

# Global Risks 2007

A Global Risk Network Report



A World Economic Forum Report

in collaboration with

**Citigroup**

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# Introduction

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At the core of this year's overview of risks to the global community over the next decade is a fundamental disconnect between risk and mitigation. Expert opinion suggests that levels of risk are rising in almost all of the 23 risks on which the Global Risk Network has been focused over the last year – but mechanisms in place to manage and mitigate risk at the level of businesses, governments and global governance are inadequate. The global economy has been expanding faster than at any time in history – but it remains vulnerable.

Some tactical gains have been made in specific areas of risk mitigation: despite the raised threat of terrorism, cooperation on dealing with the threat continues to improve; fears of a major pandemic outbreak have driven a major effort to upgrade our global preparedness to identify and isolate new diseases; there is a growing recognition of the need to improve access to mechanisms of risk transfer in emerging markets, to allow risks to be priced in a way that allows the potential economic growth of this century to be fully unlocked.

There has also been major improvement in the understanding of the interdependencies between global risks, the importance of taking an integrated risk management approach to major global challenges and the necessity of attempting to deal with root causes of global risks rather than reacting to the consequences.

Climate change is now seen as one of the defining challenges of the 21st century – and as a global risk with impacts far beyond the environment. Effective mitigation of climate change may ultimately have the consequence of improving resilience to oil price shocks in developed countries by moving them from hydrocarbons to alternative energy sources; ineffective mitigation of climate change will almost certainly be a factor in major interstate and civil wars within the next 50 years. The way in which climate change is dealt with at the global level will be a leading indicator of the world's capacity to manage globalization in an equitable and sustainable way.

But the tactical gains may be illusory and are certainly temporary. The manifestation of any number of global risks in the way described in the plausible scenarios in this report could quickly put those gains into reverse.

*Global Risks 2007* suggests two possible institutional innovations that may help mobilize businesses and governments to approach the global risks of the next 10 years. One is the idea of a Country Risk Officer – an analogy to Chief Risk Officers in the corporate world – intended as a focal point for managing a portfolio of risk across disparate interests, setting national prioritization of risk and allowing governments to engage in the forward action needed to begin managing global risks rather than coping with them. The second is to create an avant-garde of relevant governments and



companies around different global risks – “coalitions of the willing” – allowing risk mitigation to be a process of gradually-expanding alliances rather than a proposition requiring permanent consensus.

Above all, *Global Risks 2007* makes the case for the active engagement of all sections of the international community in dealing with global risks. No one group has the ability to effectively mitigate most global risks. Interdependency implies not just common vulnerability, but a shared responsibility to act.

A longer version of this report and further information on the Global Risk Network can be found at [www.weforum.org/en/initiatives/globalrisk](http://www.weforum.org/en/initiatives/globalrisk). The longer report includes further background on methodology, risk descriptions, numeric assessments, the process of workshops leading to this report and additional mitigation and scenario examples.

# Risk Assessment

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Risks are idiosyncratic – a risk to one group may present an opportunity to another. The qualification of global risks lies in their systemic nature: their impacts challenge the integrity of the system. Their consequences are harder to predict, frequently disproportionate, difficult to contain and present challenges to us all.

The key newcomers to the list for the *Global Risks 2007* report include a number of geopolitical risks which, though difficult to measure, specify and predict, were considered integral parts of the risk landscape. The risk of major interstate and civil war – often inadequately priced in markets – was one risk considered. Another was the category of failed and failing states as an underlying risk to systemic integrity. Both featured in a number of scenarios developed by the Global Risk Network.

Overall, the Global Risk Network identified 23 **core global risks** to the international community over the next 10 years. A further description of the core global risks can be found in the longer version of the report at [www.weforum.org/en/initiatives/globalrisk](http://www.weforum.org/en/initiatives/globalrisk)

## “Core” Global Risks

### Economic

- Oil price shock/energy supply interruptions
- US current account deficit/fall in US\$
- Chinese economic hard landing
- Fiscal crises caused by demographic shift
- Blow up in asset prices/excessive indebtedness

### Environmental

- Climate change
- Loss of freshwater services
- Natural catastrophe: Tropical storms
- Natural catastrophe: Earthquakes
- Natural catastrophe: Inland flooding

### Geopolitical

- International terrorism
- Proliferation of weapons of mass destruction (WMD)
- Interstate and civil wars
- Failed and failing states
- Transnational crime and corruption
- Retrenchment from globalization
- Middle East instability

### Societal

- Pandemics
- Infectious diseases in the developing world
- Chronic disease in the developed world
- Liability regimes

### Technological

- Breakdown of critical information infrastructure (CII)
- Emergence of risks associated with nanotechnology

## Understanding Geopolitical Risk

The first years of this century have been marked by the return of geopolitical risks to global prosperity and stability. In 2006, the deterioration of the situation in Iraq and the Middle East occupied the full attention of some governments, reducing “bandwidth” available for focus on other global risks and increasing fears of the fragmentation of the international system. Should any of the main geopolitical risks outlined here worsen considerably, the environment for business and society could be changed beyond recognition. In the scenarios below, geopolitics frequently provide the narrative and backdrop to the emergence of other global risks.

Despite their importance, however, geopolitical risks are hard to quantify in terms of likelihood and severity, and therefore difficult to price. While expert opinion suggests that geopolitical risk worsened in 2006, market expectations of volatility tended to fall, indicating a major disconnect. The concerted action of governments may help to reduce overall geopolitical risks in 2007 – improved pricing of these risks may help businesses to manage their consequences when they do occur.

The range of different trajectories along which geopolitical risks can develop – contingent on human decision-making and a range of other

factors – makes their outcomes hard to predict with accuracy. For example, while the conditions for the outbreak of war may be easily identifiable – militarization, existing disputes, an inflexible attitude by the parties – the exact sequence of events which turn conditions into reality are impossible to predict. The “gambler’s mentality” is unlikely to succeed.

As a result, geopolitical risk analysts normally focus on underlying trends – economic decline, environmental degradation, population density – which may provide keys to the emergence of a major event. Defence planners cope with geopolitical risk on a prudential basis – preparing for low-probability, high-severity risks (such as interstate war) which present a sovereign risk, as well as a range of more immediate challenges.

Though businesses with international exposure cannot pursue the same catch-all policy, they should look beyond discrete events and manage their risk portfolio through an appreciation of underlying dynamics. The challenge for a geopolitical risk analyst advising business is to help distinguish between events with a tactical impact and those that significantly alter underlying trends and, with them, the overall calculation of risk.

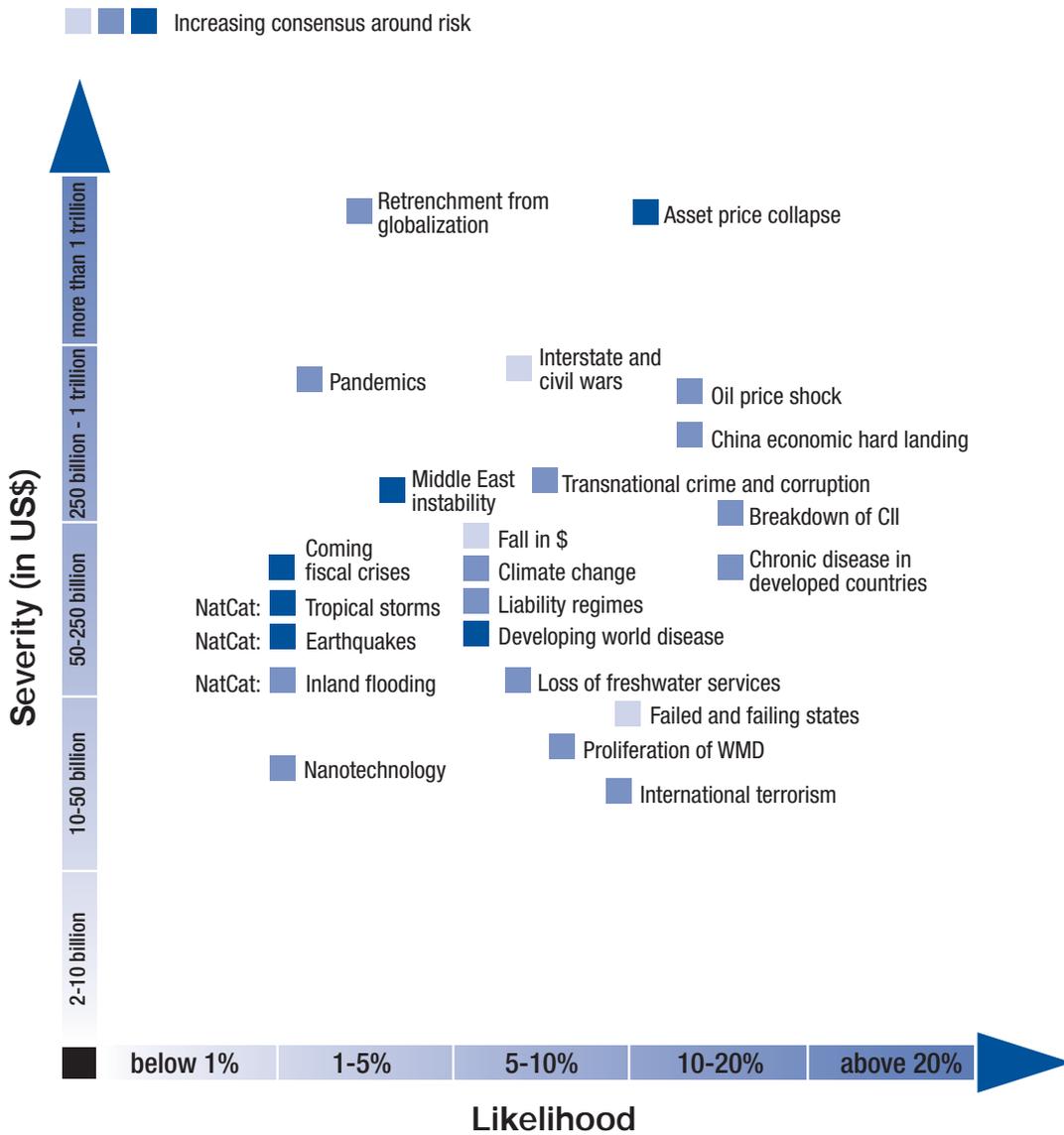


It was only in July 1914, a month before the outbreak of World War I, that liquidity in global equity markets dried up. Before then, the markets had not priced the geopolitical risk of war, one that would kill millions and trigger a retrenchment from globalization.

These core global risks were assessed in terms of likelihood and severity.

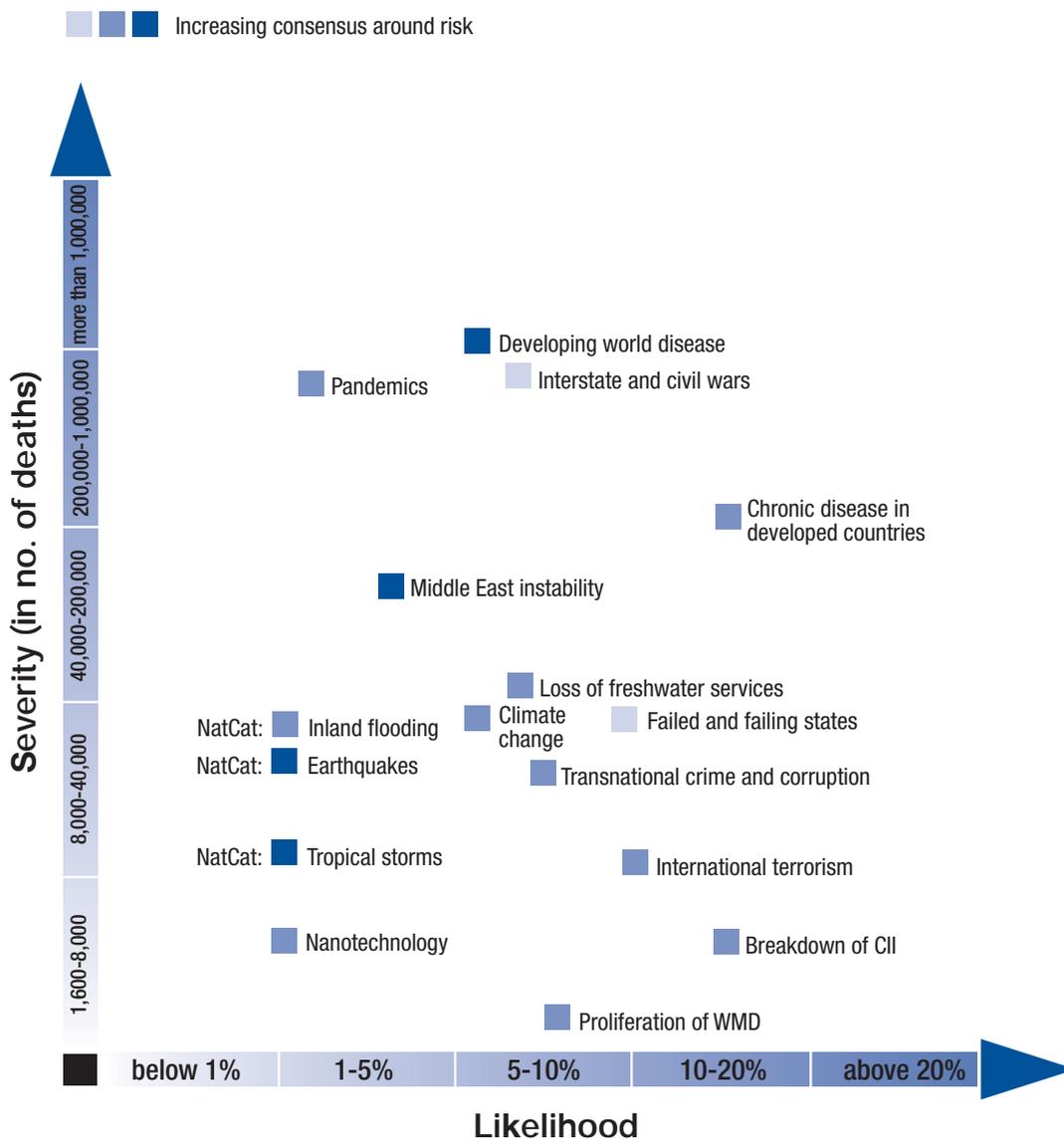
In addressing likelihood, actuarial principles were applied in the few cases where sufficient data existed; in most cases only qualitative assessments, based on expert opinion, were possible. In assessing severity, two indices were considered: destruction of assets/economic damage and – where applicable – human lives lost. Although some risks are inherently long term (such as climate change), and others (such as an oil-price shock) could occur in the near term, all risks were evaluated within a 10-year time frame.

The 23 Core Global Risks: Likelihood with Severity by Economic Loss



Note: Likelihood was based on actuarial principles where possible. For most risks, however, qualitative assessment was used.

16 Core Global Risks: Likelihood with Severity by Number of Deaths



Note: For seven of the core global risks, severity by number of deaths was not applicable. Likelihood was based on actuarial principles where possible. For most risks, however, qualitative assessment was used.

In addition to risk assessment in terms of likelihood and severity, the Global Risk Network developed a qualitative global risk “barometer”, based on expert judgement of the outlook for global risks. This is essentially a forward-looking measure: it does not look at how the risk has played out over the last year; rather, it assesses whether the seriousness of

the risk for the next 10 years has become more or less acute. For example, while 2006 saw fewer tropical storms than in 2005, expert consensus was clear that the risk trend is moving upwards, with growing agreement on the impact of climate change on severe meteorological events.

### A qualitative global risk “barometer”

Key:  Increased overall risk  Stable overall risk  Decreased overall risk  Expert disagreement

ECONOMIC	Reason for increased, stable or decreased overall risk
 <b>Oil price shock/energy supply interruptions</b>	Though some estimate capacity will increase to meet demand (forecast 25% increase by 2015), the energy market remains tight and, as such, highly vulnerable to both physical and speculative shocks.
 <b>US current account deficit/fall in US\$</b>	Although the trade-weighted real exchange rate of the US\$ has depreciated 23% since 2002, many believe this will continue, in order to limit a widening US current account deficit.
 <b>Chinese economic hard landing</b>	Chinese growth is both investment- and export-led. The expansion of exports may generate a backlash (particularly in the US); high investment (over 40% of GDP) has generated excess capacity and fears of potential bad debts.
 <b>Fiscal crises caused by demographic shift</b>	The deterioration of fiscal balances in G8 countries, combined with continuing large deficits in other large countries, renders a series of major fiscal crises possible, exacerbated by the long-term challenges of ageing and equitable healthcare provision.
 <b>Blow up in asset prices/excessive indebtedness</b>	House prices have doubled in most mature markets (and in some emerging markets) in real terms over the last 10 years, putting price-to-income ratios at all-time highs. Many experts fear a major correction, with differential impacts on consumption, economic growth and other asset prices.
ENVIRONMENTAL	Reason for increased, stable or decreased overall risk
 <b>Climate change</b>	Carbon emissions are growing above trend and there are indications that feedback mechanisms, particularly increased heat-absorption caused by Arctic ice-melt, will increase the speed and scale of warming. New research argues that the increasing intensity of North Atlantic hurricanes is due to global warming.
 <b>Loss of freshwater services</b>	The mitigation effects of improved water-pricing have yet to have an effect; economic development and global warming have increased the risk to the sustainability of many already stressed freshwater systems worldwide, particularly in Asia.

ECONOMIC		Reason for increased, stable or decreased overall risk
	<b>Natural catastrophe: Tropical storms</b>	The increasing risk from tropical storms includes two major components. The hazard itself may be increasing as global warming drives sea surface temperatures higher. Global vulnerability to tropical storms may also be increasing as a result of coastal development.
	<b>Natural catastrophe: Earthquakes</b>	The threat of earthquakes, in terms of likelihood and severity, remains the same, driven by basic geophysics. Meanwhile, slight increases in the exposure of populations are matched by slight reductions in the vulnerability of assets.
	<b>Natural catastrophe: Inland flooding</b>	Increasing floodplain development and an expected increase in climate change-driven extreme weather events increase the risk of disruptive and costly inland flooding.
GEOPOLITICAL		Reason for increased, stable or decreased overall risk
	<b>International terrorism</b>	The risk of future attacks has risen: according to official threat assessments in Britain, an attack is “highly likely”; the US National Intelligence Estimate report has argued the Iraq war has heightened risks, while the situations in Afghanistan, Somalia and Pakistan continue to cause concern.
	<b>Proliferation of WMD</b>	North Korea tested a nuclear device in 2006, Iran continued its programme, the US weakened its commitment to non-proliferation in a controversial deal with India, while some Middle East states said they would seek civilian nuclear technologies. All increase the risk of proliferation for 2007.
	<b>Interstate and civil wars</b>	Civil war took hold in Iraq in 2006 while tensions fluctuated on the Korean peninsula and in the Middle East. The International Crisis Group identified November 2006 as the worst month for conflict prevention in 40 months. The risk of any of a number of hotspots causing a major conflagration in 2007 increased.
	<b>Failed and failing states</b>	There is little prospect of immediate improvement in serial failed and failing states – notably Somalia, Afghanistan and Pakistan. The creation of the UN peacebuilding commission may improve mitigation in 2007 but risks are increasing.
	<b>Transnational crime and corruption</b>	Transnational crime and corruption remain endemic in a number of developing and developed countries, damaging state authority, economic prosperity and weakening the ability to deal with other global risks.
	<b>Retrenchment from globalization</b>	Progress on the Doha trade round appears distant, while failures will be difficult to reverse after expiry of Presidential negotiation authority. Populist sentiment in Europe and the US is set to increase. (See the <i>Europe@Risk</i> report.)
	<b>Middle East instability</b>	Overall stability is deteriorating, despite rapid growth and moves towards stability in some Gulf countries. Grand bargains to stabilize the region may be possible in 2007, but underlying problems of Islamist extremism, political succession (as in Egypt) and fragile economic structures will make the region highly volatile.

SOCIETAL		Reason for increased, stable or decreased overall risk
 Pandemics	Some measures (e.g. improved research and cooperation on early warnings) have improved response capability. However, the aggregate risk is constant as uncertainty remains over the timing and nature of any outbreak.	
 Infectious diseases in the developing world	Although infection rates have stabilized in some countries, infection rates for HIV and other diseases are rising in others, presenting major risks to future prosperity. India passed South Africa as the country hosting the largest population of HIV/AIDS infected people. (See the <i>India@Risk</i> briefing.)	
 Chronic disease in the developed world	Experts were divided on the balance between potential advances in medical science over the next 10 years and the increasing prevalence of “life-style” diseases.	
 Liability regimes	Experts were divided on the risks to global prosperity from liability regimes over the next 10 years: some argue liability regimes represent a legitimate policy choice, others suggest they represent a growing cost to business, yet others suggest that US-style liability regimes are unlikely to make headway in other parts of the world.	
TECHNOLOGICAL		Reason for increased, stable or decreased overall risk
 Breakdown of critical information infrastructure (CII)	Expert judgement suggested a balance between increasing vulnerability arising from interconnectivity and growing awareness of security issues surrounding CII with investments in resilience and spare capacity in some key infrastructure areas.	
 Emergence of risks associated with nanotechnology	In the absence of any major scientific discovery, experts estimated the potential risks arising from nanotechnology were unchanged.	

Key:  Increased overall risk  Stable overall risk  Decreased overall risk  Expert disagreement

Generally, the picture provided by the risk barometer of expert opinion on the year-on-year assessment of global risks is one of rising risks. Expert consensus was that none of the 23 global risk issues identified had improved since 2006. *However, experts noted that awareness on a number of risks – the first step to effective risk mitigation – had improved in a number of areas.*

# Scenarios

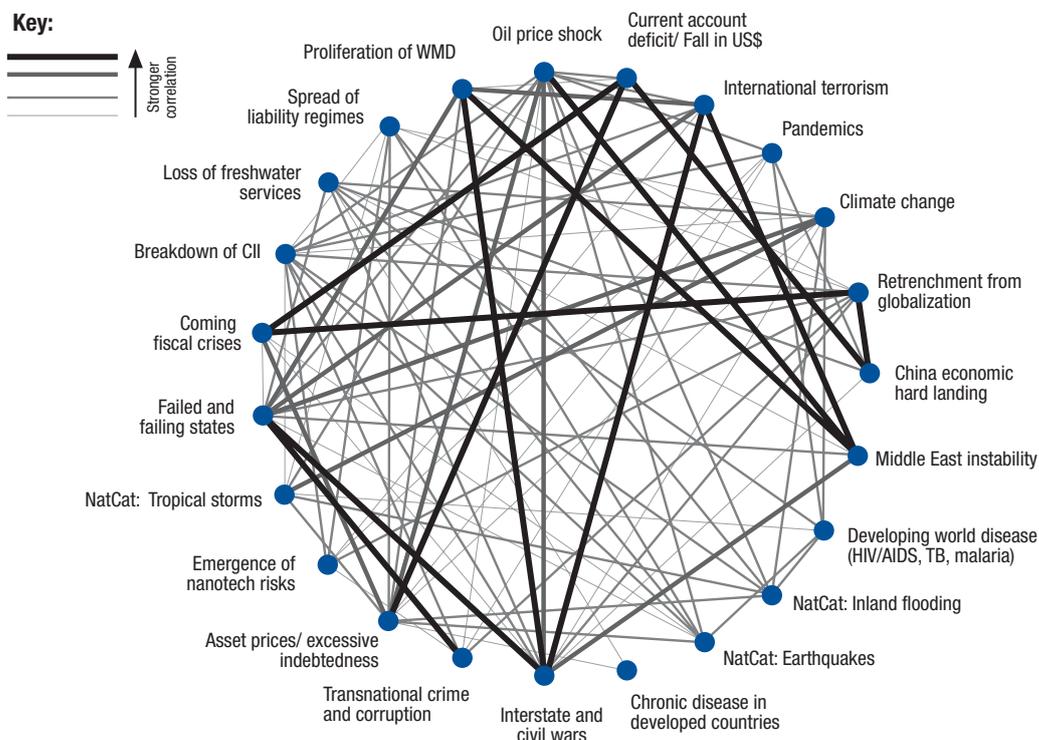
It is a central tenet of work conducted by the Global Risk Network that global risks do not manifest themselves in isolation: their drivers, triggers and consequences are interconnected. This was apparent in 2005 when the domino effects of Hurricane Katrina briefly shook the global system. More recently, the connections between two of the major issues for public policy and private enterprise – energy security and climate change – have reinforced the sense that global risks share a common lineage.

How can one best think about interconnectedness? One approach is to assess correlation. This provides a simple measure of static interconnectedness. In 2006 the Global Risk Network engaged in an ongoing survey of academics and experts to build up a picture of correlation between the 23 core

risks. Many of the risk issues have multiple causes and consequences beyond the risk list itself – the matrix is not supposed to be a comprehensive explanation of causality. However, the correlation matrix portrays the strength of the macro correlations perceived by experts to exist *between* the risk issues identified and studied in this report. In the graphic below, the numerical strength of correlation between risk issues is reflected in the thickness of the lines connecting them.

Correlation provides an excellent overall view of links between risks, but may not capture the dynamics of interconnectedness: even when causation or consequence can be determined with confidence, the context in which risks emerge and interact as they play out may lead to different assessments of probability and impact.

## The Correlation Matrix



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In order to provide this context, the Global Risk Network looked at how key risks could play out in narrative scenarios. These scenarios do not represent “best”, “worst” or even “base” cases, nor are they predictions. Instead, they are possible, plausible global risk features in which the challenges of interconnectedness become plain.

The scenarios below contain a number of surprises – some of them disturbing – but understanding the possible surprises ahead may allow policy-makers and business people to make decisions that will avert the worst consequences of surprise and turn risk into opportunity. While all the scenarios are plausible, none is likely to play out in precisely the way described. The short-term outlook for the global economy remains good: one Citigroup Global Capital Markets report (22 November 2006) predicts global GDP growth of 3.4% in 2007 and 3.8% in 2008. But these scenarios show how short-term central expectations may plausibly deteriorate.

One of the key lessons that emerged from all the risk scenarios developed by the Global Risk Network was the absolute centrality of cooperation between the United States and China in dealing with a number of major global risks – from mitigating climate change, to managing pandemics. Without the full engagement of both the US and China, global risks will be extremely difficult to manage successfully. The accelerating shift in influence, power and prosperity to the countries of Asia represents a generational opportunity to rethink governance and creates the necessity to forge common approaches to global risks.

## Global Risk Scenario A: Pandemic and Its Discontents

*The following scenario illustrates the impacts on business, the financial system and political and economic conditions that could follow from the emergence of a new pandemic. It also illustrates the amplifying role played by “infodemics”, where the rapid spread of inaccurate or incomplete information can amplify the effects of the core risk event.*

In January 2008, reports of a new virus emerge in Asia. Its properties are not well understood, but its roots may lie in the high viral loads present in the heavily vaccinated Asian chicken population.

From the outset, speculation about the virus spreads faster than essential facts. Expert commentators suggest the virus is more deadly than SARS, while governmental data is widely questioned. Fear spreads ahead of the disease, and some neighbouring countries close their borders immediately.

By February 2008, the disease has claimed fewer than 50 lives. Before the end of the month, Australia and Germany report infections carried out of Bangkok International Airport. Many passenger aircraft travelling to South-East Asia are grounded. But the effect on air freight companies is worse: a number are forced to declare *force majeure* on significant contracts, pushing them towards bankruptcy.

The knock-on effects on just-in-time inventories appear by the beginning of March, with longshoremen refusing to unload cargoes from infected countries. The oil price crashes.

In late February, a large hedge fund fails due to sudden asset devaluations. Herd behaviour causes global liquidity to dry up. Neither the G8 nor the G20 is able to coordinate a response. Central banks inject liquidity ad hoc, creating inflationary risks. As black box models fail to adjust, financial contagion continues.

By late March, there are several hundred confirmed deaths outside South-East Asia, but the virus remains poorly understood. Conspiracy theories abound, with ethnic minorities a frequent target.



Bird flu outbreak at the Norfolk road farm, Britain, April 2006

By early June consensus emerges that the virus has been spreading for a year. Yet characterization of the virus continues to move slowly and the ineffectiveness of existing anti-virals has led to a containment crisis. Liability fears among pharmaceutical companies threaten eventual vaccine production, while governments fail to credibly signal exemptions. A scaled-up response looks unlikely.

In some Asian countries, widespread discontent at the authorities' response to the pandemic – particularly in inland regions – leads to the centralization and militarization of government services. In developed democracies, armies become key emergency service providers.

Failed and failing states, particularly Myanmar, Nepal and Pakistan, end up completely isolated and deteriorate quickly, although for different reasons. In Myanmar, different factions scramble to maintain their relative positions. In Pakistan, rumours of inequitable mobilization of government resources cause tensions between central and border regions and between the Sunni majority and Shiite minority. In Nepal, the country is shut from all sides, affecting the provision of stabilization assistance and sharpening political divisions.

Globally, increased fear of cross-border movement and trade feed an emerging backlash against globalization, which in turn compounds the hit on global demand.

By November 2008 the disease is a full-blown pandemic, with one million deaths worldwide. Centralized containment measures are of limited efficacy, but private and decentralized efforts help slow the spread. By January 2009, a partially effective vaccine is produced, with distribution from March. However, internationally, there are questions of who should distribute the vaccine, to whom and at what cost. Domestically, active militaries step into a crisis-management role helping to distribute vaccines.

By summer 2009, vaccination and natural immunity have stemmed the spread of the disease. Globally, normalcy returns, though increased militarism and authoritarian tendencies have reshaped global geopolitics.

## Global Risk Scenario B: Out of the Global Warming Frying Pan (and Into the Fiscal Fire)

*Information asymmetry also plays a key role in this scenario, which illustrates the knock-on effects of a major shift in risk perception: namely, that climate change has arrived.*

Events in 2007 trigger an inflection point in global concern over the consequences of climate change.

First, massive inland flooding in South Asia resulting from a late monsoon leads to crop failure, as well as mass migrations. Tensions rise on the Bangladesh-India border as thousands flee humanitarian disaster. In the Americas, oil supply is still disrupted from 2007 tropical storms; an unprecedented cold snap in the north-east of the US leads to a spike in heating-fuel prices as domestic and local supplies are exhausted. Finally, figures released in December 2007 show an unprecedented spike in the global temperature of 1.5 degrees Celsius for the year as a whole.

China's remarkable story of 28 years of economic growth – a Citigroup Global Capital Markets report (22 November 2006) predicts real GDP growth of 9.8% in 2007 and 10.7% in 2008 – is disturbed by awareness of environmental degradation and inequality between "many Chinas". Some 150 million surplus rural workers drift between villages and cities by 2008, with many subsisting through part-time,



A farmer gathers the rice crop from his paddy field after Typhoon "Prapiroon" hit Southern China in August 2006.

low-paying jobs. This dislocation is masked by unreliable official figures, but eventually causes widespread civil unrest. In part due to the Beijing Olympics, the government is initially unable to calm demonstrations resulting from viral text-message campaigns. The protests seize the mood of global discontent and speak loudly on the issue of environmental degradation.

In North America, public concern over climate change leapfrogs scientific consensus. High oil prices cause a pull back from US asset markets, bursting that country's "housing bubble". Popular discontent results in calls for radical action.

In the United States, legislators follow California's populist lead, establishing a national carbon trading scheme and creating industry incentives for conservation and alternative energy. In late 2008, the US administration releases a white paper entitled "From Addiction to Oil, to Blessed by Biofuel", signalling an enhanced focus in US energy policy on biofuels, particularly relevant to farming communities in the American Mid-West. The white paper wins political support both from "hawks" seeking US energy independence and those fearing climate change.

This policy response has the unintended consequence of setting up acute competition for productive land, between food, fuel, forests and fibre, with increased carbon sequestration and mining activities competing at the margin. Prices rise for agricultural commodities and land.

Meanwhile, China concludes the only practical option for the country's future energy needs is nuclear, with coal-fired electricity as a bridging source. The government announces large-scale infrastructure spending and concludes negotiations with major suppliers of uranium.

While supply constraints and elevated demand keep oil prices high over 2007 to 2010, other developing countries follow China's lead, and demand the right to sovereign control of the nuclear fuel cycle. This puts increasing pressure on the international nuclear non-proliferation regime, causing it to reach a tipping point. The continued failure of the international community to halt Iran's nuclear programme leads that country to proclaim successful enrichment in early 2015.

Global concerns cause risk premiums to rise, and equities to slide. In North America and Europe, retirement funds are impacted. Governments are put under pressure to increase state financial support, causing fiscal positions to worsen, particularly in Europe. At the same time, the bursting of the US housing bubble and declines in equity markets cause private savings in major developed economies to rise – beginning a process of correcting long-standing global economic imbalances.



Gas emissions at a plant near downtown Toronto, November 2006. Current per capita CO2 emissions in Canada and the United States are approximately 5 times Chinese levels. If China were to emit at the North American per capita rate, its total emissions would be more than 4 times greater than those of the US.

## Global Risk Scenario C: Oil Shock and Its Consequences

*This scenario also illustrates the ways in which policy responses to a single shock can either create opportunities for change or facilitate a chain reaction of global risks.*

In early 2008, terrorists attack multiple tankers in the Malacca Straits, sparking a major supply-side oil price shock. The initial shock drives oil above US\$ 150 per barrel. Producing countries, acting in concert, choose to “close the tap”; a global slowdown does not reduce demand for oil products enough to counteract the supply shock. The short-term price elasticity of demand for oil proves itself to be low.

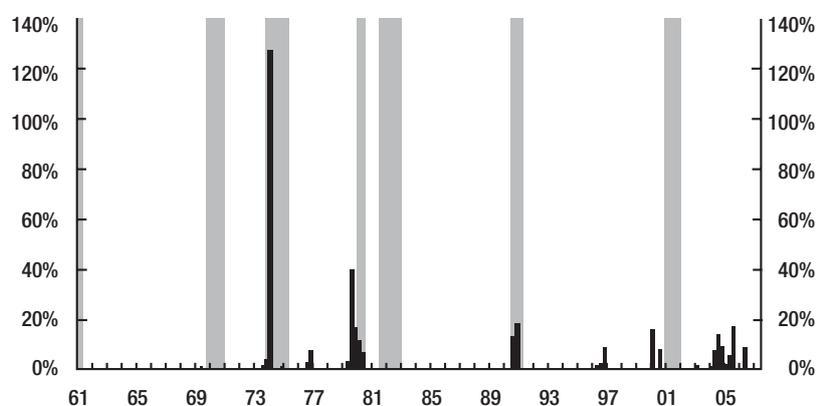
A secondary reaction of oil-producing countries is to match economic weight with a permanent increase in international political weight. Oil-producing countries aim to achieve this by setting up parallel alliances known collectively as ChavPec. The operational mode of these alliances is the expansion of development assistance from oil producers to politically sympathetic and economically vulnerable countries, in return for political support. Rather than windfall gains from high hydrocarbon prices flowing to the developed world, the windfalls generate political goodwill among developing countries.

Continuing with the scenario, the collapse of Pakistan is averted in mid-2008 by redirected oil revenues, resulting in a geopolitical realignment with Arab OPEC nations. Other blocs, similarly structured around commodity exporters, emerge in other parts of the world: between Venezuela, Bolivia and poor Latin American countries; between Russia and former Soviet republics with major energy deficits (notably Uzbekistan, Georgia and Armenia); between African commodity exporters and their neighbours. While some alignments cause concern in the West, they also help to avert state failure.

But the emergence of the ChavPec block does not go unanswered.

A countervailing OECD bloc emerges. The Malacca events cause an immediate slowdown, but the 2008 slowdown quickly turns into a recession in 2009 as OECD governments and central banks have used up their ability to inject liquidity. The recession is worse in the US than elsewhere. In the US, falling asset prices drive down consumption while the unwinding of long-term current account imbalances to which the US is particularly exposed causes a deep recession. In Japan, while higher energy prices help Japan escape deflation, growth is destroyed by the decline in European and American demand for finished goods.

### Oil Shocks (Using Hamilton Filter), 1961-3Q.06



Note: The filter measures an oil shock as the greater of zero or the percent change of the inflation-adjusted US\$ oil price over the peak price of the previous three years. Shaded areas are U.S. recessions.

Sources: BLS, NBER and *The Wall Street Journal*

In the US, Europe and Japan, events are marked by retrenchment from globalization in general, characterized by populism (in Europe and the United States), regionalism (in the emerging OECD bloc as a whole) and militarism (in the US and Japan).

But the most problematic response to high oil prices comes from China, which experiences its own economic hard landing in 2009, primarily due to the collapse in OECD consumption. The speed with which longstanding global imbalances unwind affects China more than OECD bloc countries. But the major consequence is political. China's leadership emphasizes militarism in an effort to consolidate power. Tensions over Taiwan are inflamed. An emboldened military builds up power projection capacities from a relatively low base and turns its attentions south, with an eventual aspiration to control the sea lanes and approaches to major choke-points (including the Malacca Straits). India is

isolated by these events, failing to find its place in any of the emerging major blocs. Over a period of time, tensions with Pakistan – particularly after Pakistan's realignment with Arab OPEC countries – worsen, leading to heightened fears of a nuclear exchange over Kashmir.

The final major casualty of the oil price shock is the prospect for collective action to mitigate climate change. Though the high oil price causes the rate of increase of oil consumption to fall, its major impact is to delegitimize proposals for a global carbon tax. The effect of higher oil prices on alternative energy substitutes only plays out in a 10-year time-horizon. In the short to medium term, the chief substitute for oil – where this is possible – is an increase in the consumption of coal. The fracturing of the international community means that a framework that would make carbon capture and storage attractive politically or economically does not emerge.

## Financial market scenario

	Short-Term Interest Rates	Long-Term Interest Rates	Equities (Changes)	Currency (Trade- Weighted Basis) Changes	Investment Grade Corporate Credit Spreads
<b>Stress case, Oil Shock, 3-month horizon</b>					
<b>United States</b>	5.25	4.75	-15%	-3%	+40bp
<b>Japan</b>	0.25	1.50	-15%	-3%	+20bp
<b>Euro area</b>	3.50	4.50	-15%	+5%	+40bp
<b>UK</b>	5.50	5.00	-12%	+3%	+40bp
<b>Australia</b>	6.25	5.75	+5%	+0%	+30bp

Note: Over a 3-month time horizon of oil prices above US\$ 100, equities in the United States and other markets are expected to decline by over 10%.  
Source: Citigroup Global Capital Markets report, 22 November 2006

# Understanding the Nature of Global Risks

This section of the report provides a brief exploration of three fundamental aspects of global risks: interdependency, heuristic biases and policy mistakes. The first provides an insight into the nature of interdependency and provides an example of how interdependency affects the way in which we manage and mitigate global risks. The second reflects a human approach to risk in general. Humans operate with incomplete information through the use of heuristics. The third, often connected to the second, explores how policy, often intended to mitigate risk, can actually exacerbate it.

## Why Interdependence Matters for Security

A major challenge for policy-makers is how to encourage firms to invest in risk-reducing measures in a world where there are growing interdependencies between different parts of the system. Since 9/11

there has been a focus by researchers and practitioners on strategies for dealing with this issue under the heading of interdependent security (IDS). An interdependent security setting is one in which each individual or firm that is part of an interconnected system must decide independently whether to adopt protective strategies that mitigate future losses. These measures can reduce the risk of a direct loss to a country, firm or individual, but there is still some chance of suffering damage from others who do not take similar actions.

The economic incentive of a decision-maker to invest in protective actions depends on whether others are expected to follow suit. The fact that the risk is often determined in part by the behaviour of others gives a complex structure to the incentives that individuals or firms face to reduce or invest in risk mitigation measures.

### *Setting policy under conditions of interdependency: Reducing the risk of power outages*

Consider a utility that is part of an integrated system – the power grid – and wants to determine whether to invest in additional capacity or security measures (such as taking care of growing vegetation near distribution lines) to reduce the chance that it will cause a power outage. In any highly interdependent system, such as the power grid, there is a systemic tendency to underinvest in reliability. A consequence of interdependency is that a part of the cost of a failure is passed on to competitors and their customers.

Since 2002 several outages in individual European countries (France, Italy, Germany, Switzerland) have had cross-border impacts. An agreement between different European grid operators already exists, defining who should provide back-up power when an outage in one country risks undermining the stability of the European transmission system as a whole. Although this agreement was able to avoid larger damage, it could not prevent the spread of the problem.

There are a number of alternative approaches. One is based in the provision of the service as a right for the customer, under which a utility would be held responsible for the full costs of a service failure, wherever it occurs. This is only possible, however, if the grid is set up in such a way that additional costs for providing transmission services are not directly passed on to customers. A second approach, more explicitly based in regulation, is to mandate minimum reliability standards with monitoring and serious penalties for non-compliance.

The first approach provides a clear incentive on the part of service providers to avoid failures. But it is only a valid option when accompanied by oversight. If customers are made to bear the cost, the distribution of incentives would be asymmetric. The transaction expenses (information, proving responsibility, legal fees) would be prohibitive for individual customers to seek to recover outage costs. The second seeks to prevent them through explicit regulatory action.

Further examples of interdependency can be found in the longer version of the current report at [www.weforum.org/en/initiatives/globalrisk](http://www.weforum.org/en/initiatives/globalrisk)

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In many interdependent security problems, if one actor believes others will not invest in security, the incentive to do so is reduced. The end result may be that no one invests in protection, although all would have been better off if all had incurred the cost of a protection strategy. On the other hand, should each decision-maker believe others will also undertake mitigation measures, the optimal strategy will be to do the same.

## Heuristics

The world is increasingly complex and uncertain. With imperfect information, humans cannot make fully-informed decisions; contrary to neo-classical theory, humans do not make fully rational decisions either. Our decisions frequently depend on approximations of the world around us – short cuts that allow quick decisions by resorting to learned behaviours. These short cuts and “rule-of-thumb” practices are known as heuristics, derived from the Greek word “to find”.

To a large extent, the existence of heuristics stems from the fact that human brains have evolved to specialize in rapid decision-making at the expense of processing complexity. In our original condition, survival depended upon the rapid appreciation of threat and an effective response. Heuristics are often useful, making decisions quicker and easier. But they can also lead to inaccurate judgements, particularly in risk perception.

There are approximately 80 specific heuristic biases that distort our ability to assess risk effectively. Most are not independent of one another, but exacerbate the effects of others. The use of highly diversified networks can help overcome a number of biases: interpreting a story of events through the lens of superficially similar accounts (availability), focusing on instances which seem to confirm our initial assumptions rather than those that question them (confirmation bias), overestimating our own abilities to assess (overconfidence) and clinging mentally to facts or figures heard in a particular context (anchoring).

## Policy Errors in Risk Management

Historically, public policy in financial markets has both mitigated and exacerbated risk. Global risks, difficult to understand and dependent on a range of interconnected factors, are particularly susceptible to policy errors, whether on the part of governments, regulators or central banks.

In some cases, policy has dampened the effects of the market and thereby reduced volatility – automatic stabilizers in welfare economies, for example, have helped to flatten economic cycles. In others, however, policy has seriously exacerbated risk: most initial government responses to the stock-market crash of 1929 – combining mercantilism with a classical approach to wages and prices – sharpened the consequences of the event rather than mitigated them. More recently, errors of regulatory or monetary policy have either reduced the ability of the market to mitigate risk, or exacerbated risks within the market itself.

Policy errors are generally obvious in retrospect but rarely obvious at the time – decisions made by governments and regulators depend on judgement, experience, incomplete information and the balancing of alternative paths of action. However, the awareness of potential policy mistakes may offer the best mitigation strategy for avoiding errors in the future.



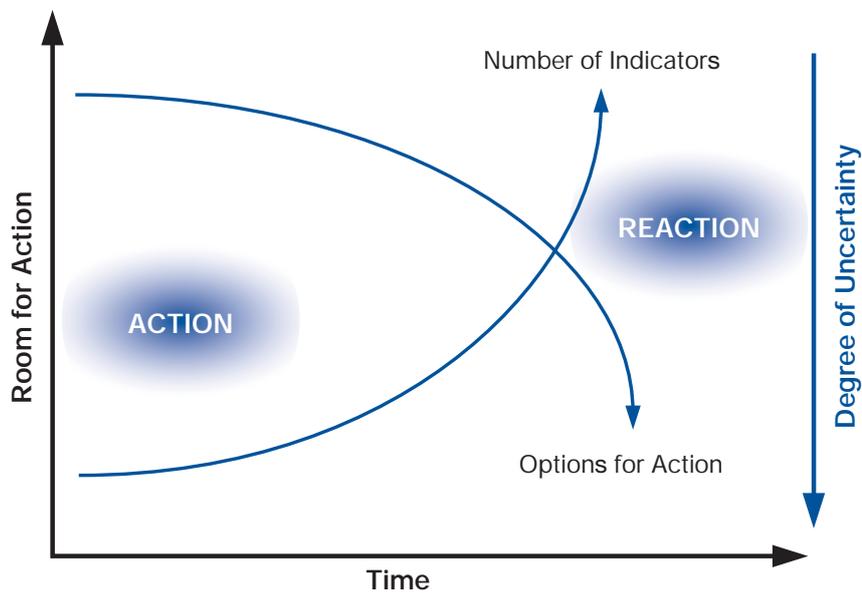
Policy decisions by governments and central banks can help improve resilience and prevent the contagion of financial risk. In 1929, however, policy in the US and elsewhere exacerbated the impacts of the equity crash.

# Risk Mitigation

The aim of risk identification and risk assessment is to provide the tools to mitigate exposure to global risk. But the step from the assessment of individual global risks to the mitigation of global risks under conditions of uncertainty, interdependency and competing interests is far from simple.

Mitigation involves a constant balance between action and reaction, between preventing a risk from occurring and dealing with its consequences when it does, between acting rashly and acting too late.

## Risk Mitigation



Note: As time progresses, the information surrounding a given risk event may increase. But as it does, the options available for effective mitigation are bound to reduce. Risk mitigation – as with risk itself – involves degrees of uncertainty. Taking proactive mitigation policies implies operating under considerable uncertainty, with incomplete indicators.

Source: Crisis and Risk Network, Swiss Federal Institute for Technology

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## Prioritizing Risk

Resources for risk mitigation are necessarily limited; prioritization among risks is a necessary step for deciding how mitigation resources should best be spent.

The normal basis for prioritization is, firstly, an assessment of the likelihood of the risk occurring and the severity of the consequences of the risk occurring. These assessments are necessarily idiosyncratic and distorted by a range of heuristics – for example, perceived likelihood is affected by “recency” and “availability” biases while severity depends on “vividness” and perceived vulnerability. A second element to prioritization is values – the different values of an organization may determine its perception of vulnerability, as well as its perception of responsibility for mitigation. A third and final element is openness to mitigation – risks where there are clear strategies for mitigation will tend to be mitigated before those where strategies are more diffuse, even if the assessment of likelihood and severity is less acute.

At the global level, these key elements of risk mitigation are problematic. First, the potential consequences of combinations of risks affect all organizations, even if global risks are often perceived by individual organizations and countries as exogenous. Second, global risks may produce consequences outside the central expectations of risk managers – they represent low-probability,

high-impact events which cannot necessarily be well understood through classic cost-benefit analysis. Third, global risks (such as climate change) may emerge over a multi-decade time-frame, making it necessary to compare mitigation over different generations to ensure equity. Fourth, interconnections between global risks complicate prioritization – looking at global risks in isolation may increase the perceived costs of mitigation: as this report argues, interdependencies are the key factor in the global risk environment. Finally, mitigating global risks often requires the cooperation of different groups – issues of how to manage collective action impact heavily on how individual and global risk mitigation priorities can be successfully aligned (the “tragedy of the commons”). Most global risks are not open to effective mitigation by any individual organization.

The Stern Review on the Economics of Climate Change offers one approach to managing risk prioritization on the multi-decade and global scale, suggesting a low discount rate for calculating the net present value of future costs from not acting to mitigate climate change. It is an approach that aims to get beyond national vulnerabilities to assess the systemic costs. An alternative approach, explicitly stating a limitation on available mitigation resources, is that undertaken by the Copenhagen Consensus project. Risk prioritization at the global level is a major task – but a necessary prerequisite to efficient mitigation.

The approach taken to mitigate an individual global risk will depend on prioritization, resources and understanding. Some risks can effectively be mitigated with relatively few resources by changing individual mindsets and altering behaviours – others require strong institutional processes and actions. What is common to the mitigation of all global risks is that they require alignment on priorities, common understanding and common efforts to overcome problems of collective action.

One approach involves acting to prevent the manifestation of a specific risk. The advantage of “upstream mitigation”, if successful, is that it allows the disruption of the risk event itself to be avoided.

However, this assumes a degree of certainty about the manifestation of the risk, and the expectation that it can be managed in isolation. The scenarios in this report suggest that interdependency between global risks is hard to manage in this way. An alternative is to attempt to understand nodes of interconnectedness between global risks, and focus mitigation efforts on them.

A final approach is to improve resilience, allowing the system to cope with a range of unexpected manifestations. Such “downstream mitigation” recognizes that not all events can be predicted and prevented.

## Why are organizations not more proactive in mitigating risk?

The following is a list of common reactions to risk, which prevent a proactive approach to risk mitigation:

- Someone else will manage my risk.
- The risk is not relevant to my organization.
- Won't taking action just slow me down?
- No one is telling me that I must act.
- What reward do I get from mitigating risk?
- It is too costly to mitigate.
- Why worry about it?  
It could never happen to me.
- It is too large to manage, and success is not guaranteed.

In reality, these approaches are not mutually exclusive. Mitigation strategies tend to involve parts of both – like global risks themselves they are dynamic and complex.

In the 2006 report, the Global Risk Network developed the idea of the “5 pathways” to mitigation, defining five elements of risk mitigation strategies: improving insight, enhancing information flow, refocusing incentives, improving investment and implementing through institutions. In the 2007 report, these “5 pathways” have been applied to the “core global risks” to achieve an understanding of where mitigation efforts should focus.

## The “5 Pathways” to Mitigation

- Improving insight: moving risks from the unknown to the known through research. The best mitigation strategies often derive from the changed mindset which can result from enhanced knowledge and information.
- Enhancing information flow: allowing information to flow effectively between decision-makers and those experiencing the risk first-hand, to provide early warning, inform the public and exchange best practice.
- Refocusing incentives: creating the incentive frameworks that will allow decisions to be made to reduce risks previously considered exogenous.
- Improving investment: providing the investments necessary to mitigate risk.
- Implementing through institutions: improving (or creating) the framework needed to mitigate risks for which an institutional response is required.

## Applying the "Five Pathways" to the 23 "Core" Global Risks

Global Risk	Improving insight	Enhancing information flow	Re-focusing incentives	Improving investment	Implementing through institutions
Oil price shock/energy supply interruptions			■	■	■
US current account deficit/fall in US\$	■				■
Chinese economic hard landing	■				■
Fiscal crises caused by demographic shift			■	■	
Blow up in asset prices/excessive indebtedness	■	■			
Climate change	■		■		■
Loss of freshwater services	■		■		■
Natural catastrophe: Tropical storms	■	■			■
Natural catastrophe: Earthquakes		■	■		■
Natural catastrophe: Inland flooding			■	■	■
International terrorism	■	■			■
Proliferation of WMD			■		■
Interstate and civil wars				■	■
Failed and failing states	■			■	■
Transnational crime and corruption	■		■		■
Retrenchment from globalization	■		■		■
Middle East instability			■	■	■
Pandemics	■	■			■
Infectious diseases in the developing world	■			■	■
Chronic disease in the developed world		■	■		
Liability regimes	■		■		
Breakdown of critical information infrastructure (CII)	■	■			
Emergence of risks associated with nanotechnology	■	■			

## Two Possible Institutional Innovations for Managing Global Risks

### Country Risk Officer

The Country Risk Officer concept would require governments to appoint a single Country Risk Officer, prioritizing risks on a cross-sectoral basis, exploring private sector techniques of risk assessment, management and transference.

In the corporate sector, the Chief Risk Officer (CRO) is responsible for all categories of risk, particularly risk reporting, consolidation and aggregation. Enterprise CROs take a portfolio view of risk – a Country Risk Officer would serve a similar function, acting as a focus point for strategic thinking (rather than day-to-day management) and forward action within government on how global risks can be effectively managed and mitigated.

The principal advantage of the CRO concept domestically would be to allow effective trade-offs between the priorities of different ministries, and to allow governments to escape silo-thinking. This is particularly relevant when thinking of “downstream” resilience strategies as similar measures can help mitigate the consequences of different risks: buildings which are protected against earthquakes are also likely to better withstand an explosion.

At the international level, the meeting of national CROs could provide a coordination body for global risk mitigation efforts.

### “Coalition of the Willing”

An alternative institutional solution to the management of global risks is the setting up of “coalitions of the willing” regarding individual global risks involving different groups of countries in a system of flexible geometry. A common criticism of current international approaches to major risk issues is that they depend on bureaucracies that

require consensus to act and that their objectives are frequently sidelined by institutional conflicts. At a time of acute global risks, the lack of decisiveness may have severe costs.

An alternative may be so-called “coalitions of the willing” whereby a number of individual, interested and vital states cooperate in a non-exclusive fashion on a specific global risk issue for a specific period of time, acting as an avant-garde for risk mitigation. Other countries will join the initiative as it progresses towards a statement of policy actions. The incentive to join is to influence a successful global policy. The incentive to pursue the risk mitigation goals seriously once inside would be a “naming and shaming” of those countries that do not meet the specific, agreed, commitments and the possible risk of expulsion.

The principal advantage of the “coalition of the willing” structure is its flexibility and the involvement of only interested states, thereby reducing the possibilities for obstruction and gradually drawing less interested states into a dialogue. The principal disadvantage of such an approach would be the inability to effectively negotiate trade-offs between different countries’ approaches to different global risks. For “grand bargains” between states a coordinating role would still be required.



The World Economic Forum can play a key role in facilitating dialogue on risk issues, helping to achieve consensus around the need for change and possible mitigation solutions.

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### *Focus on Mitigation: Oil Price Shock/Energy Supply Interruptions*

The recent progress on mitigating the risk of an oil price shock includes reductions in oil subsidies, higher investment in energy efficiency and increased strategic oil inventories:

- Energy price subsidies have been reduced in some countries, for example, Indonesia and Russia.
- High oil prices have increased investments in the oil and gas sector, public and private investment in energy efficiency and alternative energy sources.
- Reserves have been added to Strategic Petroleum Stockpiles, in, for example, the US and China.

Future mitigation needs can be divided into those which address the question of interruptions specifically, and those that broadly address the question of demand and supply.

- Remove the silo-based approach to risk management and link energy security with considerations on climate change.
- Promote marketing of energy-efficient products and clean energy sources and attempt to promote sustainable economic growth as a positive economic choice in the developed world and as a long-term policy for emerging markets.

- Reduce legal and political uncertainties related to emissions-trading schemes and renewable energies to allow markets to fully develop their potential.
- Develop nuclear energy and coal-fired electric utility plants in a manner that is mindful of the risks and environmental concerns.
- Increase investment in refinery capacity and in Liquid Natural Gas plants, off-loading and processing terminals.
- Increase taxes progressively on fuel in the United States to European levels, made more politically palatable with an equal value cut in income tax.
- Eliminate remaining energy-price subsidies. This is particularly necessary to encourage energy efficiency in emerging markets and hydrocarbon-rich nations.
- Stockpile oil in Strategic Petroleum Reserves, but release supplies unpredictably when necessary to undercut speculative psychology in the markets.
- Promote intergovernmental cooperation on energy security policies in defined geographies – such as the European Union.
- Promote and ensure common standards for energy transit.

## *Focus on Mitigation: International Terrorism*

Despite the increase in the overall strategic threat from international terrorism (particularly in Iraq, Afghanistan and Somalia), there have been a considerable number of tactical advances in the mitigation of terrorism risk. These range from improved security controls, to improved political understanding and better management of terrorism events when they occur, including development of terrorism insurance markets to cover some of the economic consequences of attacks and facilitate the recovery process.

On pre-event mitigation:

- In the United Kingdom, a plot to blow up aircraft between Britain and the United States was disrupted.
- The European Union is improving its security information-sharing system, through work on an EU-wide counter-terrorism database.
- The United States is improving its tracking of imports and exports, through its Automated Commercial Environment system.
- In Saudi Arabia, over 20 senior Al Qaeda operatives have been killed. A few years ago, fears that the Saudi regime was under threat were widespread – these fears are now reduced.
- The Philippine authorities are re-establishing control over Basilan and the Jolo Islands, operational centres for the Abu Sayyaf and Jemaa Islamiyah terrorism organizations.
- In Indonesia, the government's multipillar counter-terrorism campaign is being strengthened, with considerable new counter-terror legislation, the prosecution of a number of major terrorists and the support and promotion of moderate Islam as an alternative to radical theology.
- The private sector has improved physical security measures and screening.

In post-event mitigation:

- The private sector has continued progress on diversifying operations and building up resilience, for example, by establishing a second computer backbone.
- Terrorism insurance schemes have been established to spread the risk among the different stakeholders in some markets through public-private partnerships: NHT in the Netherlands, Pool Re in the UK, Gareat in France, Extremus in Germany and TRIA in the US.
- Terrorism insurance has risen: one survey of Marsh clients revealed that terrorism coverage rose from 23% in mid-2003 to 64% by the end of 2005.

Future specific needs for mitigating the terrorism risk:

- Renew terrorism insurance schemes scheduled to sunset in 2007 in some form; improve framework for public-private arrangements in other countries.
- Reach an internationally-agreed definition of terrorism and terrorist acts and build a body of transcultural values to help combat terrorism.
- Expand intelligence capabilities, while re-enforcing oversight functions to ensure that privacy is maintained.
- Improve cooperation between intelligence agencies. In regions where bilateral cooperation is already good and a level of trust has been established, transition to a more dynamic and efficient multilateral mode of cooperation.
- Improve tracking of financial flows to cut off funding to dispersed terrorist cells.
- Strengthen the monitoring of the shipment of goods to allow for the detection of explosive devices and nuclear/biological/chemical/radiological material.

## Focus on Mitigation: Climate Change

As the science surrounding global climate change continues to unfold, a range of public and private mitigation measures are critical both in the immediate term and over the long term.

Some steps are already under way:

- Awareness of the impacts of climate change is rising quickly (particularly in the developed world), building public support for mitigation. Ultimately, changes in the mindset of consumers – altering their behaviour as a result – may produce considerable mitigation.
- The European Union launched an Emissions Trading Scheme in 2005.
- California has passed a law aiming to reduce greenhouse gas emissions by 25% by 2020.

But there are a number of mitigation needs which should be introduced, updated or implemented more fully:

- Raise awareness in the developing world of the impacts of climate change.
- Involve major developing countries in new frameworks for limiting future emissions' growth (particularly China and India).
- Urgently begin work on a successor to the Kyoto agreement with three central principles:
  - Involvement of the United States and major developing countries (particularly China and India);
  - Differential responsibilities for future emissions' reduction dependent upon past emissions and stage of economic development; and,
  - Common overall responsibility for climate change.
- Allow transfer of technologies which may help reduce climate change, or mitigate its impacts.
- Expand market mechanisms – such as carbon emissions' credit trading – which encourage innovation, reward efficiency and ease the development of insurance and other financial tools to manage risks inherent in emissions' reduction projects.

- Strengthen current market mechanisms by ensuring a stable and predictable legal environment and ensuring ambitious overall limits on emissions.
- Create strong incentive structures and provide research funds to foster possible “breakthrough technologies” such as hydrogen fuel cells or advanced thin film photovoltaics, particularly in the power-generation sector.
- Provide investment or tax incentives that level the playing field for capital intensive investments in clean-coal combustion and carbon sequestration.
- Improve cost-effective reductions in emissions at the business and domestic level. Many well-managed corporations have already identified more efficient processes that can lead to cost savings in their production processes, transportation and facilities management. These should be extended.
- Improve the protection of private and public operations from discontinuities caused by severe physical risks due to climate change, including strategic assessments of long-term vulnerabilities.
- Encourage long-term adaptation in countries where impacts of climate change are most likely to be felt, by increasing adaptation aid and creating financial structures to leverage global insurance capacities.



A car struck by a tree blown down in the storm on a road in China's Guangdong province. Typhoon “Prapiroon” killed at least 48 and left 15 others missing after crashing ashore in Southern China.

## Focus on Mitigation: Pandemics

The nature of the pandemic threat has become much more widely understood over the last year:

- A pandemic is not a one-time occurrence, but occurs as a series of waves.
- An outbreak cannot be predicted – multiple, simultaneous geographic outbreaks may occur with concurrent failures in the supply/value chain.
- The behavioural response to an outbreak – the “infodemic” element – may be more significant than the virus itself.

As a result, mitigation measures have advanced, both for the specific HN51 virus, as well as preparedness for a pandemic outbreak more generally:

- There has been an increase in exchange of best practices between businesses.
- The coordination of international organizations has improved.
- The awareness of the significance of national transparency in order to aid any future international effort makes the control of the disease more likely.

Some future mitigation needs may only become available once an outbreak has occurred and its origins and vector of transmission have been identified. But many mitigation options remain incomplete or not fully exploited:

- Strengthen collaborative preparedness activities, including simulations and decision-modelling exercises among national, local and value-chain interdependent parties.

- Manage expectations of what government will and will not do if an outbreak occurs, endorsing wider accountability in the event of a pandemic and driving financial responsibility.
- Improve governmental ability to provide timely, clear and effective information, and improve education of first-responders.
- Increase research into the identification of critical choke-points in the supply/value chain where skill sets are rare, interdependencies are greatest and the risk of triggering systemic failure is highest.
- Invest in surge capacity in healthcare services.
- Encourage private sector investment in surge capacity for vaccine manufacture.
- Develop effective domestic plans for the distribution and administration of vaccines and other medication in a pandemic situation.
- Reach understanding between manufacturing and consuming countries on an equitable and agreed basis for international distribution of vaccines in a pandemic situation.
- Encourage the maintenance of basic supplies at home.
- Explore the possibility of “work-from-home” for some businesses, reducing the potential for infection and spread.
- Undertake an administration-wide skill-set evaluation to allow planning for replacing skilled personnel, should they become unavailable.
- Explore the feasibility of alternate financing schemes to serve as a backstop and transfer the risk to a larger community, including the public sector, to avoid systemic failure.

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All of the four global risks focused on here – oil-price shocks, international terrorism, climate change and pandemics – would benefit in different ways from the institutional innovations suggested in this report: a Country Risk Officer or the setting up of “coalitions of the willing” around particular global risks.

A Country Risk Officer would allow prioritization to be made effectively and resources to be focused on different risks at different times – creating, for example, the kind of surge capacity for dealing with pandemics which is outlined above. A Country Risk Officer would be equally well placed to understand the interconnections between many global risks – understanding how some mitigation measures for climate change might help improve energy security while others would transfer the risk, or understanding how improvements in preparedness for natural catastrophes could also strengthen resilience to international terrorism. Faced with a portfolio of mitigation options, a Country Risk Officer would be able to shape the necessary strategic understanding and response to global risks that are needed.

The “coalition of the willing” idea would allow for flexibility and clarity in adopting many of the specific mitigation options suggested above. The appropriate governance, management and mitigation of global risks are only likely to emerge from the expanding participation of interested parties. Some of the specific mitigation ideas above are already under way in some parts of the world, but their impact is reduced by the partial nature of their adoption elsewhere. Structured “coalitions of the willing” would allow momentum to build up around mitigation measures, bringing countries and businesses into an evolving set of standards, rather than seek to achieve an overarching arrangement at the outset. As such, a “coalition of the willing” would reflect the realities of global politics – and attempt to derive dynamic advantage from them.

In some cases, this approach would not work: a global definition of terrorism and terrorist acts is clearly a task which requires cross-cultural consensus from the outset. However, for others – such as an oil-price spike – this structure might create exactly the balance between inclusiveness and manageability that is required to produce agreement on appropriate measures for global risk mitigation.

There is no guarantee of mitigation initiatives preventing global risks from causing major disruption to the international system, economic damage and irreparable human loss. Global risks cannot – for the most part – be mitigated out of existence. But inaction in the face of global risks is not an option – either for businesses or government.

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Over the past year there have been a number of workshops associated with the Global Risk work. Four of these, at the Wharton School in May, in London in June and October, and in New York in September, directly contributed to the writing of the current report. We would like to thank the participants in these workshops for their time – and above all for their insights:

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