Natural-disaster shocks and the fiscal stance of countries

Natural disasters could constitute a major shock to public finances and debt sustainability because of their impact on output and the need for reconstruction and relief expenses. Among high- and middle-income countries, geological and climatic disasters tend to reduce real gross domestic product. For the average country, budget deficits increase only after climatic disasters, but for lower-middle-income countries the increase in deficits is a more general phenomenon. In countries with higher initial government debt, disasters do not lead to larger deficit increases or larger output declines, suggesting that among these countries debt levels reflect access to credit. Countries with high financial development suffer smaller real consequences from disasters, but deficits expand. Disasters in countries with high insurance penetration (like Japan) also have smaller real consequences, but do not result in deficit expansions. Thus, insurance penetration seems to offer the best ex-post mitigation approach against real and fiscal consequences of disasters, although a complete evaluation should also consider the costs associated with different alternatives for risk management.1

Natural disasters and their welfare impacts in Vietnam

Costs of natural disasters remain primarily based on immediate estimates of infrastructure damage. But, disasters affect the wider economy. In addition, when they occur regularly, they undermine the coping capacity of households, leaving them often with low risk, low return portfolios as the only viable alternative. To capture both the immediate and long-run as well as some of the economy-wide welfare effects, highly disaggregated natural disaster and hazard maps derived from primary, geo-referenced meteorological data are linked with a series of national living standard measurement surveys from Vietnam. The results confirm the potentially devastating nature of natural disasters, with riverine floods causing immediate welfare losses of up to 23 percent and hurricanes reducing welfare by up to 52 percent in large cities. Households prove more adept at handling the immediate consequences of droughts, largely due to irrigation, underscoring that irrigation does not only help by increasing incomes, but also by reducing their variability. There are also important long-run negative effects from the frequent exposure to disasters, in Vietnam mostly for droughts, flash floods, and hurricanes. At the same time however, households have learned to turn moderate riverine flooding to their advantage. Differences in the welfare effects across space and disaster appear partly linked to the functioning of the disaster relief system, which has, so far, largely eluded households in hurricane prone regions.2

When do governments require earthquake resilient construction?

The 9.0 magnitude Japanese earthquake released 1,000 times as much energy as the 7.0 magnitude Haitian earthquake, and yet, even though Japan suffered as well from the terrible tsunami, many more people perished in Haiti. Why? Recent research points to the interaction of earthquake propensity, poverty, and governance. First, governments do not require quake-proof construction in countries such as Haiti, with lower earthquake propensity, where the payoffs to investments in prevention of earthquake-related mortality are lower. Indeed, large investments in mortality prevention may not be a wise use of public resources in places where earthquake propensity is low. Even countries with high earthquake propensity, such as Japan, prioritize investments according to where experts identify the highest threats (where tectonic plates meet). The latest earthquake in Japan has had such terrible consequences because it was unusually large, even by Japanese standards, and because it occurred in an area that was judged relatively less vulnerable. Second, even in high propensity countries, the opportunity costs of mortality prevention investments are higher in poorer countries. Mortality is correspondingly less responsive to earthquake propensity in poor countries. Third, mortality is higher at any level of quake propensity when governments have fewer incentives to provide public goods, such as in autocracies with less institutionalized ruling parties or in more corrupt countries. 3

Balancing gains from economic density with risk from natural hazards

Today, 370 million people live in cities in earthquake prone areas and 310 million in cities with high probability of tropical cyclones. By 2050, these numbers are likely to more than double as firms seek economic benefits and people seek higher wages in urban areas. As population and economic density in risk-prone areas rise, efforts to plan for natural disasters are often hampered by weak land use management leading to poor people locating in slums close to hazard sources; rent controls that reduce private incentives to invest in mitigation; and limited provision of basic public services, such as adequate sewers and drains, that could mitigate risks. A cope-mitigate-transfer framework of risk management, when applied to different types and sizes of cities in a country’s urban system, shows that good hazard management is first and foremost good general urban management. There is a critical role for the public sector in generating and disseminating credible information on urban hazard risk. This will help people and businesses make better choices on where to live and where to invest, promote internalizing risk in land and housing markets, and encourage market mechanisms for better risk mitigation and transfer. 4

Macroeconomic costs of natural disasters often sizable

The frequency of climate-related natural disasters is very likely to increase in the future. Empirical estimates of the macroeconomic impact of climatic and other disasters suggest that a single climate-related disaster reduces real per capita GDP by at least 0.6 percent. The increased incidence of these disasters in recent decades has already had measureable macroeconomic impacts. Among climatic disasters, droughts have the largest average impact, with cumulative losses of 1 percent of GDP per capita. Across countries, small


states are more vulnerable than other countries to windstorms, but exhibit a similar response to other types of disasters; and low-income countries respond more strongly to climatic disasters, mainly because of their larger response to droughts. A country’s level of external debt has no relation to the output impact of any type of disaster, and aid flows have historically done little to attenuate the output consequences of climatic disasters. Among other types of disasters, the average long-run decline in GDP per-capita following a geological catastrophe, like Japan’s recent earthquake, is about 2 percent in high-income countries, but this figure conceals significant variation across events.5

**Growth impact of natural disasters varies**

This work characterizes year-to-year GDP growth fluctuations after four types of natural disasters—droughts, floods, earthquakes, and storms. The path of adjustment and recovery from these events may look different from their net permanent effect. For example, economic growth after an earthquake may have no long-run consequences, but follow a shorter-term path of growth decline followed by recovery. Several results emerge. First, the effects of natural disasters are stronger on developing than on advanced countries. Second, not all natural disasters are alike in terms of the subsequent growth response and, surprisingly, some can even boost economic growth (e.g., droughts have negative effects, while those of floods tend to be positive). Third, while the impact of some natural disasters can be beneficial when they are of moderate intensity, severe disasters have no positive effects and often carry much worse repercussions. Fourth, the time profile of the growth response varies with both the type of natural disaster and the sector of economic activity. For instance, negative effects tend to occur immediately (e.g., the impact of droughts on agricultural growth), while positive effects, if they occur, involve some delays (e.g., the impact of floods on agricultural growth and earthquakes on non-agricultural growth).6

**Natural disasters and growth—beyond the averages**

Despite the tremendous human suffering caused by natural disasters, their effects on economic growth remain unclear, with some studies reporting negative, and others indicating no or even positive effects. These seemingly contradictory findings can be reconciled by exploring the effects of natural disasters on growth separately by disaster type and economic sector. When we do this, three major insights emerge. First, the affect of disasters on economic growth is not always negative—the effects differ across types of disasters and economic sectors. Droughts, for instance, tend to affect agricultural growth negatively, while floods tend to exert a positive effect on overall growth. Second, although moderate disasters can have a positive growth effect in some sectors, severe disasters do not. For instance, the positive impacts of storms and earthquakes on industrial growth disappear when these events are severe. Third, growth in developing countries is more sensitive to natural disasters than in developed ones, with more sectors affected and the effects larger and economically meaningful.7

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