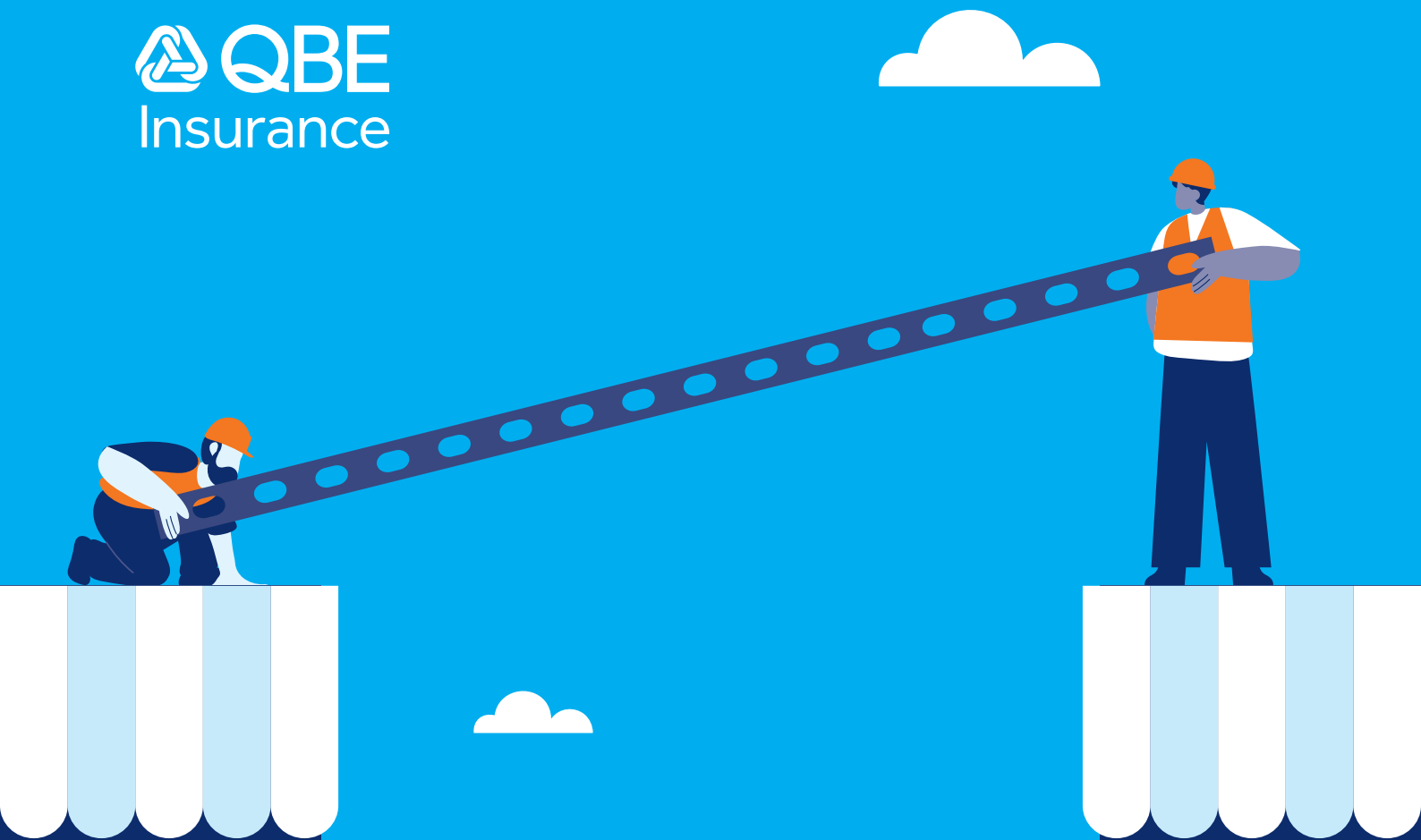




The recovery gap

**Understanding the
longer-term impact of
disruption on Australian
small businesses.**



Foreword

Small businesses are at the heart of Australia's economy. They employ millions of Australians, support local communities, and drive innovation, productivity and growth across the country.

As a major insurer of Australian small businesses, QBE has a unique perspective on the opportunities and challenges facing the sector. Every day, we see the important role small businesses play in their communities, and the resilience required to navigate growing challenges.

From natural disasters and cyber incidents to supply chain disruption and economic uncertainty, small businesses are facing a broader range of risks than ever before. The ability to recover from disruption and adapt to changing conditions has become critical to long-term success.

When most people think about a major disruption, they think about the immediate impacts: damaged property, interrupted operations and the recovery effort that comes after.

What is less visible is the economic impact these events can have on communities in the years that follow.



Businesses and communities that are better prepared are more likely to withstand disruption, recover more quickly and adapt to changing conditions over time.

Some communities recover quickly. Others continue to feel the effects long after the event, with fewer businesses operating, reduced employment opportunities and lower economic activity than they might otherwise have experienced. In many cases, the impacts persist for years and some communities may never catch up to the path they were on before disruption occurred.

This research, commissioned by QBE and conducted by Oxford Economics Australia, examines the longer-term impact major disruptions can have on small and medium-sized businesses and the communities they support. Natural disasters provide a useful lens through which to examine these effects as they allow us to observe not only the immediate damage, but also how communities recover and rebuild over the years that follow.

Our research highlights the risk of long-term economic scarring. While some communities recover quickly, others experience lasting effects, with business activity and economic growth remaining below expected levels years after a major disruption.

At the same time, the findings reinforce an important message: resilience matters. Businesses and communities that are better prepared are more likely to withstand disruption, recover more quickly and adapt to changing conditions over time.

Insurance is a critical part of that equation.

As QBE marks its 140-year anniversary, we remain focused on helping Australian small businesses navigate an increasingly complex risk environment. Over that time, we have seen the important role insurance plays in supporting resilience, helping businesses manage uncertainty, invest with confidence and recover when unexpected events occur. Our longevity reflects an ability to adapt to changing risks and evolving customer needs, while giving us a deep appreciation of the factors that contribute to long-term success.

By sharing these insights, we hope to contribute to a broader conversation about how businesses, communities, industry and government can work together to strengthen resilience and support sustainable economic growth.

Ming Yiu Song

General Manager SME
QBE Australia Pacific



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Methodology

QBE Insurance (Australia) Limited (QBE) commissioned Oxford Economics Australia to examine how major disruptions affect SMEs and their local communities. This included analysis of seven significant bushfires, floods and cyclones that occurred between 2018 and 2023, comparing business outcomes in affected areas against those that were unaffected during the same period. The study analysed almost 1,000 regions across Australia and measured how SME numbers changed in the year of disruption and over the following three years.

For more information on the methodology, data sources and limitations, please refer to the Technical Appendix.

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Key findings

Major disruptions can have lasting economic impacts on small businesses and local communities.

Impacts can deepen over time

The largest impacts emerge after the immediate recovery period. Two years after a major disruption, the average affected community was estimated to have 9% fewer small businesses, equivalent to around **\$43 million** less in annual economic activity generated by those businesses.



21% ▼



Very high severity events leave deeper scars

In the highest-intensity events analysed, local communities were estimated to have 21% fewer businesses than **their expected level two years after disruption**, highlighting how disasters continue to shape recovery for years after the event itself.

Some sectors recover more slowly than others

Businesses with greater reliance on physical assets and local economic activity such as those in the **industrial** sector experience more pronounced impacts, while sectors supported by ongoing government support and essential service provision tend to recover more quickly.

Regional communities are more exposed

The effects of disruption are generally larger and **more persistent in regional areas**, where local economies are often more interconnected and have fewer alternative markets, suppliers and transport links.

15% ▼

Resilience changes the recovery path

Communities and businesses with stronger resilience characteristics are better positioned to withstand and recover from disruption. Two years after a disruption, small business numbers in low-resilience regions were around 15% below their expected level, while high-resilience regions were largely unaffected.



Beyond the immediate impact

Recovery doesn't end when the clean-up has finished

Major disruptions such as bushfires, floods and cyclones can affect communities in many ways, but one of the clearest indicators of their longer-term impact is the economic strength of the local business community.

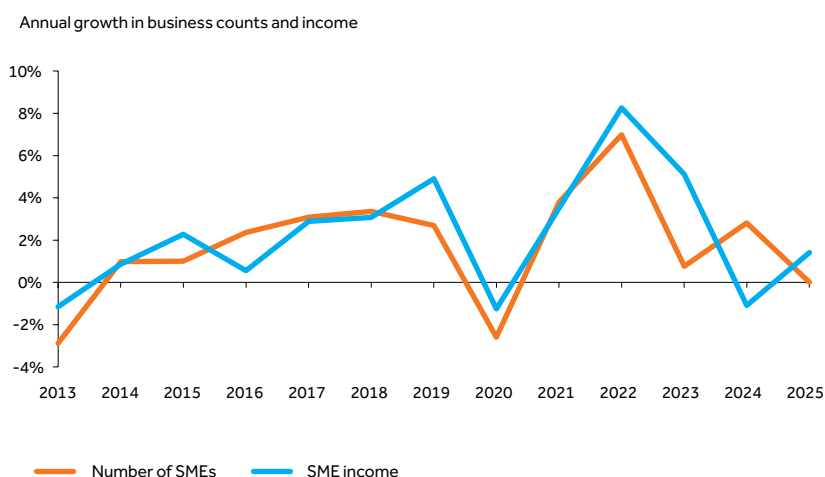
This report uses small business numbers as a measure of economic conditions. While business counts do not capture every consequence of disruption, they provide an important indicator of the health and resilience of a local economy.

Many businesses continue operating after a disruption, yet still face lower sales, fewer customers, disrupted supply chains, staffing challenges or delayed investment.

A smaller business community can also have wider consequences, including reducing demand for local suppliers, limiting access to services, and slowing recovery across the broader local economy.

Business numbers are closely linked to the strength of local economic activity, making them a useful indicator of recovery and resilience. As a result, changes in small business numbers provide a practical indicator of the longer-term effects of disruption and the resilience of local economies.

Annual growth in count of SMEs and real sales and service income from SMEs



Changes in small business numbers provide a practical indicator of the longer-term effects of disruption and the resilience of local economies.



Two years after a major disruption, the average impacted community is estimated to support close to

1 in 10
fewer local businesses

than it would have without the disruption. For these communities, this represents a meaningful loss of economic activity, jobs, services and demand for local suppliers. Business numbers remain below expected levels even after three years, highlighting the long-term economic impact of major disruptions.

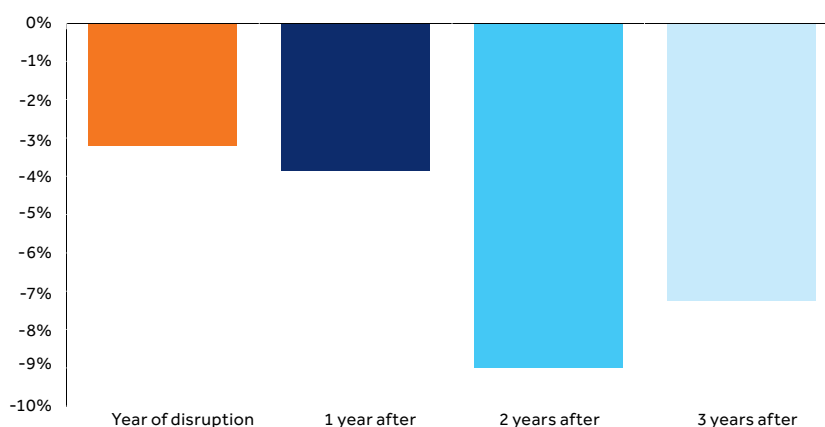
While recovery may begin soon after a disruption, affected regions can remain well below the path they would otherwise have followed. Rather than triggering an immediate collapse in business numbers, major disruption can have a lasting effect on business growth, leaving communities with a smaller and less dynamic business base for years after the event.

Major disruptions leave affected businesses and communities worse off, with impacts often felt immediately. Businesses may be unable to access their premises, serve customers or receive supplies¹, while falling revenue, repair costs, damaged equipment and loss of stock can place significant pressure on cash flow. As fixed costs such as rent and wages continue, many businesses face a difficult path to recovery even after the immediate disruption has passed.

However, the greatest impacts often emerge after the initial recovery period. Many affected businesses initially remain operational, drawing on savings, insurance payments, government assistance or additional debt while they rebuild and adapt. Access to emergency finance can play an important role in businesses remaining operational after disasters, while personal savings can also influence the speed of recovery.^{2,3}

As a result, some business closures may occur only after these resources have been exhausted. At the same time, weaker local demand and uncertainty about the recovery may discourage new businesses from opening, with the effects of natural disasters reducing start-up activity for one to two years.⁴

% change in number of businesses relative to unaffected region



1. Syndor, Niehm, Lee, Marshall & Schrank (2017) Analysis of post-disaster damage and disruptive impacts on the operating status of small businesses after Hurricane Katrina. [Available here](#).
2. Collier, Howell & Rendell (2024) After the Storm. [Available here](#). 3. Asgary, Imtiaz Anjum & Azimi (2012) Disaster recovery and business continuity after the 2010 flood in Pakistan. [Available here](#).
4. Boudreaux, Escaleras & Skidmore (2019) Natural disasters and entrepreneurship activity. [Available here](#).



The true cost of disruption

“Recovery is often measured by what has been rebuilt. This research highlights another side of the story: the businesses that never reopen, the opportunities that never emerge, and the growth that never occurs.”

Ming Yiu Song
General Manager SME

Fewer businesses can mean fewer local jobs, less spending in the community and reduced demand for suppliers and service providers. Over time, these effects can ripple through the local economy, leaving communities with lower levels of economic activity than they might otherwise have experienced.

Existing research supports this finding. Small business employers in parts of the Burnett River catchment affected by Cyclone Oswald in 2013 had incomes an estimated 45.3% lower than they would have been otherwise, while international evidence shows business sales and survival can remain weaker for up to five years after a major disaster.

To illustrate the scale of these broader effects, our research estimates the economic activity associated with the smaller business base following a major disruption.⁵ While this is not an estimate of the total economic impact, it provides a clear indication of the economic activity associated with having fewer businesses in a local community.

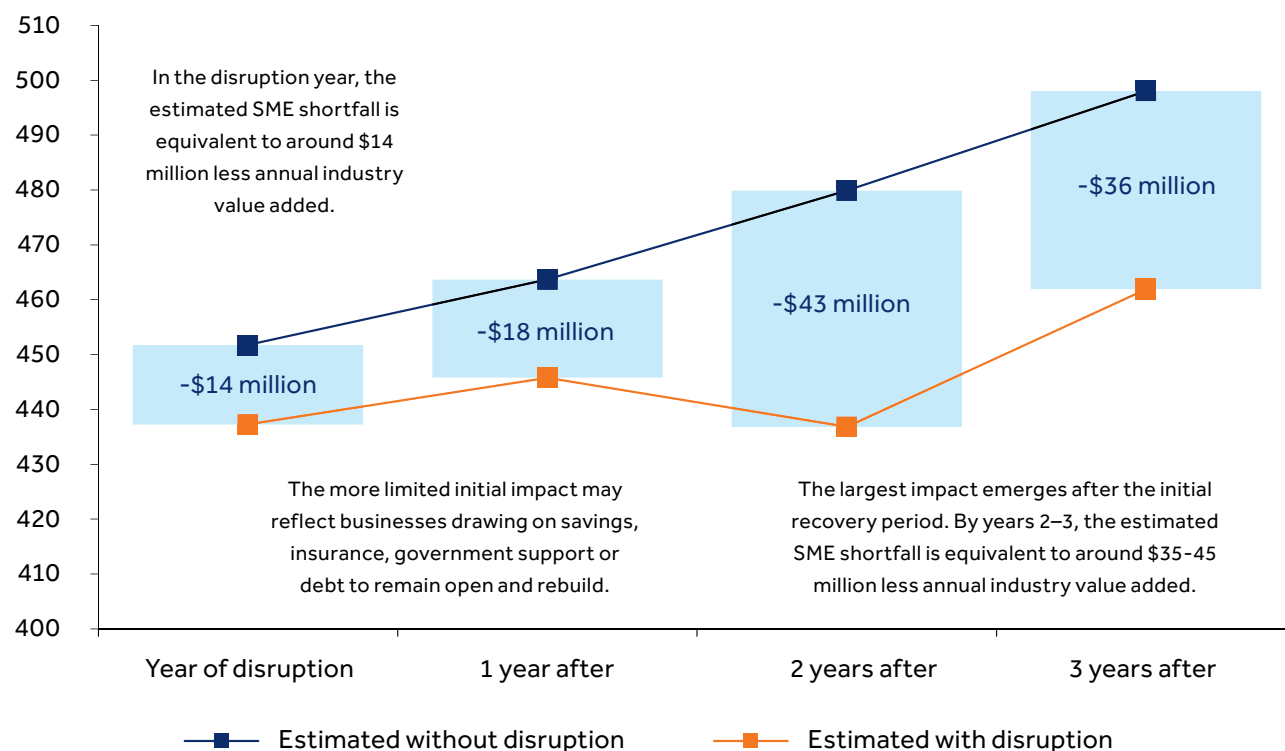
Some businesses that remain open may lose sales as trading conditions weaken, while others may gain customers and absorb activity from businesses that close. The estimate also excludes wider effects on suppliers, workers and household spending. Together, these findings highlight how disruption can continue to shape local economies long after the event itself.

The persistence of this shortfall shows that recovery is a longer-term process of adaptation and renewal, rather than simply the completion of rebuilding.⁶

5. These estimates apply the national industry value added per SME for businesses with 0–199 employees in FY25 to the business count trajectories shown. The no-disruption trajectory is based on cohort-weighted average growth among eligible control SA2s, while the with-disruption trajectory applies the estimated treatment effects. As industry value added data are only published at a broad geographic level, the estimates are indicative only. 6. Regional Australia Institute (2013) From disaster to renewal. [Available here](#).



Industry value added (millions)



Source: Oxford Economics Australia, QBE

Note: The no-disruption path (blue) applies the cohort-weighted average growth observed among eligible control SA2s to the average pre-disruption business base of affected SA2s. The with-disruption path (red) applies the average treatment effect for each time period to this trajectory. Industry value added is derived by applying average IVA per SME to each path. The chart is therefore an illustration of the economic scale of the estimated business count impact rather than a separate estimate of industry value added.



The impact builds over time

While many businesses survive the initial shock, it is often two years after an event that resilience becomes most evident, once savings, insurance payments and other forms of support may have been depleted.



Recovery is not immediate

By the third year, affected regions begin to recover but economic activity remains well below the path it would otherwise have followed.



Signs of permanent scarring

Economic activity in disaster-prone regions can remain below its pre-disaster trend for five years or more following a severe event.⁷

7. International Monetary Fund (2022) Natural Disasters and Scarring Effects. [Available here.](#)



How severity can shape outcomes

The most severe events can leave the deepest scars

Very high severity events see the largest business decline

Two years after disruption, communities affected by very high severity events had

21%
fewer

businesses than they otherwise would have, had the disruption not occurred.

Note: The high and very high severity events were selected based on the distribution of losses per person within the disaster data base. High severity events refer to those with insurance losses per person in the 4th quintile of the distribution (\$550-\$1,650 per person). Very high severity events refer to those with insurance losses per person in the 5th quintile of the distribution (\$1,650+ per person).

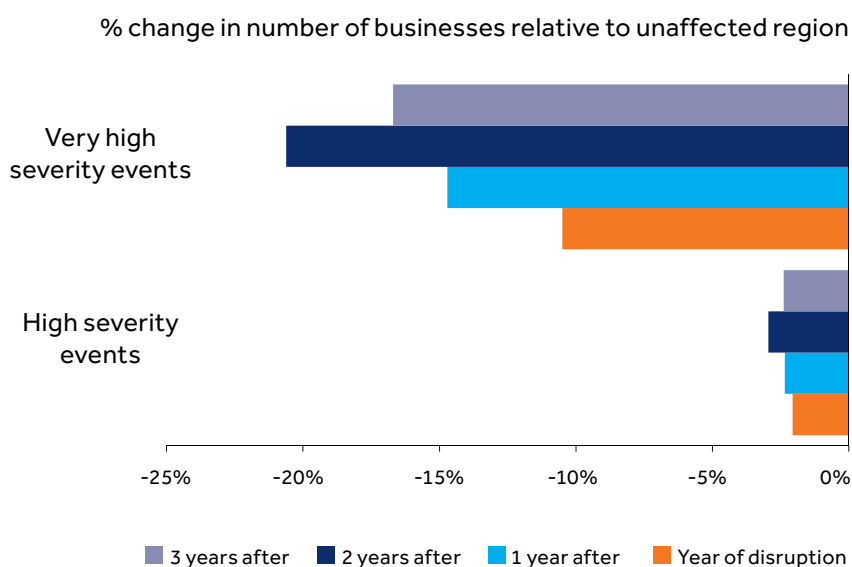
8. Eichholtz, Steiner & Yönder (2018) No shelter from the storm? [Available here](#). 9. Indaco, Ortega & Taşpınar (2021) Hurricanes, flood risk and the economic adaptation of businesses. [Available here](#).

While every major disruption creates challenges for local businesses, the most severe events can damage a larger share of local premises and infrastructure, interrupt trading for longer and affect households, workers and suppliers across more of the community.

The very high severity events measured in our analysis combined substantial insured losses with a concentrated impact across the affected population. These included the 2019 Townsville floods, Tropical Cyclone Seroja in 2021, and the Murray River floods in 2022–23. Their high losses per affected resident indicate that damage was more concentrated within the communities affected than for other major events, even where total damage costs were not necessarily the largest.

The lasting decline in business activity has consequences for both small business owners and commercial property owners. Evidence from major disasters shows that affected businesses can experience persistent reductions in revenues, assets and employment, as well as higher rates of closure and relocation.

For commercial property owners, these effects can flow through to weaker occupier demand, with disaster exposure also associated with changes in vacancy, rental income and property values. Where these effects persist, some properties may become increasingly difficult to lease or adapt to alternative uses.^{8,9}



Source: Oxford Economics Australia, QBE



“Preparation does not always require significant investment. One of the most effective ways businesses can prepare for severe weather is through regular maintenance. For example, water ingress remains one of the most common causes of long-term property damage following severe weather events. Simple actions such as maintaining roofs and gutters, repairing minor damage early and protecting critical assets can help reduce damage, disruption and recovery time.”



Ming Yiu Song
General Manager
SME



Resilience can help businesses and communities absorb disruption

Resilience is often invisible until it is tested. It can influence how quickly businesses resume trading, how communities recover and whether local economies regain momentum after a major disruption.

To better understand the role resilience plays in recovery outcomes, we compared the performance of communities with different levels of resilience following major disruption events.

Using the Australian Disaster Resilience Index, affected regions were grouped according to their level of community resilience.¹⁰

While business numbers in high-resilience regions remained broadly stable following disruption, low-resilience regions fell increasingly below their expected level over the following two years. By year two, business numbers in low-resilience regions were 15% below their expected level, highlighting how community resilience can help protect local communities from long-term economic damage.



10. Natural Hazards Research Australia (2025) Australian Disaster Resilience Index. [Available here](#).



What contributes to community resilience?



Disaster mitigation and preparedness measures, such as flood protection and local planning initiatives



Reliable roads, utilities and communications infrastructure



Strong local employment and economic opportunities



Access to critical services and support networks



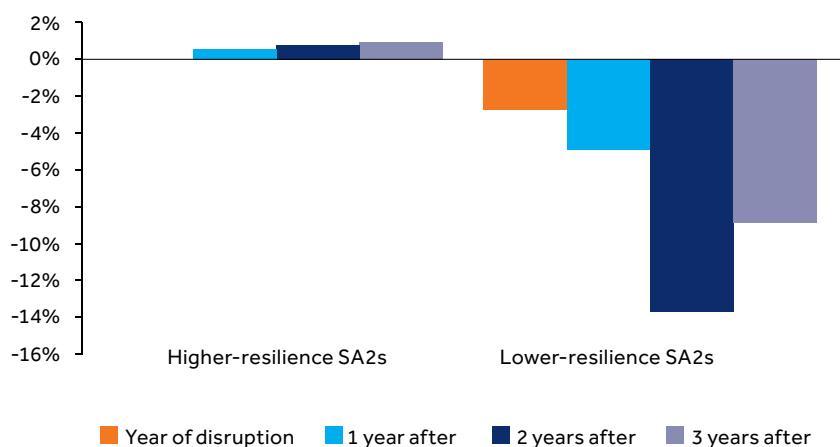
Connected and engaged communities¹¹

Note: The high- and low-resilience SA2s were classified based on the median value of the ADRI, which ranges from 0 to 1 and was calculated to be 0.62. SA2s scoring above the median were classified as high resilience, and those below as low resilience, resulting in an even split of 1,154 and 1,153 SA2s respectively. Within each group, around 48% of SA2s were never affected by a major disruption over the sample period

Despite facing an increasingly complex risk environment, only 25% of Australian small businesses have a current business continuity plan.¹⁴

Communities with stronger disaster resilience were largely unaffected by severe disruption.

Estimated difference in SME numbers in higher- and lower-resilience regions relative to comparable unaffected regions



Source: Oxford Economics Australia, Natural Hazards Research Australia, QBE

While community resilience plays an important role in recovery outcomes, businesses can also take practical steps to reduce the impact of severe weather events. Planning ahead, regularly maintaining critical assets and identifying vulnerabilities early can help minimise damage and return to trading sooner – which helps support local supply chains, customer activity and demand for commercial property.^{12,13}

11. Natural Hazards Research Australia (2025) Australian Disaster Resilience Index. [Available here](#). 12. Xiao & Peacock (2014) Do Hazard Mitigation and Preparedness Reduce Physical Damage to Businesses in Disasters. [Available here](#). 13. Liang, Ewing, Cardella & Song (2023) Probabilistic Modeling of Small Business Recovery after a Hurricane. [Available here](#). 14. Australian Small Business and Family Enterprise Ombudsman (2022) Small Business Natural Disaster Preparedness and Resilience Inquiry. [Available here](#).



The impacts of disruption are not shared equally

Business size, sector and location all influence how disruption affects recovery outcomes

Small businesses have less room to absorb shock¹⁵

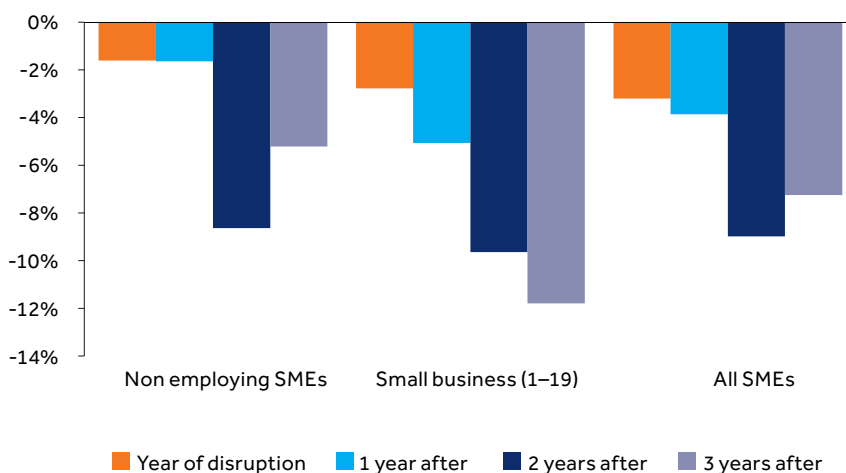
Small businesses employing 1–19 people were

12%

below expected levels three years after a major disruption.

Some parts of the economy are much harder hit than others, particularly small business employers, industrial businesses and regional communities.

% change in number of businesses relative to unaffected region



Small employers are particularly exposed to prolonged disruption. These businesses must continue to manage wages and other fixed costs while revenue is disrupted, often alongside the cost of repairing premises or replacing stock and equipment. Consistent with these findings, 65% of small businesses employing one to five people reported financial losses following a disaster.¹⁶

Businesses with no employees also experienced a substantial impact but recovered some of the gap by the third year. This may reflect the greater flexibility these businesses have to reduce operating hours or temporarily scale back activity without carrying the same fixed costs as employing businesses.

15. Note: The estimates for medium businesses (20–199 employees) are volatile and are not statistically distinguishable from zero. 16. Parliament of Australia (2024) Impact of Climate Risk on Insurance Premiums and Availability. [Available here](#).



Industrial businesses most affected

Small industrial businesses in agriculture, mining, manufacturing, utilities and construction were estimated to have nearly

10% fewer

businesses than they otherwise would have two to three years after a major disruption.

Note: Industrial includes agriculture, mining, manufacturing, utilities, and construction. Private services includes wholesale and retail trade, accommodation and food services, transport, media and telecommunications, financial and insurance services, real estate, professional and administrative services, and arts and recreation. Public services includes public administration, education and training, and health care and social assistance.

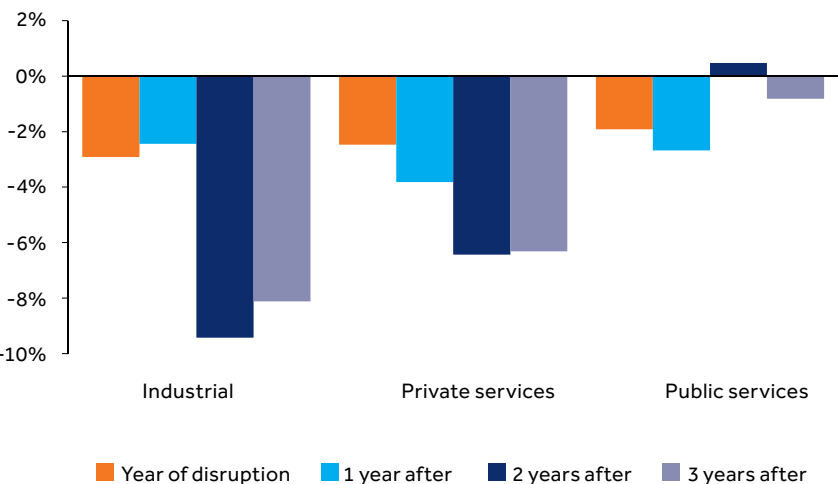
The impacts of major disruptions vary significantly across sectors, reflecting differences in how businesses are exposed to damage and how they recover.

Industrial businesses often receive an initial boost from clean-up and rebuilding activity, particularly as private and public spending increases during recovery.¹⁷ However, these businesses are also more reliant on physical assets such as equipment, machinery, vehicles and specialised facilities. Damage to these assets can disrupt operations for extended periods, creating cash flow and financing pressures that can weigh on recovery over the longer term.¹⁸

Private service businesses including retail, hospitality and professional services, experience a more gradual decline as household spending, tourism activity and local demand weaken, highlighting how businesses can be affected even without experiencing direct physical damage.¹⁹

Public services are comparatively more insulated from long-term impacts, as governments and councils prioritise the continued delivery of essential services and direct additional resources towards emergency assistance and rebuilding.²⁰

% change in number of businesses relative to unaffected region



Source: Oxford Economics Australia, QBE

17. Reserve Bank of Australia (2025) Statement on Monetary Policy – May 2025. [Available here](#).
18. Collier, Howell & Rendell (2024) After the Storm. [Available here](#). 19. Collier, Howell & Rendell (2024) After the Storm. [Available here](#). 20. Australian Small Business and Family Enterprise Ombudsman (2022) Small Business Natural Disaster Preparedness and Resilience Inquiry. [Available here](#).



Regional communities most at risk

Communities in regional Australia supported nearly **1 in 10 fewer small businesses** in the years following a major disruption than they otherwise would have,

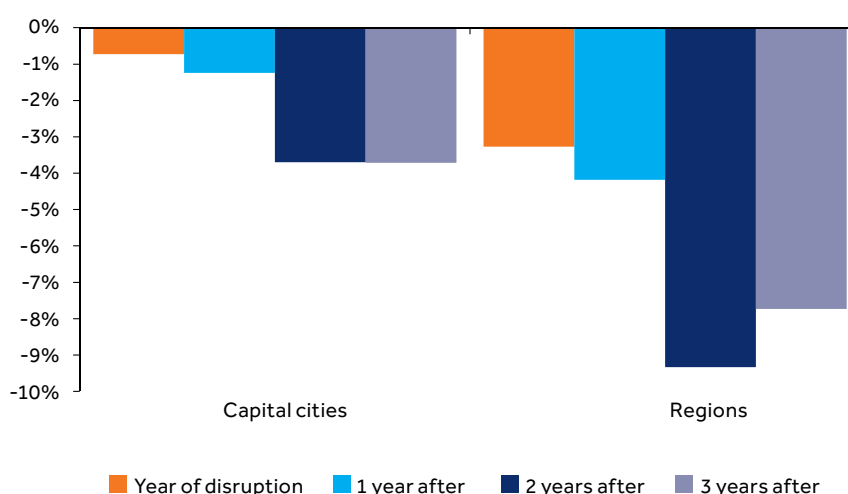
more than **2x**

the gap seen in capital cities.

Regional economies are often more reliant on a smaller group of industries and closely connected local supply chains.^{21,22} As a result, disruptions can have wider spillover effects, particularly where transport routes are cut, visitor activity declines or a major local producer is affected.^{23,24} By contrast, capital-city businesses typically have access to larger markets, more diverse supplier networks and a wider range of transport options, helping to limit these flow-on effects.

Natural hazard exposure also varies across Australia. New South Wales and Queensland have historically borne the majority of disaster costs, accounting for around 60% of the national total. Victoria has emerged as a significant contributor following major bushfire events since 2000.²⁵ As climate change continues to alter the frequency and severity of extreme weather, natural hazard exposure is also expected to evolve, with warmer sea temperatures predicted to extend cyclone risk further south, increasing exposure for coastal cities such as Brisbane and areas like northern NSW.²⁶

% change in number of businesses relative to unaffected region



21. Regional Australia Institute (2020) Regions, work and vulnerability. [Available here](#). 22. Australian Bureau of Statistics (2013) A Review of Regional Development Australia Committee Regional Plans. [Available here](#). 23. Infrastructure Australia (2022) Regional road and rail freight corridor resilience. [Available here](#). 24. Australian Small Business and Family Enterprise Ombudsman (2022) Small Business Natural Disaster Preparedness and Resilience Inquiry. [Available here](#). 25. Australian Journal of Emergency Management (2018) Updating the costs of disasters in Australia. [Available here](#). 26. Deloitte (2021) Special report: Update to the economic costs of natural disasters in Australia. [Available here](#).



What the insurance claims tell us

\$78.8m

Total incurred claims cost

2,403 claims lodged

\$32.8k

Average incurred cost per claim

\$1.13m³²

Largest claim incurred

While the analysis in this report focuses on the long-term effects of major disruptions on small businesses and local economies, QBE's 2025 catastrophe claims data²⁷ provides a snapshot of the immediate impacts businesses can face when disaster strikes. The data highlights the scale of insured losses, the concentration of claims across major events and the variation in impacts experienced by businesses.

Small business catastrophe claims were concentrated in a handful of regions.²⁸

Region	Total small business claims
Gold Coast and hinterland, QLD	283
Logan and Redlands, QLD	282
Brisbane metropolitan area, QLD	278
Townsville and Hinchinbrook, QLD	263
Hunter and Newcastle, NSW	131
Northern Rivers, NSW	111
New England and Northern Tablelands, NSW	105

Losses were concentrated

Two major weather events²⁹ accounted for 46% of total incurred costs, and over half of all claims lodged.

Claim severity varied

\$16,700³⁰ to \$70,900³¹

Average incurred cost per claim across catastrophe events

27. QBE catastrophe claims data relating to 17 significant weather events from Jan 2025– Dec 2025 (Business Packages property claims only).

28. Claims across the 2025 significant weather events included in the analysis have been grouped into broad geographic regions to show where impacts were most concentrated. 29. Tropical Cyclone Alfred (March 2025) & East Coast Significant Storm & Hail (November 2025) 30. SA Tornado & Vic Storms (August 2025) 31. Glen Innes Hail (January 2025) 32. QLD & Northern NSW Hail and Storms (October 2025)



The QBE difference

Understanding your risks is the first step towards resilience

“In an increasingly uncertain world, resilience is becoming a core business capability. The businesses that are best positioned for the future are those that build resilience into the way they operate, not just the way they respond.”

Ming Yiu Song
General Manager
SME

This research highlights the important role disaster preparedness can play in reducing the impact of major disruptions on small businesses and local communities.

While every business faces different risks, understanding potential vulnerabilities and planning ahead can improve preparedness and support better outcomes when disruption occurs.

To help businesses take practical action, QBE's Risk Solutions team offers a range of Self-Assessments that enable businesses to evaluate key risk areas across their operations, such as business continuity and crisis management, property, liability, motor fleet and ESG (Environmental, Social and Governance) risk. By identifying strengths and highlighting potential vulnerabilities, businesses gain practical insights to help prioritise actions and strengthen resilience.





Learn more

To access QBE's Self-Assessments, visit:

[Risk Solutions Tools & Resources | QBE AU](#)

[qbe.com/au/brokers/risk-insight-expertise/risk-solutions/
tools-and-resources](https://qbe.com/au/brokers/risk-insight-expertise/risk-solutions/tools-and-resources)

Businesses can also access a range of education and risk management resources through QBE's Q Academy and Q Risk Insights hub, which provide practical guidance, training and expert insights to help build long-term resilience and support better risk management decisions.

About QBE Risk Solutions

QBE's Risk Solutions team helps businesses identify, assess and manage risk through practical support, specialist expertise and data-driven insights. Working alongside customers, the team provides training, risk assessments, risk insight reporting, technical advice and solution offerings to help businesses better understand their exposures and take action to reduce risk.

By combining deep risk expertise with actionable support, Risk Solutions helps businesses minimise potential losses, strengthen operational resilience and prepare for the challenges of a changing risk landscape.



To learn more about
Risk Solutions at QBE, visit

**Risk Solutions, Insights
and Expertise | QBE AU**

[qbe.com/au/brokers/risk-insight-expertise/
risk-solutions](https://qbe.com/au/brokers/risk-insight-expertise/risk-solutions)



Technical appendix

QBE commissioned Oxford Economics (OE) Australia to examine how major disruptions affect SMEs and local business communities. Natural disasters were used as an observable measure of major disruption. Unlike many other disruptions, they generally have an identifiable starting point, a defined geographic footprint and an estimated measure of severity. This allows changes in business numbers following an event to be compared with the path they were likely to have followed without the disruption.

Detailed Methodology

To estimate the impact of major disruption on local business activity, OE combined historical disaster records with ABS business counts and other economic data for SA2s across Australia.^{33,34,35,36} OE identified major bushfires, floods and cyclones using insured losses per affected resident, then compared changes in SME numbers in affected areas with changes in similar areas that had not experienced a major disaster using a difference-in-difference approach. This allowed OE to separate the effect of disruption from broader economic trends affecting businesses across the economy.

The model accounted for key differences between local areas, including regionality, employment, industry structure and population. It estimated the average impact in the year of the disaster and over the following three years, with additional sensitivity testing used to check that the results were not being driven by repeat events or the treatment threshold used to identify a major disruption, set at the top two quintiles of the distribution of losses per person.

Cohort selection

The severity of each of the bushfire, flood and cyclones in the dataset is calculated as total insured losses divided by the population of the SA2s affected by that event. An event is treated as a major disruption where insured losses exceed \$554 per affected resident, the top 2 quintiles of

the distribution of losses per person. The seven significant events included in the study were:

1. Tathra Bushfires – 2018
2. Townsville floods – 2019
3. Black Summer Bushfires – 2019–20
4. Perth Hills Bushfire – 2021
5. Tropical Cyclone Seroja – 2021
6. 2022 East Coast Floods – 2022
7. Murray River Floods – 2022–23

Each SA2 is then assigned to one of two cohorts at each time period:

Treated cohort: the SA2 experiences a qualifying event above the treatment threshold that year.

Control cohort: the SA2 has not yet or never experiences a qualifying event above the treatment threshold.

Each SA2 is assigned a first-treatment year based on its first qualifying disruption. Before that year, it may serve as a control where it remains untreated in the relevant comparison period. From its first qualifying disruption onward, it is treated and is no longer eligible to act as a control. SA2s that never experience a qualifying event remain eligible controls throughout the estimation window.

These are the two cohorts that are compared at each time period to develop the estimated post-treatment impacts of the disruptions. Given the insurance losses per person threshold OE set on what qualifies as a disruption and the chance that a treated SA2 can suffer an additional disaster during the three years post-initial treatment, OE run sensitivity testing on two stand out cases that could bias results.

- When another major disaster occurs within the 3-year estimation period:
 - Under the central specification The SA2 remains in the main estimate. Its event-time +2 outcome may reflect both the continuing impact of the 2018 disaster and the additional

33. Australian Bureau of Statistics, Counts of Australian Businesses, including Entries and Exits. [Available here](#). 34. Australian Bureau of Statistics, Jobs in Australia. [Available here](#). 35. Australian Bureau of Statistics, Regional Population. [Available here](#). 36. Insurance Council of Australia (2026) Historical Normalised Catastrophe list. [Available here](#).



2020 disaster.

- The re-hit sensitivity removes this SA2 entirely to test whether repeat disasters are driving the later-year estimates.
- When there is a bushfire, flood or cyclone with an insurance loss per person over \$100 but less than the \$554 threshold prior to the first major qualifying disaster:
 - Under the central specification, this SA2 remains a control in the main estimate because it never reaches the treatment threshold.
 - The buffer sensitivity removes this SA2 entirely to test whether earlier disasters are driving the later-year estimates.

Neither of these sensitivities have large impacts on the direction or scale of the results in the main specification.

Difference-in-difference approach

A difference-in-difference approach estimates the impact of disruption by comparing how business numbers changed over time in affected areas with how they changed over the same period in comparable unaffected areas. Rather than simply comparing business levels after a disaster, it measures whether affected areas moved onto a different path after the event. The analysis uses a multi-period approach, grouping affected areas by the year of their first major disaster and estimating the effect for each group over time before combining the results.

For treatment cohort g and comparison year t , each SA2's change in log business counts is measured relative to the year immediately before treatment:

$$\Delta Y_i(g, t) = Y_{i,t} - Y_{i,g-1}.$$

Where:

- g is the year of the cohorts first qualifying disaster.
- $Y_{i,t}$ is the outcome log business count for SA2 i in year t after treatment in year g

OE also include a set, X_i , of control variables to account for differences in cohorts before that existed before the treatment period:

$$X_i = [C, E, I, P]_i$$

Where,

- C is a binary variable representing whether an SA2's is in a capital city or a regional area
- E is the average employment-to-population ratio of the SA2 for the three years pre-treatment
- I is the average share of employment in the SA2 represented by five industrial sectors for the three years pre-treatment: Agriculture, Manufacturing, Mining, Utilities and Construction
- P is the average log population for the SA2 for the three years pre-treatment

The fitted model, taking into account control variables, then estimates how businesses counts in an untreated cohort would typically change as a function of these control variables using a linear regression. For each SA2, the estimated variables above allows us to calculate the expected change in business counts based on the SA2's characteristics:

$$\hat{m}_0(X_i) = \hat{E}[\Delta Y_i | X_i]$$

OE run a logistic model to determine how much weight to place on each of the control SA2's when comparing the treated cohort to the control cohort. This estimate determines the probability of being a treated cohort given each SA2's characteristics. The calculated probability for each untreated SA2, a measure of the similarity to the treatment cohort, is then used to determine the weighting placed on each control SA2. This does not discard all dissimilar control SA2's. It gives more influence to eligible SA2's that look more like the treated cohort on the included control characteristics.

The predicted normal change is then removed from each treated SA2's observed change:

$$R_i(g, t) = \Delta Y_i(g, t) - \hat{m}_0(X_i)$$

OE can then take the average, and weighted average for the control cohort, of this difference for all SA2's in the treated and untreated cohorts and compare the differences. The controlled effect for cohort g in year t is the difference between them:

$$\widehat{ATT}_{g,t}^{\text{controlled}} = \overline{R}_{g,t}^{\text{treated}} - \overline{R}_{g,t}^{\text{weighted controls}}$$

The above provides the estimated difference in difference for a treatment cohort g in time t . OE then repeat this process for every cohort in every year to produce the set of cohort-year



effects. OE then convert each cohort and year pair into an event time estimate, the estimated difference in difference of a particular treatment cohort g in time t , and take the weighted average across these event-time estimates:

$$\widehat{ATT}_e^{\text{controlled}} = \sum_g \omega_{g,e} \widehat{ATT}_{g,g+e}^{\text{controlled}}$$

Where,

- $e = t - g$
- $\omega_{g,e}$ is the relative size of the treated cohort at treatment period e

Limitations and interpretation

What the estimate measures

The results measure how business numbers in affected areas changed relative to the level expected without the disruption. They should not be interpreted as the observed change in business numbers following a disaster. An affected area may continue to gain businesses in absolute terms while still recording a negative estimated effect because it grew more slowly than comparable areas.

The percentage estimates represent the average effect across the disasters and regions included in the analysis. They do not imply that every affected community experienced the same outcome. The effect of an individual disaster will depend on its severity, location, duration and the characteristics of the local economy.

Causal interpretation

The difference-in-differences approach is designed to estimate the effect caused by a major disruption. It does this by comparing the change in affected areas with the change in similar unaffected areas over the same period. This helps account for wider economic conditions affecting both groups, such as national changes in consumer demand, interest rates or business formation.

A causal interpretation depends on the affected and comparison areas being likely to have followed similar paths if the disaster had not occurred. The model uses business conditions and economic characteristics measured before the disaster to improve the comparability of the two groups. However, other local developments occurring at the same time, such as the closure of a major employer or a separate

economic shock, may influence the results. The estimates provide evidence of the likely effect of major disruption after accounting for observed differences, but they cannot rule out every other influence on local business numbers.

Business numbers as a proxy for business performance

Business counts provide a consistent measure of the size of the local business base, but they do not capture every way in which SMEs are affected. A business may remain operating while experiencing lower sales, fewer customers, reduced working hours or delayed investment. These effects are not reflected in the results unless they ultimately affect whether businesses operate in the area.

The results should therefore be interpreted as a measure of the overall effect on the number of businesses operating in an affected community. The wider economic cost of disruption may be larger than the effect recorded through business numbers alone.

Disaster selection and severity

The analysis is limited to natural disasters that meet the study's definition of a major disruption, including a minimum normalised insured-loss threshold of \$554 per person to better align the disaster data set to our use as a proxy for lengthy or significant disruption to regular trading conditions. OE have also excluded storms and hail from the natural disaster database as their insured losses can be driven disproportionately by damage to homes and motor vehicles, making insured loss a less reliable measure of damage to businesses or disruption to normal trading conditions.

Normalised insured losses provide a consistent way to compare the financial scale of disasters occurring in different years. However, insured losses do not capture all economic costs. They exclude uninsured damage and many indirect effects, including lost sales, interrupted production and reduced local spending. Insurance coverage, property values and the concentration of assets also differ across locations. The severity categories should therefore be interpreted as broad measures of event scale rather than complete measures of economic damage.

