

**DEALING WITH THE AXIS OF FINANCIAL
DESTRUCTION: DEMOGRAPHICS,
DEVELOPMENT AND DISASTERS**
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ABSTRACT

Core to the insurance system's contribution to economic efficiency is funding, pricing, and diversifying risk. This paper focuses on one major aspect of that contribution, the funding of losses from large natural disasters through the global reinsurance system and capital markets. Generally, the larger the number of independent risks which can be pooled, the lower the cost of risk transfer. Thus, Florida, California, and Japan, which represent "peak" exposures in 2009, carry a high "risk load". Australia, on the other hand, can pool its risk with many other places, reducing the cost of its risk transfer. Other markets with the potential to generate huge losses, such as China, still enjoy relatively low risk transfer costs due to low insurance penetration and limited insurable values. This paper examines how factors such as economic growth and changes in insurance penetration may alter the current profile of global risk diversification over the next several decades. Over time, the relative price of risk transfer in various locations will shift, with implications for insurers, governments, and consumers in many countries. The paper closes with a discussion of how the coming demographic changes may affect how public policy planners view building codes and loss mitigation strategies.

INTRODUCTION

The global reinsurance system is a key mechanism for both diversifying risk and funding extreme events. Regions represent different sized exposures to the global pool, affecting the level of funding required and its cost. Major contributors to the insurance system's exposure include the nature of natural perils, the quality of construction, the size of the population in harm's way, and the level of insurance penetration.

What factors drive changes in catastrophic loss exposure over time, and what drives which locations will become peak zones? These questions are important as they help determine how global resources are allocated to support the international reinsurance system. The total cost for risk transfer is a function of two main drivers: the raw exposure to loss and the capital charge associated with risk transfer. These components can shift over time. Indicated loss cost, as measured by Average Annual Loss (AAL), can change due to better modeling and improvements in underlying data. Capital charges can change as the places considered peak zones shift due to patterns in economic activity, population, and insurance penetration. History has shown in Florida that both the magnitude and cost of financing losses can change dramatically over a relatively short period of time. This paper will examine drivers which will affect the global financing of catastrophic losses will over the next 40 years. We will construct a hypothetical base global reinsurance market in 2009, and then use techniques developed to normalize historical losses in the United States for demographic changes to speculate about how the global risk financing picture may change by 2050.

Readers will note that we have deliberately masked some data and summarized findings, as this exercise involves extrapolating how the world may look in 40 years from a 2009 base developed from limited data and models. We do not want to imply a false sense of accuracy, as any attempt to forecast trends over several decades is prone to significant forecast errors. Thus, it is important to focus on large scale trends and relativities rather than specific forecasts of losses in this exercise. We will start with a brief discussion of Florida, which represents a “perfect storm” of difficulties arising from demographics, development, and disasters.

PROLOGUE: A CASE HISTORY IN FLORIDA

The power of demographic forces in driving the cost of natural disasters is clearly seen in the history of Florida, which went from a largely undeveloped agricultural state into one of the world's peak zones for natural catastrophes in a generation. This transformation reflected four key drivers: high exposure to loss, lack of sophisticated actuarial tools to measure risk in past decades, rapid development in a period of increasing wealth, and inadequate investment in loss mitigation. First, the state has a high exposure to loss. A large proportion of landfalling hurricanes in the United States affect Florida, including the most severe. The state has a long coastline and is very flat, offering little protection against storms. Second, in the decades before Hurricane Andrew (1992) actuaries lacked the tools to properly measure and price for risk. For example, in the late 1980s Florida property insurance prices were set using the “excess wind procedure”. It is useful to review this process to understand how radically actuarial techniques have changed in just 20 years.

The 1980s was an era with very limited computer technology and databases that were often little more than statewide aggregations of losses. Statewide loss data was accumulated by year and separated into wind and non-wind components. A ratio of wind to non-wind losses was calculated for each year over a long time period. If in any year this ratio exceeded a threshold value (perhaps two standard deviations above the mean), the “excess” losses were removed and averaged over a much longer period. An “excess wind factor”, reflecting long term average ratios of excess wind to normal losses, was calculated. This factor was then weighted with a regional factor reflecting many US states and applied to normal capped losses to yield an estimate of total expected losses in an “average” year, forming the basis for property insurance rates. The method makes several assumptions about the 20-30 year period used in the “excess” calculation:

- Catastrophic activity was “normal”.
- Population demographics were stable.
- Insured losses by peril were stable.
- Changes in coverage or construction practices did not affect the ratio of wind to non-wind losses.

Each of these assumptions was violated in the 20-30 year period ending in the late 1980s. Worse yet, the method failed to account for critical differences in loss exposure between individual risks, such as:

- Geography: eg. areas right on the coast vs. those 10 or 20 miles inland.

- Construction: eg. masonry vs. wood frame.
- Coverage: eg. actual cash value vs. replacement cost settlement.

In 1992 a US rating bureau, the Insurance Service Office, calculated an excess wind factor of 1.14 for Florida Homeowners coverage, which would have generated approximately \$80 million in catastrophe premiums for the entire Florida insurance industry annually. Current modeled estimates of the needed revenue for catastrophes based on 1992 exposure levels are at least 10-20 times that amount. In 1992 it was possible to buy hurricane coverage for a USD 113,000 structure in Miami Beach for USD 15 a month from the Florida Windstorm Underwriting Association.

The magnitude of the difficulties estimating loss exposure illustrates both how severe errors can be made in forecasts and the impact new technology can have on our perception of risk. The primary effect of limited tools and data in the 1980s was a significant underestimation of risk. This led insurers to offer more coverage than they could support, with overly generous terms and inadequate prices. This contributed to the third and fourth problems in Florida, rapid development and inadequate investment in loss mitigation.

According to the US Census Bureau, between 1950 and 1990 Florida's overall population increased 367%, from 2.8 million to 12.9 million. The growth was not uniform, with much of it occurring in the most catastrophe prone part of the state near Ft. Lauderdale and Miami. This period was also one of rapid wealth accumulation as the US emerged from the post-World War II era to post stunning economic growth. Thus, in 40 years the value of property exposed to severe hurricanes exploded. This was also a period of below average hurricane activity due to the well-established Atlantic Multi-Decadal Oscillation. Consumers, government, and insurers were lulled into a false sense of security. When the state experienced severe hurricanes there were no people and when the people moved in the state experienced few hurricanes.

The final element of Florida's climb to peak zone status was an inadequate investment in loss mitigation, reflecting a lack of economic incentives for doing so based on available and affordable insurance. The problem was illustrated by a study done by the Insurance Institute for Property Loss Reduction following Hurricane Andrew (1992). It found that homes built after 1980 were three times more likely to have been rendered uninhabitable in winds up to 97 mph in Andrew than those built before 1980 (10% vs. 33%). The extent of economic and demographic pressures on Florida can be seen by looking at the Great Miami Hurricane of 1926. During the subsequent 80 years, inflation increased by 830%, per capita wealth increased 480%, and population in the area increased 3,500%. Those trends indicate that the same event in 2006 would have generated economic losses of almost \$150 billion, which is consistent with the estimates of catastrophe models after adjusting to an insured loss basis. The 1926 hurricane caused significant local disruption but had relatively little effect on the national economy or the global insurance system. A similar event today would have much greater consequences.

Florida experienced significant hurricane activity in 1992, 2004, and 2005, resulting in massive disruption of the insurance market and triggering government intervention. It is an excellent case study of what can happen when an area prone to severe natural

disasters experiences rapid population growth during a period of economic wealth creation.

RISK DIVERSIFICATION

The insurance system must collect enough to cover expected losses, administrative expenses, and provide a return on capital. Capital is required to assure claims can be paid in periods when losses and administrative expenses exceed premium income. The amount of capital required for a risk pool is a function of the number of independent risks in the pool. A large pool of independent risks will have a lower coefficient of variation than one with a small number of risks subject to high severity losses. In the case of catastrophe insurance, the number of risks available for pooling varies by geographic region. Australia, with a moderate loss profile, can pool its risk with many locations around the world, while Florida cannot. This places cost pressure on Florida while reducing cost pressure on Australia. Generally, more participants in the pool results in a lower coefficient of variation and lower premiums, and vice versa.

Reinsurance is a form of capital which reduces the amount an insurer must raise from other sources, such as investors, to support the risks it underwrites. The cost of that capital (often referred to as a “risk load” or “margin”) reflects a complex set of factors which are beyond the scope of this paper, but very generally for large catastrophe risks:

- Risk load (margin) is correlated with the number of locations where risk can be pooled.
- Reinsurers prefer a portfolio of very many equal independent event risks spread evenly around the world; when this is violated price will increase.
- Peak zones require high risk margins to “clear” the market, so that coverage made available will balance the amount demanded.

This effect is illustrated in the following chart, which reflects an actual insurance portfolio placed by Aon Benfield Australia. The margin (in stripes) as a percentage of total premium increases with layer.

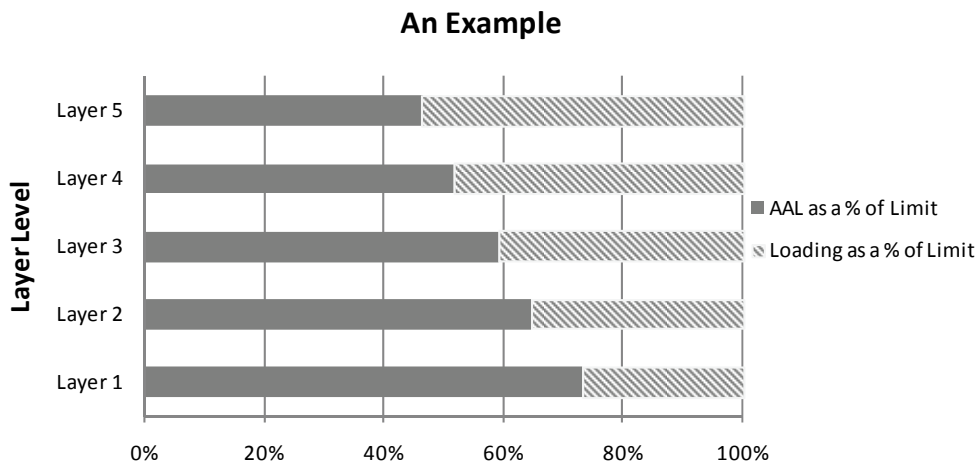


Figure 1: The proportion of AAL and Margin by layer in a catastrophe program

The margin as a proportion of total premium increases with layer, reflecting the larger coefficient of variation associated with higher layers of a reinsurance program. The overall margin for all layers also reflects the portfolio's geographic profile: generally, programs in locations that do not represent global "peak zones" have lower overall margins for a given loss exposure.

A HYPOTHETICAL 2009 REINSURANCE MARKET

The key exercise in this paper involves examining whether demographic trends in coming decades may change the global risk diversification profile. The foundation is construction of a hypothetical reinsurance market for 2009. We chose to do this using commercially available catastrophe models in countries where we were able to approximate countrywide exposure databases. Importantly, no effort is made to build a comprehensive view for all countries and perils, as limitations in models and data precluded this. Instead, we chose a representative sampling of countries and perils, as shown in Figure 2, Table 1, and Table 2.

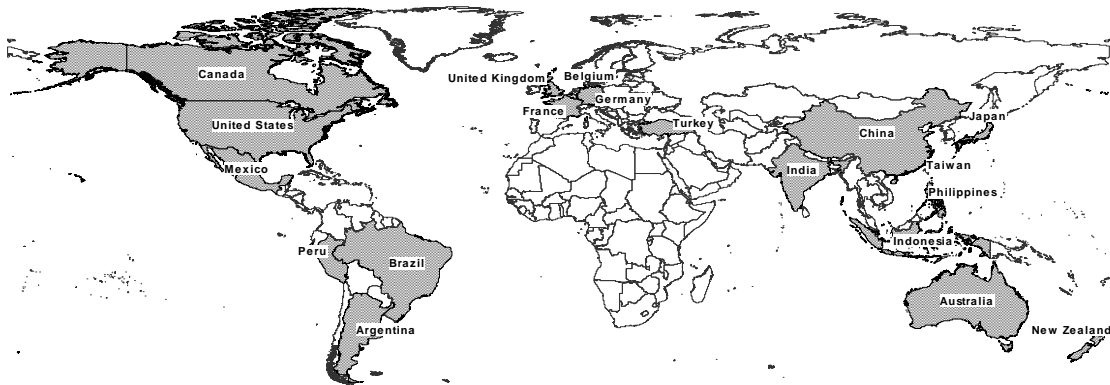


Figure 2 – Countries used in this study

We divided the countries into three groups reflecting availability of exposure information:

Group 1	Group 2	Group 3
Belgium, Canada, France, Germany, Japan, UK, USA	Australia, China, India, Indonesia, New Zealand, Philippines, Taiwan	Argentina, Brazil, Mexico, Peru, Turkey
For these countries, we have the 2009 RiskLink Industry Exposure Database (IED) which is representative of the insurance penetration of that country. We used these to project insured loss directly.	For category 2 countries, we made use of the Insurance Market Database (consolidated Client data) available to Aon Benfield, which is roughly indicative of the insured exposure in that particular country. These exposures were projected to 100% insured exposure and then the insured loss was calculated.	For these countries where neither exposure information nor a market database was available, we estimated economic exposure based on an approximate relationship between GDP and economic exposure for other countries. A 100% insurance market exposure is then derived by incorporating a relative insurance penetration assumption.

Table 1 – Country grouping

The following models were used:

	RMS				EQECAT	AIR CLASIC/2
	EQ	WS/TY	FL	SCS	WS/TY	WS/TY
Argentina	X					
Australia	X	X				
Belgium		X				
Brazil	X					
Canada	X			X		
China	X					X
France		X				
Germany		X				
India	X				X	
Indonesia	X					
Japan	X	X				
Mexico	X					
New Zealand	X					
Peru	X					
Philippines	X					
Taiwan	X					
Turkey	X					
United Kingdom		X	X			
United States	X	X		X		

Table 2 – Model Utilization (EQ: Earthquake, WS: Windstorm, TY: Typhoon (Hurricane/Cyclone), FL: Flood, SCS: Severe Convective Storm)

Return Period	Top 3	Top 10	Top 50
100 – 250 Year Return Period Losses	5.00	3.50	2.50
50-100 Year Return Period Losses	3.50	3.00	1.75

Table 3 – Hypothetical Risk Loads (Margin)

Our approach was to run the models for each country to yield average annual loss and losses by return period. These were then used to estimate market reinsurance premium using expected loss plus a margin based on observed market loadings reflecting the size of the country’s loss. Generally, margins are higher in peak zones and at upper layers of programs. We selected entries in the matrix in Table 3 to roughly

follow observed patterns in market prices. These are purely hypothetical. A simplified view of the market reinsurance premium (ignoring expenses) can be expressed as:

$$\Sigma (AAL_{RP,C} * Loading_{RP,C})$$

where RP = Return Period Range
 C = Country Category

Table 4 shows some sample return period (PML) results for major countries.

Countries	50-Year PML	100-Year PML	250-Year PML
United States	\$71 B	\$102 B	\$156 B
Australia	\$5 B	\$10 B	\$21 B
China	\$2 B	\$3 B	\$5 B
Japan	\$43 B	\$54 B	\$74 B
Mexico	\$5 B	\$7 B	\$14 B

Table 4 – Illustrative Modeling Results

Our hypothetical reinsurance market is shown here. It is based on the loaded losses in the 50 – 250 year return period range. The large dark grey block in the middle is the US, which currently represents a significant part of global reinsurance exposure.

Hypothetical 2009 Market

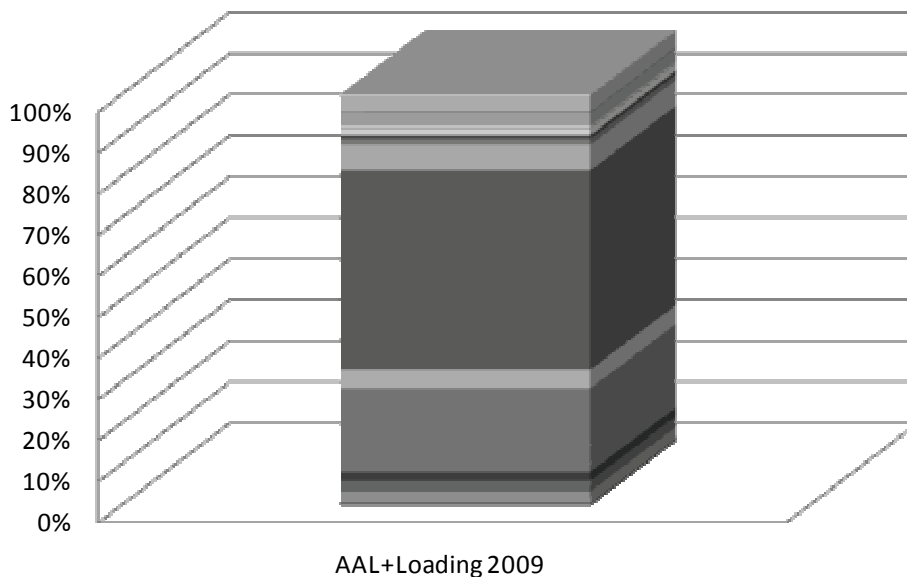


Figure 3 – Hypothetical 2009 Reinsurance Market

NORMALIZING LOSSES USING ECONOMIC AND DEMOGRAPHIC DATA

A team of researchers led by Roger Pielke has developed techniques for adjusting losses for changes in economic conditions over time. The technique is called "Normalization". The methodology takes losses at one point in time, identifies key indices, and adjusts past losses to a future point in time (Pielke, et. al., 1999, 2008).

The research was prompted by observations that actual loss data adjusted only for the effects of inflation showed a clearly increasing trend (Figure 4, dark bars). This led some to conclude that losses were growing due to some change in underlying hazard, ie. US hurricane activity was increasing due to global warming. The research showed that apparent increases in inflation adjusted losses could be explained by changes in population and wealth over time (Figure 4, light bars). The large loss in the period 1926-1995 was due to the Great Miami Hurricane discussed earlier. The researchers tested the US results against commercial catastrophe models and found them to be reasonable. Crompton and McAnneny have done similar research in Australia.

The US normalization process involves:

- Collecting historical data.
- Identifying key normalization variables.
- Calculating historical adjustment factors.
- Adjusting historical data to current conditions.
- Testing results against output from catastrophe models.

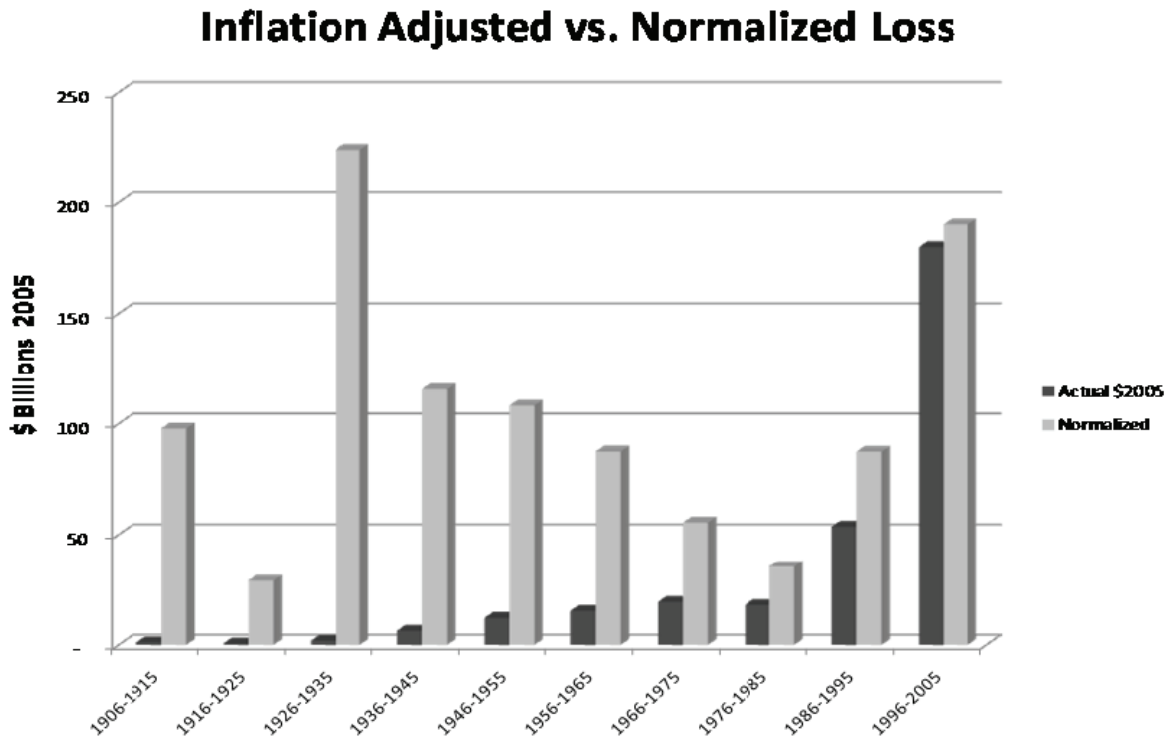


Figure 4 –Loss Normalization

Pielke, et. al. (2008),

LOOKING AHEAD TO 2050

Cyclone Nargis (Myanmar) and the Sichuan Earthquake (China) are recent examples of severe natural disasters which might have had different insured loss outcomes if insurance practices similar to those in the US or Australia were in place. Over the next 40 years, can changes in factors like population density, economic wealth, and insurance penetration affect how much events like this contribute to the global insurance system? How will losses like this be funded in 40 years? The Pielke led research demonstrates that changes in loss activity over time can be related to demographic and economic trends. We will now extend the concept globally by identifying variables to trend losses forward in time. Our choices are limited by available data and significant assumptions must be made. We observe that:

- Economic growth and population change are forecast to vary significantly by country over the next 40 years.
- Insurance penetration is currently very low in a number of developing countries; if this changes significantly it will drive a large change in insured losses.
- Losses are related to these factors and thus the risk diversification picture will change over time.
- New peak zones will emerge.
- The cost of financing risk will be affected, as it was in Florida.

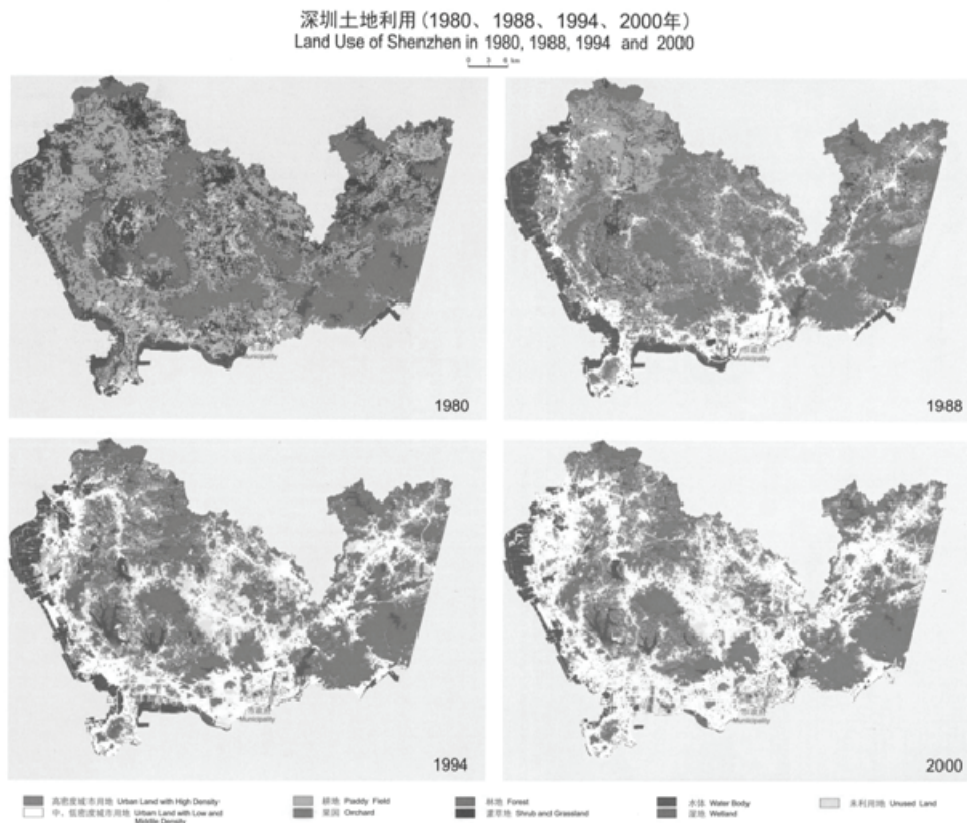


Figure 5 – Example of Demographic Change – Shenzhen, China (Shi, 2003)

The maps in Figure 5 from Shi (2003) show changes in land use in Shenzhen Province, China, near Hong Kong. Note the rapid increase in the areas in light grey and white (or the corresponding decrease in areas colored in dark grey), indicating rapid urbanization. This pattern is repeated across Asia in areas prone to natural disasters. We have seen in Florida and from the normalization study in the US how massive changes in insured losses can follow several decades of development.

Following the US approach, we will consider the change in real GDP and population by country to adjust 2009 losses to 2050. One variable not considered by the US researchers, insurance penetration, will be added to reflect significant differences in this metric across the globe. Our study has ignored inflation as our purpose is to measure relative losses by country, rather than absolute losses. Inflation distorts the analysis for little gain in understanding. We assume that differences in inflation rates between countries will, over time, be offset by changes in the relative value of currencies, so that the effect of inflation can be safely ignored.

Figure 6 shows real GDP by country forecasts by country from 2009 to 2050. To normalize the effect of population growth on GDP, the real GDP per capital was adopted instead of an overall GDP growth assumption (PriceWaterhouseCoopers, 2006). Growth rates are clearly different by country, as real GDP is projected to grow rapidly in a number of countries prone to natural disasters, including Mexico, Turkey, China, and India.

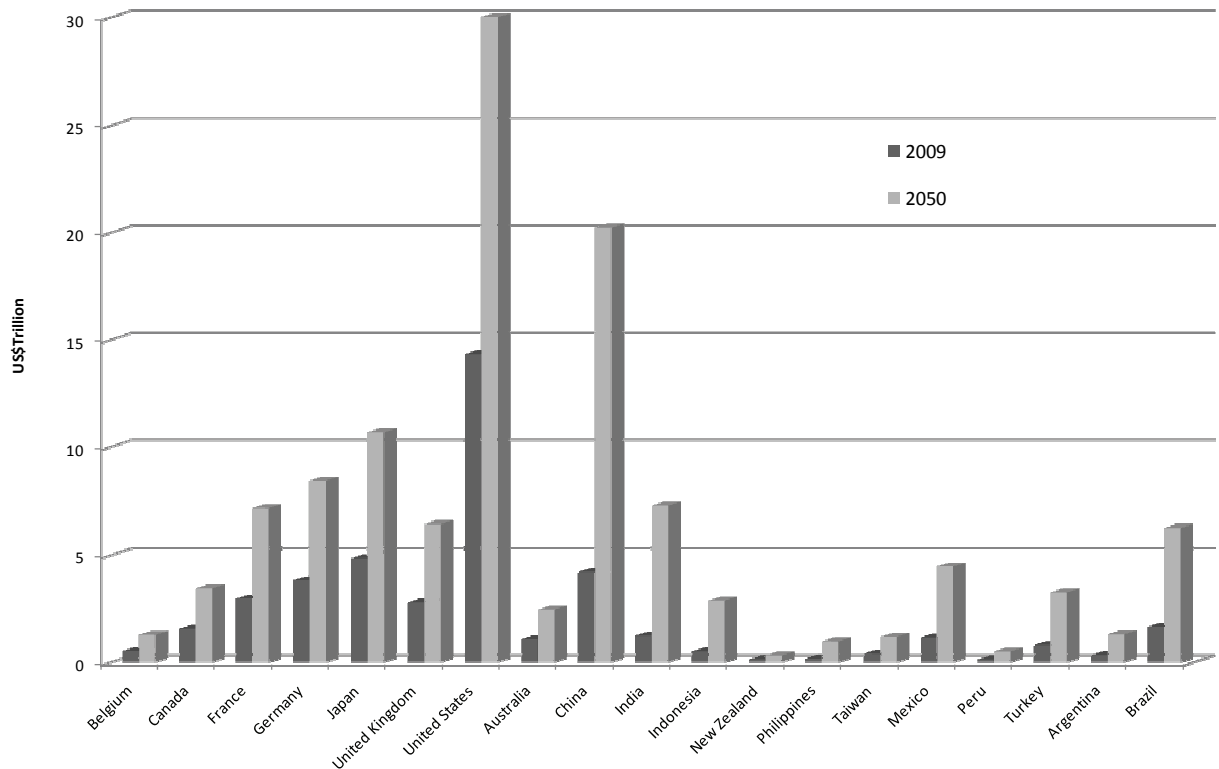


Figure 6 – Real GDP
(Source: The World in 2050, PriceWaterhouseCoopers, 2006)

Figure 7 shows population growth in coming decades. A number of catastrophe prone countries are also projected to have higher than average population growth, including the United States, India, Turkey, and the Philippines.

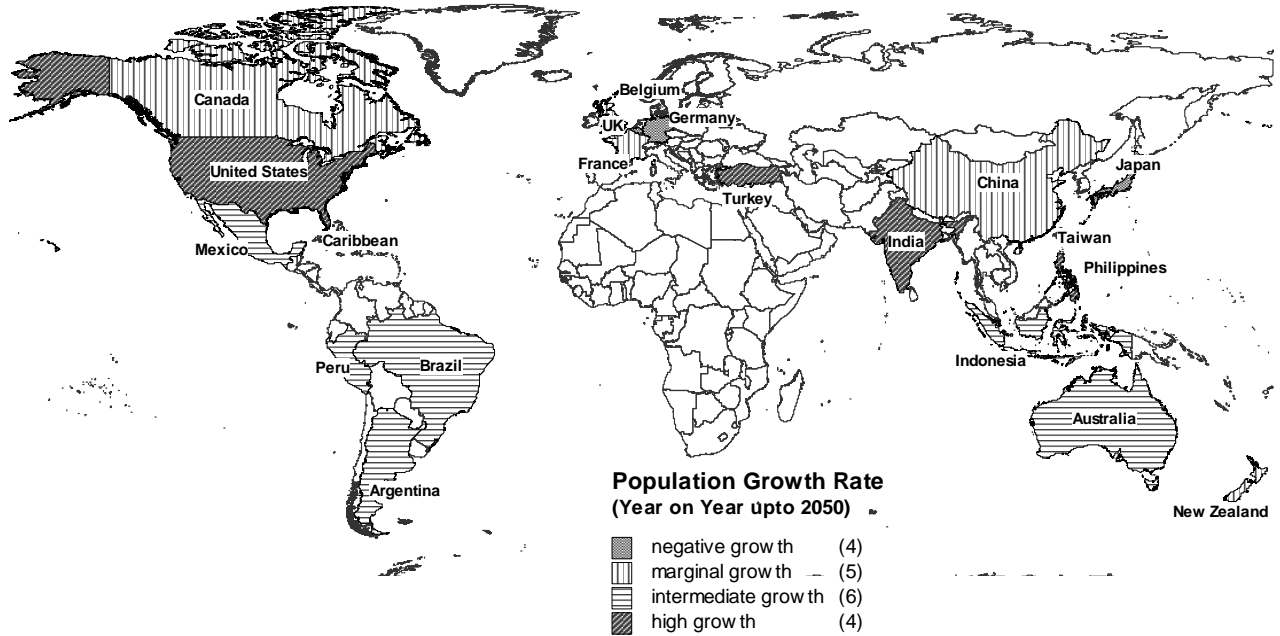


Figure 7 – Population Growth 2009 – 2050
 Source: U.S. Census Bureau, International Data Base

An obvious issue in thinking about future losses from natural disasters is the level of insurance penetration in various countries. Data from a recent Munich Re study shows estimated economic losses and insured losses from various events, a sampling of which are shown here. Generally, the ratio of insured loss to economic loss is lower in developing countries. The result for US disasters is consistent with the Pielke led research cited earlier.

Event	Economic Loss (US\$million)	Insured Loss (US\$million)
2004 Indonesia Tsunami	10,000	1,000
2008 China Sichuan Earthquake	85,000	300
2005 US Hurricane Katrina	125,000	61,600
1992 US Hurricane Andrew	26,500	17,000
1994 US Northridge Earthquake	44,000	15,300

Table 4 – Economic vs. Insured Loss
 Source: Munich Re

Ideally, insurance penetration should be examined directly by determining the proportion of property exposure covered by insurance, further refined to consider policy conditions such as whether flood coverage is offered. Unfortunately, such information

is almost impossible to acquire across the globe, though we plan ongoing research in this area. The commonly used metric today is the ratio of insurance premium to GDP. While crude, it provides a useful way to look at insurance coverage across countries. We believe that the metric significantly understates the relative levels of property insurance coverage in developing countries. For forecasting purposes in this study, we set the level in 2050 equal to the proportion in the US (see the light grey bar in Figure 8).

In the following charts we trend the losses developed in our 2009 base case as follows:

- $Nl_{2009,2050}$ = losses normalized from 2009 to 2050
 - C = countries affected
 - $L_{2009,C}$ = Loss in 2009
 - $GDP_{2050,C}$ = Real GDP per capita growth from 2009 to 2050
 - $P_{2050,c}$ = Population growth from 2009 to 2050
 - $IP_{2050,C}$ = Insurance penetration growth from 2009 to 2050
- $Nl_{2009,2050} = L_{2009,C} * GDP_{2050,C} * P_{2050,c} * IP_{2050,C}$

We computed return periods by country. In Figure 8 the colors represent:

- Dark grey, n year return period using current exposure
- Medium grey, n year return period trended for population and GDP
- Light grey, n year return period trended for population, GDP, and insurance penetration

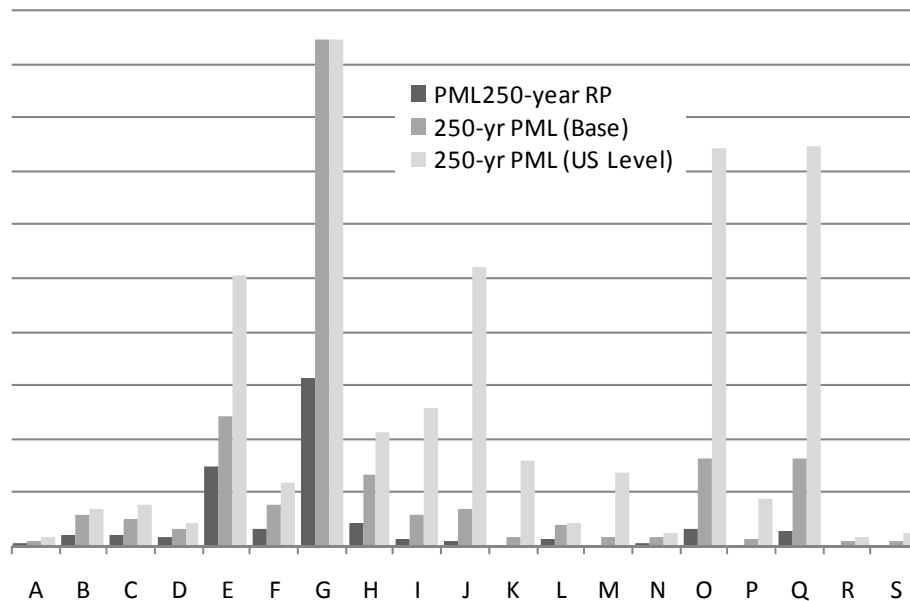


Figure 8 – Comparison of 250 year Return Period Losses by Country

It is apparent that new peak zones are emerging, and not all are in locations that are intuitively obvious. Since losses are related to events at an individual location, as opposed to an entire country, some smaller countries generate significant losses, including Turkey and Mexico. It should be noted that if our earlier hypothesis is correct

about the selected adjustment metric for insurance penetration being low, and due to the fact that we have not explicitly allowed for the full effect of flood in many countries, the shift in the loss diversification profile could be much more pronounced than is shown here. We have deliberately omitted the country names from Figure 8 to avoid focusing on the individual locations, reflecting our belief that specific forecasts are beyond the scope of this exercise. However, we are comfortable making the assertion that the relative positions of countries will shift significantly over time.

To close the process, Figure 9 shows the projected reinsurance premiums in 2050 with the loading adjusted for emergence of new peak zones:

$$= \Sigma (\text{Projected AAL}_{2050} * \text{Loading}_{RP,C})$$

where RP = Return Period Range
 C = Country Category

Once again, we have omitted the names of individual countries as our focus is on the possibility of a significant shift in the risk funding landscape rather than individual country results.

This result is important because prices paid by insurers for risk transfer through reinsurance are affected by the pool of other risks with which the insurer's book can be combined. This is not only an issue for peak zones, but locations throughout the system. Generally, the emergence of new peak zones will add pressure to the supply of capital overall, but will also reduce the relative cost in current peak zones which will have other places to diversify risk with. An implication of a shift in insurance penetration is that the capital required to underwrite (re)insurance will have to grow more quickly than overall GDP.

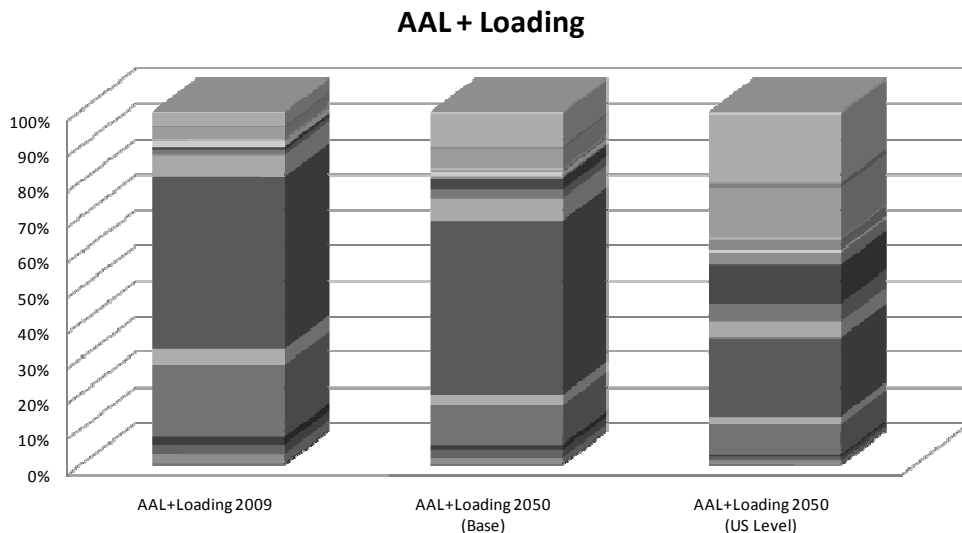


Figure 9 – Shift in Hypothetical (AAL + Loading) Distribution
PUBLIC POLICY CONSIDERATIONS – MITIGATION STRATEGIES

We close with a discussion of how mitigation strategies may be affected by the thinking developed in this paper. Traditionally, building codes have been focused on life safety

and/or protection of property. Standards have been developed by engineers, often with relatively little focus on the economic value of mitigation activities in a macro sense. While building codes are concerned with the structure's resistance to loss over its lifetime, the issue is generally thought of as an engineering problem. We are not aware of codes which explicitly consider both the current and future cost of risk financing as an economic problem.

Three lenses through which we can view loss mitigation activities are:

- **Life Safety:** prevent injury and or death.
- **Protection of Individual Properties:** minimize the potential for damage on individual structures, such as an ability to withstand x m/s wind at a location. The focuses include structural integrity and degree of loss.
- **Management of Overall Economic Impact:** focus on the overall damage to the economy, which implies that the overall size of the potential loss in an area should affect the wind engineering standard at a location, and further that the *potential* of future losses in an area affects the appropriate standard today. Put simply, risk must be considered both across space and time.

To see how an economic mitigation standard could be developed, assume that the economic value of mitigation is equal to the present value of expected savings in insurance costs over the life of the building.

Then assume that:

- Insurance costs are a function of expected loss, operating expenses, and a "risk load" to allow for needed profit and the cost of risk transfer.
- Expected loss and expenses can be estimated in a stable manner over time.
- Risk load is affected by overall risk concentration.
- Large risk concentrations carry a higher load.

It follows that insurance cost is a function of both the individual building and those around it. Further, the economic value of mitigation must reflect the expected cost of risk transfer over the lifetime of the building, *which will change as the diversification profile changes over time*. This has significant implications for mitigation planning. Additional investments are required for areas of high potential future growth, due to either population or wealth or both. Had people been thinking this way in Florida in the 1960s, it is likely that the problems of the 1990s could have been reduced. Could Australia experience difficulties in this area, for example from growth in Queensland? There are important differences between Florida in 1960 and Australia in 2009. Australia has:

- Better building codes which have been in place since Cyclone Tracy.
- Clearer understanding of risk due to modern modeling technology.
- Stricter solvency regulation through APRA.

However, even with all of the above advantages, rapid population growth in Queensland could put significant pressure on the insurance system and affect the country's ability to diversify risk in the global financial system. At a minimum, this may affect the price for coverage and pose difficult questions for public policy planners about how such costs should be shared across the population. In Asia there are many markets where our risk analysis tools are less developed and where demographic pressures are interacting with a developing insurance market. How will the systems

react if improved risk measurement tools expose serious funding shortfalls in the insurance system?

CONCLUSIONS AND OBSERVATIONS

The trends postulated in this paper will affect insurers, reinsurers, and governments. Insurers will see the cost of financing risk change over time due to large scale demographic forces. If they operate in territories which move towards “peak” status, scrutiny will increase from reinsurers, governments, and rating agencies. Insurers will have to adapt, but the requisite changes may take time to implement. Examples include IT systems, information collection, internal controls, and pricing. Reinsurers will need to be prepared for changes, which may yield significant opportunities. Governments will need to rethink their approach to building codes and loss mitigation. Mitigation strategies take a long time to implement and their benefit can be slow to materialize. While certain actors in the public policy arena may oppose stricter building codes for economic reasons, the public backlash against leaders who are seen as having failed to prepare for problems can be unpleasant, as many in Florida have learned.

Readers should consider whether there any places globally which have several of these issues:

- Significant cat exposure (include flood).
- Potential for rapid population growth.
- Forecast of strong GDP/Wealth growth in coming decades.
- Limited/incomplete modeling coverage (ie. flood).
- Missing data, such as detailed flood elevation maps or construction coding.
- Developing building codes and/or unclear understanding of current stock’s condition.
- Low insurance penetration.

These are the type of problems which led to the difficulties in Florida in past decades. We believe there are many places in the world which have some of the same issues today. Insurers, reinsurers, and public policy planners must pay careful attention to trends and plan for possible changes before they occur. There have been massive changes in the last several decades. For example, cat models are a recent development, as are satellites and the internet. This should give us hope that we can do a better job in managing future insurance hot spots.

We conclude with six observations:

- Florida is an example of how limited risk measures, population growth, and economic development contributed to significant funding problems for natural disasters.
- The cost of financing risk is a function of both the expected loss and the concentration of risk (the ability to diversity the risk through combination with other portfolios).
- The concepts in Pielke, et. al. (1999, 2008), can be used to help understand how demographics and development interact with disasters over time.
- Many areas of high economic growth and increasing insurance penetration are prone to severe natural disasters.

- Economic and demographic forces are likely to put upward pressure on disaster costs in coming decades. As trends are not uniform, the global loss profile will shift in coming decades.
- Decisions on how much money to invest in avoiding losses must consider not only today's conditions, but those which can be expected in the future.

Will history repeat itself? Probably not, as conditions in Australia and Asia are quite different than those in Florida in past years. Certainly we know more now and can learn from others' mistakes. However, we face significant changes in coming decades, and by thinking of the future we can improve our odds of avoiding adverse outcomes.

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