

# Evidence from the 2009 L'Aquila earthquake shows the importance of public grants in stimulating output following an economic shock

**ISE** [blogs.lse.ac.uk/europpblog/2014/09/25/evidence-from-the-2009-laquila-earthquake-shows-the-importance-of-public-grants-in-stimulating-output-following-an-economic-shock/](https://blogs.lse.ac.uk/europpblog/2014/09/25/evidence-from-the-2009-laquila-earthquake-shows-the-importance-of-public-grants-in-stimulating-output-following-an-economic-shock/)

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*In 2009, an earthquake struck the region of Abruzzo in Italy near L'Aquila, causing over 300 deaths and substantial damage to buildings. **Francesco Porcelli** and **Riccardo Trezzi** present findings on the economic impact of the earthquake, particularly in terms of the role of reconstruction grants which were allocated to affected areas. They note that not every area which suffered damage by the earthquake was allocated funding and that these grants proved essential in stimulating economic output following the disaster. The findings provide evidence that interventions through public funding can be vital in enabling areas to recover following an economic shock.*



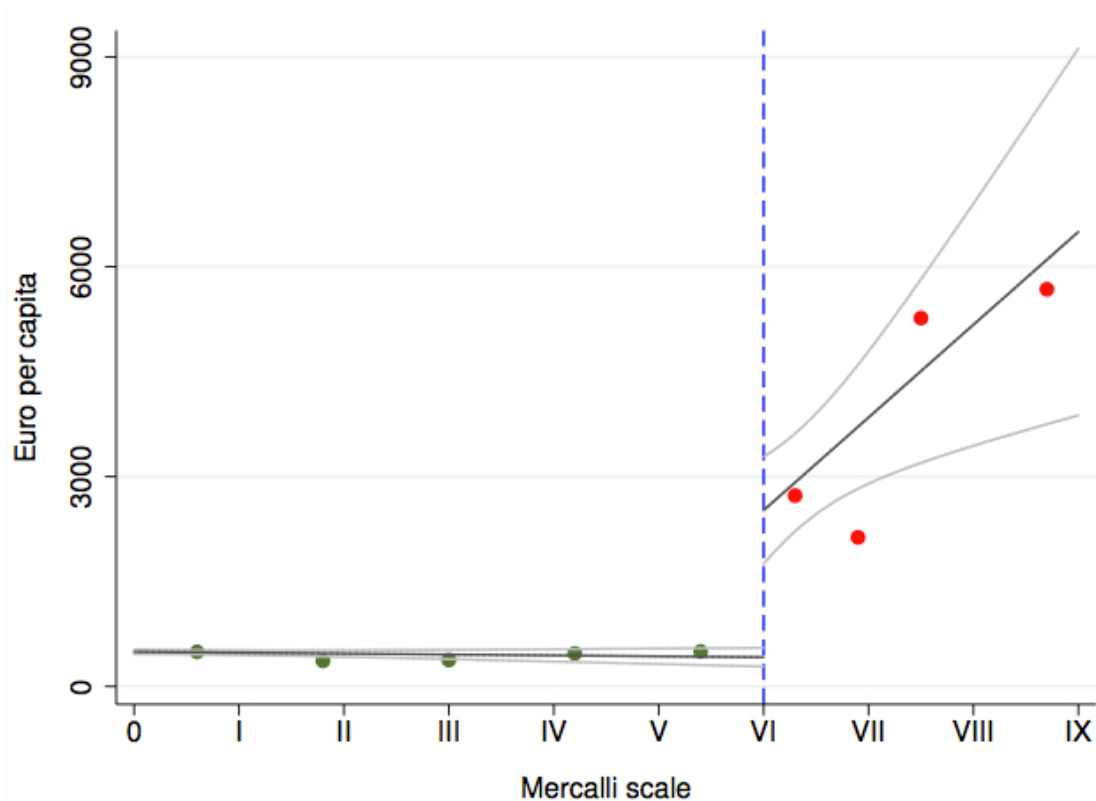
The effectiveness of fiscal policy – typically summarised by a number ('the multiplier') representing the **elasticity** of output to exogenous fiscal shocks – has been an important driver of policy and academic debates in recent years. Although several contributions have provided estimates of 'the multiplier' using different identification strategies, there is still no consensus in the literature. While virtually all earlier contributions have focused on aggregate effects, recent papers have shifted the attention to the **local dimension**. As Antonio Acconcia and his co-authors **point out**, the shift is motivated not only by specific policy questions – such as countering area-specific recessionary shocks – but also by the opportunity to address econometric issues in identification: fiscal policy is highly endogenous to the business cycle and its effects are often anticipated by rational agents.



In a **recent paper** we contribute to the on-going debate on the effects of government interventions using a natural experiment, the **2009 'Aquilano' earthquake** in Italy. Specifically, we estimate the output effect generated by the event, as a result of two combined shocks, the negative supply shock due to the quake, and the positive demand shock driven by reconstruction grants to the region.

Our empirical strategy relies on two separate factors. On one side we take advantage of quantified measures of damage to 75,424 buildings to construct a municipal-specific index (which captures both the severity and extent of the damage) to identify the negative supply shock. On the other side, we rely on a law issued to allocate reconstruction grants which resulted in sharp variation across neighbouring municipalities to estimate the positive demand shock. Regarding this second factor, despite the earthquake generating damage in 97 municipalities, only 57 qualified for grants by reporting sufficiently severe damage (measured using an *ad-hoc* macroseismic scale called the **Mercalli scale**). The relationship between the intensity of the earthquake in different municipalities and the central government grants allocated is shown in Figure 1 below.

**Figure 1: Relationship between grants from central government and intensity of the earthquake on the Mercalli scale**

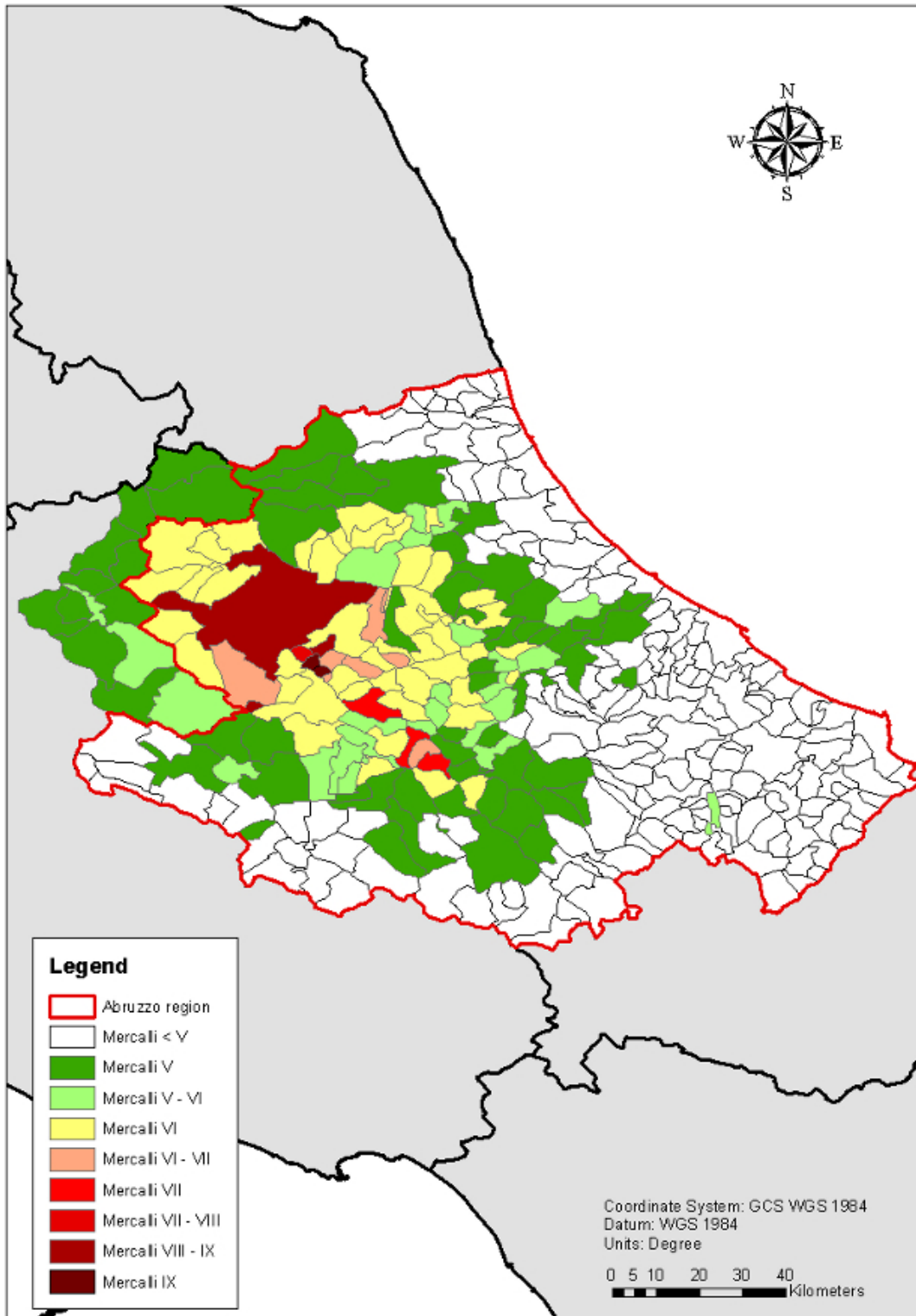


**Note:** The horizontal axis shows the points on the Mercalli scale (from 0 to IX with IX being the highest intensity). The vertical axis shows the level of government grants given to each municipality, with the dots representing the level of financial support received relative to the intensity of the earthquake in a particular area. As can be seen, municipalities which experienced the earthquake at higher intensities tended to receive larger grants. For a more detailed explanation see the authors' [full study](#).

Our research compares economic activity across neighbouring municipalities which were in an identical economic position prior to the earthquake, but which suffered different intensity levels when the earthquake struck. Using a linear fixed-effects panel data model, we estimate three things. First, we estimate the output loss generated by the earthquake due to the destruction of physical capital (possible endogeneity of damages are solved using the distance of each municipality from the epicentre as a strictly exogenous instrument).

Second, we estimate the 'grants multiplier' – i.e. the effect on local output generated by the reconstruction grants allocated from the government. Third, noticing that the discontinuity in local spending (not shown here for brevity) is at level VI on the Mercalli scale as for grants while the discontinuity in local tax revenues (not shown here for brevity) is at Mercalli VII, we estimate the 'local spending multiplier' net of marginal tax rebates and the 'local tax multiplier' net of variations of the tax base (respectively around the Mercalli VI and VII cutoffs). The intensity of the earthquake across the affected area is shown in Figure 2 below.

**Figure 2: Map of the earthquake according to Mercalli scale ranks**



**Note:** For a more detailed explanation see the authors' [full study](#).

Our findings show that the direct effect of the earthquake on output is unambiguously negative. Our analysis shows that, on impact, the output loss from the quake averages 3.7 percentage points. Against the output effects of the negative supply shock, we document positive effects of reconstruction grants. The estimated 'grants multiplier' (in line with the 'local spending multiplier') is bounded between 0.14 and 0.36 according to the model while the 'local tax multiplier' is well above unity with point estimate of 2.56.

Multiplying these elasticities by the magnitude of the fiscal shock, our results suggest that public grants compensate for the output fall generated by the quake (which is instead suffered by the control group). In the absence of a private insurance mechanism (given households and firms cannot insure against earthquakes in Italy) our research underlines the importance of public intervention: output in uncompensated regions contracts, while it expands, albeit marginally, in municipalities that qualified for grants.

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*Note: This article gives the views of the authors, and not the position of EUROPP – European Politics and Policy, nor of the London School of Economics or the Board of Governors of the Federal Reserve Board. Featured image credit: Roberto Taddeo (CC-BY-SA-3.0)*

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## About the authors

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Dr Francesco Porcelli is a lecturer in economics at the University of Exeter. He has a BA in Economics from University of Bari, an MSc in Economics from University of Warwick and a PhD in Economics from University of Warwick. His research focuses predominantly on studying what drives local government decisions, in particular he is interested in the role played by the introduction of incentive schemes and the level of fiscal decentralisation. His research methods are based predominantly on the use of econometric models and quasi-experimental techniques, such as difference-in-difference and regression discontinuity.



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