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Social equity in community disaster funding

Lihini de Silva[1], David Johnston[2], and Sundar Ponnusamy[3]

Abstract

Government funding for environmental disasters and climate adaptation can strongly influence community recovery and resilience-building. Yet given funding is often distributed via competitive schemes, inequities may arise if allocation is determined by factors such as cost effectiveness rather than need. Consequently, disadvantaged communities may receive inadequate support and be highly vulnerable to future disasters. We examine whether federal government community grants following the Australian 2019/20 Black Summer Bushfires were distributed equitably. Using detailed grant-level data including where the grant activity took place, the recipient organisation, and the amount awarded, we find that even after controlling for physical exposure to the fires, communities that are more vulnerable by demographics (e.g., more children, elderly people, non-working individuals, and First Nations people) receive less. Communities with larger ethnic minority populations also get less though this result is not as robust. Conversely, communities with greater built environment vulnerability (i.e., more remote) receive more. We demonstrate that lower funding for demographics and minority vulnerable communities manifest mostly via grants targeting economic and social outcomes whilst higher funding for built environment vulnerable communities is largely driven by infrastructure grants. Furthermore, inequities persist across organisation types including government institutions, which are expected to more carefully consider equity compared to non-government organisations. Finally, the observed inequities hold even across grants received by the same organisation. Altogether, our findings suggest a tension in competitive grant schemes between targeting need and funding projects that are more likely to be successful and cost effective, resulting in socially vulnerable communities receiving less.

Keywords: disaster relief, equity, social vulnerability, disaster resilience

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1. Introduction

As the climate crisis intensifies, government support is increasingly needed for community disaster recovery, adaptation, and mitigation. For example, amid growth in the number of major disaster declarations over time, the total annual obligations under the Disaster Relief Fund- the predominant source of federal disaster recovery funding in the US- has surpassed $40 billion for the first time in 2020 and remained elevated since (Lacalle et al., 2025). However, climate disasters impact communities differently, with socially vulnerable populations disproportionately exposed to and affected by disasters, often suffering the most economically, socially, and psychologically (Masozera et al., 2007; Qiang, 2019; Zahran et al., 2011). Hence, the way finite resources are distributed between communities can have strong equity implications.

Concerningly, evidence suggests that disaster funding is often distributed inequitably and fails to target those most in need (Emrich et al., 2022; Tyler et al., 2023). Instead, factors such as political alignment, civic capacity, and organisational capacity are influential (Consoer & Milman, 2018; D. Lee, 2021; Lowe et al., 2016). This trend of distributional inequities has been witnessed in various disaster contexts such as flood-mitigation home buyout programs in the United States (Nelson & Molloy, 2021), and more broadly in the distribution of international climate adaptation finance (Islam, 2022; Garschagen & Doshi, 2022).

To avoid distributive injustices, it is argued that funding agencies should consider both the community's physical and social vulnerability (Grasso, 2010).[4] Social vulnerability can manifest through a range of characteristics including gender, mobility, and race (Neumayer & Plümper, 2007; Parker et al., 2016; Quaill et al., 2018). For example, elderly people may be unable to rapidly evacuate during a disaster whilst non-English speakers may miss warning communications (Lindell & Perry, 2004). Furthermore, barriers to accessing support following a disaster can worsen health and wellbeing among vulnerable populations (Hamideh & Sen, 2022). Thus, a vicious cycle may arise whereby disasters disproportionately impact vulnerable communities, who then receive inadequate support and are consequently more vulnerable to future disasters.

While existing studies document substantial inequities in disaster recovery funding, less is known about how these inequities arise within competitive, community-based grant programs, or the extent to which they reflect social vulnerability rather than the characteristics and capacity of recipient organisations. We extend current understanding by examining the extent to which competitive community disaster grants reach vulnerable communities. These are grants provided to local organisations to fund community-level recovery and resilience-building. Using detailed grant records, we assess whether $670 million worth of competitive grants were distributed equitably among beneficiary suburbs affected

[4] Physical and social vulnerability refer to disaster susceptibility due to characteristics of the physical environment and sociodemographic factors respectively.

by one of the most severe wildfires in recorded history - the 2019/20 Australian Black Summer Bushfires.

This analysis is made possible by rich grant-level data that identify where funded activities took place (i.e., the beneficiary suburb), the recipient organisation responsible for delivering the project, the amount awarded, and the stated purpose of each grant. We combine these data with a multidimensional social vulnerability index for Australian communities (Wang et al., 2022) to investigate the relationship between per capita funding and five dimensions of social vulnerability: socioeconomic status (SES), demographics, minority, housing, and the built environment.

Conditional on fire exposure measured by area burnt and damage levels, we find that suburbs with higher demographics vulnerability (defined by characteristics including a greater share of children, elderly people, non-working individuals, and First Nations people) and higher minority vulnerability (reflecting greater ethnic diversity and lower English proficiency) receive significantly less funding. Conversely, funding is positively associated with built environment vulnerability (largely reflecting remoteness). These patterns with respect to demographics and built environment vulnerability are robust to a series of checks including omitting controls, excluding grants flowing to multiple suburbs, and using alternative measures of social vulnerability. Additionally, we demonstrate that the results are not driven by differences in physical exposure along social vulnerability lines.

The negative association between funding receipt and demographics and minority vulnerability is primarily driven by the allocation of grants for economic and social purposes. In particular, funding for projects focused on improving community economic and social outcomes (such as economic development, safety, support, and connection) is substantially higher when the beneficiary suburbs have lower levels of demographic and minority vulnerability. By contrast, the positive association between funding and built environment vulnerability is largely explained by the allocation of infrastructure-focused grants which typically incur greater per capita service delivery costs due to both the high fixed costs of projects in suburbs that are remote from commercial centres and public services and small population sizes.

Comparisons across organisation types reveal that inequities in funding distribution by demographic and minority vulnerability persist even among government recipients. This is notable given that government organisations are generally expected to place greater emphasis on equity considerations than private businesses or other non-government organisations. Moreover, these findings hold even when comparing grants administered by the same organisation. Within organisations, grants targeting less vulnerable communities receive systematically higher funding than those targeting more vulnerable communities, suggesting that our results are not due to recipient characteristics such as organisational capacity or experience. Instead, the results reflect differences in grant application development and funding decisions by applicants and agencies for projects involving communities of varying vulnerability.

In relation to this, we identify a few mechanisms that may help explain why funding is systematically allocated away from more socially vulnerable communities. First, both applicants and funding agencies may hold the perception that projects targeting highly demographically- and minority-vulnerable communities are riskier or less likely to deliver measurable outcomes within standard funding timeframes. This mechanism may be particularly influential if significant weight is placed on the success of funded projects. Second, barriers related to age and language for example can hinder engagement between applicants and vulnerable communities and in turn limit the salience of demand and support for projects in these communities. Finally, prior negative experiences engaging with local institutions may lead to a lack of trust and reluctance among vulnerable communities to engage with organisations. Both barriers to engagement and low institutional trust can be costly and complex for applicants to overcome, requiring additional time, trust-building, and tailored delivery approaches. As a result, organisations may be less likely to propose large-scale projects in these settings and funding agencies may not fully account for the higher costs associated with effective engagement and delivery. Consistent with this interpretation, we find that funding inequities are most pronounced for grant purposes that require more direct and sustained community engagement. Together, our results illustrate the dual motivation that often arises with respect to competitive grant schemes whereby there is a trade-off between targeting need and investing in projects that are considered more likely to be successful, resulting in funding allocations which are skewed towards less socially vulnerable communities.

This paper extends the literature on the equitable distribution of disaster recovery funding, which documents inequities internationally along several indicators such as race, income, education, and rurality.[5] These studies most commonly explore how a wide array of narrowly defined indicators of vulnerability influence funding receipt. Our study is most closely related to work by Tyler et al. (2023), who focus on broad sub-themes of social vulnerability rather than individual indicators, and find that US counties with higher socioeconomic and demographic vulnerability received fewer competitive flood mitigation grants, while counties with higher minority vulnerability received more. Highly detailed grant data allows us to extend this work in a few key ways. First, suburb-level data enables exploration of funding inequities at a more fine-grained level than the county-level.[6] Second, we control for largely unexplored recipient organisation characteristics such as organisational capacity and preferences towards working with certain communities which can be instrumental in grant-application,

[5] See Domingue & Emrich (2019), Elliot et al. (2023), Emrich et al. (2020), Gourevitch et al. (2020), Mach et al. (2019), Nelson & Molloy (2021), Seong et al. (2022), and Siders (2019).

[6] US counties have an average population around 100,000 and a median population close to 25,000 (U.S. Census Bureau, 2017, 2024) while Australian suburbs have an average population of approximately 1,500 (Australian Bureau of Statistics, 2021).

expanding current understanding of the mechanisms by which inequities manifest. Finally, we compare funding outcomes across grant purposes and organisation types to further explain distributive inequities.

Our findings also contribute more broadly to studies which investigate distributive inequities in climate finance and highlight the importance of accounting for recipient characteristics (Robinson et al., 2023; Tennant et al., 2024). For example, Garschagen and Doshi (2022) and Islam (2022) find that highly vulnerable countries received less funding due to low institutional capacity and investment readiness. While these studies control for recipient characteristics using measures of the recipient's readiness and government effectiveness, we use recipient fixed effects which more comprehensively control for unobserved recipient characteristics. Furthermore, these studies typically use country-level measures of vulnerability despite substantial variation in within-country vulnerability. By contrast, given we focus on the suburb-level our target population is much smaller, enabling the use of a highly precise measure of vulnerability. Finally, climate finance research tends to focus on bilateral agreements given they make up the majority of global climate finance (OECD, n.d.), despite bilateral flows being difficult to compare due to differing donor interests and processes. Insight into the role of vulnerability in programs where funding comes from a dedicated pool is comparatively limited (Garschagen & Doshi, 2022; Persson & Remling, 2014; Treichel et al., 2024). Thus, we add to this literature by investigating whether funding inequities manifest within a competitively-allocated rules-based scheme in a different setting. With funds-based climate finance schemes rapidly gaining momentum globally (OECD, 2022), this work can inform future programs.

The remainder of this paper is structured as follows. Section 2 summarises social equity in funding distribution. Section 3 describes the disaster funding and data. Section 4 details the methodology. Section 5 presents the results. Finally, Section 6 discusses policy implications.

2. Social equity, social vulnerability, and distributive justice

Current disaster funding programs often prioritise communities based on physical vulnerability, with resources directed towards areas expected to experience the greatest hazard-related impacts. Physical vulnerability refers to susceptibility arising from physical and geographic characteristics such as location, land use, and the built environment (Fuchs & Thaler, 2018). For example, a town located close to bushland may have heightened exposure to wildfires. In practice, this approach is commonly operationalised through loss-based criteria, whereby funding is allocated according to observable damage, including housing and infrastructure loss (Hamideh & Sen, 2022; Tafti & Tomlinson, 2019). While effective at targeting material damage, this focus may overlook less tangible but consequential losses, such as health impacts, displacement, and longer-term social disruption.

Concerns about these limitations have motivated a broader focus on social equity within the disaster funding and environmental justice literature. Social equity is commonly defined as a state in which individuals and communities have full and equal access to resources and opportunities needed to meet their needs (Emrich et al., 2020). Importantly, social equity recognises that vulnerable populations often experience disproportionately adverse outcomes due to existing economic, social, and political structures, and therefore require differential treatment to achieve equitable outcomes (Gooden, 2017).

In this study, social equity is considered as a pathway to distributive justice, which relates to the allocation of scarce resources when needs differ across individuals or communities. Drawing on the Rawlsian Difference Principle, distributive justice does not require equal allocation, but rather equitable allocation, whereby those with greater need receive more support (Gooden, 2015). In the context of government funding, this implies distributing resources unevenly in order to addresses unequal socioeconomic circumstances (Barrenho et al., 2017). A key challenge, however, lies in identifying which communities are most in need.

The disaster aid and climate adaptation literature increasingly advocates for a needs-based approach to funding allocation (Drakes et al., 2021; Grasso, 2010). This approach builds on principles of social equity by arguing that, in addition to physical vulnerability, funding agencies should account for social vulnerability – that is, the susceptibility to harm and reduced capacity to recover or adapt due to social factors (Tafti & Tomlinson, 2019). For example, communities with higher shares of low mobility residents or non-English speakers may face greater risks during disasters due to difficulties evacuating or accessing warning information and thus should receive more (Cutter et al., 2003; Emrich et al., 2022). Using measures of both physical exposure and social vulnerability, this study assesses whether disaster funding allocations align more closely with a loss-based or a needs-based approach.

3. Data

1) Information on Awarded Disaster Grants

We focus on community-level grant programs established in response to the Black Summer Bushfires, a devastating wildfire season which affected much of the Australian east coast in 2019/20. The fires burnt over 24 million hectares of land, caused 478 human deaths, killed or displaced an estimated 3 billion animals, and destroyed approximately 3,000 homes (ABC, 2020; Australian National Audit Office, 2021; Cowled et al., 2022; WWF Australia, 2020).

We obtained detailed data on successful grants under four major, community-focused, federally-funded, competitive grant programs: (1) The Black Summer Bushfire Recovery Grants Program (BSBF); (2) Local Economic Recovery Fund (LERF); (3) The Regional Tourism Bushfire Grants (RTB); and (4) The Bushfire Recovery for Wildlife and Habitat Community Grants program (BRWH). Applications were only open to government institutions (e.g., local (i.e., municipal) governments), businesses (e.g., local tourism organisations and small businesses), and community organisations (e.g., clubs and charities). Proposed projects were required to support community-level activities within 110 disaster-declared Local Government Areas (LGAs).[7]

All programs were competitive, meaning that applicants were ranked based on selection criteria that assessed how well proposed projects addressed broadly-defined social, economic, natural environment, or built environment needs within the community. Applicants were also required to demonstrate community support or involvement (e.g., letters of support or testimonials), provide evidence of cost-effectiveness, and show capability to deliver the proposed project. Neither applicants nor beneficiary communities were required to contribute financially.[8] Further details are provided in Appendix A.

Across the four programs, a total of 1,211 grants were awarded.[9] For each grant, we observe: (1) the recipient organisation, (2) the amount awarded, (3) a description of the grant activity, and (4) the location of the grant activity (i.e., the beneficiary suburb). The beneficiary suburb can be identified for 70% of all grants. The remaining grants either serve multiple Local Government Areas (10%), are designed to support the Local Government Area as a whole (11%), or have missing location information (9%). Information on unsuccessful applications is not available.

We focus on the four specified grant programs for three main reasons. First, they were the only major sources of funding for delivering community-wide initiatives. Second, the programs were large in scale, accounting for approximately $1 billion in funding (Royal Commission into National Natural Disaster Arrangements, 2020). Finally, because all programs were competitively allocated, they allow us to examine factors associated with funding receipt under a competitive grant model.

Due to a feature of the social vulnerability index used in this study (as discussed in Section 3.2 below), we focus on non-metropolitan suburbs (i.e., those outside capital cities), which account for 83% of suburbs in disaster-declared LGAs. This results in an analytical sample of 727 grants, with a combined value of $670 million. In total, the 727 grants flowed to 512 suburbs, each receiving $7245.17 per capita on average. We use per capita funding as our primary outcome measure, reflecting that the benefits were typically distributed across the local population and is consistent with prior studies (Domingue & Emrich, 2019; Hall, 2008).

In terms of recipients, 50% of grants are awarded to government organisations (primarily local governments), 32% to other organisations, and 18% to businesses. Grant descriptions are used to classify each project according to its primary purpose: (1) economic, (2) natural environment, (3) social, (4) infrastructure, and (5) built environment adaptation.[10] Further details in Table 1.

[7] Disaster-declared LGAs have an average population size of approximately 70,000.
[8] The BSBF mandated more funding for more physically exposed areas. Besides this, the assessment criteria across all four programs do not explicitly mention physical or social vulnerability.
[9] We exclude from the analysis 15 of these grants which were awarded non-competitively under the South Australian LERF.
[10] The purposes reflect the Australian Disaster Recovery framework (ANZEMC, 2022) and the grant guidelines. We note that some projects served multiple purposes.

2) Social Vulnerability

To measure social vulnerability, we use a nationwide suburb-level index (SoVI) of pre-fire vulnerability in non-metropolitan areas, calculated using 2016 census data (Wang et al., 2022). The index is heavily based on Cutter et al.'s (2003) social vulnerability index, which outlines a set of sociodemographic and built environment characteristics relevant to disaster susceptibility and recovery.

Wang et al. (2022) define five vulnerability dimensions: (1) SES (education and employment); (2) demographics (e.g., children, older residents, and First Nations populations); (3) minority (ethnic diversity and English proficiency); (4) housing (insecure housing and overcrowding); and (5) built environment (remoteness and building density) with a higher score indicating greater vulnerability in a given domain. The indicators used to construct each dimension are listed in Table 2, and the characteristics of highly vulnerable disaster-affected suburbs are reported in Appendix Table B.1. Although built environment vulnerability may reflect remoteness and high building density, within our sample it primarily captures remoteness. Further details in Appendix Section B. [11]

4. Methodology

1) Empirical design

We analyse the relationship between social vulnerability and the total funding received by a suburb using regression analysis.[12] Specifically, we estimate equation (1) using ordinary least squares (OLS):

$$y_{sl} = \boldsymbol{\beta V'_{sl}} + \boldsymbol{\gamma P'_{sl}} + \boldsymbol{\delta X'_{sl}} + \theta_l + \epsilon_{sl} \qquad (1)$$

where y_{sl} is the logarithm of total amount received per capita by suburb s in LGA l. The vector $\boldsymbol{V_{sl}}$ contains the five standardised social vulnerability dimensions.

We control for physical exposure to the Black Summer Bushfires through the vector $\boldsymbol{P_{sl}}$, which includes the average percentage of land burnt, total area burnt (km^2), and the number of residential insurance losses per 100 residents across the suburb and its neighbouring suburbs. Including exposure measures for both the focal suburb and its neighbours helps account for spatial spillovers in fire impacts.

The vector $\boldsymbol{X_{sl}}$ captures additional pre-wildfire suburb-level characteristics shown to influence competitive grant acquisition. These include measures of civic capacity (number of registered charities per 100 residents), civic engagement (percentage of formal votes cast at the 2019 federal election), population size, and political alignment (percentage of the two-party preferred vote received by the Liberal–National Party in the 2019 federal election).

[11] Appendix Figure B.1 presents pairwise correlations between the vulnerability dimensions. Correlations across vulnerability dimensions are low, with a maximum absolute correlation of 0.24, indicating that they capture distinct aspects of vulnerability.
[12] Summary statistics for suburbs in the sample can be found in Appendix Table C.1.

Finally, θ_l is a vector of LGA fixed effects, which control for unobserved LGA-level characteristics that may influence funding receipt, such as administrative capacity and prior wildfire exposure. The $\boldsymbol{\beta}$ vector represents the parameters of interest, and captures differences in funding between suburbs with varying levels of social vulnerability within the same LGA, conditional on physical exposure and other observed determinants.

We assess the robustness of equation (1) through a series of extensions including re-estimating the model excluding controls, restricting the sample to Local Government Areas with high burn severity, using grants that serve a single suburb only, and estimating the model separately for each grant program, rather than pooling funding across schemes. We additionally test sensitivity to alternative measures of social vulnerability including examining whether funding responds to the presence of highly vulnerable subpopulations within suburbs, rather than average vulnerability levels. Finally, we examine funding allocations by grant purpose, distinguishing between economic, social, infrastructure, and built environment projects, and by recipient organisation type.

2) Unobserved recipient organisation characteristics

A key feature of our grant data is that it identifies the recipient organisation for each funded project. This enables comparisons of projects delivered by the same organisation across communities with differing levels of social vulnerability. By exploiting this within-organisation variation, we can narrow the set of mechanisms that could plausibly explain the funding inequities we observe. In particular, this approach allows us to rule out explanations based on systematic differences between organisations, such as some organisations being both better resourced and more likely to operate in less vulnerable communities (Garschagen & Doshi, 2022; Miao & Davlasheridze, 2022). Remaining differences in funding therefore reflect how a given organisation's projects in communities with differing levels of vulnerability are proposed, assessed, and funded, including differences in project scope or requested budgets, as well as differences in how funding agencies evaluate and support projects in more versus less vulnerable communities.

To implement this approach, we re-estimate our model on the subset of suburbs that received funding from organisations awarded multiple grants across multiple suburbs. This sample includes 364 suburbs served by 96 recipient organisations, covering 414 grants and $452.9 million, or 45% of total funding. We estimate the following specification with recipient organisation fixed effects:

$$y_{slg} = \boldsymbol{\alpha V'_{slg}} + \boldsymbol{\rho P'_{slg}} + \boldsymbol{\pi X'_{slg}} + \theta_l + \partial_g + \epsilon_{slg} \qquad (2)$$

where variables are defined as in equation (1), and ∂_g represents recipient organisation fixed effects. In this specification, the coefficients in $\boldsymbol{\alpha}$ capture differences in funding amounts received by the same organisation when delivering projects in communities in the same LGA with different levels of social vulnerability.

As noted, equation (2) is estimated using a subset of organisations that receive multiple grants across multiple suburbs. While this sample excludes single-project organisations, it captures a substantial share of total funding, suggesting that the within-organisation patterns we document are relevant for understanding broader funding allocation dynamics.

3) Scope of inference

Equations (1) and (2) estimate differences in realised disaster funding received by communities as a function of social vulnerability, conditional on physical exposure, and other area and organisation-level characteristics. This framing reflects our primary perspective: we are interested in how funding outcomes ultimately differ across communities following a major disaster, rather than in modelling the success of individual grant applications.

Observing unsuccessful grant applications would allow for a more detailed examination of the mechanisms underlying these funding outcomes. In particular, application-level data would make it possible to distinguish whether observed inequities arise because organisations propose fewer or smaller projects in more vulnerable communities, or because funding agencies are less likely to approve or fully fund proposals targeting those communities. Such information would be valuable for understanding the relative roles of applicant behaviour and assessment processes. Although, even including unsuccessful applicants would still provide imperfect insight given the lack of data on applicants who were deterred from applying due to insufficient resources, for example. Thus, to fully understand the mechanisms driving successful grant data we would ideally need data on all prospective grant applicants (i.e., successful applicants, unsuccessful applicants, and deterred applicants).

However, the absence of data on unsuccessful and deterred applicants does not affect the interpretation of our main estimates. Equations (1) and (2) characterise differences in realised funding received by communities, which is the relevant outcome from a distributive equity perspective. Regardless of whether these differences arise from application behaviour, assessment decisions, or both, the resulting allocations determine the resources available for recovery and resilience building across communities.

5. Results

1) Funding distribution and social vulnerability across communities

Table 3, column (1) reports estimates from equation (1). It shows negative, statistically significant associations between per capita funding and socioeconomic (-0.282), demographic (-0.363), and minority (-0.259) vulnerability. These estimates imply that a one-standard deviation increase in socioeconomic, demographic and minority vulnerability is associated with a 25%, 30%, and 23% lower funding per capita, respectively. Given that beneficiary suburbs receive \$7,245 per capita on average, this corresponds to substantial differences in realised per capita funding across communities (\$1,811, \$2,174, and \$1,666). Taken together, these results indicate that suburbs with characteristics including lower education and employment levels, a higher share of First Nations, older and younger populations, and greater ethnic diversity receive less disaster recovery funding.

Conversely, built environment vulnerability exhibits a large and statistically significant positive association with funding receipt (1.102). A one-standard deviation increase in built environment vulnerability is associated with a 201% increase in funding per capita. As shown in Appendix Table B.1, this dimension primarily reflects remoteness, and so this result is consistent with higher service delivery costs of projects in rural areas (Slack et al., 2003) as well as funding being distributed across smaller populations.[13] Importantly, housing-vulnerable suburbs tend to have larger populations, yet we find no significant negative association between housing vulnerability and funding receipt. This suggests that the positive association between built environment vulnerability and funding is not driven solely by population size. Built-environment-vulnerable communities may also attract more funding due to perceptions of elevated wildfire risk associated with rurality and proximity to bushland, although we cannot directly test this mechanism.[14]

Measures of physical exposure are also positively associated with funding receipt. Both the percentage of the suburb burnt and the number of residential losses show statistically significant associations, with coefficients of 0.016 and 0.043 respectively.[15] Among other controls, political alignment has no association with funding, while civic capacity is positively associated with funding receipt: one additional charity per 100 people is associated with a 12% increase in funding per capita.

Table 3, columns (2)-(6), present additional robustness checks and extensions to the baseline specification. Column (2) shows that the negative association between funding and demographic vulnerability, and the positive association with built environment vulnerability, are robust to excluding control variables. This suggests that the main patterns are already evident in raw differences across suburbs and are not sensitive to the choice of covariates.

We next examine whether inequities along social vulnerability dimensions persist even among the most severely fire-affected suburbs. Column (3) restricts the sample to suburbs in the top quartile of burnt percentage. Within this subsample, funding remains significantly lower in demographically vulnerable

[13] Built environment vulnerability is associated with small population size (see Appendix Table B.1); however, we control directly for population in our regressions.

[14] Islam (2022) find nonlinearities in the distribution of climate finance with moderately vulnerable countries being more likely to receive funding than the most vulnerable countries. Hence, we test for similar results using quintiles of demographics and built environment vulnerability. As per Appendix Table D.1, we do not find evidence of a similar nonlinear pattern. Instead, we find that the strong correlations with respect to demographics and built environment vulnerability established in Table 3 appear to be driven by suburbs that are most vulnerable in each dimension.

[15] Given the relationship between physical exposure and funding, we assessed whether the main results could be driven by differences in exposure across communities. We regressed physical exposure, measured as percent of suburb burnt, on the vulnerability dimensions (see Appendix Table D.2). Socioeconomic and minority vulnerability are positively and significantly associated with fire exposure, while demographic vulnerability is weakly and insignificantly related. These results indicate that lower funding to socially vulnerable communities is not explained by lower exposure to fire.

suburbs and higher in suburbs with greater built environment vulnerability, although the magnitude of the latter effect is smaller.

Column (4) addresses potential sensitivity to how funding is allocated across suburbs for grants serving multiple suburbs. Restricting the analysis to grants with a single beneficiary suburb (91% of grants originally included), we continue to find significant negative correlations with respect to demographic (-0.532) and minority (-0.417) vulnerability, and a positive correlation with built environment vulnerability (1.187).

Columns (5) and (6) report results estimated separately for the two largest programs, the Black Summer Bushfire Recovery Grants Program (BSBF) and the Local Economic Recovery Fund (LERF), which together account for the vast majority of funding in our sample. As shown in columns (5) and (6), the negative association with demographic vulnerability and the positive association with built environment vulnerability remain, indicating that the baseline findings are not driven by a particular program design.

We also assess robustness to alternative measures of pre-wildfire social vulnerability using the Socio-Economic Indexes for Areas (SEIFA). Replacing the SES and demographic vulnerability dimensions with SEIFA measures of disadvantage, advantage, economic resources, and education and occupation[16] yields qualitatively similar results: funding is systematically higher in less vulnerable communities (Appendix Table D.3). Finally, to test whether using average vulnerability masks potential targeting of highly vulnerable subpopulations within suburbs, we re-estimate the analysis using the share of the suburb's population living in areas with very high vulnerability, rather than average vulnerability levels. Results reported in Appendix Table D.4 show that the negative associations for socioeconomic and demographic vulnerability and the positive association for built environment vulnerability persist. This suggests that the baseline results are not driven by aggregation masking targeted support for the most vulnerable groups.

2) Funding distribution within recipient organisations

Next, we include recipient organisation fixed effects as specified in equation (2), allowing us to compare how the same organisation allocates funding across projects serving communities with differing levels of social vulnerability. Results are presented in Table 4, with and without controls.

After accounting for recipient organisation fixed effects, the main patterns observed in Table 3 persist and, if anything, strengthen. As shown in Column (1), funding remains significantly lower for projects serving communities with higher demographic (-0.546) and minority (-0.286) vulnerability, while communities with high built environment vulnerability receive significantly higher funding (1.493). Specifically, we find that one-standard deviation increases in demographics, minority, and built

[16] SEIFA indices are constructed using a range of measures including unemployment, education, and elderly populations. Thus, per Appendix Figure B.1, they are most strongly correlated with SES and demographics vulnerability (max. absolute correlation 0.82).

environment vulnerability are associated with a 42% decrease, 25% decrease, and 345% increase in funding, respectively. The coefficient on socioeconomic vulnerability remains negative and similar in magnitude to the baseline estimate, though it is no longer statistically significant, likely due to the smaller sample size. Furthermore, we continue to find that funding favours areas with higher physical exposure. Column (2) shows that these results are robust to excluding control variables, with coefficients similar in magnitude.

Taken together, these estimates show that funding inequities by social vulnerability persist even when comparing projects delivered by the same recipient organisation. This indicates that the patterns documented in the baseline specification are not driven by differences across organisations in capacity, experience, or strategic orientation. Instead, they reflect how projects targeting communities with differing levels of vulnerability are proposed and funded.

3) Heterogeneity in funding allocation by grant purpose

We next explore whether the associations between social vulnerability and funding differ across four grant purposes: economic, social, infrastructure, and built environment adaptation. Differences across grant types are informative because projects aimed at social outcomes typically require greater community involvement, buy-in, and uptake to be successful (Warlick, 1978). For example, the success of a program to provide mental health support for wildfire-affected community members depends partly on usage. Conversely, infrastructure and built environment projects are more delivery-focused. Economic projects often span both categories, combining physical investments with activities that rely on community participation.

For this analysis, we estimate Poisson regressions of funding amounts by grant purpose, which allows us to account for the substantial share of suburbs that received zero funding for a particular category. Given relatively few suburbs received natural environment grants, we omit this outcome from the analysis. Results are presented in Table 5.

Estimates show that inequities by demographic and minority vulnerability are concentrated in economic and social grant funding. A one standard deviation increase in demographic vulnerability is associated with a 74% reduction in economic grant funding and an 86% reduction in social grant funding, while minority vulnerability is associated with reductions of 43% and 37%, respectively. These results indicate that funding for projects aimed at economic development, safety, support, and social connection is systematically lower in more demographically and minority-vulnerable communities.

While we found no relationship with housing vulnerability when grants were pooled, Table 5 shows substantial heterogeneity across grant purposes. Housing vulnerability has a negative relationship with social grant funding, but a positive relationship with economic and infrastructure grant funding. Specifically, a one standard deviation increase in housing vulnerability corresponds to a 70% reduction in social grant funding, alongside increases of 123% and 79% increases in economic and infrastructure grant funding, respectively.

Finally, built environment vulnerability is positively associated with funding for economic, infrastructure, and built environment adaptation grants, as seen in columns (1), (3), and (4). The association is especially strong for infrastructure grants where a one-standard deviation increase in built environment vulnerability is associated with funding amounts more than seventeen times higher. This pattern is consistent with higher service delivery costs in remote areas and the indivisible nature of infrastructure investments, which tend to generate higher per capita funding in smaller communities (C. Gray, 2025; Infrastructure Australia, 2021).

Taken together, these results show that funding inequities by demographic, minority, and housing vulnerability are most pronounced in grant categories that involve direct community engagement, while higher funding to built-environment-vulnerable communities is driven primarily by infrastructure-focused projects. We return to the implications of this heterogeneity for understanding funding processes and equity in the Discussion.

4) Heterogeneity in funding allocation by recipient organisation

Finally, we explore whether funding inequities vary by recipient organisation type: government, business, or other organisation (mainly community clubs and charities). This distinction is informative because the extent to which social vulnerability is prioritised may differ across organisation types. For instance, government institutions (in this case, mostly local governments), which received around half of grants, can reasonably be expected to place greater weight on supporting vulnerable communities than business organisations. Local governments are also likely to be better informed regarding the extent of vulnerability within the constituency through administrative data collection or local service delivery, for example.

A Poisson regression is used to estimate the funding amount a suburb receives using only grants awarded to a specific organisation type. Results are presented in Table 6. For government-administered grants, we find evidence of significant inequities. Specifically, a one standard deviation increase in demographic vulnerability is associated with a 54% reduction in funding granted to government organisations, while a similar increase in minority vulnerability is associated with a 49% reduction. These results indicate that even within government-delivered funding, more demographically and minority-vulnerable communities receive systematically less support. At the same time, housing vulnerability is positively associated with government funding: a one standard deviation increase corresponds to a 162% increase in funding. This pattern suggests that local governments may be targeting housing-related disadvantage, which is more directly observable, relative to other dimensions of social vulnerability.

For business-administered grants, we find little evidence that funding is lower in more socially vulnerable communities. Instead, funding is concentrated in built-environment-vulnerable suburbs: a one standard deviation increase in built environment vulnerability is associated with a 448% increase in funding. This pattern is consistent with business grants being disproportionately directed towards rural and remote areas, where tourism, agriculture, and related activities are more prevalent.

Finally, for grants administered by other organisations, we again observe substantial inequities. A one standard deviation increase in demographic vulnerability is associated with a 92% reduction in funding. Given 'other' organisations are primarily clubs and community groups, these results may be due to these organisations in advantaged communities having greater institutional capacity to develop, scale, and deliver larger projects, although we cannot directly test this mechanism.

6. Discussion

Government funding is crucial in supporting community recovery from disasters and adaptation to climate change. However, it is unclear whether funding allocation processes adequately account for the needs of socially vulnerable populations who are disproportionately impacted by disasters. This paper examines the equitable distribution of competitive community grants following the Black Summer Bushfires in Australia. Using detailed grant-level data, we contribute to understanding the mechanisms that influence the distribution of competitive grants across communities.

We find that funding programs provide systematically less support to demographically vulnerable communities, which include those with higher shares of children, elderly people, non-working individuals, and First Nations people. Specifically, communities received 30% ($2,174) less funding per capita for each one standard deviation increase in demographic vulnerability. Communities with greater minority vulnerability, characterised by higher ethnic diversity and lower English proficiency, also received less funding (23% or $1,666), although this finding is less generally robust. Comparisons by organisation type revealed less funding for demographic- and minority-vulnerable communities even in the case of grants awarded to local governments which are typically expected to be more sensitive to equity considerations. Additionally, these inequities are particularly large for economic and social grants, where community consultation and involvement are more central to project design and delivery, and small for infrastructure grants. For instance, a one standard deviation increase in demographic vulnerability is associated with an 86% reduction in social grant funding.

In contrast, built environment vulnerability has a strong positive association with funding. Communities that are vulnerable due to remoteness and distance from services receive substantially higher funding per capita: 201% or $14,563 for a one standard deviation increase in vulnerability. This association is particularly strong for infrastructure grants and is consistent with higher service delivery and fixed project costs in remote areas (Slack et al., 2003), as well as the mechanical effects of distributing funding across smaller populations. Though we cannot directly test this, the results we find may also reflect a perception among applicants and funding agencies that built-environment-vulnerable communities experience higher wildfire risk because of their remoteness and surrounding bushland, motivating larger funding allocations.

Importantly, these patterns persist even when comparing projects delivered by the same recipient organisation. Exploiting within-organisation variation, we show that organisations receive systematically less funding for projects serving more demographically and minority-vulnerable communities, and more funding for projects in built-environment-vulnerable communities. This indicates that the observed inequities are not driven by differences in organisational capacity, experience, or resourcing across recipients. Instead, they reflect differences in funding outcomes across projects undertaken by the same organisation in communities with differing vulnerability profiles, consistent with mechanisms operating through application design, funding decisions, or both.

These findings are robust across a wide range of alternative specifications and samples. The main patterns persist when excluding controls, focusing on the most severely fire-affected areas, restricting to single-suburb grants, estimating results separately by major grant program, and using alternative measures of social vulnerability. We also show that the results are not driven by differences in physical fire exposure across communities, nor by aggregation masking targeted support for highly vulnerable subpopulations.

One plausible explanation for our findings is that both funding agencies and applicants may, consciously or unconsciously, prefer working with less vulnerable communities due to perceptions that they are more able to support and successfully deliver projects. For example, instances of unsuccessful community programs in disadvantaged communities have been widely documented (Hodge & Turner, 2016; Karran et al., 2023). In this context, projects in less demographically and minority-vulnerable communities may be viewed as lower-risk, more predictable, and more probable to generate demonstrable outcomes. This mechanism is likely more important where measurable success is highly valued such as in the schemes included in our analysis where the progress of funded projects is strictly monitored over time. Accordingly, funding agencies may desire their projects to be successful in order to reduce monitoring costs (Collins & Gerber, 2008; Lowe et al., 2016). Assuming funding agencies strongly preference projects which will likely succeed, applicants may strategically exploit this to increase their chances of securing greater funding. Additionally, applicants themselves likely place high importance on their awarded projects being successfully completed. These reasons can lead to funding agencies and applicants allocating less funding to grants targeting vulnerable communities given the plausibly greater consequence if a larger project fails.

Barriers to community engagement provide a further explanation for these patterns. Demographically and minority vulnerable communities often face physical, cultural, and institutional obstacles to participating in consultations and planning processes, which can limit both the visibility of community demand and applicants' ability to demonstrate community support in grant applications (Goedhart et al., 2021; C. S. Gray et al., 2016). For example, language barriers and a lack of communication materials in foreign languages have been found to limit engagement with non-English speaking communities (Everett et al., 2023; S. K. Lee et al., 2014). Likewise, reduced mobility, low digital literacy, and limited transport access were identified as inhibiting the engagement of elderly populations (Money et al., 2024; Sadio et al., 2025). This can pose challenges for applicants when consulting with vulnerable communities given the barriers to engagement typically require additional time, money, and personnel to be overcome. For example, Stadnick et al. (2022) in a study of community engagement in public health interventions found that effective engagement with disadvantaged communities required significant resources initially and during the program such as technology assistance, live interpretation, and establishing support systems. Given these added costs, applicants may be more hesitant to develop projects involving vulnerable communities or may scale back project scope and requested budgets. Agencies as well may not fully appreciate the higher costs of effective engagement which cause these proposals to appear comparatively expensive or less cost-effective. These dynamics are likely to be most consequential for grant categories that rely heavily on direct and ongoing community involvement, helping to explain why inequities are concentrated in economic and social grants.

Limited engagement may also reflect deeper issues of institutional trust. As highlighted in the literature on silent citizenship, past neglect or discrimination can lead vulnerable communities to disengage from formal institutions, not only due to resource constraints but also due to scepticism about whether engagement will lead to meaningful outcomes (Gest & Gray, 2015; Rodriguez-Díaz & Lewellen-Williams, 2020; White et al., 2007). Feelings of low trust among disadvantaged populations has been found to pose significant challenges for collaboration with ethnic minority communities and can be exacerbated if staff members of applicants lack cultural competency training or if programs are not culturally tailored to best fit the unique needs of vulnerable communities, for example (Harrison et al., 2019; Williams & James, 2008). In turn, weaker engagement may shape funding agencies' perceptions of community support and project viability, reinforcing funding patterns that favour less vulnerable areas. Additionally, time and financial resource investments to ensure culturally sensitive engagement may further deter organisations from proposing large projects involving vulnerable communities.

From a policy perspective, these findings suggest that improving equity in competitive funding systems requires more than increasing funding volumes. Where perceived project success drives allocation decisions, efforts to strengthen engagement, trust, and institutional relationships in vulnerable communities may be important to achieving equitable outcomes. This includes reducing barriers to participation, supporting community–institution partnerships, and investing in long-term trust-building processes. For example, Davis et al. (2025) describe approaches to rebuilding trust in disaster-affected marginalised communities through sustained support and embedded local engagement. Additionally, applicants should consider directing efforts towards reducing the cost of effectively engaging with vulnerable communities such as by investing in technology that can enable virtual engagement for community members who lack transport access (Stadnick et al., 2022). Furthermore, these efforts can also extend to improving the capability of vulnerable groups to lobby local institutions to pursue grants on their behalf. For example, Sharpe et al. (2015) outline strategies such as monthly workshops and technical assistance to develop skills including grant-writing, utilising electronic resources, and mobilising the community.

More directly, funding agencies may need to explicitly incorporate social vulnerability into allocation criteria, rather than relying on competitive processes alone to deliver equitable outcomes. This would allow funding proposals to better reflect the additional cost of effectively engaging with vulnerable communities and would additionally mirror existing approaches that explicitly target physical exposure and hazard risk. Such policy shifts are already occurring. For example, in the US, under the Biden administration at least 40% of hazard mitigation funding was committed to disadvantaged communities (The White House, n.d.). Likewise the largest international climate fund is mandated to allocate 50% to highly vulnerable developing countries including small island developing states (SIDS) and least developed countries (LDCs) (GCF, 2024).

More broadly, our findings highlight a fundamental tension within competitive grant systems between targeting need and funding projects perceived as most likely to succeed. When funding decisions place significant weight on perceived feasibility, allocations can systematically favour communities where projects are expected to perform more reliably, even when needs are greater elsewhere. This underscores the limitations of competitive funding models for achieving social equity and points to the need for alternative allocation frameworks in disaster recovery funding and climate finance.

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Tables

Table 1: Grant purposes, description, and percentage serving purpose

Purpose	Description	Percentage of grants serving purpose (%)
Economic	Projects that deliver economic benefits, boost employment, and support local businesses & industries.	35
Natural environment	Restoration of native flora and fauna and initiatives to protect the natural environment from future disasters.	9
Social	Initiatives to promote community safety, development & wellbeing, and provide support and connection.	52
Infrastructure	Restoring or upgrading damaged local infrastructure or new local infrastructure projects.	41
Built Environment Adaptation	Investment in disaster preparedness to mitigate the impact of future disasters on the built environment.	29

Table 2: Indicators included by Wang et al. (2022) in each dimension of social vulnerability for non-metropolitan areas

Theme	Indicators
Socioeconomic Status	Percentage of population in non-managerial, professional, clerical or administrative occupation
	Percentage of population with highest education level at high school or lower
	Unemployment rate
Demographics	Median age
	Percentage of population aged above 65
	Percentage of population not in labour force
	Percentage of population aged 0-18
	Percentage of population with need for childcare
	Percentage of population who are First Nations
	Percentage of households with two or more families (multi-family households)
	Percentage of population that is female
Minority	Percentage of population born overseas
	Ethnic diversity
	English proficiency
Housing	Percentage of households without internet access
	Percentage of households with low mortgage repayments (<$2000 per month)
	Percentage of households with no car
	Percentage of dwellings that are multi-unit dwellings
	Diversity of housing
	Percentage of households living in mobile places
Built environment	Distance to commercial
	Distance to public service
	Distance to cities
	Distance to public transit
	Density of roads and railways (m/km^2)
	Number of traffic connectivity per km^2
	Density of buildings (m/km^2)
	Number of street facilities (e.g., benches, streetlamps) per km^2

Table 3: Results from model estimating association between per capita funding and social vulnerability

	(1) Full model	(2) Without controls	(3) High burn LGAs only	(4) Single suburb grants only	(5) BSBF only	(6) LERF only
SES (std.)	-0.282**	-0.232	-0.215	-0.212	-0.084	-0.285
	(0.141)	(0.152)	(0.161)	(0.151)	(0.172)	(0.190)
Demog. (std.)	-0.363*	-0.430**	-0.513*	-0.532**	-0.474**	-0.633**
	(0.215)	(0.198)	(0.283)	(0.258)	(0.220)	(0.311)
Minor. (std.)	-0.259*	-0.221	-0.109	-0.417**	-0.003	-0.254
	(0.154)	(0.141)	(0.174)	(0.204)	(0.184)	(0.168)
Housing (std.)	-0.127	-0.205	-0.179	-0.262	-0.256	-0.116
	(0.155)	(0.138)	(0.183)	(0.161)	(0.178)	(0.236)
Built (std.)	1.102***	1.423***	0.699**	1.187**	1.138***	1.217*
	(0.370)	(0.307)	(0.336)	(0.492)	(0.280)	(0.618)
Burn percent (%)	0.016*		0.016*	0.017	0.006	0.021*
	(0.009)		(0.009)	(0.013)	(0.008)	(0.011)
Burn area ('0s km2)	-0.004		-0.004	-0.003	-0.003	-0.004
	(0.004)		(0.003)	(0.005)	(0.002)	(0.006)
Losses per 100 ppl.	0.043*		0.042*	0.038	0.048	0.015
	(0.025)		(0.024)	(0.026)	(0.029)	(0.023)
Charities per 100 ppl.	0.114*		-0.107	0.151**	0.153	0.031
	(0.057)		(0.148)	(0.070)	(0.144)	(0.053)
Formal vote (%)	-0.016		-0.043	0.010	0.046	0.030
	(0.056)		(0.052)	(0.079)	(0.058)	(0.074)
Population	-0.001*		-0.000*	-0.001*	-0.001***	-0.001*
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
LNP vote (%)	-0.017		-0.027	-0.017	-0.000	0.250
	(0.079)		(0.094)	(0.085)	(0.076)	(0.432)
LNP vote (%) sqd.	0.000		0.000	0.000	0.000	-0.003
	(0.001)		(0.001)	(0.001)	(0.001)	(0.003)
R-squared	0.52	0.50	0.37	0.56	0.63	0.52
N	512	512	284	351	285	262

Standard errors in parentheses. Standard errors clustered by LGA (except column (3) for which robust standard errors are used). All regressions include LGA fixed effects. For column (6), LNP vote (%) and LNP vote (%) squared are measured using the the two-party vote percentage for the incumbent party in the state election prior to the wildfires as the LERF is administered at the state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Results from model estimating association between per capita funding and social vulnerability including recipient organisation fixed effects

	(1) Full model with recipient organisation fixed effects	(2) Without controls
SES (std.)	-0.224	-0.210
	(0.169)	(0.160)
Demog. (std.)	-0.546**	-0.660**
	(0.259)	(0.273)
Minor. (std.)	-0.286*	-0.356**
	(0.163)	(0.151)
Housing (std.)	0.141	0.037
	(0.186)	(0.178)
Built (std.)	1.493***	1.965***
	(0.475)	(0.383)
Burn percent (%)	0.018**	
	(0.009)	
Burn area ('0s km2)	-0.004	
	(0.005)	
Resid. losses per 100 ppl.	0.046	
	(0.040)	
Charities per 100 ppl.	0.078	
	(0.131)	
Formal vote (%)	-0.037	
	(0.082)	
Population ('0s)	-0.001	
	(0.001)	
LNP vote (%)	-0.122*	
	(0.073)	
LNP vote (%) squared	0.001*	
	(0.001)	
R-squared	0.68	0.66
N	411	411

Standard errors in parentheses. Standard errors clustered by LGA. All regressions include LGA and recipient organisation fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Results from model estimating association between per capita funding and social vulnerability by grant purpose

	(1) Economic	(2) Social	(3) Infrastructure	(4) Built Environment Adaptation
SES (std.)	0.289	0.624*	0.090	-0.123
	(0.506)	(0.334)	(0.204)	(0.112)
Demog. (std.)	-1.337***	-1.942***	-0.039	0.180
	(0.425)	(0.615)	(0.256)	(0.292)
Minor. (std.)	-0.567**	-0.459*	-0.163	-0.150
	(0.258)	(0.246)	(0.128)	(0.144)
Housing (std.)	0.800**	-1.209***	0.580***	-0.251
	(0.356)	(0.344)	(0.218)	(0.221)
Built (std.)	1.711*	-0.663	2.852***	0.677*
	(0.975)	(0.448)	(1.075)	(0.381)
Burn percent (%)	-0.006	0.020*	0.020	0.032***
	(0.032)	(0.011)	(0.014)	(0.008)
Burn area ('0s km2)	-0.011	-0.004	-0.012	-0.002
	(0.018)	(0.002)	(0.012)	(0.002)
Resid. losses per 100 ppl.	-0.169**	0.029	-0.003	0.005
	(0.085)	(0.018)	(0.030)	(0.013)
Charities per 100 ppl.	0.126	-0.014	-0.025	-0.662***
	(0.460)	(0.153)	(0.129)	(0.210)
Formal vote (%)	-0.197**	-0.032	-0.029	0.124**
	(0.095)	(0.074)	(0.054)	(0.051)
Population ('0s)	-0.018	-0.005**	-0.003**	-0.001
	(0.014)	(0.002)	(0.001)	(0.001)
LNP vote (%)	-0.122	-0.061	-0.198**	-0.083
	(0.111)	(0.066)	(0.084)	(0.068)
LNP vote (%) squared	0.001	0.000	0.002**	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Pseudo R-squared	0.76	0.71	0.74	0.55
N	512	512	512	512

Standard errors in parentheses. Standard errors clustered by LGA. All regressions include LGA fixed effects.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Results from model estimating association between per capita funding and social vulnerability by organisation type

	(1) Government	(2) Business	(3) Other
SES (std.)	-0.007	-0.505*	0.590*
	(0.245)	(0.260)	(0.327)
Demog. (std.)	-0.783***	-0.177	-2.544***
	(0.293)	(0.401)	(0.703)
Minor. (std.)	-0.679***	-0.127	-0.100
	(0.224)	(0.261)	(0.331)
Housing (std.)	0.963***	-0.917	-0.914***
	(0.283)	(0.619)	(0.353)
Built (std.)	1.379*	1.701***	-0.970
	(0.769)	(0.582)	(0.635)
Burn percent (%)	0.014	0.024*	0.006
	(0.027)	(0.013)	(0.016)
Burn area ('0s km2)	-0.012	-0.020**	-0.001
	(0.017)	(0.008)	(0.004)
Resid. losses per 100 ppl.	0.047	-0.076	0.065**
	(0.047)	(0.079)	(0.029)
Charities per 100 ppl.	0.165	-0.497	-0.237
	(0.172)	(0.411)	(0.159)
Formal vote (%)	-0.093	-0.239	0.008
	(0.066)	(0.151)	(0.083)
Population ('0s)	-0.007	-0.005*	-0.011***
	(0.005)	(0.002)	(0.004)
LNP vote (%)	-0.141	0.216*	-0.097
	(0.123)	(0.111)	(0.083)
LNP vote (%) squared	0.001	-0.002	0.001
	(0.001)	(0.001)	(0.001)
Pseudo R-squared	0.75	0.70	0.77
N	512	512	512

Standard errors in parentheses. Standard errors clustered by LGA. All regressions include LGA fixed effects.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix

Section A – Grant program details

One of the largest sources of funding following the Black Summer Bushfires was the National Bushfire Recovery Fund (NBRF) which the federal government announced in the wake of the Black Summer Bushfires. Under this $2 billion fund, the Morrison government allocated funding for a range of programs that would be delivered by federal, state, and territory agencies to support the "recovery, rebuilding and future resilience of [bushfire-affected] communities". The NBRF was distributed among 28 projects across four recovery domains (social and community, economic, infrastructure, and the natural environment) under the National Disaster Risk Reduction Framework. It included both subsidies and competitive grants for a range of different stakeholders such as individuals, businesses, and communities. Further details regarding the value and size of the programs under the NBRF that our analysis focuses on can be found in Table A.1.

Table A.1: Details of grant programs included in analysis

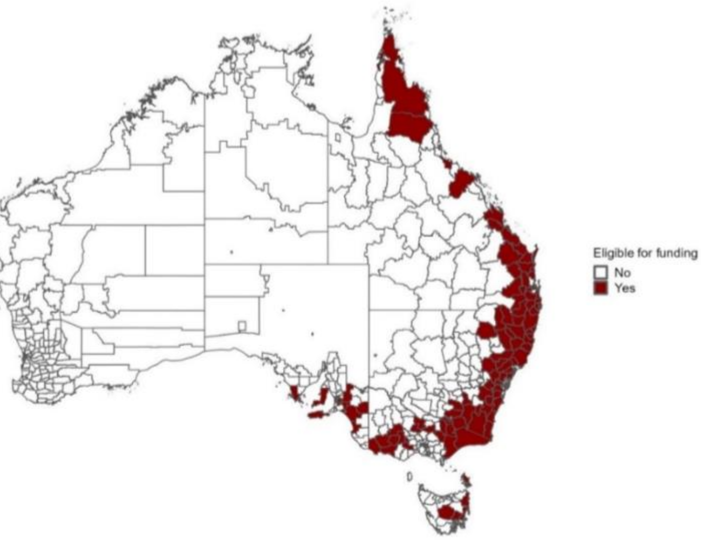
National Bushfire Recovery Fund Program	Total Expenditure	No. of grants	Percentage of grants among programs in analysis
Black Summer Bushfire Recovery Grants (BSBF)	$409 million	524	43.27
Local Economic Recovery Program (LERF)	$615 million *($350 million from Federal government)*	409	33.77
Regional Tourism Bushfire Recovery Grants (RTB)	$11 million	192	15.85
Bushfire Recovery for Wildlife and Habitat Community Grants Program (BRWH)	$11 million	86	7.10
Total	$1.05 billion	1211	100

1. The Black Summer Bushfire Recovery Grants (BSBF)

The BSBF was administered by the former Department of Industry, Science, Energy and Resources on behalf of the former National Recovery and Resilience Agency (now the National Emergency Management Agency). The grant program was announced on 1 July 2021 (roughly a year and a half after the wildfires) and aims to "support the medium to long-term recovery of [affected] communities". To be eligible for funding the project had to benefit the community, as opposed to a single business or organisation.

Successful projects were required to support either the social, economic, or built environment recovery and/or resilience of communities in the 110 disaster-declared LGAs across New South Wales, Victoria, Queensland, South Australia, Tasmania and the Australian Capital Territory. Figure A.1 shows the LGAs that were disaster-declared. Projects targeting recovery of the natural environment were excluded from this grant program. Examples of eligible activities include programs to support mental wellbeing of communities and projects to rebuild damaged infrastructure.

Figure A.1: LGAs eligible for funding due to official Black Summer Bushfire disaster declaration



524 grants were awarded ranging from $20,000 to over $10 million and applicants were not required to contribute a share of the project expenditure. The guidelines state that it is not a guarantee that successful applicants would receive the full amount requested. The average grant size is $780,570.

According to the guidelines, LGAs were categorised into one of two groups based on the impact of the wildfires. While the guidelines do not specifically state what exactly was used to measure this impact, they do allude to the economic impact of the fires. Furthermore, category 1 LGAs have a higher burn percentage. Each LGA was given a funding envelope with category 1 LGAs receiving $4.5 million and category 2 LGAs receiving $1.6 million. Within an LGA, applications that met the funding criteria were ranked and projects were funded until the envelope was fully allocated. Where an LGAs envelope was not fully allocated, remaining funds were allocated to deserving applicants in other LGAs. Eligible applicants included businesses, not-for-profit organisations, and local governing agencies (e.g., councils).

Applicants were scored on two assessment criteria for which they had to provide supporting evidence. The guidelines specified that applications for projects of greater size, complexity, and funding amount warranted more detail and evidence in the application. First, applicants had to explain how their project would promote community recovery from the wildfires by addressing social, economic, or built environment needs. For example, a project could support economic recovery by creating jobs within the local economy. While applications from both local government and non-government organisations are allowed, the assessment criteria exhibit a preference towards projects run by local councils.

Second, applicants needed to show capacity and capability to deliver on grant obligations through their previous experience managing similar projects, as well as their planned schedule, assessment of risks, and proposed budget. Both criteria had equal weighting. Applicants were also required to demonstrate community support for their project. Grants were then assessed according to whether they met assessment criteria, how they performed on these criteria relative to other applications, and whether the proposed project signified good value for money.

A committee led by the Coordinator-General of the National Recovery and Resilience Agency decided which applications to recommend for funding and final approval for grants was decided by the Minister for Emergency Management, considering these recommendations. Successful applicants are required to submit progress reports periodically to inform the agency on the progress of the project relative to certain milestones as well as how details on funds are being spent. Again, the level of detail required in these reports is commensurate with the amount of funding, complexity of the project, and size of the project. See grant guidelines for more details (GrantConnect, n.d.-b).

2. The Local Economic Recovery Program (LERF)

In May 2020 the Australian Government announced the $350 million Local Economic Recovery (LERF) funding which would support long-term local-led recovery across wildfire-affected states. The LERF is a joint partnership between the federal government and state & territory governments under Category D of the DRFA. LERF funding was made available in New South Wales, Queensland, and Victoria.[17] Unlike the other grant programs we analyse, LERF was enacted differently in each recipient state as each set up their own inter-jurisdictional agreement with the federal government.

1) New South Wales

In New South Wales, $250 million of available funding was announced in October 2020 under the Bushfire Local Economic Recovery Fund (BLERF). The program is managed by the Department of Regional NSW and 265 grants were awarded. The BLERF was intended to support recovery and resilience building across one of the following five domains: 1) enabling infrastructure, 2) industry and business development, 3) social development, 4) natural environment and resource development, and 5) built environment adaptation in communities impacted by the Black Summer Bushfires. Examples of eligible projects included resilience-building programs and the restoration of wildfire-impacted local infrastructure. The guidelines note that funding will be targeted towards the most heavily impacted areas. Projects were required to be delivered in at least one of the disaster-declared LGAs in New South Wales. The amount awarded varied by project type and the federal & state government each contributed 50% of the grant amount. Infrastructure projects were awarded a minimum of $400,000 and a maximum

[17] LERF funding was also available in South Australia however we do not include it in this analysis as the grants were not allocated via an open-call competitive process. Rather, the government selected a range of programs to fund following consultations with relevant stakeholders such as councils and communities.

of $20 million. All other projects had a minimum award of $200,000 and a maximum of $4 million. It was not guaranteed that winning proposals would receive 100% of the requested funds. Applicants were not required to contribute to the cost of the project but it was recommended. Eligible organisation types were councils, not-for-profit organisations, research organisations, and local aboriginal land councils. For-profit organisations and state government agencies were considered if the project served a public benefit. Projects that provided "exclusive private benefits" to individuals or businesses were not eligible under the program.

Applications were assessed against a set of assessment criteria. This included local support for the project (for example, if the proposal is community-led). Another criterion was that the applicant must provide evidence of the community's need for the project however the guidelines do not specify how need is defined in this instance. An example of need provided is "evidence of degraded services or facilities". Furthermore, applicants must provide evidence of their capability of carrying out the project in the form of expertise in delivering the project or the ability to hire the necessary specialised support. Where the funding request is for over $1 million dollars, the government also required a completed business case.

A panel of departmental and independent officials then reviewed projects against the assessment criteria. Applications were compared against each other and winning projects were selected. Successful applicants had to submit regular progress reports to the Department. It is worth noting that the first stage of funded projects made up $180 million of the funding and included 22 fast-tracked priority projects. These were projects that would allegedly bring a sizeable and rapid benefit to the local economy in more severely affected areas. Furthermore, these were projects that had been unsuccessful in earlier grant programs or those that were considered "shovel-ready". See grant guidelines for more details (NSW Government, 2020).

2) Queensland

In Queensland, the Local Economic Recovery (LER) was a $36.8 million funding package administered by the Queensland Reconstruction Authority which awarded 48 grants. Similar to the NSW BLERF program, the LER was designed to support local and regional recovery across the five aforementioned domains in the wildfire-affected communities. Examples of eligible activities include community development initiatives and projects to boost local workforce participation.

Prospective grantees could apply for up to $5 million of funding for their project. According to the guidelines, the project had to take place in one of the disaster-affected LGAs. Unlike the BLERF, the LER was only open to local governments and state agencies.

Applications were assessed against a set of criteria, one of which was balance and need. This involved meeting local recovery needs and supporting vulnerable groups while minimising unintended consequences. Applicants also needed to demonstrate the projects feasibility which included their capacity and experience to deliver on the project, as well as a cost benefit analysis. Other assessment criteria included providing an enduring benefit and local participation in the project. Applications were judged against each other and winning grants were selected taking into account the economic recovery gains of the project and the applicant's cost benefit analysis. See grant guidelines for more details (Queensland Reconstruction Authority, 2020).

3) Victoria

In Victoria, the Local Economic Recovery Program was a $68.6 million program administered by Bushfire Recovery Victoria. The funding was split into two streams. 40% went to local community grants while 60% funded larger region-level projects. Given our focus is on community level grants, we do not include the region-level grants in our analysis. The local community grants were open competitive grants distributed over a number of rounds of funding for the purpose of community recovery and economic stimulus. Similar to the above programs, successful projects had to be completed in one of the disaster-affected LGAs in Victoria. The amount projects received varied based on the project type. Infrastructure projects were required to seek between $100,000 and $2 million while other projects were required to seek between $50,000 and $500,000. Eligible applicants included local governments, not-for-profits, and businesses and similar to the programs in NSW and QLD, the project had to align with one of the five dimensions of recovery (or with the additional dimension of First Nations culture and healing). Examples of eligible activities include building local infrastructure and regeneration activities.

Applicants that met the eligibility criteria were then scored according to a range of selection criteria which included the local community need. This was defined as addressing a need of the community however no specific definition of what need had to entail was included in the grant guidelines. Applicants also had to demonstrate the feasibility of delivering the project by outlining timeframes, budgets, risks, and whether they had the necessary expertise, as well as local participation and support for the program. A selection panel then made recommendations as to which projects should be funded with final approval being provided by the Minister for Emergency Services. See grant guidelines for more details (Bushfire Recovery Victoria, 2022).

3. The Regional Tourism Bushfire Recovery Grants (RTB)

The RTB is a $10 million grant program administered by the Australian Trade and Investment Commission. The funding was announced in February 2020 and was delivered in two streams with the second stream being targeted at badly affected areas. $2 million was allocated to the first stream and $7.5 million to the second stream. Under the program, funding was provided to boost local tourism in disaster-affected areas through events, festivals, other tourist attractions, business events, and social media promotion. The objective of this program was to support the local economy in fire-affected areas by promoting the unique features of eligible communities to attract visitors. Funding could be used to support existing events or create new tourist attractions.

Under this program, eligible applicants were invited to apply rather than it being an open application process. Applications were only allowed from local government authorities or regional tourism organisations in disaster-declared LGAs. It was not guaranteed that applicants would receive the full amount requested. The program entailed two assessment criteria. The first was that the project had to demonstrate its alignment with the funding objectives (e.g., increasing tourism in the target LGA). The second was that the applicant had to demonstrate their capacity to deliver the project. This involved providing evidence of the organisation's track record with similar projects and their access to resources needed to carry out the project.

Eligible applications were ranked according to their performance against the assessment criteria. Stream 2 applications were then compared against other applications while Stream 1 applications were not. Finally, all applications were considered on the extent to which they provide value for money. The final funding decision was made by the CEO of the agency. Successful applicants have certain period reporting obligations to provide evidence of their progress on the project and handling of funds. See grant guidelines for more details (AusTrade, 2020).

4. The Bushfire Recovery for Wildlife and Habitat Community Grants Program (BRWH)

The BRWH is a $10 million grant program administered by the Department of Industry, Science, Energy and Resources and opened in late 2020. The program was designed to help fund community-level support to the natural environment. In particular, the program aims to support native flora and fauna and involve the local community in the rehabilitation of the natural environment. Eligible activities included, for example, on-ground wildfire recovery activities and providing shelter for native fauna.

Grant amounts ranged between $5,000 and $150,000. Applicants were not required to commit their own funds to the project but it was encouraged. Applications were welcomed from entities including not-for-profit organisations and local governing bodies. Eligible locations for the grant activity are in wildfire-affected areas in the eastern and southern parts of the country. The grant guidelines show eligible locations in Western Australia as well however given our focus on the east coast of the country we restrict our analysis to grants that went to projects on the eastern part of the country. Similar to the above programs, the two assessment criteria for this project were that the project needed to benefit wildfire-affected native flora and fauna and that the applicant had the capacity to deliver the project. Eligible applications were assessed against the assessment criteria and compared to other applications by a committee of employees at the Department of Agriculture, Water and the Environment and the Department of Industry, Science, Energy and Resources. The final funding decision was made by the Minister for the Environment. See grant guidelines for more details (GrantConnect, n.d.-a).

Section B – Characteristics of highly vulnerable suburbs

In this section, we compare all non-metropolitan suburbs in disaster-affected LGAs against those which are considered highly vulnerable in each of the five dimensions individually. These are all suburbs that the grant guidelines deem as being eligible to apply for funding due to being in disaster-affected LGAs. To be specific, highly vulnerable suburbs are defined as those which fall in the upper quartile of all non-metropolitan suburbs in disaster-declared LGAs according to their vulnerability score in a given dimension. For example, the SES vulnerable eligible suburbs here are those with the highest score in SES vulnerability among all non-metropolitan suburbs across the country. We compare the average of suburbs in these groups across a range of characteristics such as population density and socioeconomic status. Table B.1 presents these comparisons.

As seen in Table B.1, compared to all eligible suburbs, highly vulnerable suburbs across most dimensions tend to be those with larger populations, more dwellings, and more dense populations. This is especially true for housing vulnerable suburbs and potentially reflects the fact that car ownership and single-unit dwellings are perhaps less common in more "urban" non-metropolitan areas. Population and density dwelling is also relatively high for minority vulnerable suburbs which suggests that, among non-metropolitan areas, ethnic diversity is higher in more populous areas. On the other hand, built environment vulnerable areas tend to be sparsely populated with low population and dwelling density. Built environment vulnerable areas also tend to be larger in size. Across all vulnerability dimensions, highly vulnerable suburbs have a similar number of people per dwelling as all eligible suburbs.

Built environment vulnerability is constructed such that the dimension simultaneously defines highly populated and sparsely populated areas as being vulnerable with respect to the built environment. Specifically, Wang's definition of built environment vulnerability includes characteristics associated with both more and less populous areas. More populous areas have higher building density which is a cause of greater built environment vulnerability. At the same time, being further away from commercial areas and public transport is typical of more sparsely-populated remote areas. Thus, built environment vulnerable areas may be vulnerable due to their high building density or their distance from commercial and civic places.

Table B.1 shows however that highly vulnerable built environment vulnerable suburbs have a population and building density that is well below average. This provides a clear indication that in our sample, built environment vulnerability is heavily driven by remoteness rather than high building density. Thus, we are confident that in this study, built environment vulnerability reflects vulnerability that arises as a result of living in a remote location. It is also worth noting that Table B.1 shows that despite being mostly made up of remote populations, highly built environment vulnerable suburbs in our sample do not have a higher proportion of First Nations residents than the average eligible suburb.

In terms of socioeconomic advantage, compared to all eligible suburbs, highly SES vulnerable suburbs have the lowest socioeconomic status as expected according to their SEIFA (IRSD and IRSAD). SEIFA scores are also lower than average among suburbs that are highly vulnerable in terms of demographics and housing. Related to this, Table B.1 also shows that the proportion of the population that completed year 12 is lower than average in SES and demographics vulnerable suburbs. On the other hand, suburbs that are highly vulnerable in the minority dimension tend to have high levels of socioeconomic advantage and year 12 completion rates compared to the average eligible suburb. This likely reflects the fact that migrant populations in non-urban areas in Australia on average have a higher median income and are more educated than the Australian-born population (Massey & Parr, 2012). Finally, built environment vulnerable suburbs tend to have SEIFA scores similar to the average eligible suburb.

The proportion of the population that is elderly is quite similar across all eligible suburbs and highly vulnerable areas in most dimensions. However, it is higher in demographic vulnerable suburbs, as expected given the construction of the measure. Similarly, as expected, the proportion of the population that is born in Australia is similar across these groups with the exception of minorities vulnerable areas where it is considerably lower. Table B.2 presents these comparisons for beneficiary suburbs only. It shows that the above patterns largely hold when comparing suburbs in the top quartile of a given vulnerability dimension among beneficiary suburbs against all beneficiary suburbs.

Table B.1: Characteristics of highly vulnerable non-metropolitan suburbs in disaster-declared LGAs

	All beneficiary suburbs	SES vulnerable	Demographic vulnerable	Minority vulnerable	Housing vulnerable	Built vulnerable
Population	732.6	984.5	1354.9	1330.6	1385.5	103.5
	(2133.9)	(2165.0)	(2950.1)	(3270.2)	(3214.4)	(607.6)
Population density (no. per km2)	98.99	147.3	177.1	189.8	211.4	6.514
	(330.0)	(374.6)	(390.0)	(479.9)	(505.1)	(94.51)
Area (km2)	113.3	114.2	78.50	102.7	168.8	245.9
	(402.2)	(544.2)	(376.3)	(340.1)	(715.4)	(748.5)
No. of dwellings	323.5	442.9	629.6	588.5	644.9	53.41
	(917.4)	(933.3)	(1284.2)	(1404.5)	(1458.0)	(243.9)
Dwelling density (no. of dwellings per km2)	44.58	66.20	81.16	87.16	100.0	4.289
	(154.6)	(165.6)	(174.0)	(235.8)	(251.4)	(42.91)
No. of people per dwelling	2.377	2.492	2.128	2.570	2.577	2.057

	(5.270)	(10.32)	(0.871)	(10.55)	(10.43)	(1.016)
Index of Relative Socio-economic Disadvantage	986.2	925.6	964.3	991.0	956.7	976.0
	(64.46)	(64.26)	(73.16)	(66.44)	(72.07)	(62.74)
Index of Relative Socio-economic Advantage and Disadvantage	971.9	909.5	951.1	978.6	945.3	967.8
	(61.59)	(53.24)	(68.96)	(64.76)	(65.49)	(58.08)
Percent of population that is First Nations	3.010	4.508	3.775	2.340	4.331	2.979
	(6.029)	(7.601)	(7.340)	(4.518)	(8.745)	(7.858)
Percentage of population aged 55 or older	37.45	37.86	44.08	38.76	37.35	39.27
	(17.70)	(18.14)	(16.44)	(19.32)	(18.42)	(22.13)
Percentage of population born in Australia	80.36	80.16	79.49	74.64	79.53	79.86
	(14.31)	(13.30)	(11.80)	(14.77)	(14.63)	(19.28)
Percentage of adult population that completed year 12	40.75	33.57	38.91	45.08	39.33	40.57
	(19.18)	(16.13)	(16.89)	(19.11)	(20.13)	(25.87)
N	5,528	1,380	1,378	1,381	1,381	1,381

Table B.2: Characteristics of highly vulnerable non-metropolitan beneficiary suburbs

	All beneficiary suburbs	SES vulnerable	Demographic vulnerable	Minority vulnerable	Housing vulnerable	Built vulnerable
Population	1821.7	2204.7	2980.1	2108.7	4313.1	155.9
	(3818.0)	(3509.4)	(4812.3)	(4028.4)	(6106.7)	(155.9)
Population density (no. per km2)	96.11	163.7	142.9	99.78	269.9	3.796
	(245.8)	(335.1)	(222.4)	(257.3)	(400.7)	(22.63)
Area (km2)	153.7	107.6	96.78	122.0	145.4	258.5
	(280.4)	(143.6)	(153.4)	(187.2)	(337.2)	(288.8)
No. of dwellings	833.3	979.2	1441.0	981.3	1950.9	92.72
	(1662.9)	(1481.9)	(2134.9)	(1721.6)	(2645.6)	(102.8)
Dwelling density (no. of dwellings per km2)	45.25	73.96	72.04	47.88	124.9	1.511
	(114.0)	(153.1)	(103.9)	(120.0)	(187.4)	(5.561)
No. of people per dwelling	2.119	2.133	1.908	2.034	2.145	1.914
	(0.789)	(0.459)	(0.517)	(0.707)	(0.456)	(1.147)
Index of Relative Socio-economic Disadvantage	960.5	888.9	941.3	974.7	921.9	948.3
	(68.53)	(54.75)	(65.08)	(70.77)	(67.04)	(74.93)
Index of Relative Socio-economic Advantage and Disadvantage	947.9	879.5	927.0	966.3	912.2	945.6
	(63.86)	(43.42)	(58.38)	(64.64)	(61.60)	(66.55)
Percent of population that is First Nations	3.914	6.352	4.594	2.844	6.068	3.013
	(4.870)	(6.620)	(6.346)	(5.530)	(6.742)	(6.220)
Percentage of population aged 55 or older	42.11	41.00	47.24	41.65	41.25	45.59

	(15.20)	(15.18)	(9.652)	(14.82)	(18.30)	(16.59)
Percentage of population born in Australia	78.97	80.41	79.47	71.91	78.58	77.73
	(10.68)	(6.779)	(5.375)	(12.64)	(11.20)	(15.38)
Percentage of adult population that completed year 12	37.78	30.35	36.19	43.83	36.29	35.80
	(12.25)	(8.452)	(9.364)	(13.80)	(12.18)	(15.74)
N	512	128	128	128	128	128

Figure B.1: Correlation matrix among social vulnerability dimensions and SEIFA scores

	SES	Dem.	Min.	House	Built	IRSD	IRSAD	IER	IEO
SES	1	0.13	0.12	-0.01	-0.01	-0.60	-0.70	-0.52	-0.82
Dem.	0.13	1	0.10	0.12	-0.24	-0.50	-0.44	-0.51	-0.24
Min.	0.12	0.10	1	-0.07	0.00	-0.11	-0.09	-0.18	-0.05
House	-0.01	0.12	-0.07	1	0.04	-0.36	-0.32	-0.45	-0.18
Built	-0.01	-0.24	0.00	0.04	1	-0.19	-0.13	-0.21	0.02
IRSD	-0.60	-0.50	-0.11	-0.36	-0.19	1	0.97	0.94	0.73
IRSAD	-0.70	-0.44	-0.09	-0.32	-0.13	0.97	1	0.90	0.84
IER	-0.52	-0.51	-0.18	-0.45	-0.21	0.94	0.90	1	0.61
IEO	-0.82	-0.24	-0.05	-0.18	0.02	0.73	0.84	0.61	1

-1 -0.99 -0.75 -0.5 -0.25 -0.1 0 0.1 0.25 0.5 0.75 0.99 1

Section C – Summary statistics

Table C.1: Summary statistics for suburbs that receive funding

	Mean	SD	Min	Median	Max
Funding received per capita ($)	7245.17	47159.35	1.29	900.78	833333.31
Number of grants received	1.85	1.70	1.00	1.00	15.00
SES (std.)	0.26	0.85	-2.70	0.28	2.44
Demog. (std.)	0.42	0.56	-2.56	0.44	1.83
Minor. (std.)	0.11	0.82	-2.00	-0.01	4.17
Housing (std.)	0.07	0.78	-2.24	0.02	3.54
Built (std.)	-0.30	0.48	-1.08	-0.42	1.11
Burn percent (%)	15.24	21.28	0.00	3.68	83.32
Burn area (km2)	264.17	572.17	0.00	32.63	4703.09
Resid. loss per 100 ppl.	1.69	4.20	0.00	0.01	31.75
IRSD	960.53	68.53	765.00	963.00	1127.00
IRSAD	947.86	63.86	775.00	947.00	1164.00
Charities per 100 ppl.	0.35	1.35	0.00	0.13	25.56
Formal vote (%)	93.53	2.48	83.68	93.69	100.00
Population	1822	3818	3	406	44830
LNP vote (%)	59.79	12.55	13.82	61.05	93.71

Section D – Additional results

Table D.1: Results from model estimating association between per capita funding and social vulnerability including quintiles of demographics and built environment vulnerability

	(1) Demographics and built environment vulnerability quintiles
SES (std.)	-0.312**
	(0.139)
Demog. (2nd quintile)	-0.499
	(0.321)
Demog. (3rd quintile)	-0.204
	(0.283)
Demog. (4th quintile)	-0.410
	(0.390)
Demog. (5th quintile)	-0.763**
	(0.377)
Minor. (std.)	-0.255*
	(0.152)
Housing (std.)	-0.061
	(0.144)
Built (2nd quintile)	0.583*
	(0.317)
Built (3rd quintile)	0.558*
	(0.308)
Built (4th quintile)	1.184***
	(0.349)
Built (5th quintile)	1.721***
	(0.423)
Burn percent (%)	0.017*
	(0.009)
Burn area ('0s km2)	-0.004
	(0.004)
Resid. losses per 100 ppl.	0.039
	(0.024)
Charities per 100 ppl.	0.137**
	(0.057)
Formal vote (%)	-0.015
	(0.056)
Population ('0s)	-0.001
	(0.000)
LNP vote (%)	-0.003
	(0.080)
LNP vote (%) squared	0.000
	(0.001)
R-squared	0.53
N	512

Standard errors in parentheses. Standard errors clustered by LGA. Includes LGA fixed effects. Demographics quintile coefficients are relative to Demographics (1st quintile). Built quintile coefficients are relative to Built (1st quintile). For both the demographics and built environment dimension, vulnerability is lowest for those in the 1st quintile and highest for those in the 5th quintile. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.2: Results from model estimating association between percentage burnt and social vulnerability using suburbs that receive funding

	(1) Percentage of suburb burnt (%)
SES (std.)	4.096***
	(1.437)
Demog. (std.)	-0.861
	(1.610)
Minor. (std.)	3.249**
	(1.353)
Housing (std.)	-2.188
	(1.662)
Built (std.)	21.409***
	(4.755)
Population ('0s)	-0.002
	(0.002)
Area (km2)	0.005
	(0.006)
R-squared	0.57
N	510

Standard errors in parentheses. Standard errors clustered by LGA. Includes LGA fixed effects.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.3: Results from model estimating association between per capita funding and social vulnerability using SEIFA scores

	(1) IRSD	(2) IRSAD	(3) IER	(4) IEO
IRSD	0.003			
	(0.002)			
IRSAD		0.004*		
		(0.002)		
IER			0.004*	
			(0.002)	
IEO				0.003*
				(0.002)
Minor. (std.)	-0.201	-0.212	-0.181	-0.222
	(0.149)	(0.149)	(0.147)	(0.149)
Housing (std.)	-0.066	-0.064	-0.003	-0.119
	(0.155)	(0.149)	(0.165)	(0.139)
Built (std.)	1.326***	1.285***	1.318***	1.211***
	(0.298)	(0.303)	(0.297)	(0.321)
Burn percent (%)	0.009	0.009	0.009	0.007
	(0.009)	(0.009)	(0.009)	(0.009)
Burn area ('0s km2)	-0.001	-0.001	-0.001	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)
Resid. losses per 100 ppl.	0.048	0.048	0.051*	0.050*
	(0.030)	(0.030)	(0.030)	(0.030)
Charities per 100 ppl.	0.108**	0.108**	0.116**	0.110**
	(0.052)	(0.052)	(0.052)	(0.052)
Formal vote (%)	-0.008	-0.013	-0.009	-0.009
	(0.058)	(0.059)	(0.056)	(0.059)
Population ('0s)	-0.000	-0.000	-0.000	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)
LNP vote (%)	-0.036	-0.034	-0.038	-0.021
	(0.076)	(0.076)	(0.075)	(0.075)
LNP vote (%) squared	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
R-squared	0.53	0.53	0.53	0.53
N	504	504	504	504

Standard errors in parentheses. Standard errors clustered by LGA. All regressions include LGA fixed effects.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.4: Results from model estimating association between per capita funding and social vulnerability using proportion of highly vulnerable residents

	(1) Highly vulnerable residents
High SES (%)	-0.011*
	(0.006)
High demog. (%)	-0.010*
	(0.005)
High minor. (%)	-0.004
	(0.009)
High housing (%)	-0.004
	(0.006)
High built (%)	0.007**
	(0.003)
Burn percent (%)	0.016
	(0.010)
Burn area ('0s km2)	-0.001
	(0.004)
Resid. loss per 100 ppl.	0.039
	(0.027)
Charities per 100 ppl.	0.119*
	(0.065)
Formal vote (%)	-0.006
	(0.060)
Population ('0s)	-0.001**
	(0.000)
LNP vote (%)	-0.045
	(0.075)
LNP vote (%) squared	0.000
	(0.001)
R-squared	0.49
N	512

Standard errors in parentheses. Standard errors clustered by LGA. Includes LGA fixed effects.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$