



The legacy of natural disasters: The intergenerational impact of 100 years of disasters in Latin America



Germán Daniel Caruso

Poverty and Equity Global Practice, The World Bank, 1850 I St NW, World Bank Group, Room 14-386 (20006), Washington, DC, USA

ARTICLE INFO

JEL classification:

D31
I00
J13

Keywords:

Long term effects
Intergenerational transmission
Natural disasters

ABSTRACT

Disasters can have long lasting effects, but understanding the breadth, variety and longevity of their effects can be challenging. This paper examines the long term effects and subsequent intergenerational transmission of exposure in childhood to the natural disasters that have occurred in Latin America in the last 100 years. The identification strategy exploits the exogenous variation in geographic location, timing and exposure of different birth cohorts to natural disasters. This study measures individuals' exposure to each disaster based on their geographic location at birth to avoid any bias in the estimates due to possible selective migration caused by each disaster. The main results indicate that children in utero and young children are the most vulnerable to natural disasters and suffer the most long-lasting negative effects. These effects include less human capital accumulation, worse health and fewer assets when they are adults. Effects are found to have a non-linear relationship with the level of development of each country. Furthermore, the results provide evidence of the intergenerational transmission of shocks, indicating that children born to mothers who had been exposed to natural disasters also have less education and increased child labor.

1. Introduction

Over the last 50 years, the number of recorded natural disasters has been increasing significantly, especially those related to global warming (Helmer and Hilhorst, 2006; Van Aalst, 2006). Governments and policy makers often evaluate the consequences of these shocks by focusing primarily on the damage to infrastructure (Prestemon and Holmes, 2000). According to these estimates, natural disasters cost an annual average of \$901 million. However, this damage estimation does not consider the effect of natural disasters on other dimensions of welfare such as employment and education, which may have lasting effects (Baez et al., 2010) and which are vital to consider when attempting to assess the full impact of the shocks inflicted by a natural disaster.

In addition, there is a growing concern among economists and policy makers that negative conditions experienced early in life may have persistent effects. Recent research documents the long-lasting effects of shocks experienced in early childhood on child development (Currie, 2009) and on adult outcomes in areas such as education, height, self-reported health and socio-economic outcomes (Alderman et al., 2006; Almond et al., 2005; Maluccio et al., 2009). Despite the strong evidence that shocks in early childhood have long-term effects,

and despite researchers' increasing interest in the relationship between parental and child health and education (Anger and Heineck, 2010; Coneus and Spiess, 2012), there is, surprisingly, limited research on the intergenerational transmission of shocks in early life.

Given the recent increase in the recorded number of natural disasters and the long-term effects on the welfare of those exposed to these events, the primary research questions of this paper are: What is the long term effect of natural disasters on education, health, welfare and labor outcomes, and can this impact be transmitted to the next generation? This paper estimates the impact of natural disasters, including the effects on both first and second generations. In particular, the long-run effects of shocks experienced in early childhood and their intergenerational transmission are examined using *all* natural disasters occurring in Latin America in the 20th century.¹ Additionally, this paper explores whether there are generalizable patterns across different types of disasters in different countries.

Specifically, this paper separately estimates the impact of each type of disaster triggered by natural hazards (floods, earthquakes, tropical cyclones, landslides and volcanoes) by including all the events of each type.² The identification strategy of this paper relies on the exogenous timing and geographic variation of each disaster. It identifies as

E-mail address: gcaruso@worldbank.org.

¹ Since some disasters may have no records, every time this paper refers to all natural disasters occurring in Latin America in the 20th century, it means all the recorded natural disasters that have occurred between the years 1900 and 2000.

² This paper focuses only on disasters triggered by natural hazards. Every time this paper mentions the term natural disaster, it refers to disasters triggered by natural hazards. More information about the terminology used in the disaster risk management literature has been included in the Appendix.

affected those individuals who were exposed to natural disasters during their first 15 years of life. In particular, this study measures individuals' exposure to the disaster based on their geographic location at birth to avoid any bias in the estimates due to possible selective migration caused by the disaster. The main outcomes examined in this paper are the years of education, the probability of being disabled, the probability of being unemployed, a wealth index, fertility rate and child labor.

The heterogeneity of effects of each type of disaster and the persistence of their impact across generations is also explored. In order to explore the heterogeneity of the impacts, this study compares the impact of each natural disaster type at different ages in different countries with different levels of development. Finally, this paper estimates the intergenerational impact of these shocks by identifying as affected those individuals with a parent that has been exposed to a natural disaster during his or her first 15 years of life.

This paper makes three main contributions. First, this work takes a comprehensive approach to study the impact of natural disasters by using data about all natural disasters that affected one continent in the last 100 years. The standard approach in the literature focuses on case studies that evaluate the impact of single specific shocks,³ but such studies mainly focus on the estimation of extreme cases. As shown in Fig. 1,⁴ the estimated loss of years of education due to the impact of a natural disaster is greater for those studies that only analyze extreme disasters.⁵ In particular, small disasters have a 30–99% smaller impact than big disasters for children exposed in utero. This paper complements the existing case study analyses by obtaining an estimation of the impact of natural disasters in Latin America that incorporates the whole distribution of events.⁶ Furthermore, this strategy compares how exposure to different types of natural disasters at birth, in different countries with different levels of development, leads to poor welfare outcomes, thus distinguishing the effect of the shock from the intrinsic influence of its location of occurrence and examining the role of different mechanisms like the level of destruction of each disaster.

The second contribution of this paper is an improvement in the accuracy of the estimation of the effects, since another difficulty in capturing the long-term impacts of exposure to natural disasters is that migration may occur as a consequence of the disaster. Traditional studies have used individuals' location at the time of their surveys as a measure of exposure, without recognizing the fact that selective migration may bias the estimations. This paper accounts for those movements by using the birth location data included in the national censuses to measure individuals' exposure to each disaster. Disregarding this data would lead to an incorrect classification of exposure for 7% of individuals, and the estimated negative impacts of exposure to the natural disasters on years of education would be 18% greater than if the individuals' locations at the time of the censuses were used.

Third, this paper also expands the scope of focus of previous studies in two innovative ways. The literature of shocks in childhood traditionally focuses on the effects of exposure to shocks during gestation

³ Baez and Santos (2007) show that the Hurricane Mitch in 1998 negatively impacted schooling, child labor, health and nutritional outcomes between 1998 and 2001 among children in regions directly affected by Mitch compared to children in control areas. Bustelo et al. (2012) also provide evidence of the negative impact of the 1999 Colombian Earthquake on child nutrition and schooling. Moreover, Caruso (2017) demonstrates that the great flood of Tanzania in 1993 negatively affected child height of the first and second generation of affected individuals.

⁴ In Fig. 1 a natural disaster is classified as "Big" if it affects more individuals than the mean estimated for its type. In the same way, a disaster is defined as "Small" if it affects fewer individuals than the mean estimated for its type.

⁵ Examples of studies that find relatively large effects of natural disasters due to focus on extreme disasters can be found in Caruso and Miller (2015), Santos (2007) and Ureta (2005) where the effects on years of education are 29–76% larger than the estimation obtained when all the disasters are incorporated.

⁶ Case studies add an important heterogeneity to the results by exploring extreme cases. So, this paper should be viewed as a complement rather than as a competing approach to identify the impacts of disasters.

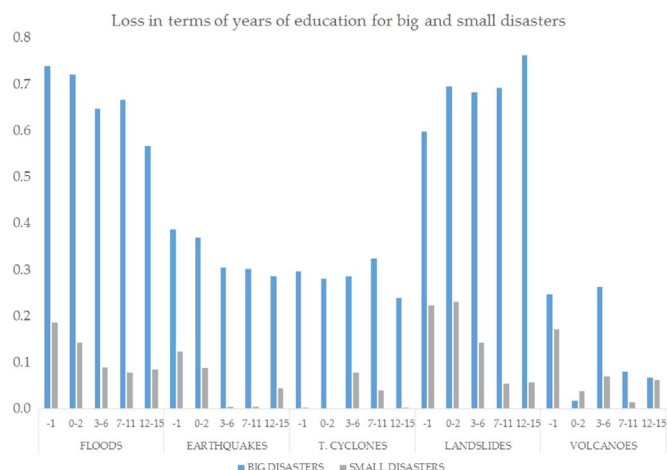


Fig. 1. Loss in years of education for each age range and disaster type – big and small disasters. *Notes:* Author's calculations of the absolute value of the loss in terms of years of education are based on the estimation of the main model by the size of each natural disaster. Natural disasters above and below the mean number of affected individuals are classified as big and small natural disasters, respectively.

and the first two years of life. In contrast, this paper can distinguish how exposure to different disasters at different ages, in utero to age 15, may have different long lasting effects.⁷ Moreover, this paper contributes to the literature of shocks in early childhood by providing micro estimates of how the impact of these shocks can be translated to the next generation.

The main results of this paper indicate that the most fragile period for any individual to receive this kind of shock is during the first years of life through school age. In particular, those individuals exposed in childhood suffer long-lasting negative effects including less human capital accumulation, worse health and less asset accumulation when they are adults. Exposure in utero to natural disasters generates an average reduction of 0.3 years of education.⁸

This study finds that unpredictable natural disasters impose the largest impact during gestation and the first two years of life. However, natural disasters that allow governments to take action before they impact, such as evacuating affected areas, are mainly relevant for school ages due to the unavoidable damage to infrastructure. This paper further finds that shocks affecting health are especially disastrous, particularly for education and employment.⁹

The empirical approach of this paper has allowed the possibility of comparing shocks and has uncovered the fact that there is a non-linear relationship between the size of impacts and the level of development in the countries where they occur. In addition, this study provides evidence of the intergenerational transmission of shocks. The results show that the children of women exposed to natural disasters are negatively affected with increased child labor and decreased education.

The remainder of the paper is organized as follows. In the next section, an overview of natural disasters and the problems caused is presented. Section 3 describes the data used in the analysis and explains the key variables. Section 4 depicts the empirical identification strategy, and Section 5 presents the main results and robustness tests followed by a discussion of the results and policy implications. Finally, Section 6 concludes.

⁷ Some scarce literature that focuses on the long-term effects of other types of shocks (e.g., armed conflicts) investigates exposure at different ages (e.g., Akresh et al., 2012; León, 2012).

⁸ Given that the average level of education in the sample is 7 years of education, which is equivalent to the average duration of primary school in Latin America, the loss 0.3 years of education significantly reduces the probability of finishing primary school.

⁹ Natural disasters that affect water provision, such as floods, usually generate outbreaks of cholera among other illnesses.

Download English Version:

<https://daneshyari.com/en/article/5094268>

Download Persian Version:

<https://daneshyari.com/article/5094268>

[Daneshyari.com](https://daneshyari.com)