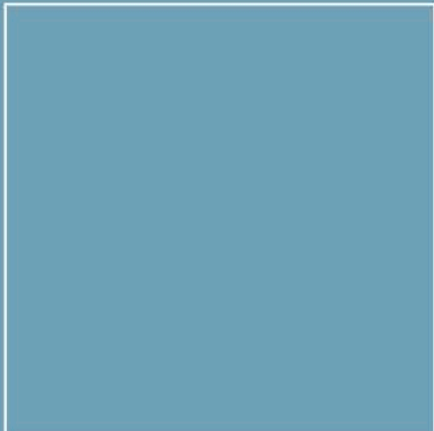
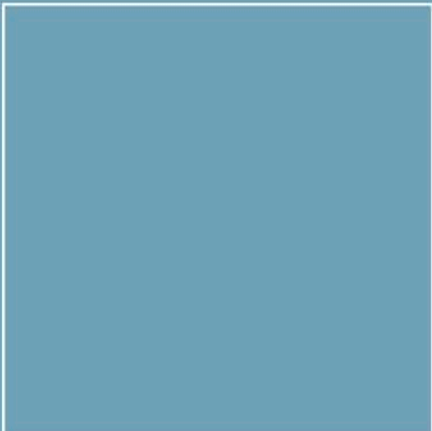


Managing risk  
through catastrophe  
insurance





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# TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>2</b>
<b>ABOUT INSURANCE BUREAU OF CANADA.....</b>	<b>3</b>
<b>1. THE LANDSCAPE IS CHANGING .....</b>	<b>4</b>
<b>2. THE MACROECONOMIC IMPACT OF DISASTERS .....</b>	<b>6</b>
OUTPUT AND GDP.....	6
FISCAL AND MONETARY PRESSURES.....	8
FINANCIAL STABILITY .....	9
<b>3. THE DISASTER RISK MANAGEMENT FRAMEWORK .....</b>	<b>11</b>
RISK ASSESSMENT.....	11
FINANCIAL MANAGEMENT.....	12
RISK REDUCTION .....	13
<b>4. THE ROLE OF INSURANCE .....</b>	<b>15</b>
IMPROVING ECONOMIC OUTCOMES .....	15
IMPROVING FISCAL OUTCOMES .....	16
<b>5. CONCLUSIONS.....</b>	<b>18</b>
<b>REFERENCES.....</b>	<b>19</b>



## EXECUTIVE SUMMARY

This paper offers an in-depth look at how insurance helps to lower the economic and fiscal costs of natural disasters. It demonstrates that insurance is an efficient and effective way to mitigate these impacts. The research presented here can help policy-makers, businesses and homeowners plan for disaster risk and make more informed risk management decisions.

We know the global risk landscape is changing. Climate change is generating more severe weather. Meanwhile, growth in populations and GDP in disaster-prone cities and regions continues unabated. As a result of these trends, the frequency and economic severity of natural disasters has soared over the last few decades.

Even in countries such as Canada that have been spared devastating natural disasters in recent history, the question is not whether large catastrophes will occur, but how extensive the damage will be and whether we, as a country, will be prepared.

The economic stakes are high. Our research shows that large natural disasters have a negative impact on economic conditions. A typical disaster lowers economic growth by around one percentage point and GDP by about 2%. But major catastrophes can have even more pronounced effects. The 1995 Kobe earthquake, for instance, reduced residents' GDP per capita by 13% over the long term.

In a disaster's aftermath, lost tax revenues and demands for relief and reconstruction aid place enormous fiscal strain on governments. On average, disasters increase governments' budget deficits by 25%. A disaster's local impact can also spread to the national economy, as insolvencies and loan defaults create a domino effect.

Insurance improves economic and fiscal outcomes via several channels. Before a disaster strikes, the pricing of insurance gives policyholders an incentive to reduce their exposures through risk mitigation measures. In the aftermath of disaster, insurance transfers the fiscal burden away from taxpayers onto the private sector and into international capital markets. It also limits financial contagion by restoring supply chains and stalled business operations faster, while providing needed liquidity and certainty in business and financial planning.

Canadians need solutions to mitigate the impact of more frequent and costly natural disasters. Governments, businesses and households should consider the demonstrated benefits of insurance to manage this looming challenge.



## **ABOUT INSURANCE BUREAU OF CANADA**

Established in 1964, Insurance Bureau of Canada (IBC) is the national industry association representing the Canadian private property and casualty (P&C) insurance industry. Our members account for over 90%, by premium volume, of private auto, home and commercial insurance sold in Canada.

The P&C insurance industry employs over 118,600 Canadians, pays more than \$7 billion in taxes to the federal, provincial and municipal governments, and has a total premium base of \$46 billion, approximately half of which is derived from automobile insurance.

IBC's role is to be active on behalf of its members. IBC does this by:

- Forecasting and responding to issues that may arise in the industry;
- Anticipating opportunities to identify, shape and influence change in support of members' business needs; and
- Lobbying the federal and provincial governments to secure changes in public policy and in the business-operating environment that will benefit insurance companies and their customers.

IBC works on a number of fronts to increase public understanding of home, car and business insurance. Public understanding is also fostered through IBC's five regional consumer information centres, where trained personnel with many years of industry and government relations experience answer tens of thousands of consumer inquiries each year.



# 1. THE LANDSCAPE IS CHANGING

In recent years, natural catastrophes have increased in frequency and severity. Since the 1970s, the average number of natural catastrophes worldwide per year has grown by almost 250% – from 39 in the 1970s to 136 in the 2000s<sup>1</sup>. Of the 25 costliest disasters since 1970, 14 have occurred since 2001<sup>2</sup>.

Several factors contribute to these trends. Growing evidence suggests that climate change is increasing the number of weather-related events such as hurricanes, droughts and floods.

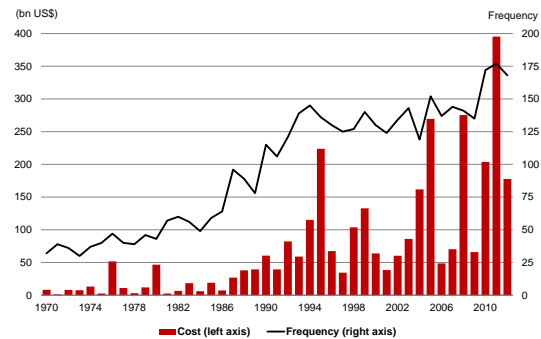
Meanwhile as global growth continues, a growing share of the world’s population and economic output is being concentrated in disaster-prone cities and regions. The United Nations expects that 6.3 billion people, or 68% of the world’s population, will reside in cities by 2050. Many of these cities are located near coasts, floodplains and fault lines, and are therefore vulnerable to floods, storms, earthquakes and other natural hazards.<sup>3</sup>

Global catastrophes have increased by **250%** since the 1970s

The result is that any given disaster now tends to exact a higher economic toll. During the 1990s alone, catastrophes had a more

devastating impact on insurers than in the whole history of insurance prior to that<sup>4</sup>.

**Figure 1: Global catastrophes are increasing in frequency and cost**



Source: IBC, using data from Swiss Re (sigma explorer database)

These global trends can also be observed in Canada.

Between 1970 and 2013, the federal government earmarked a cumulative total of \$8.4 billion in financial assistance for disasters under its Disaster Financial Assistance Arrangements (DFAA). Of this, only 30% was paid out during the first 30 years of the program while the remaining 70% was concentrated within the past 13 years. As a result, the financial cost of disaster assistance skyrocketed. Annual DFAA spending has jumped from an average of \$36 million a year in the 1970s, to \$166 million in the 2000s, to well over \$1 billion a year in the first four years of this decade<sup>5</sup>.

The message is clear: policy-makers need to better understand the economic and fiscal

<sup>1</sup> Swiss Re, sigma explorer database. Available online: <http://www.sigma-explorer.com/>

<sup>2</sup> (Kunreuther & Michel-Kerjan, 2010)

<sup>3</sup> (Swiss Re, 2013a)

<sup>4</sup> (Kunreuther & Michel-Kerjan, 2010)

<sup>5</sup> IBC’s analysis on Public Safety Canada DFAA data. Figures in 2012 dollars.



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costs of natural catastrophes, and how these costs can be mitigated.

Although the existing disaster management literature emphasizes the importance of financial preparedness, there is little formal research on the role of insurance in reducing the economic and fiscal consequences of natural disasters.

The purpose of this report is to fill this gap by identifying the macroeconomic impact of disasters (Section 2), and using the disaster risk management framework (Section 3) to explore how insurance and reinsurance can be leveraged to mitigate these costs and improve our resiliency to natural catastrophes.



## 2. THE MACROECONOMIC IMPACT OF DISASTERS

There is a growing literature on the macroeconomic impacts of natural disasters. In this section, we combine expectations based on mainstream economic theory with a review of the available evidence to quantify the fiscal and economic effects of major catastrophes.

Our starting consideration is that the opportunity cost of financial preparedness has increased considerably over the last few decades.

The average annual inflation-adjusted economic cost of disasters has soared by over 400% over the past three decades – from \$25 billion in the 1980s to \$130 billion in the 2000s<sup>6</sup>.

### The economic cost of disasters has soared by **400%** since the 1980s

This is mostly due to increasingly severe weather affecting disaster-prone urban areas characterized by high-density populations and high-value assets.

#### Output and GDP

In the short-term aftermath of a disaster, factors of production are fixed due to supply constraints and interrupted trade flows. Output is lost, and inflation erodes the demand-boosting effect of government expenditure on response and reconstruction efforts.

As factors of production adjust to excess demand, inflation levels out and new

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<sup>6</sup> (Swiss Re, 2013b)

investment contributes to output growth. The faster the economy can bounce back, the lower the long-term impact on growth.

Although this result varies depending on the type and severity of disaster<sup>7</sup>, major catastrophes have always been harmful to macroeconomic growth<sup>8</sup>.

### “Economic losses from disasters are **out of control**”

UN Secretary-General (2013)

The impact on the level of economic output is unequivocally negative. Despite significant government spending to fund reconstruction efforts, the 1995 Kobe earthquake reduced residents’ per capita GDP by 13% over the long term<sup>9</sup>.

Likewise, the Hawaiian island of Kauai permanently lost 12% of its population, and a similar share of its income, 17 years after the 1992 hurricane Iniki<sup>10</sup>.

More generally, evidence from 6,700 tropical cyclones shows that a 1-in-10-year event reduces long-run GDP by 7.4% and a 1-in-100-year event depresses it by 14.9%<sup>11</sup>.

A similar trend is visible with respect to the rate of output growth. Between 1970 and 2005, the GDP growth rate in U.S. coastal counties

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<sup>7</sup> (Skidmore & Toya, 2002)

<sup>8</sup> (Hochrainer, 2009); (Fomby, Ikeda, & Loayza, 2009)

<sup>9</sup> (DuPont & Noy, 2012)

<sup>10</sup> (Coffman & Noy, 2009)

<sup>11</sup> (Hsiang & Jina, 2014)



dropped by 1.5 percentage points during a “hurricane year” – a large effect, given that the average county growth rate was less than 1.7% over the same period<sup>12</sup>.

By the same token, GDP growth in eastern Caribbean countries saw an immediate drop of 2.2 percentage points in the wake of the 12 major disasters affecting the region between 1970 and 2002<sup>13</sup>.

While this effect is typically strongest in the short run, in many cases long-term growth prospects can also be severely dampened, dwarfing, by orders of magnitude, the short-term impact. Indeed, a typical (median) disaster that lowers a country’s GDP growth by 0.7 percentage points within the first year results in a cumulative longer-term output loss of about 1.7%<sup>14</sup>.

Such long-run effects depend in large measure on the extent to which immediate direct losses can be contained to avoid contagion to the rest of the economy.

## In the wake of hurricane Katrina, each dollar in direct losses led to an additional 39 cents in indirect losses

This is clear when looking at evidence on the impact of hurricane Katrina in 2005, where each dollar in direct losses incurred led to an additional 39 cents in indirect losses<sup>15</sup>.

This multiplier effect between direct and indirect losses can compound the immediate

macroeconomic losses over the longer term. For instance, factories, machinery and equipment lost to a disaster can turn an immediate GDP impact of only -0.5% into a reduction of 4% five years after the event<sup>16</sup>.

The literature on the macroeconomic impact of disasters, however, can sometimes be ambiguous. In some cases, moderate disasters are shown to have little or even positive effects on economic variables<sup>17</sup>. Five considerations explain this seemingly counterintuitive result.

First, investment for reconstruction is measured in GDP (a flow), but the destruction of physical capital (a stock) is not. As a result, the accounting dictates that replacing lost capital can artificially increase GDP in the aftermath of a natural disaster.

Second, some macroeconomic studies adopt a low threshold for what counts as a “disaster” and/or aggregate disasters of disparate types and magnitudes. These methods can mask the true impact of severe catastrophes.

Third, several studies examined the macroeconomic effects of disaster at the country level, even though the impact is typically localized at the regional or provincial level.

Fourth, given the difficulty in identifying a counterfactual outcome (“What would growth have been in the absence of a disaster?”), many studies fail to account for the effect of omitted, unobserved variables.

Finally, growth could actually be increased if lost capital is replaced with newer and more productive technologies. However, evidence for this productivity effect is not systematic,

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<sup>12</sup> (Strobl, 2008)

<sup>13</sup> (Rasmussen, 2004)

<sup>14</sup> (Von Peter, Von Dahlen, & Saxe, 2012)

<sup>15</sup> (Hallegatte, 2008)

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<sup>16</sup> (Hochrainer, 2009)

<sup>17</sup> (Fomby, Ikeda, & Loayza, 2009)





and even when it does occur, quantifying the net impact on growth is challenging.

## Fiscal and monetary pressures

Natural disasters can also pose a major issue for public finances and debt sustainability.

When a catastrophe strikes, public finances take a two-pronged hit. Economic activity contracts, reducing both current and future tax revenues. At the same time, government expenditure expands to fund emergency relief and reconstruction efforts.

While the magnitude of the fiscal effect varies when different statistical methods and disaster types are examined<sup>18</sup>, the budgetary impact of extreme events is typically significant.

It has been estimated that between 1975 and 2008, in both high- and medium-income countries, disasters have, on average, raised government expenditures by 15% and lowered revenues by 10%, leading to a combined 25% increase in budget deficits<sup>19</sup>.

On average, disasters increase budget deficits by **25%**

Adding to that, under today's fiscal constraints, monetary considerations can further magnify the cost of government stimulus spending.

Economies with significant public debt often face higher borrowing costs, making recourse to capital markets a significant burden on

taxpayers, and further dampening long-term growth.

This is evident when looking at developed economies, where large disasters have been estimated to lower government revenues by 3% of GDP and increase outstanding debt by over 8% of GDP<sup>20</sup>.

Similar evidence is also available from Caribbean countries where, within only three years of each event, large disasters have increased the public debt-to-GDP ratio by 6.5 percentage points<sup>21</sup>.

In any event, the net fiscal impact will largely depend on the extent to which losses are absorbed by the private insurance sector.

Over the past two decades, only 20% to 40% of economic losses from disasters were covered by insurance<sup>22</sup> – with the remaining 60% to 80% falling on taxpayers.

With disaster losses largely shouldered by taxpayers, there is a risk that more frequent and costlier climatic events will put unsustainable fiscal pressures on governments.

Due to under-insurance, **60-80%** of economic losses are borne by taxpayers

Reversing this trend will require transferring a larger share of disaster costs to the private sector, through insurance and other risk financing mechanisms.

<sup>18</sup> (Lis & Nickel, 2009); (Heipertz & Nickel, 2008)

<sup>19</sup> (Melecky & Raddatz, 2011)

<sup>20</sup> (Noy & Nualsri, 2011)

<sup>21</sup> (Rasmussen, 2004)

<sup>22</sup> (Swiss Re, 2013b)



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This point was made by UN Secretary-General Ban Ki-moon, who at the launch of a 2013 report on disaster risk reduction<sup>23</sup> noted that “economic losses from disasters are out of control and can only be reduced in partnership with the private sector”<sup>24</sup>.

## **Financial stability**

Inadequate risk transfer and risk financing can also turn economic interconnectedness from an engine of growth into a threat to financial stability.

Disaster losses can spread across different sectors of the economy in a systemic domino effect.

For example, a large earthquake can devastate a region’s housing stock. If affected properties are uninsured, mortgage holders can find themselves with negative home equity and a strong incentive to default on their debt. Under this scenario, the consequences for the banking sector could be overwhelming, as the recent financial crisis in the U.S. has demonstrated.

What’s more, as banks’ balance sheets deteriorate, credit availability shrinks, stalling recovery and potentially leading to systemic insolvencies across the country through a network of credit and lending relations.

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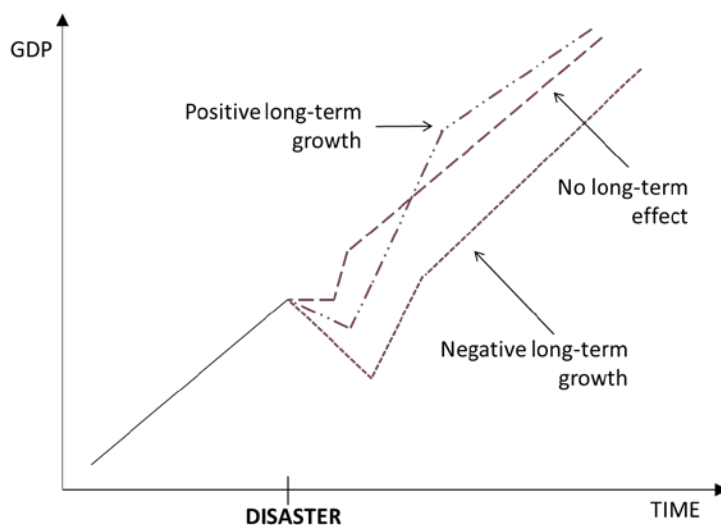
<sup>23</sup> (UNISDR, 2013)

<sup>24</sup> United Nations Office for Disaster Risk Reduction, Press Release 2013/15



## The theory of disasters and growth

While there is general agreement that, in the short run, disasters cause significant macroeconomic damage, in theory, a disaster could send an economy along three divergent long-term growth paths.



Source: IBC, adapted from Hochrainer (2009)

The compounding of direct and indirect losses in physical and human capital could place an economy on a permanently slower growth track. Although it will eventually return to its average long-run growth trajectory, growth will long remain below its counterfactual scenario (where the disaster never occurred).

On the other hand, rebuilding in the wake of a disaster could result in old, worn-out capital being replaced with newer and more productive technologies, machinery, factories and equipment. This “creative-destruction” process could place the economy on a permanently higher growth path. Even when this happens, however, the financial and opportunity cost of upgrading the lost infrastructure can be significant, and the net effect is unclear.

A third possibility is that the two effects cancel each other out, with no significant impact on long-term growth trends.

Theoretically, it is impossible to know which of these scenarios will ultimately prevail, but the empirical literature suggests that the growth impact of large catastrophes is typically negative<sup>25</sup>.

<sup>25</sup> (Hochrainer, 2009); (Fomby, Ikeda, & Loayza, 2009)



### 3. THE DISASTER RISK MANAGEMENT FRAMEWORK

Disaster risk management (DRM) is a tested methodological framework developed around the world and implemented by international institutions, including the World Bank, the G20 and the Organisation for Economic Co-operation and Development (OECD)<sup>26</sup>.

#### The DRM Framework



DRM involves identifying, assessing and reducing the risks associated with catastrophes to maximize a country's disaster resilience.

At its core, DRM encompasses three functions:

- i. Risk assessment ("what is the nature and scope of the risk and its expected impact?");
- ii. Financial management ("do we have the resources to manage the financial consequences of a disaster?"); and
- iii. Risk reduction ("what can we do now to prepare for, prevent and mitigate the risk?").

A robust DRM strategy enables policy-makers to reduce the macroeconomic losses caused by natural catastrophes.

#### Risk assessment

It's no surprise that effective disaster management starts with an assessment of the risk. What's more remarkable – and increasingly acknowledged by decision-makers around the world – is that insurers should play a central role in both the identification and evaluation of disaster risk.

Historically, this function has been largely dominated by geologists, climatologists, seismologists and other members of the scientific community. While their contribution to understanding the nature of hazards is paramount, their perspective and analytical methods are guided by the natural sciences.

Insurers, on the other hand, use actuarial sciences and stochastic modelling to both evaluate the likelihood of a given disaster and quantify the scope of its economic impact, building on a detailed catalogue of assets and business activities exposed to each hazard.

#### Insurers play a central role in the identification and evaluation of disaster risk

To be effective, risk assessment ought to integrate both perspectives, combining a scientific understanding of each hazard with the quantification of associated physical and monetary impacts.

This is the approach that IBC is undertaking as part of an effort to improve Canada's resiliency to earthquake risk<sup>27</sup>.

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<sup>26</sup> (G20 & OECD, 2012)

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<sup>27</sup> (AIR Worldwide, 2013)



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## Financial management

Once the risk is known and quantified, the next step is to put in place mechanisms and plans to proactively manage its expected financial impact.

Risk transfer involves allocating disaster risk to the party best positioned to deal with it.

As a general rule, government intervention is warranted only when private markets fail to provide a welfare-enhancing service.

This is, however, not the case with disaster risk management, where the private insurance sector has the ability and expertise to provide the necessary financial protection.

## Insurance can transfer disaster risk from taxpayers to global capital markets cheaply and efficiently

Not only do insurers have access to international reinsurance and capital markets, enabling them to cheaply diversify risk across different geographies and stakeholders, they also have an incentive to ensure this is done as cost-effectively as possible.

Moreover, insurers, unlike governments, are experts in claims adjusting and loss compensation. This expertise can limit the time and transaction costs associated with post-disaster reconstruction and recovery.

Yet, governments still have a role to play<sup>28</sup>, by providing the institutional arrangements necessary to ensure insurance markets are functioning well.

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<sup>28</sup> (Cummins, 2006)

At the most basic level, this is about establishing a well-oiled regulatory regime. In some cases, as with the management of extreme (or “tail”) catastrophe risk, it may involve introducing government backstops or national reinsurance pools. Governments can also address the needs of low-income people by subsidizing the take-up of essential insurance coverage in high-risk regions and by ensuring basic financial relief.

In the absence of adequate risk transfer to the private insurance market, governments are left to self-insure in preparation for a disaster.

Whether it involves actual prefunding or setting up contingent liabilities, this type of self-insurance is hardly an efficient use of scarce public funds.

Private insurance, through mechanisms such as reinsurance and catastrophe bonds, can spread local risks globally, whereas self-insurance leaves taxpayers bearing the full cost of disaster exposure<sup>29</sup>.

Government self-insurance can also unintentionally lock an economy into an environment of low growth and sluggish recovery. Economic and business recovery is indeed “more likely [...] where governments have the capacity to invest in reconstruction or where they have risk financing measures in place that cover most contingencies”<sup>30</sup>.

Finally, in addition to delivering a more efficient vehicle for risk transfer and risk financing, private insurance typically provides consumers with actual loss compensation. By contrast, government disaster assistance is often limited to basic subsistence relief or capped compensation, which is often

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<sup>29</sup> (Cummins, 2006)

<sup>30</sup> (UNISDR, 2013)



inadequate to offset the losses resulting from catastrophic events<sup>31</sup>.

## Risk reduction

The need for risk reduction is obvious, and it becomes increasingly important in the context of changing weather patterns.

Erratic fluctuations in climatic and weather trends introduce an element of uncertainty into the financial management of disaster risk.

Risk transfer and risk financing solutions that are developed today may become obsolete in less than a decade if the frequency and severity of the underlying risk changes significantly.

Avoiding this invariably requires a focus on preplanning – complementing financial risk management with risk reduction, mitigation and adaptation measures.

Public education plays a critical role in this process. Indeed, the OECD has argued that public awareness of natural hazards and disaster risk reduction education constitute “a foundation and prerequisite” for effective catastrophe risk management strategies at the national and regional levels.<sup>32</sup>

Other effective preplanning methods include changing consumer behaviour, implementing early warning systems, improving building codes and investing in new, resilient public infrastructure.

Although quantifying this effect is challenging, we know that risk reduction works and that the

return on investment is noticeable,<sup>33</sup> especially when coupled with insurance<sup>34</sup>.

In the U.S., for example, each dollar spent to mitigate flood risk was estimated to reduce future costs by as much as \$4<sup>35</sup>. Similarly, modelling insured losses in U.S. hurricane states suggests that mitigation can reduce losses by up to 61%<sup>36</sup>.

Moreover, investment in adaptation is not only effective, but can be rather inexpensive, too.

The cost to build a new house that is adapted to climate change for its life cycle, for example, doesn't typically add more than 5% to front-end building costs<sup>37</sup>. Even a simple \$200 investment to install a backflow valve can avoid repair costs of anywhere from \$15,000 to \$20,000<sup>38</sup>.

## Insurance provides the risk mitigation incentives that public disaster assistance programs lack

Unfortunately, implementation is often hindered by a lack of incentives and a combination of consumer myopia, inertia and moral hazard (i.e. the tendency to take fewer precautions when others bear the risk).

As we are learning, though, removing these barriers to cost-effective risk reduction can be

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<sup>31</sup> (Raddatz, 2009)

<sup>32</sup> (OECD, 2010)

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<sup>33</sup> (Moench, Mechler, & Stapleton, 2007)

<sup>34</sup> (Kleindorfer & Kunreuther, 1999)

<sup>35</sup> (National Institute of Building Sciences, Multihazard Mitigation Council, 2005)

<sup>36</sup> (Kunreuther & Michel-Kerjan, 2010)

<sup>37</sup> (Feltmate & Thistlethwaite, 2012)

<sup>38</sup> (Feltmate & Thistlethwaite, 2012)



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as simple as encouraging insurance take-up – making negligent individuals bear the true cost of the risk they are exposed to.

This is because insurance premiums, policy limits, exclusions and deductibles are a function of the underlying risk exposure.

As such, the structure of insurance encourages consumers to reduce their exposure to specific hazards through risk mitigation measures – whether through retrofitting their homes, installing a backwater valve or even moving out of disaster-prone areas.

By contrast, public disaster relief assistance programs provide no such incentive.

To the contrary, expectations that government will fund post-disaster reconstruction may lead to consumers making, on balance, riskier choices – such as building homes on a flood plain – that could otherwise be avoided.



## 4. THE ROLE OF INSURANCE

The literature on the interplay of insurance and the macroeconomic impacts of natural disasters is still nascent. In this section, we look at existing evidence from both systematic and case-study data to demonstrate how insurance minimizes the fiscal and economic costs of natural disasters.

The central intuition is that a country's ability to manage the financial impact of natural disasters depends in large measure on how well-insured it is<sup>39</sup>.

This is because insurance is a fundamental tool for assessing, managing and mitigating disaster risk, reducing the overall macroeconomic and fiscal impacts of catastrophes. It does so through four main channels.

First, it reduces the aggregate value of disaster costs by (i) transferring risk away from taxpayers, (ii) financing that risk more efficiently and (iii) encouraging consumers to plan ahead to reduce that risk.

Second, it allows governments to focus on their core business, freeing up public funds and speeding up response efforts.

Third, it allocates reconstruction capital to properties and businesses that stand to benefit the most from it – as they were deemed valuable enough to insure in the first place.

Lastly, it quickly channels funds to the affected parties, limiting supply chain interruptions and leading to faster reconstruction and resumption of economic activity.

Following the 2011 Tohoku earthquake and tsunami in Japan, for instance, the swift payment of insurance was among the first types of relief to reach the disaster area, and the industry settled over 90% of the reported claims in the first three months after the event.<sup>40</sup>

### Improving economic outcomes

For many countries, statistical data on the take-up of catastrophe insurance are scarce, which limits the availability of applicable evidence. When this is the case, differences in a country's economic development can provide a helpful proxy, as the maturity of insurance markets tends to increase with income levels and economic development.

Several studies found that the macroeconomic damage inflicted by natural disasters is significantly greater in developing economies than in developed economies<sup>41</sup>.

Although other variables contribute to explaining this gap – including capital availability, better mitigation measures, more stringent building codes and resilient infrastructure – this difference is partially explained by the fact that, in developed economies, the private insurance market absorbs a larger share of disaster losses and enables a more efficient recovery.

These results are a sombre reminder of the moral and economic imperative to build disaster resilience in the developing world, particularly in light of evidence that climate

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<sup>39</sup> (Lloyd's & Centre for Economics and Business Research, 2012)

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<sup>40</sup> (Geneva Association, 2013)

<sup>41</sup> (Raddatz, 2009); (Fomby, Ikeda, & Loayza, 2009); (Noy & Nualsri, 2011)





change's effects will disproportionately affect developing regions.

## The impact of natural disasters is smallest where insurance take-up is highest

Despite the limited data availability, a handful of studies are methodologically robust and offer compelling conclusions on the relationship between insurance penetration and the macroeconomic impact of disasters.

One of the most comprehensive studies of this type – examining industry data on insured losses through 8,252 observations for 203 jurisdictions and 2,476 major natural catastrophes between 1960 and 2011 – demonstrated that the impact of natural disasters is smaller in countries with high levels of insurance take-up<sup>42</sup>.

The authors found that the macroeconomic costs of disasters are largely driven by the uninsured component of catastrophe losses, while insured events are inconsequential in terms of foregone output – even when controlling for differences in economic development of countries.

The study also determined that the strongest growth-enhancing effects from insured losses appear in the three years following a catastrophe – corresponding to the average timing of insurance payouts – suggesting that insurance facilitates reconstruction efforts.

## Improving fiscal outcomes

We just saw how insurance alleviates the macroeconomic cost of disasters. This, in turn, has a direct positive effect on governments' fiscal objectives.

In the immediate aftermath of a disaster, less unplanned government expenditure will need to be allocated toward reconstruction and relief.

On top of that, over the medium term, faster growth recovery means tax revenues will bounce back more swiftly, further reducing the pressure on public finances.

This is borne out by the evidence. Countries with relatively low insurance penetration suffer both larger GDP declines and greater deficit increases than countries where insurance plays a larger role in the financial management of disaster risk<sup>43</sup>.

According to World Bank research, “the availability of insurance seems to dampen the impact of disasters by taking some of the losses and helping the government to focus fiscal expenses on the remaining un-hedged risks.”<sup>44</sup>

## Countries with low insurance penetration suffer larger GDP declines and greater deficit increases

Higher insurance take-up also relieves governments from the obligation to self-insure against disaster risk.

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<sup>42</sup> (Von Peter, Von Dahlen, & Saxe, 2012)

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<sup>43</sup> (Melecky & Raddatz, 2011)

<sup>44</sup> (Melecky & Raddatz, 2011)



This is often costly, as governments only have recourse to local taxpayer funding or debt finance, while insurers can globally diversify their exposure to damaging low-frequency, high-severity events<sup>45</sup>.

It is also a less efficient means to manage risk<sup>46</sup>, as public funds allocated to disaster recovery leave less capital to stimulate public investment, consumption, and recovery.

On the other hand, where insurance is responsible for providing loss compensation to businesses and individuals, governments can focus on their core business: delivering effective emergency response services, providing subsistence relief to low-income households and rehabilitating public infrastructure<sup>47</sup>.

What's more, in the absence of adequate risk transfer to the private insurance sector, the cost of disasters borne by taxpayers can actually exceed overall losses<sup>48</sup>. This is because a greater share of losses falls on government, which may rebuild to a better standard instead of providing loss compensation as in the case of private insurance.

Insurance also has the potential to decrease a country's risk profile, improving its credit rating, lowering its borrowing costs and contributing to its monetary stability.

Although most credit rating agencies currently do not rigorously account for a country's exposure to climatic or catastrophe risk, the increasing frequency and severity of natural

disasters will likely make it a more significant factor in the near future.

For example, Standard & Poor's credit rating methodology already accounts for a country's disaster risk profile as part of its economic volatility and "event risk" assessment.

Similar to the treatment of political risk, a severe natural catastrophe could "lead to a material deviation from [a country's] indicative rating level depending on the extent of damage and the effect on the country's fundamentals" and its economic score would be negatively affected "if economic activity were vulnerable due to constant exposure to natural disasters or adverse weather conditions"<sup>49</sup>.

## With low insurance take-up, taxpayer costs can actually exceed overall disaster losses

Overall, compared to insurers, government spends more, less efficiently and at a greater financial and opportunity cost.

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<sup>45</sup> (Cummins, 2006)

<sup>46</sup> (Lloyd's & Centre for Economics and Business Research, 2012)

<sup>47</sup> (Melecky & Raddatz, 2011)

<sup>48</sup> (Lloyd's & Centre for Economics and Business Research, 2012)

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<sup>49</sup> (Standard & Poor's, 2013)



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## 5. CONCLUSIONS

The global risk landscape has evolved. As climate change generates more severe weather and populations and economies cluster, the cost of natural disasters will continue to increase. In light of these trends, governments, businesses and households must re-evaluate how they plan for disasters and develop solutions to mitigate their financial impact.

Indeed, the research surveyed in this paper shows that the macroeconomic impact of disasters can become unsustainable and affect a region's economic performance. But our research also reveals a compelling solution to these challenges in the form of insurance.

Private insurance take-up mitigates the economic and fiscal impacts of a disaster because it provides incentives to reduce exposure, transfers the fiscal burden away from taxpayers and restores supply chains and stalled business operations faster. Insurance also relieves governments of the need to self-insure for disasters and allows them to instead focus public funds on emergency response efforts.

No country can escape the new normal of more frequent and costly natural catastrophes. As we saw with the recent floods in southern Alberta – which added about \$2 billion to the federal deficit – these trends are already affecting Canadians. Canada should consider the demonstrated benefits of insurance as they face the coming storms.



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