
Research Statement

1 Introduction

My research spans the fields of development, health, education and labor economics and focuses on poverty analysis and the effects of shocks experienced in childhood. Three main themes drive my work. My work examined the short and long-term impacts of aggregate shocks on socioeconomic outcomes. First, I have been analyzing the effects of exposure to natural disasters such as earthquakes, hurricanes and floods. Second, I have studied the consequences of man-made shocks like armed conflicts and controllable nutrition-related disorders that affect in utero gestation. Third, I have been working on poverty analysis focusing on poverty measurement and the role of public policies alleviating poverty. I describe each of these research areas below.

2 Welfare Impacts of Natural Disasters

Individuals in developing countries are exposed to different types of exogenous shocks including famines, armed conflicts and natural disasters such as floods and earthquakes. Among these shocks, the least studied and most likely to keep affecting people's lives are natural disasters. These are deeply traumatic events that affect about 217 million people every year and provoke damages to infrastructure of \$686 million. Previous literature has analyzed the macroeconomic impact of natural disasters on growth and found a marginal long-term effect. In contrast, my research focuses on the effect of natural disasters on individuals. One of my main findings is that children exposed to a natural disaster suffer short, mid and long-term adverse health effects, negative impacts in the labor market and loss of human capital accumulation, all of which can lead to negative consequences for the next generation.

The standard approach in the literature focuses on case studies that evaluate the impact of a single specific shock. However, these case studies are subject to the criticism that the observed results may not be generalizable to other locations or types of shocks (external validity). To address this critique, in my job market paper, "**The Legacy of Natural Disasters: The Intergenerational Impact of 100 Years of Natural Disasters in Latin America**", I combine 954 shocks occurring in many countries and provide evidence for whether the effects can be generalized.

This study contributes to the literature of shocks in early childhood and natural disasters in several ways. First, it provides micro estimates of the long-term impact and intergenerational transmission of shocks in early life. Second, it compares how exposure to different types of natural disasters at birth in different countries leads to poor welfare outcomes. Third, this study improves the identification of the pre-existent papers including 954 shocks covering a period of 100 years, maximizing the identification of the disasters and minimizing the probability of obtaining spurious correlations. Finally, due to the unique data that includes individuals' geographic location at birth and information on the intensity of the shocks, this paper accurately measures an individual's exposure to each shock.

My empirical approach exploits the exogenous variation in geographic location, timing and exposure of different birth cohorts to the natural disasters. The identification strategy relies on a comparison of each outcome for similarly aged individuals in affected and non-affected regions. The implicit assumption is that differences across birth cohorts in each outcome of interest would be similar across affected and non-affected regions in the absence of the shock. Using the place of birth,

we measure individuals' geographic location during the disasters to avoid any bias in our estimations due to the endogenous migration provoked by each disaster.

My main results indicate that the most fragile period for any individual to receive this kind of shock is the first years of life through school age. Natural disasters related to global warming deliver the largest impact. For example, hurricanes strongly affect the probability of suffering an employment disability and also a decrease in the future income of affected individuals. Volcano eruptions are also found to produce a large impact on income and wealth. Furthermore, I find that shocks affecting health, like epidemics, are especially disastrous for education, fertility, unemployment and income. This paper also provides evidence of the intergenerational transmission of shocks by showing that the children of the mothers that have been hit are also negatively affected by the disasters.

I also explore how health shocks caused by natural disasters can be transmitted to the next generation. In "**Intergenerational Transmission of Shocks in Early Life: Evidence from The Great Tanzania Flood of 1993**" I estimate the short and long term effects of exposure to the Tanzania Flood of 1993 on the health of young victims and show their intergenerational transmission. The identification strategy of this paper exploits the exogenous variation in the disaster's geographic extent and timing, and analyzes the exposure of different birth cohorts to the disaster. I find that the children exposed to the flood have lower height-for-age Z-scores three years after the shock, with bigger effects for girls than for boys. Also, women who were less than 18 years old during the flood experienced negative impacts even 12 years after the flood, and their children have lower height-for-age Z-scores. The children of those men exposed before their 18th year experience no effect on their height-for-age Z-scores. Furthermore, this study identifies one of the main mechanisms of the intergenerational transmission of health effects as the poor performance of affected females in the marriage market.

When shocks such as natural disasters occur in early childhood, they can have lasting health impacts but also educational and economic effects that can be transmitted to the next generation. In "**Long Run Effects and Intergenerational Transmission of Natural Disasters: A Case Study on the 1970 Ancash Earthquake**" (Journal of Development Economics, 2015, with Sebastian Miller) we estimate the long-run effects of the 1970 Ancash earthquake on human capital accumulation for the affected and subsequent generations 37 years after the shock. We exploit the localized nature of the earthquake and the exogenous timing of this event to capture a child's exposure and identify the effect of the earthquake on welfare. The main finding of this paper shows that in utero males exposed to the earthquake completed on average 0.5 years less schooling than their unaffected cohorts, while exposed females completed 0.8 years less schooling. Surprisingly, children whose mothers were affected at birth by the earthquake have 0.4 less years of education while those whose fathers were affected by the earthquake at birth suffer no effects on their educational achievement. The evaluation of other outcomes also suggests that the level of welfare of affected individuals was negatively impacted in the long run.

While short and long term effects have been studied in the papers mentioned, my in-progress study, "**Medium-term natural disasters effects: Household income, individual health and child schooling after the 2005 Atlantic Hurricane Season in Mexico**", analyzes the medium term effects (5 years after the shock) of the hurricanes on income poverty, health and schooling. In this paper, the identification strategy uses household GPS location to compare those households within the hurricanes' trajectories with those households outside of the trajectories. The fact that the hurricanes passed through different states allow me to obtain a treatment group that it is not necessarily related to one specific region, thus separating region specifics from the effect of the hurricanes. I find that five years after the hurricanes, exposed households are poorer, while exposed individuals have a greater probability of disability or mental health problems. Moreover, I find that school age children have lower rates of school enrollment.

From a development standpoint, monitoring the impact of aggregate shocks on internal displacement is crucial given the relevance of migration on agriculture, urbanization and growth. In **“The Migration-Disaster Nexus in Central America and the Caribbean”** (with Javier Baez and Valerie Mueller) to identify the impact of natural disasters on mobility, we link multiple census surveys from the region with natural disaster indicators constructed from georeferenced climate data at the district level. In particular, we implement a triple difference-in-difference regression, which assuming disasters affect the migration status of individual in the 15-39 age range significantly more than individuals outside that age range (40-60). We find that migration increases as a result of slow onset disasters like droughts, while migration decreases of rapid onset disasters like hurricanes.

Another knowledge gap in the literature is the role of ex-ante and ex-post risk management reducing the consequences of natural disasters. My in-progress works, **“Weather Shocks and Alleviation Policies”** (with Richard Akresh, Damien de Walque and Harounan Kazianga), **“Natural Disasters and Insurance Programs”** (with Sebastian Miller and Ilan Noy) and **“The Effect of Climate Change in Agriculture”** (with Pablo Acosta and Futoshi Yamauchi) analyze cash transfers, formal insurances and agricultural diversification, respectively, as risk management mechanisms. While the first work uses a randomized control trial in Burkina Faso, interacting the fact of receiving a cash transfer with the fact of being exposed to a rainfall shock in childhood, the last two papers use information about formal insurances before the Chilean earthquake of 2010 and agricultural diversification in Philippines before the occurrence of changes in the monsoon season.

3 Welfare Impacts of Armed Conflicts and Other Man-made Negative Shocks

Environmental and economic shocks are widely believed to be an important determinant of people’s current health and economic well-being, especially in low-income countries where many subsistence-level households have limited risk-coping mechanisms. One such shock is the occurrence of armed conflict, an obviously important factor that may influence early childhood health in a number of low-income country settings.

In **“Long Term Effects of Violence in El Salvador: Evidence from the Civil War”** (with Pablo Acosta, Javier Baez and Carlos Carcach, in progress), we study how exposure to the Salvadoran armed conflict subsequently affected the education and labor market outcomes of individuals exposed in utero. The identification strategy of this paper compares the educational performance of individuals born in the war-affected regions with that of those that born in non-affected regions. We exploit the exogenous variation in the conflict’s geographic extent and timing to identify exposure to the fighting of different birth cohorts while in utero or early childhood.

Much of the research on the impact of war on children uses extremely large geographic areas to identify which children are defined as exposed to the war. However, in **“Medium-Term Health Impacts of Shocks Experienced In Utero and After Birth: Evidence from Detailed Geographic Information on War Exposure”** (with Richard Akresh and Harsha Thirumurthy), we study how exposure in utero to the Eritrean-Ethiopian war differs from exposure after birth. To address measurement error that would misclassify a child’s war exposure, we use global positioning system (GPS) data on the location of the survey villages. This is the first paper to use data from both countries involved in a war to measure the war’s impact on child health in each nation. We find that war-exposed children in both countries have lower height-for-age Z-scores, with the children of the war-instigating and losing country (Eritrea) suffering more than children of the winning nation (Ethiopia). The paper uniquely incorporates GPS information on the distance between survey villages and conflict sites to more accurately measure a child’s war exposure. Results indicate

negative impacts that are 35-75% greater than if exposure is measured at the imprecise, region level.

Whereas the occurrence of war is out of an individual's control, there are also controllable nutrition-related disorders that can be characterized as shock. The prime example of this type of shock is the fasting during Ramadan for Muslims. In **“Life-Long Effects of Gestation during Ramadan: Evidence from Nigeria”** (with Seyed Karimi, in progress), we use a different type of natural experiment, exposure to the Islamic fasting month of Ramadan, in order to measure the scope of the effects of malnutrition in utero. To uncover the effects in the life-long range, we analyze a wide array of adverse effects from birth and childhood to school age and adulthood to measure health, education, and labor market outcomes. Testing this wide range of outcomes allows us to investigate both cognitive and physical channels of the adverse effects of malnutrition in utero. A unique feature of this paper is the usage of a uniform socioeconomic context, Nigeria, to measure effects that are specific to the different stages of life. This property, which is missing in the related literature, enables us to provide a complete and proportionate picture of the consequences of Ramadan-induced malnutrition in utero.

4 Poverty Analysis

Poverty remains as an alarming worldwide problem. According to 2010 World Bank statistics, more than 20% of the world population lives with less than \$1.25 per day. This means that more than 1,200 million people suffer from food, health and educational deprivation, and as recent research shows, this lack of nutrition and education has not been identified or addressed. A third strand of my research examines how to measure and alleviate poverty.

In **“Poverty and the Dimensionality of Welfare”** (with Walter Sosa- Escudero and Marcela Svarc, in *Poverty and Social Exclusion, New Methods of Analysis*, Routledge) we review strategies to obtain a multidimensional measure of poverty. The methods discussed in this chapter are shown to be able to summarize an initially large list of variables into a few new variables (as in factor analytic methods) or a subset of the original ones (as in feature selection / cluster methods), that can serve the purpose of characterizing the poor. These methods can assist the conceptual search for relevant dimensions of welfare, or provide confirmatory analysis of alternative, likely multidisciplinary studies aimed at isolating relevant factors for poverty analysis.

In another paper, **“Deprivation and the Dimensionality of Welfare: A Variable-Selection Cluster-Analysis Approach”** (with Walter Sosa- Escudero and Marcela Svarc, forthcoming in *Review of Income and Wealth*) we approach the problems of measuring the dimensionality of welfare and that of identifying the multi-dimensionally poor by first finding the poor using the original space of attributes and then reducing the welfare space. The starting point is the notion that the ‘poor’ constitute a group of individuals who are essentially different from the ‘non-poor’ in a truly multidimensional framework. Once this group has been identified through a clustering procedure, we propose reducing the dimension of the original welfare space with recent blinding methods for variable selection. We implement our approach to the case of Latin America based on data from the Gallup World Poll, which contains ample information on many dimensions of welfare.

In the last 20 years, cash transfer programs have become popular among policy makers. In **“Do social programs reduce poverty? An application for the Supplemental Security Income program”** I evaluate the impact of the Supplemental Security Income (SSI) program on poverty duration. I use a duration model to estimate how the program affects the hazard rate for leaving poverty. I deal with the endogeneity problem in poverty duration models by applying an instrumental variable approach. The results indicate that the SSI program reduces poverty duration by 25.5%, increases income not related to the subsidy and reduces the probability of being poor. The

theoretical framework and the empirical results suggest that cash transfer programs are an efficient poverty alleviation policy for breaking the persistence of poverty traps.

However, much of the impact of different policies might depend on their degree of institutionalization. As a result, the role of institutions in economic development has attracted the attention of academics and policy makers while our understanding of the economic effects of formal institutional rules has progressed substantially in recent decades. In “**Are we all playing the same game?**” (with Mariano Tommasi and Carlos Scartascini, forthcoming in *E. Journal of Political Economy*), we study whether institutional arenas are where decision-making takes place. This paper addresses an important source of variation within democracies the degree of institutionalization. The concept of institutionalization describes the extent to which politics takes place, and is believed to take place, via formal political institutions. Countries vary in their degree of institutionalization, hence, in the degree to which political actors pursue their goals via conventional politics or via “alternative political technologies”. This paper postulates that if politics is conducted largely outside of formal channels, the structure of the formal channels should not matter much as a determinant of policy outcomes. To address this issue this paper proposes a new index of institutionalization and with it revisits seminal work regarding the impact of constitutions on public spending. The findings show that the effect of constitutional rules on policy outcomes is conditional on the degree of institutionalization.

The design of public policies aimed to alleviate poverty also depends on the citizens’ preferences for redistribution. In “**Re-distribution in times of fiscal pressure: Using games to inform a subsidy reform**” (with Manuel Sanchez Masferrer and Kinnon Scott), we estimate inequality aversion and preferences of redistribution in a context of a subsidy reform in El Salvador. The government of El Salvador faces a serious fiscal deficit and one of the highest public debts in Central America in combination with a subsidy program to the electrical and water consumption that covers 80% of the population. Given the urgent need for a fiscal reform, the regressive subsidies offer an opportunity for improving the fiscal picture but the political sensibilities of such reform cannot be ignored. Using a set of behavioral experiments, this paper evaluates the willingness to stop receiving the subsidy of the fourth quintile of the income distribution. The results of this paper indicates that the great majority of the participants would be willing to donate their electricity and water subsidies to be used in poverty reduction projects or public goods. Furthermore, trust in the government is relevant in terms of the willingness to share of the participants to donate their subsidy to the central budget of the government.

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