



Photo: Bundaberg Police

POLICY BRIEF

AUGUST 2020

# Disasters and economic resilience: the income effects of 2013 Tropical Cyclone Oswald on small business owners

## A case study of the Burnett River catchment area

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### About this research

This research began in 2013 and was conducted as part of the *Optimising post-disaster recovery interventions in Australia* project. The project investigated how recent natural hazards have impacted and rippled through communities and the broader economy over time, through case studies of the 2009 Black Saturday bushfires, 2009 Toodyay bushfire, 2010-11 Queensland floods and 2013's Tropical Cyclone Oswald. The research findings will help policymakers better understand the socio-economics of natural hazards and formulate public policies in a way that better distributes budgets and resources towards vulnerable socio-economic groups and sectors of employment.

Australia to understand the impact of disasters caused by natural hazards on small businesses, or the efficacy of government assistance programs in promoting their recovery.

### Aims and objectives

*Disasters and economic resilience: the income effects of Cyclone Oswald 2013 on small business owners. A case study on the Burnett River catchment area* (Ulubasoglu 2020) explores the impact of 2013's ex-Tropical Cyclone Oswald on the incomes of small business owners residing in the four Burnett River catchment local government areas (LGAs) in Queensland, depicted in Figure 1 (see below).

From 22 to 29 January 2013, ex-Tropical Cyclone Oswald moved across parts of Queensland and New South Wales, causing severe storms, flooding and tornadoes. Devastation was widespread in Queensland, with the associated extreme weather and flooding declared a disaster in 53 Queensland local government areas. Most of the devastation was felt in the Bundaberg and North Burnett regions, with damage to key infrastructure, including sewerage systems and economically important assets, and ports and road networks relied on by agricultural and manufacturing enterprises in the area. The record flooding in Bundaberg forced the evacuation of over 7,500 residents and damaged over 2,000 homes.

### Background

Small businesses are regarded as the backbone of Australia's economy, forming up to 98 per cent of Australian businesses and employing around 44 per cent of Australia's private sector workforce (Australian Bureau of Statistics, 2018).

Despite their economic importance, little empirical research has been undertaken in

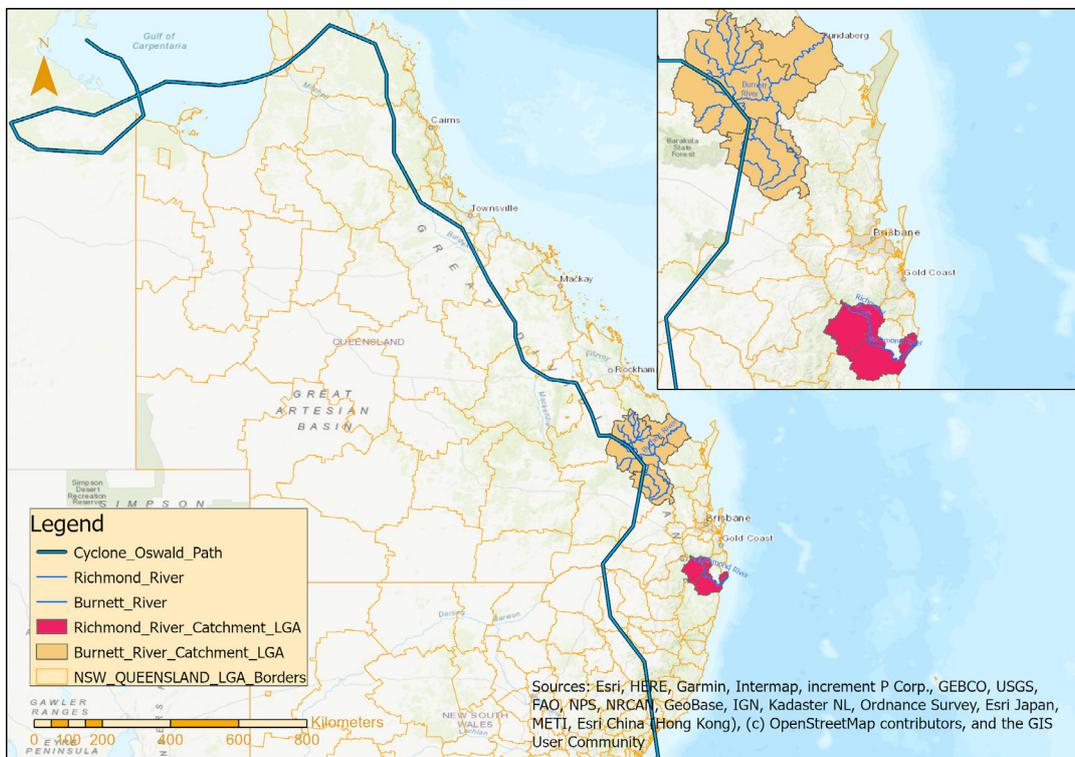


Figure 1: Burnett River and Richmond River catchment areas and LGAs.

Consequently, the flooding associated with *Oswald* that occurred in this region presents a unique opportunity to causally investigate the impacts of a major disaster on small businesses in a regional community with an important agricultural base. As up to 98 per cent of Australian businesses are small businesses, this study provides yet another layer to dissect disaster resilience and recovery on an important section of the community and workforce.

The key aim of this study was to demonstrate the devastating economic effects that extreme weather can have on small businesses in regional communities.

## Methodology

This research used a statistical technique called difference-in-differences (DID) modelling. The model mimics experimental research design by comparing the effect of a treatment (i.e. a disaster) on a 'treatment group' relative to a 'control group'. That is, it compares the effect of this treatment on an outcome (individual income) by comparing the changes in income in the treatment group before and after the disaster, relative to the changes in the control group. The latter provides the expected income trajectory had the cyclone not occurred. The Richmond River catchment area (New South Wales) was chosen as the control group as it closely resembles the treatment group. The LGAs within this comparison catchment group are Ballina, Kyogle and Richmond Valley (see Figure 1, page one).

The study utilises data from the Australian Census Longitudinal Dataset (ACL) available through the DataLab of the Australian Bureau of Statistics (2018). This dataset includes a nationally representative five per cent sample from each of the 2006, 2011 and 2016 censuses, and links the individual records across these three censuses. This enables a de-identified individual to be tracked over time, including changes in their economic, demographic and other characteristics.

The research team undertook an additional modelling step, called entropy balancing<sup>1</sup> (EBalance). This technique helps to choose small business owners from the control group who most closely resemble small business owners in our treatment group on a range of characteristics, not just income. These characteristics include: education, marital status, age, and mover/non-mover status (i.e. movements into/out of residential address and therefore treatment and comparator regions across 2006, 2011 and 2016).

<sup>1</sup> Entropy balancing (EBalance) is a pre-processing procedure that allows researchers to create the most comparable treatment and control groups for the subsequent estimation of treatment effects. That is, it permits selecting individuals from the control group who most closely resemble the individuals in the treatment group, based on a range of characteristics, such as similar education, marital status, age, and residential mover/non-mover status.

## Findings

- Compared to the control group, small business owners in the Burnett River catchment area suffered income losses of 45.3 per cent in the medium-term (up until 2016), compared to what they would have earned had the cyclone and flooding not occurred.
- The aforementioned estimate equates to average annual income losses of \$21,005. Based on the number of small businesses at the time of *Oswald* (3,722 employing small businesses in 2013), this corresponds to income losses of at least \$78.2 million for employing small business owners as a whole (assuming one owner per small business).

## Policy implications

### General implications

- While the estimated income losses appear to be large, they are plausible considering the widescale devastation to important infrastructure (including ports and water treatment facilities) that agricultural small businesses are heavily represented within in these areas; and that agricultural losses alone in North Burnett and Bundaberg were estimated at \$265 million (Queensland Government, 2018).
- These would have had knock-on effects on other sectors in the region. They are also consistent with the low capacity for disaster resilience of the Burnett River catchment area, as assessed by the CRC's Australian Disaster Resilience Index project (Parsons et al., 2020).
- This finding supports a key insight from the team's 2010-11 Queensland floods report (Ulubasoglu and Beaini, 2020), which identifies three possible channels through which disaster-induced economic shocks can be transmitted to individuals, vis-à-vis income. These are: owning a business, working in sectors whose economic activity is susceptible to disaster shocks (both positive and negative), and working part-time.
- It is difficult to fully mitigate economic losses in regional communities in Australia, particularly where economic activity is concentrated in, and centred around, disaster-sensitive industries like agriculture and tourism. For the Wide Bay-Burnett region, these difficulties will only be exacerbated by the projected population growth and the anticipated effects

of climate change, which is expected to increase extreme weather and the risk of further inundations in communities like Bundaberg.

- Given the workforce composition of the region, there may also be other factors that might exacerbate the financial ability of these small business owners to cope with floods, or capacity to take on additional loans, even at attractive rates as envisaged by these arrangements. Here, it is noted that 94 per cent of employed residents in the Burnett River catchment LGAs work locally, accounting for 95 per cent of the total workforce across all these regional councils. With the scale of devastation in these areas, it is likely that small business owners were hit twice. Indeed, past natural hazards suggest that it is likely that at least some of these small business owners had to also contend with flood damages to their own private properties, particularly if uninsured. Thus, assistance may need to be framed in a way that recognises the overlap and interrelationships between the seemingly different groups covered by assistance arrangements.

#### Implications for government relief and recovery

- The estimated losses are the net effect of the disaster after government relief and recovery efforts. This has important implications on the scope and sustainability of Australia's disaster relief and recovery arrangements.
- Given the time period, the losses were sustained into the medium term, despite the significant government relief and recovery efforts directed at the Burnett Catchment area LGAs, particularly Bundaberg and North Burnett. This underscores the severity of the flooding events associated with *Oswald* in the region, and the heightened exposure of the predominantly agricultural Wide Bay-Burnett region to disasters.
- As the research focused on small businesses that employ staff (i.e. those who have 1–19 employees), these income losses are likely to have broader economic impacts on the workforce, particularly where small business owners are forced to reduce their employees' shifts or are unable to retain their workforce due to the severity of the flooding's effects on business activity, as happened in other natural hazards such as the 2010–11 Queensland floods.
- Small businesses account for 97.4 per cent of Queensland's businesses and employ 44 per cent of Queensland's private sector workforce (Queensland Government, 2017). Small businesses also rarely take out flood insurance, with rates of insurance coverage much lower than residential insurance (Insurance Council of Australia, 2015). This makes small businesses particularly reliant on government relief and recovery efforts in the aftermath of disasters.

- In examining Australian disaster relief and recovery arrangements, it is noted that small businesses (and primary producers) are already covered by these arrangements, with category B and C assistance under the Disaster Recovery Funding Arrangements providing loans and subsidies, and assistance with clean-up costs. For *Oswald*, it is apparent that many programs funded under category D assistance were prioritised and appropriately targeted towards minimising disruptions to core income-generating activities in the region, for example, the dredging works at Port Bundaberg.

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