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Research paper

The Impact of Natural Disasters on Secondary School Enrollment Rates

Harpaljit Kaur[1]*, Muzafar Shah Habibullah[2] and Shalini Nagaratnam[3]

[1]*Taylors Business School, Taylors University, 47500, Subang Jaya, Malaysia*
[2]*Faculty of Economics and Management, Universiti Putra Malaysia, 43500, Serdang, Malaysia.*
[3]Universiti Putra Malaysia, 43500, Serdang, Malaysia
**Corresponding author Email: HarpaljitKaur.PritamSingh@taylors.edu.my*

Abstract

This paper examines the impact of total disasters and four individual natural disasters (flood, storm, drought and earthquake) on secondary school enrollment rates using panel data over the period 1970 to 2014. For robustness check, we use four measures on each of these natural disasters; the number of occurrence, number of death, number of people affected and the estimated damages caused by natural disasters as a percentage of GDP; thus we employ twenty natural disaster variables. In addition, we re-estimate all specification using lag of natural disaster variables to capture the delayed effect of these variables on enrollment. Employing the system Generalized Method of Moment (GMM) model, the findings show that the number of occurrences and disaster related losses (death, affected and damages) significantly contribute to the rates of secondary school enrollment. The current study also found that the secondary school enrollment rates are more affected by the contemporaneous effects of natural disaster for the exception of total disasters and floods, which are affected by both the medium and long-term effects. One unanticipated finding that emerge from the analysis is that earthquake have a positive effect on secondary enrollment rates in the long-term.

Keywords: Enrollment Rate; GMM; Natural Disaster; Panel Data.

1. Introduction

Natural disasters have become among the most pressing issues facing the world today. It is becoming more recurrent and more intense worldwide in the recent decades due to changes in the global climatic environment and has influenced the human development drastically [16, 20, 28]. Human capital is vital to economic growth and education and is the most compelling indicator for human capital progress of a nation's economy. Natural disasters, whether big or small, have plausible impact on children, adolescents and the education system. Closure of schools due to destruction, damage to school related infrastructure and prolonged and repeated use of school infrastructure as evacuation shelters have disrupted education cycles, affecting the learning process of the students. There is an urgent need to address these disruptions as children and youth exposed to the disasters may not be able to continue schooling or follow up with their studies and could drop out of school or universities permanently due to conditions of the household [4, 6, 9]. Prolonged interruption in education whether in the short or long term, may decrease human capital accumulation through the disruption in education of children, development, outcomes and may decrease the lifetime earnings in the future, thus, creating inadequate and weak skills in the workforce in future [32, 30, 22]. These effects on human capital accumulation may significantly impact a country's economic development and expose children and adolescents to the risk of child labour, early marriage, exploitation and health problems.

Past research on natural disasters and human capital concentrated more on case studies, regarding specific disaster and at micro level, focusing on the effect of disasters on household level and country-specific [11, 13, 17, 18]. However, macro level analysis on the effect of natural disasters on human capital are rather limited [8, 21, 26]. Much of the macro level research on natural disasters and human capital up to now, focused on the effect of geological and climatological disasters [8, 26] and total disasters [21] on secondary school enrollment rates. Due to the need of addressing the alarming rate of increase in natural disasters and inconclusive nature of previous macro level empirical studies, the present intends to improve upon past studies in two major ways. First, we analyze the effect of total disasters and four individual natural disasters (floods, drought, storm and earthquake) separately, on secondary enrollment rates, covering more countries and a longer period, controlling a series of human capital determinants every time. The current study contributes on post disaster human capital accumulation with panel data over a 45-year period from the years 1970 to 2014 and the model is estimated by the Blundell-Bond [5] system GMM to control for potential measurement error and endogeneity issues. Beside the type of disasters, it is also vital to analyze the potential heterogeneity within disaster impacts as different measures imply a different impact of human capital. Past studies have focused on the impact of disaster on human capital using one measurement only [8, 21, 26], therefore the current study seeks to contribute further to literature by employing four natural disaster measures; number of occurrences, death, people affected and damages as a percentage of GDP, for each disaster. In addition, since the effects of natural disaster on human capital differ significantly across different types of natural disasters, the impact of these disasters, if not address well in a timely and systematic manner, will have a persistent effect on the future human capital accumulation. Generally in disaster response, education is