Why many individuals still lack flood protection: new findings

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The growing cost of floods and need for protection

Recent natural catastrophes, including floods, earthquakes, tsunamis, landslides, wildfires, and droughts, have inflicted significant economic losses. The most recent edition of the United Nations Global Assessment Report on Disaster Risk Reduction published earlier this year estimates that while improvements in disaster management have led to dramatic reductions in mortality in some countries, economic losses are now reaching an average of over USD 200 billion each year.[1] During the period 2001 to 2010, insured losses from weather-related disasters averaged USD 30 billion annually.[2] Of all natural hazards, floods are the most costly and have affected the most people.[3] Several factors contribute to this trend: growing concentrations of population and assets in flood-prone areas, lack of appropriate protection, and failure of individuals to undertake preparedness measures. The level of hazards may be expected to increase as a result of changing climate patterns. To reduce losses (both direct and indirect, including recovery) and increase resilience, we need to be more proactive in deploying protection measures at both the individual and community levels.

This Risk Nexus provides new findings from our ongoing work that focuses on individual decision-making related to flood protection.

Most exposed individuals do not seek flood protection voluntarily

While there is general agreement that investing in pre-disaster protection is more effective than waiting for ad hoc post-catastrophe response, there is growing evidence that many people often do not voluntarily invest in loss reduction measures. This holds true for both physical protection and flood insurance. For instance, 80 percent of residents in the area inundated by Superstorm Sandy in New York in 2012 had no flood insurance; 90 percent of small businesses did not have such protection, either, despite flood

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> “Policymakers and others are keen to know how post-disaster aid affects demand for protection by individuals and businesses.”

insurance being provided at a subsidized rate by the U.S. federal government. Similarly, in Germany where flood insurance purchase is not mandatory, only about 15 percent of people have flood insurance.

Inadequate protection proved to be a major policy issue when catastrophic floods occurred in Germany in 2002 and in the U.S. in 2005 and 2012. In both these countries following the disasters a significant amount of post-disaster government aid was doled out to help the uninsured and affected areas recover from losses that might have been reduced by ex-ante investment in cost-effective protection measures. While these are two of the world’s largest economies and have well-developed insurance markets, the potential for government aid to create moral hazard is real: In other words, people tend to think, “Why pay for financial protection pre-event if the government will bail us out?”

Does government disaster relief create moral hazard?

Whether there is indeed moral hazard is worth analyzing empirically. In practice, most governments provide post-disaster aid, and more of it over time. This is often the result of political pressure on elected officials to help their constituencies, as opposed to leaving uninsured constituents to deal with their losses on their own.

In recent years, policymakers, business leaders and academic experts have become more interested in whether individuals’ and firms’ potential underinvestment in financial protection before natural disasters occur may be due largely to government post-disaster assistance provided. Indeed, such government relief may inhibit insurance purchases if individuals treat federal aid as a (partial) substitute for insurance.

A new study by the Wharton School’s Risk Center and colleagues as part of the Zurich flood resilience alliance has undertaken the first such analysis of this topic by observing how insurance purchases change after individuals in the U.S. received government disaster aid, by examining the influence over an entire decade of disaster grants from the Federal Emergency Management Agency (FEMA) through the Individual Assistance (IA) program.[4] These grants are provided directly to affected households for uninsured losses specifically related to flood events. We distinguished these findings from the impact of low-interest disaster loans provided by the U.S. Small Business Administration (SBA). In the U.S. these two programs have long been the primary sources of direct federal aid for households that sustain uninsured damage from a disaster.

While we recognize that our findings need to be replicated in other contexts, they provide a first look at how important it is to properly design government flood disaster aid programs; these programs are not equal in creating or limiting moral hazard. If people know that they can receive a fairly sizeable amount of money ‘for free’ after a disaster, they will most likely include this knowledge in their insurance decision-making process, giving rise to moral hazard. But small amounts of aid actually led people to purchase more coverage after a flood. If people know loans are available to them, but will be added to their mortgage, then we find no impact on the demand for flood insurance (see Box 1).

Moral hazard is only one factor contributing to failure of individuals to undertake cost-effective flood protection measures. Research by the Wharton Risk Center and our flood resilience alliance partners reveals that other factors contribute to underinvestment in protection measures. These include insurance being viewed as a financial investment rather than as a protective measure (if no claims are reimbursed then people think it was a bad investment), lack of money to pay for protection, high upfront costs,

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Box 1 – Key questions and findings: impact of government aid on insurance demand

1. How does the receipt of government disaster aid affect demand for insurance? While FEMA's Individual Assistance (IA) grants provide important financial help to those in need after a disaster, we find that this creates a significant moral hazard effect. Increasing the average IA disaster grant by USD 1,000 in a postal zone reduces the average individual demand for insurance in that zone by up to USD 6,000.

2. Does the impact depend on the size of the grant? Yes. As theory would predict, the larger the grant, the more significant the impact. In fact, we found that when the grant was on the high end of the distribution (top 75 percent quartile), the moral hazard effect could be up to three times larger. Interestingly, when the grant was on the lower end (lower 25 percent quartile), individuals in that same postal zone actually purchased more insurance, probably because they found federal aid to be insufficient to cover their costs.

3. Do people cancel their insurance policy after they receive disaster relief grants? No. We found that free relief mostly had an impact on the quantity of insurance purchased, not the decision to buy it. Government relief is typically associated with legal requirements to carry disaster insurance, and those requirements seem to be well enforced, as least in the years immediately following the disaster.

4. Do all government relief programs encourage more risk taking? No; this is another important finding. We looked at whether individuals changed their insurance purchase behavior after receiving a low-interest disaster loan from the SBA and found no systematic impact. The difference was that FEMA's IA program provides free grants, while the SBA program provides liquidity to victims of disasters to repair or rebuild. They then have to repay the loan to the federal government over time with interest.

difficulty to perform cost-benefit analysis, and simple procrastination: "We'll do it next year."[5]

One can also ask to what extent people living in flood-prone areas actually understand the risk they face when making decisions, and hence, the benefits of protection. Is the average individual good at estimating the probability of a flood? Is that person good at estimating the anticipated severity of their loss, should a flood affect their home? How do those estimates differ from an expert's estimates and what drives this divergence?

A recent study by the flood resilience alliance focusing on New York City, which we describe next, demonstrated for the first time that a majority of people largely underestimate the severity of the loss – something that can explain residents' propensity to underinvest in protection. The more we understand and measure the behavioral barriers and risk perception limitations, the better equipped we will be to address this issue.

First empirical analysis of individual perception of flood damage

A risk is defined as the probability of an event multiplied by the impact of the event, should it occur. And while there is a large body of literature on risk perception, surprisingly, almost all studies have focused on the former component: the misperception of the probability of a risk. For instance, a study analyzes how 1,306 Swiss households' flood risk perceptions relate to the

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> “Previous studies have focused on people’s perception of the likelihood of a flood, not its severity.”

riskiness of the households’ location, calculated on flood maps characterizing four flood hazard zones and the likelihood of flooding in each region.[6] People’s perception of flood risk was derived from a qualitative estimate of the perceived flood probability, based on answers that were categorized ranging from very low to high. Household perceptions of flood probability were correlated with this categorization of the flood hazard maps. Even so, many residents in high flood-hazard areas perceived flood probabilities as low, while many residents in areas with no flood hazard perceived a high flood probability. This is in line with several studies that find that non-experts’ perceptions of risk probabilities can substantially diverge from those of experts for a wide variety of hazards.[7] In general, individuals have difficulty assessing low-probability, high-impact risks and have difficulty distinguishing between low likelihood events that differ, even by a factor of 100 (e.g., 0.01 versus 0.0001).[8] We thus expect many of the individuals residing in flood-prone communities studied by the flood resilience program to exhibit similar patterns – in other words, that they, too, will diverge from experts in their perceptions – but this needs to be verified and the degree of divergence measured.

Moreover, all the previous literature has focused on probability perception, not on how residents perceive the severity of a flood, that is, what will be the average loss to their residence should a flood occur. To this end, we undertook our analysis in New York City (NYC), since the city was affected twice by flooding in recent years: from Hurricane Irene in 2011 and again in 2012 by Superstorm Sandy. Sandy’s flooding caused 43 deaths and about USD 19 billion of damage to the city alone.[9] As mentioned earlier in this brief, only 20 percent of NYC households in the area inundated by Sandy had flood insurance at the time of the disaster. The decision not to purchase coverage may be due to misperceptions about the probability of flooding, and/or the damage it can cause.

One challenge in doing any in-depth comparison of perceived and objective risks is how to obtain estimates of flood damage and probability at a granular level. We address this by using detailed

Superstorm Sandy’s aftermath included dramatic flooding in areas of New York City.

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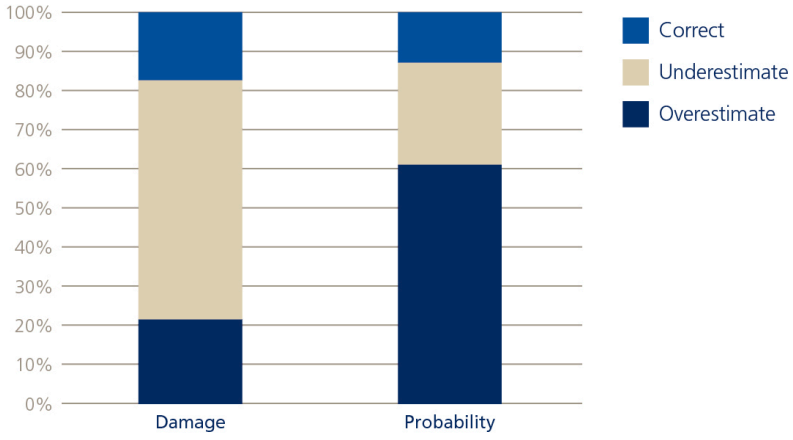
probabilistic flood risk estimates for NYC undertaken at the census block level.[10] These estimates are based on 549 storm surge simulations that were the subject of a paper by the Wharton Risk Center, the University of Amsterdam, MIT and Princeton University published in Science last year.[11] To complement these estimates, we collected flood risk perception data via a detailed survey in 2013 of more than 1,000 homeowners who all lived in flood-prone areas in NYC. Based on the survey data, we estimated how individual risk perceptions related to risk indicators by experts by examining the degree to which people living in these areas over- or underestimated the likelihood of being flooded and the resulting damage.

Allowing for a 25 percent error margin around the experts' estimates, Figure 1 shows how individuals' perceptions of flood probability and flood damage compare. We found that while many overestimated the probability, most people underestimated the risk. With the expert risk data in hand, we are able to explain why they did so – it is not the likelihood of a flood happening, but the potential damage that is at stake here; a large majority of the residents in this flood-prone area (63 percent of them) underestimated the average damage a flood would cause to their house.[12]

We also did a series of statistical regression analyses to better understand how the perception of damage is influenced by other factors. We found that a high level of worry about floods, a higher income, and past experience with devastating floods result in higher expected damage, while low levels of education and high trust in local government's capability to handle floods for the community lead to lower expected flood damage. Unfortunately, a low level of education is rather typical of low-income areas, both in OECD and developing countries. The key take-away is that many people tend to believe a flood will not be that bad. Thus, improving flood risk awareness is critical to enhancing exposed communities' resilience (see Box 2).

Our main recommendation: individuals should be provided with objective data on the flood risk that they face, both the hazard probability and the expected impact, to enable them to understand what these estimates imply for the future safety of their property and

Figure 1: The percentage of repondents who correctly, under- or overestimate the flood probability and flood damage (25% error margin)



Sources: Botzen, Kunreuther and Michel-Kerjan, forthcoming in Judgment and Decision Making

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Box 2 – Key findings: divergence between individuals' perceptions and actual risks

Most of the literature on flood risk perception has focused on the probability of a flood, not the damage a flood can cause to individual residents' property. In a new study we found that the majority of people surveyed largely underestimate the extent of damage they will suffer from a flood. This can explain why many people do not voluntarily buy flood insurance or invest in ways to mitigate flood loss. Thus, providing better education for individuals on expected flood losses should become a priority.

assets, and how a severe flood might affect their household. Individuals who incorrectly believe that potential flood damage will be minor are likely to believe that purchasing insurance coverage or taking measures to mitigate damage will not be cost-effective.[13] This also means that insurance premiums must reflect the true risk to underscore the real exposure the policyholder faces. If premiums are artificially suppressed or subsidized, this can lead many people to believe their risks are lower than what they are in actual fact.

What do we know about residential flood losses and ways to reduce them?

In view of the need to educate people about flood risk on both risk dimensions, we are interested in improving public knowledge of residential flood damage, and providing specific recommendations as to what individuals can do to reduce their exposure. By performing geographic analyses of several flood losses over time, we will be in a better position to communicate about flood damage to individuals, who in turn would then better understand the risk they really face – and, we hope, better protect themselves. Insurance policies and claims provide a natural conduit to approach this question; data on flood insurance claims is a source of important information. But here, too, solid empirical analysis has been lacking. To the best of our knowledge, there has never been a systematic analysis of residential flood losses carried out and made public.

To address this need, the Wharton team and Resources for the Future, a U.S.-based non-profit research organization, have reviewed the flood insurance claims portfolio of the U.S. National Flood Insurance Program (NFIP) – more than 1 million claims over a 35-year period – and performed a number of analyses on this data.[14]

Keeping in mind that losses depend on the nature and value of the exposed assets that can vary widely from one region to another, we first examined the mean and median combined building and contents claims for single-family homes, in 2012 constant dollars (USD) by year, along with the number of paid claims and the rate of claims for different groups of policyholders (that is, the number of claims per year over the number of policies-in-force in that year in the entire NFIP portfolio). For all years, the mean claim payment in 2012 inflation-adjusted terms is just over USD 34,000, with a record high year at nearly USD 92,000 in 2005 (largely driven by the flooding that resulted from Hurricane Katrina in Louisiana, where houses below sea level were entirely destroyed when the levee system failed) (see Table 1). When we look at the entire distribution over all the years, we find that in 2012 dollars, half of claims are less than USD 12,500 and 75 percent are less than USD 41,000. The 99th percentile, however, is USD 310,240, demonstrating that some claims can indeed be truly catastrophic to homeowners.

> "Insurance premiums must reflect the true risk to emphasize the policyholder's real exposure."

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Table 1: NFIP claim statistics (2012 USD) for single-familiy homes over the period 1980-2012

Years	Mean claim	Median claim	Number of paid claims	Annual claim rate for single family policies	Annual claim rate for single-family policies in the SFHA	Annual claim rate for single-family policies outside the SFHA
1980-1989	$16,335	$7,735	228,275	2.30%	1.66%	3.44%
1990-1999	$21,795	$9,900	321,913	1.44%	1.56%	1.16%
2005	$91,911	$72,887	177,100	5.21%	6.16%	3.31%
2000-2009	$54,506	$21,740	456,255	1.36%	1.52%	1.06%
2012	$34,080	$20,000	105,434	2.15%	3.02%	1.09%
1980-2012	**$34,478**	**$12,555**	**1,199,274**	**1.45%**	**1.55%**	**1.27%**

Source: Kousky and Michel-Kerjan, forthcoming in Journal of RIsk and Insurance
Data from FEMA, U.S. Department of Homeland Security

We then observed that the average building claim as a percentage of value is almost 25 percent. Looking at the overall distribution of our main dependent variable – the building claim as a percentage of value – we find that half of claims are for less than 10 percent of the value of the building, roughly 15 percent of claims exceed 50 percent of the building's value, and approximately 7 percent exceed 75 percent.[15]

We then looked at the claim rate in a given year (that is, number of claims over number of flood insurance policies-in-force for the entire NFIP portfolio and for subsamples). This claim rate was compiled using the aggregate data from FEMA on policies-in-force by year, and combining it with NFIP flood insurance claims data. FEMA's maps distinguish special flood hazard areas (SFHAs) as those having high risk (1-in-100 year return period of flood) and outside the SFHAs as low risk zones (lower return period). But over all the years we find an average claim rate of 1.55 percent in SFHAs and a high 1.27 percent claim rate outside of SFHAs.

As such, FEMA's distinction between high and low risk seems fairly imprecise because claims in 'low risk' areas in fact have a higher return period than 100 years, on average. This lack of precision in demarcating areas as 'high' and 'low' risk no doubt contributes to a belief by some people residing in flood-prone areas that they are safer than they actually are. The high claim rate outside the SFHA could also reflect the fact that those who decide to insure are more exposed, or simply that flood maps are inaccurate.

Lastly, we compared characteristics of the houses that were flooded. Our findings (see Box 3) provide important empirical insights both on the amount of flood damage claims and on the effectiveness of individual protection measures in lowering flood loss. We hope these findings will be used widely to improve communication about flood risk and encourage discussion on ways to improve resilience.

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Box 3 – Key findings: flood insurance claim analysis
The mean flood insurance claim payment in 2012 inflation-adjusted USD is just over USD 34,000.

Half of the claims are less than the median USD 12,500.

Claim rates are found to be higher than 1 percent (1-in-100 return period) for both 'high risk' (55 percent higher) and 'low risk' areas (27 percent higher) (hazard classification defined by FEMA). This might demonstrate the artificial nature of the high/low risk zones.

Older properties built before flood maps were established and before federal floodplain management regulations were in place suffer 45 percent higher claims than those built after flood maps were established.

Claims for elevated buildings are 15 percent less than for non-elevated buildings.

Buildings with more than one floor have 30 percent lower claims compared with one-story buildings.

Conclusion and next steps

As flood disasters around the world affect more people and damage more assets, improving resilience to flood risk is critical. The Zurich flood resilience alliance is a multi-year effort to better understand community flood resilience and aid communities to effectively enhance their resilience to floods. To support this work, the alliance is developing a framework to measure the sources of community flood resilience. This method uses a '5 Capitals' (5C) approach to capture not just the physical and financial sources of resilience, but also the sources that are provided through human, social and natural capital.

As this Risk Nexus highlights, the perception of risk as well as the attitudes and culture surrounding the responsibility toward risk (for example, should one limit government disaster relief?) are important and perhaps pre-requisites for investing in the financial and physical protection. Interdependencies need to be considered as well. For example, social (including political) capital may need to be enhanced in the form of specific requirements that are put in place and legally enforced (e.g., building codes, elevating houses, not building in high-risk areas, etc.).

Risk perception is key to triggering actions. Through three new studies by the Wharton Risk Center team and their colleagues, we found that the majority of people underestimate the damage associated with a flood, even though it can be substantial, as a detailed analysis of more than 1 million flood insurance claims over 35 years reveals. While it is well known that individuals have a hard time dealing with the concept of probability, 'what if' scenarios can be a powerful communication tool to increase awareness about flood damage. We hope our efforts will motivate individuals exposed to flood risk to take a more pro-active approach.

It is important to explore the interaction between individual decision-making with regard to protection and buying insurance, and collective decision-making at a community level. This can be achieved by working with specific communities over time, as well as by analyzing the operation and effectiveness of dedicated programs designed to link flood risk awareness, community-level protection and insurance purchases.

> "Risk perceptions, attitudes and cultural views on risk must be considered when making any decisions to invest in protection."

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One such program is of particular interest to the alliance's work: the community rating system (CRS) in the U.S., established in 1990, which now has over 1,200 active communities. The CRS measures the flood preparedness of these communities. To the best of our knowledge, this system has no equivalent elsewhere in the world. By analyzing the strengths and limitations of the CRS, good practices and linking community-level activities to our 5C approach, we hope to further improve the way we effectively measure resilience and how progress can gradually be made in these and other communities.

Finally, governments around the world must also realize that the short-term political pressure placed on policymakers to deliver an ever-growing amount of government post-disaster relief has direct and long-lasting consequences. These include decreasing the demand for flood insurance and investment in physical protection even more than is already the case.

Already published

Several studies have been released as part of our ongoing effort:

Enhancing Community Flood Resilience: A Way Forward (May 2014) reviewed the flood resilience literature and proposed a new framework to measure resilience in a comprehensive manner using a 5 Capitals integrated approach. This is now being tested in several communities around the world, including through baseline surveys of residents to evaluate the starting point at which we begin to work with selected communities to increase their resilience.

http://opim.wharton.upenn.edu/risk/library/zurichfloodresiliencealliance_ResilienceIssueBrief_2014.pdf

Making Communities More Flood Resilient: The Role of Cost-Benefit Analysis and Other Decision-Support Tools (September 2014) provides a comprehensive review of the benefits and limitations of such an approach to guide flood risk resilience investments.

http://opim.wharton.upenn.edu/risk/library/ZAlliance-decisiontools-IB.pdf

Evaluating Flood Resilience Strategies for Coastal Megacities (May 2014) conducts a large-scale cost-benefit analysis of flood protection measures for the city of New York under current and possible future climate scenarios. Published in Science and awarded the 2014 Science of Risk Prize by Lloyd's.

http://www.sciencemag.org/content/344/6183/473

Central European floods 2013: a retrospective (June 2014) looks in detail at the major floods in 2013 and 2002 in central Europe and the impact they had on communities. It looks at what was learned. It draws conclusions and provides insights into what has changed since the 2002 flood, and where changes are still needed.

http://knowledge.zurich.com/flood-resilience/risk-nexus-central-european-floods-2013-a-retrospective/

Notes

[1] http://www.preventionweb.net/english/hyogo/gar/2015/en/gar-pdf/GAR2015_EN.pdf

[2] Swiss Re (2011). Natural Catastrophes and Man-made Disasters in 2010. Sigma: 1/2011.

[3] Miller, S., R. Muir-Wood and A. Boissonnade (2008). An exploration of trends in normalized weather- related catastrophe losses. Climate Extremes and Society. H. F. Diaz and R. J. Murnane. Cambridge, UK, Cambridge University Press; Stromberg, D. (2007). Natural Disasters, Economic Development, and Humanitarian Aid, Journal of Economic Perspectives, 21(5): 199-222.

[4] See: Kousky, C., E. Michel-Kerjan and P. Raschky (2015). Does Government Disaster Relief Crowd out Private Insurance? Wharton Risk Center working paper.

[5] See Kunreuther, H., R. Meyer and E. Michel-Kerjan (2013). Overcoming Decision Biases to Reduce Losses from Natural Catastrophes. Chapter 23 in Behavioral Foundations of Public Policy, E. Shafir (ed.) Princeton University Press.

[6] Siegrist, M., and H. Gutscher (2006). Flooding risks: A comparison of lay people's perceptions and expert's assessments in Switzerland. Risk Analysis, 26(4), 971-979.

[7] See Rowe, G., and G. Wright (2001). Differences in expert and lay judgments of risk: Myth or reality? Risk Analysis, 21, 341-356. Siegrist and Gutscher (2006) for literature reviews.

[8] Barberis, N.C. (2013). The psychology of tail events: Progress and challenges. American Economic Review, 103(3), 611-616; Carman, K. G., and P. Kooreman (2014). Probability perceptions and preventive health care. Journal of Risk and Uncertainty, 49: 43-71; Kunreuther, H.C., N. Novemsky, and D. Kahneman (2001). Making low probabilities useful. Journal of Risk and Uncertainty, 23(2), 161-186.

[9] NYC (2013). PlaNYC: A stronger more resilient NYC. New York City, Mayor's Office of Long Term Planning and Sustainability. http://www.nyc.gov/html/sirr/html/report/report.shtml

[10] U.S. Census Bureau, 2010. Geographic Terms and Concepts - Block. Accessed 23 July 2015 at https://www.census.gov/geo/reference/gtc/gtc_block.html

[11] Aerts, J.C.J.H., W.J.W. Botzen, K. Emanuel, N. Lin, H. De Moel, E. Michel-Kerjan (2014). Evaluating flood resilience strategies for coastal mega-cities. Science, 344, 473-475.

[12] Botzen, W., Kunreuther. H. and E. Michel-Kerjan, forthcoming, Divergence between Individual Perceptions and Objective Indicators of Tail Risks: Evidence from Floodplain Residents in New York City. Judgment and Decision Making.

[13] Botzen, W.J.W., and J.C.J.M. van den Bergh (2012). Monetary valuation of insurance against flood risk under climate change. International Economic Review, 53(3), 1005-1025.

[14] Kousky, C. and E. Michel-Kerjan, forthcoming, Examining Flood Insurance Claims in the United States, Journal of Risk and Insurance.

[15] When we exclude 2005 data, roughly 10 percent of claims exceed 50 percent of the building's value and only slightly more than 3 percent of claims exceed 75 percent of the building's value.

The Zurich flood resilience alliance

An increase in severe flooding around the world has focused greater attention on finding practical ways to address flood risk management. In response, Zurich Insurance Group launched a global flood resilience program in 2013. The program aims to advance knowledge, develop robust expertise and design strategies that can be implemented to help communities in developed and developing countries strengthen their resilience to flood risk. To achieve these objectives, Zurich has entered into a multi-year alliance with the International Federation of Red Cross and Red Crescent Societies, the International Institute for Applied Systems Analysis (IIASA), the Wharton Business School's Risk Management and Decision Processes Center (Wharton) at the University of Pennsylvania, and the international development non-governmental organization Practical Action. The alliance builds on the complementary strengths of these institutions. It brings an interdisciplinary approach to flood research, community-based programs and risk expertise with the aim of creating a comprehensive framework that will help to promote community flood resilience. It seeks to improve the public dialogue around flood resilience, while measuring the success of our efforts and demonstrating the benefits of pre-event risk reduction, as opposed to post-event disaster relief. Our collective goal is to work closely with a number of communities in need on the ground, and also to develop a body of new knowledge and expertise that can be applied much more broadly as we work with business leaders and policymakers alike in both OECD and non-OECD countries.

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