



Elasticity of Tornado Casualties in the United States

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Tornadoes are capable of catastrophic destruction and mass casualties (deaths and injuries) but there are yet no estimates of how sensitive the number of casualties are to changes in the number of people in harm's way or to changes in tornado energy. Most tornadoes cause relatively few, if any, casualties but the potential for large losses is always high when a violent tornado strikes a city. Using reports over the period 2007–2015 we show that comparison of two tornadoes in the United States that differ by a factor of two in population affected but identical in energy, shows an increase in the casualty rate of 28%, on average. And that comparison of two tornadoes that differ by a factor of two in energy but identical in population affected, shows an increase in the casualty rate of 22%, on average. To better articulate the determinants of tornado casualties we evaluate a number of previously considered and a few new social factors related to vulnerability with the goal to better understand why some locations are more susceptible than others.