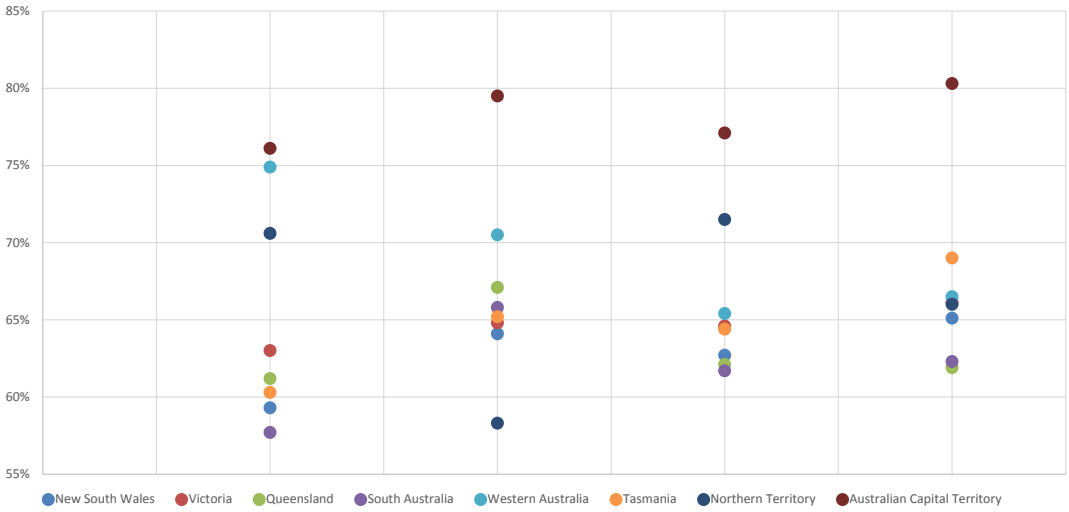
It is available from the 2001–02, 2005–06, 2009–10 and 2011–12 surveys.[44] For the purposes of this analysis, we have taken the data points from the ABS survey for the years in which the information is available and, for the years where data is not available, applied the participation rate for each state and territory recorded in the last survey period until new survey data is available.

That is, data for:

- 2002–03, 2003–04 and 2004–05 is taken from the 2001–02 survey
- 2006–07, 2007–08 and 2008–09 is taken from the 2005–06 survey
- 2010–11 is taken from the 2009–10 survey.

Figure 12 presents the ABS data on sports participation for each Australian state and territory for the years in which the survey data is available.

Figure 12: Participation in sports and physical recreational activities



Source: KPMG, 2014

Voter participation

Regions with low levels of informal voting may be considered to demonstrate a greater capacity for social and community resilience.

Voter turnout has been considered an important indicator of how engaged a community is in developing networks for mutual benefit and civic cohesion.[45]

However, given that enrolment and voting in state and federal elections is compulsory and enforced in Australia, voter turnout is not necessarily a good measure of participation of citizens in a democratic society. Rather, a more informative measure to consider is the proportion of informal votes cast as an indicator of community engagement. That is, regions with low levels of informal voting may be considered to demonstrate a greater capacity for social and community resilience.

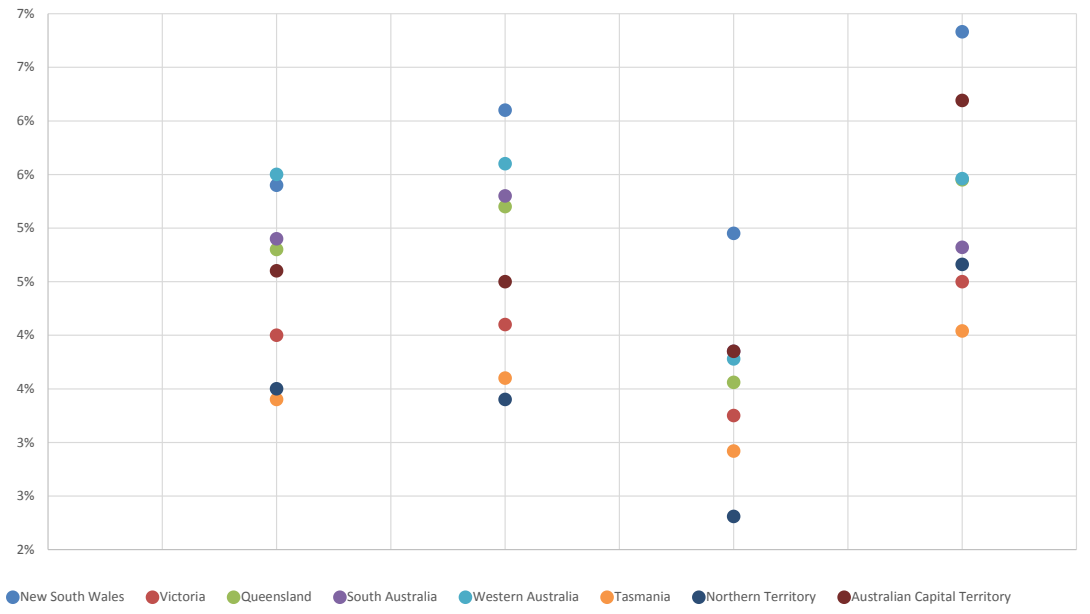
In Australia, an informal vote is one in which the ballot paper was completed incorrectly and so was not included in the final count (in most countries, this is called an 'invalid vote'). An individual may cast an informal vote for any number of reasons,[46] including the desire to make a deliberate protest or express disillusionment under a system of compulsory voting.[47]

As the data for this measure is periodic and coincides only with when elections are held, we have applied the informal voting percentage for each state and territory last recorded in an election until new data from later elections is available. That is, data for:

- 2002 and 2003 is applied from the 2001 election
- 2005 and 2006 is applied from the 2004 election
- 2008 and 2009 is applied from the 2007 election
- 2011 and 2012 is applied from the 2010 election.

Figure 13 shows the number of informal votes by state and territory as a percentage of total votes for elections held for the Commonwealth House of Representatives.

Figure 13: Voter participation (informal voting)



Source: KPMG, 2014

Our findings

KPMG has collated data on the individual parameters into the three dimensions identified by Foster that collectively make up a regional capacity index: regional economic capacity, socio-demographic capacity and community connectivity capacity.

The charts in this section show the dimensional capacity sub-indices for each state and territory for the period 2003–04 to 2011–12.

Regions are complex, multi-faceted, and continually changing; therefore, defining and measuring regional resilience is challenging.

Table 3: Dimensions and dataset included in the Australian Regional Capacity Index

ARCI	
Economic capacity	Income equality
	Economic diversification
	Regional affordability
	Economic dynamics index[17]
Socio-demographic	Educational attainment
	Female labour force participation
	Poverty
	Life expectancy
Community	Incarceration rates
	Net overseas migration
	Participation in sport
	Voter participation

Regional economic capacity

As shown in Figure 14, Victoria has generally been the state with the highest economic capacity for most of the period under review. It is important to recognise that these measures are not seeking to identify jurisdictions with the greatest economic activity or fastest economic growth but rather those jurisdictions that have the capacity to limit the size of any downswing in economic activity during a recessionary event, and correspondingly the capacity to 'bounce back' to either trend economic or above trend economic after a recessionary event has occurred.

In this context, it is interesting to note that South Australia and the ACT have increased their relative economic capacity over recent years, driven primarily by improvements in income equality and regional affordability. In comparison, New South Wales has consistently recorded below average economic capacity, even though it is the largest state in terms of economic activity and resident population. This below average economic capacity measure for New South Wales is caused primarily by high levels of relative income inequality and lower levels of housing affordability.

Socio-demographic capacity

As presented in Figure 15, the ACT records a socio-demographic capacity sub-index value substantially higher than any other jurisdiction in Australia, as it records the highest value in nearly all socio-demographic indicator measures. For example, the ACT has the highest educational attainment levels of all states and territories, effectively as a consequence of the high levels of skilled migration – both overseas and interstate – that occurs due to the fact that Canberra is the geographic focal point of Commonwealth Government activities. The ACT also records the lowest poverty levels and the highest life expectancy levels of all the states and territories.

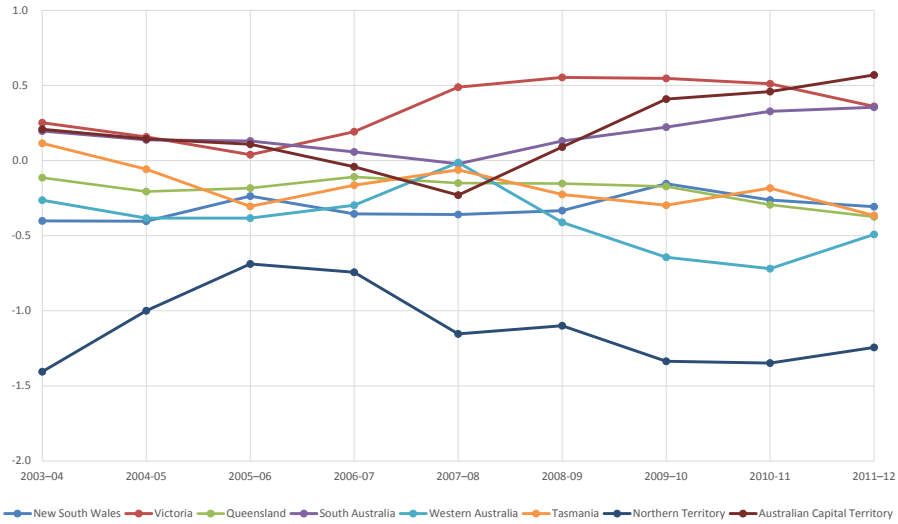
Conversely, the Northern Territory has the lowest life expectancy and substantially below average levels of educational attainment which, combined with the other indicator measures, places it last in the socio-demographic

Community connectivity capacity

The results for the Community Connectivity Sub-index are more volatile than either the economic or socio-demographic capacity sub-indexes; this reflects the fact that some of the measures used rely on periodic values (which are carried forward between data updates) rather than time series statistics. While there are some data limitations with this sub-index, the results still provide a useful indicator of which states and territories have relative strength in the area of community connectivity. As shown in Figure 16, Victoria, Western Australia and the ACT have been the jurisdictions with consistently above average indicator values, while New South Wales, South Australia and the Northern Territory generally record below average outcomes.

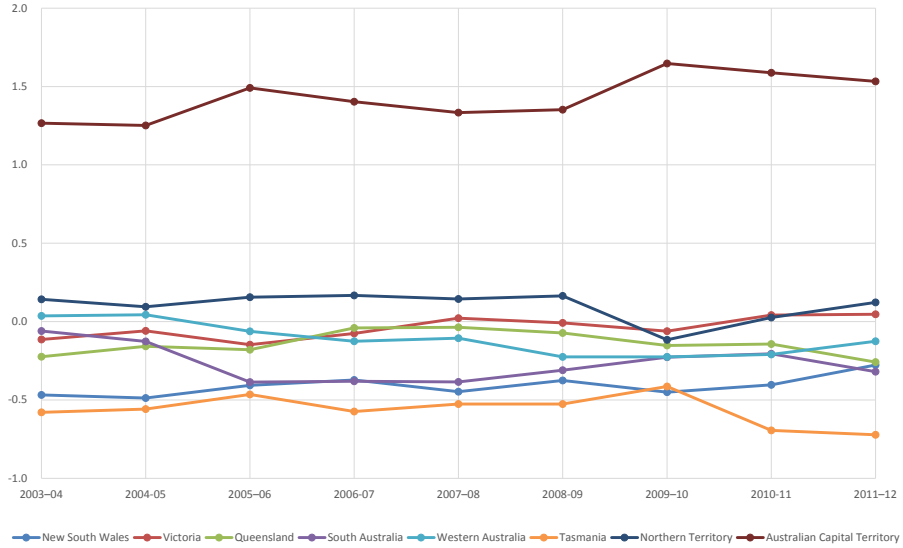
One of the factors influencing this outcome is the fact that New South Wales consistently has the highest percentage of people recording informal votes for the Commonwealth House of Representatives. New South Wales also records a relatively low level of participation in sport and physical activity among its residents, and it also attracts a lower proportion than its 'fair share'[48] of overseas migrants.

Figure 14: Regional economic sub-index



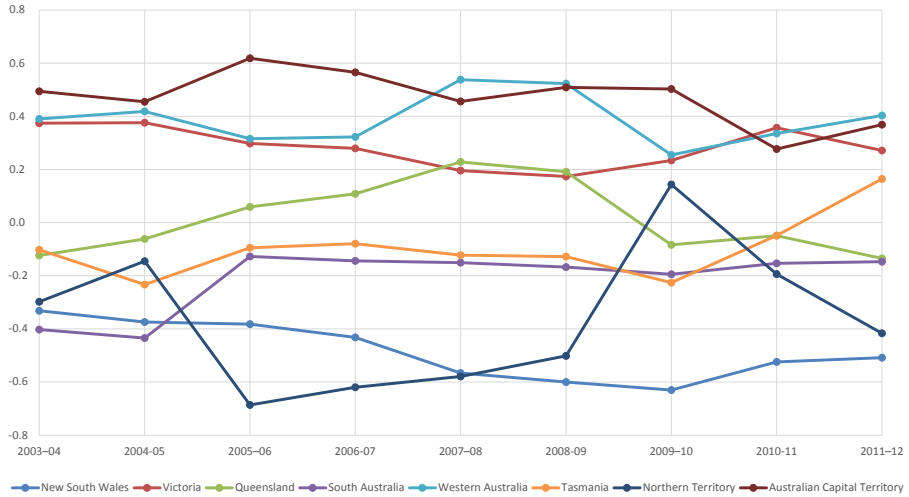
Source: KPMG, 2014

Figure 15: Socio-demographic sub-index



Source: KPMG, 2014

Figure 16: Community connectivity sub-index



Source: KPMG, 2014

Australian Regional Capacity Index

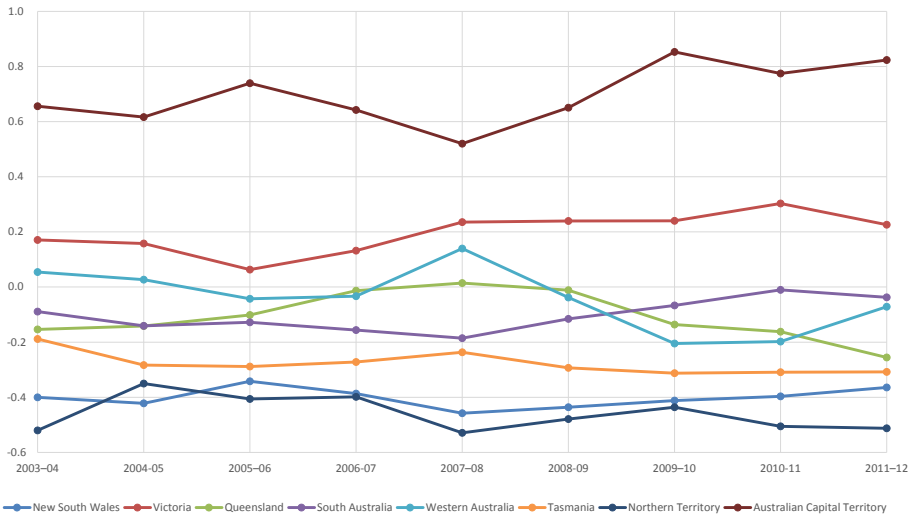
The ARCI is a combination of all the individual indicators that make up the three dimensional sub-indices, again with each measure weighted equally. As shown in Figure 17, it reveals the ACT as the most resilient jurisdiction, with the highest capacity to deal with economic, social and community shocks. Victoria follows the ACT as Australia's second most resilient jurisdiction, influenced more so by its economic capacity than the ACT, whose ranking is achieved by very strong social and community factors.

The Northern Territory, New South Wales and Tasmania achieve the lowest resilience ranking, reflecting relatively weak outcomes in all three subindices, particularly economic capacity. These jurisdictions have relatively narrow economic bases, limited research and development investment activity and an under-represented level of sizable business establishments.

We concede that this analysis is thought provoking in the sense that the outcomes, notably where each jurisdiction is ranked in the ARCI, may not appear intuitive in the first instance. Again, it is important to reiterate what the ARCI is – and, in particular, is not – a measure of. The ARCI attempts to show the relative regional resilience for each state and territory in Australia, and implicitly each region's capacity for adaption and adaptability. It does not attempt to measure absolute growth, either economic or population; rather it seeks to quantifiably assess the settings available to achieve growth in a post-shock environment.

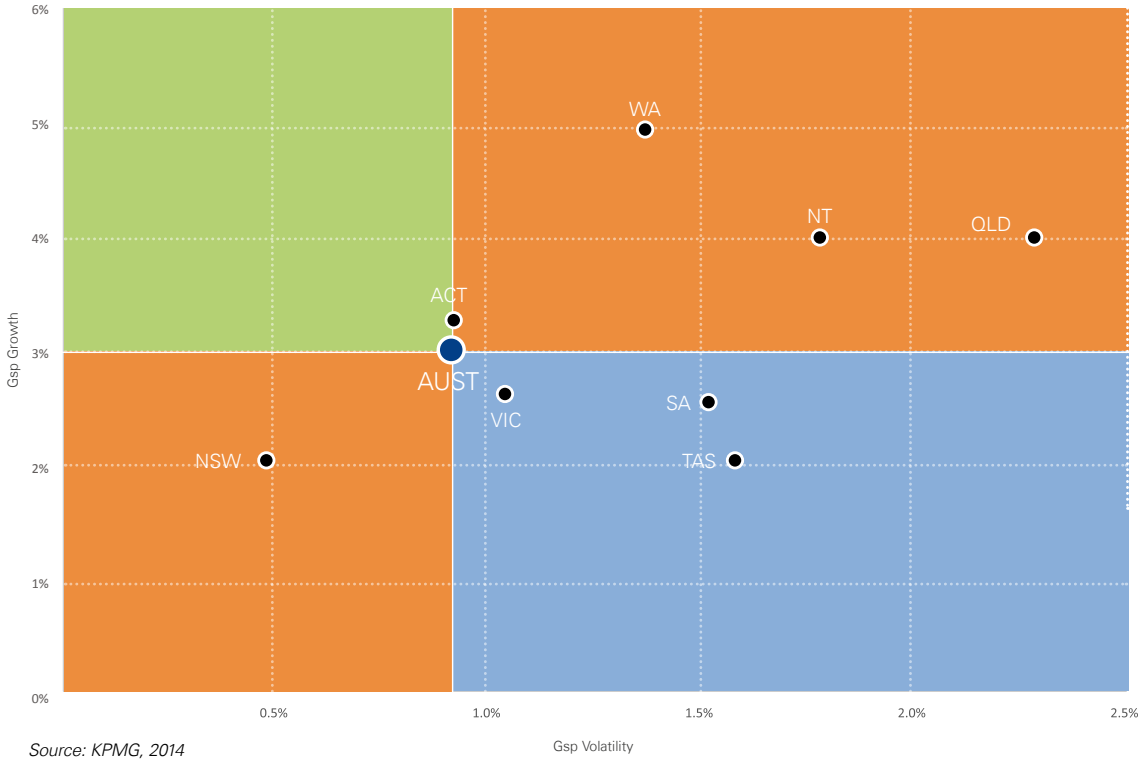
In validating the outcomes of the ARCI, we analysed gross state product (GSP) over the same time period, particularly noting growth rates and their volatility.[48] Figure 18 shows this analysis.

Figure 17: Regional capacity index



Source: KPMG, 2014

Figure 18: Regional comparison - Australian Regional Capacity Index



Source: KPMG, 2014

As shown, there is only one jurisdiction that records both:

- at or above national growth rates
- at or below national volatility.

The jurisdiction with this profile is the ACT, the jurisdiction ranked highest in the ARCI.

Arguably the next closest jurisdiction is Victoria, with slightly lower real GSP growth and slightly higher volatility. Victoria is ranked second in the ARCI.

The remaining jurisdictions record results that are consistent with expectations based on ARCI results, with the possible exception of Queensland, which recorded above average economic growth but the most volatile growth of all the states and territories over the period under review.

Implications

As a nation, we have been spared from widespread social and community devastation such as civil war, famine and major unrest in our society.

While this is true, the capacity for individual jurisdictions to deal with significant economic, social and community challenges is varied. Some jurisdictions have a diversity of economic activity but poor social capacity and even poorer community connectivity. Resilient regions need not only economic strength during times of uncertainty but also a strong social fabric binding the community together to ensure it can return to the 'good times'. Undertaking this analysis on a sub-regional basis would provide an assessment of the capacity of different geographic areas within a jurisdiction to bounce back from a shock in the shortest period possible, and hopefully surpass them thereafter.

The implication of this analysis is that policy makers need to strive for not only the fundamentals of a diverse, investment-orientated economy but also the complementary building blocks of an educated, healthy population, while at the same time providing the environment for a safe and engaged community.

Finally, improving regional capacity in areas identified to have low resilience is more likely to be achieved through a place-based policy framework, given the challenges of delivering uniform policy settings across diverse populations and geographies.

By any measure, Australia could be considered a resilient country, having weathered many economic and environmental challenges in recent history.

About the author

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Brendan has extensive experience in advising public sector agencies in relation to economic policy, econometric analysis, economy-wide modelling, cost benefit analysis, impact assessments, efficiency improvements, and legislative and regulatory reform. Brendan¹s qualifications include a Bachelor of Economics, Master of Economics and Master of Applied Finance.

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10. *Ibid*
11. *Including factors such as topography, climate, and infrastructure systems.*
12. *Including factors such as nature and level of processes, relationships, behaviours, and capacities (including money, information, political culture, and clout).*
13. *University of Buffalo Regional Institute, State University of New York.*
14. *http://brr.berkeley.edu/rci/site/faqs*
15. *Ibid*
16. *A z-score is a statistic of variance quantifying the distance, measured in standard deviations; a raw value is from the mean (average) value for a population. Z-scores may be positive (above the mean) or negative (below the mean). The formula is z-score = (raw value – mean value)/standard deviation.*
17. *The Australian economic dynamics index includes data on (a) the number of businesses opening and closing (i.e. business 'churn'), (b) residential broadband connections, (c) size of business establishments, and (d) spend on research and development activity.*
18. *US EDI includes data on (a) the number of businesses opening and closing (i.e. business 'churn'), (b) residential broadband connections, (c) change in the number of broadband holding companies, (d) number of small business establishments, and (e) access to enough venture capital.*
19. *KPMG chose not to include a measure on disability like that in the USRCI as it is essentially incorporated in that analysis as a negative measure, with the interpretation that 'regions with higher proportions of persons with a disability are more vulnerable to physical, social and economic challenges'. We see this measure as portraying people with disability in a negative light, and have therefore chosen to use an alternative indicator.*
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48. *As measured by the standard deviation in real GSP.*

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