Chapter 2

The Hidden Risks of Economic Globalisation

Disaster risk has been etched into the contemporary economic landscape largely through investment decisions. In most countries, 70 percent to 85 percent of total investment is made by the private sector – small and large companies, investors and households. How these investments are made, directly determines levels of disaster risk. They shape the direction of capital flows and the level of disaster risk that is internalised in the capital stock or assets produced. To date, these investments have largely increased disaster risk.

As a consequence, the wealth of countries has repeatedly been eroded by disasters through loss of and damage to its capital stock. When produced, human and natural capital is affected by disasters; the competitiveness and sustainability of economies can be severely compromised with long-term negative impacts. These risks and the resulting costs are often transferred to and shared with other locations, actors or times.

2.1 The wealth of nations at risk

The wealth of a country in the form of produced, human and natural capital can be severely affected by disasters. In such cases, even a temporary inability of local and national economies to attract capital may have long-term negative impacts.

Disasters are often still described as exogenous shocks (G20/OECD, 2012). In reality, disaster risk is endogenous to investment and assets. Extreme hazards, such as major earthquakes, volcanic eruptions and destructive tsunamis, can certainly be described as exogenous events. But the losses and impacts that characterise disasters usually have as much to do with the exposure and vulnerability of capital stock as with the severity of the hazard event.

Capital stock can be divided into three categories: produced capital (including machinery and structures and urban land); intangible capital (including human and institutional capital); and natural capital (including energy, mineral and forest resources, crop and pasture land and protected areas) (World Bank, 2011; UNU-IHDP and UNEP, 2012).[i]

Disaster risk becomes internalized in and endogenous to these different categories of capital stock, reflecting how and where investment decisions orient capital flows, in the context of a range of mediating factors, including government regulation and incentives, insurance availability and pricing and financing. In other words, disaster risk is not natural but is produced through investment decisions and the range of factors that mediate those decisions.

Since the last global economic crisis of the mid-1970s, a new economic globalisation has transformed the world beyond recognition—in its economy, society, politics, culture, territory and environment. It is beyond the scope or objective of this report to analyse the complexity or dynamics of these transformations. But if economic globalisation has changed the pathways through which capital flows, then the landscape of disaster risk will also have been transformed.

Over recent decades, spatial barriers to investment have been continuously eroded. Technological innovations such as containerization, satellite communication and the internet; the liberalization of trade and financial markets; new organizational models based on networks rather than hierarchies and the emergence of important new markets are only some of the components that have enabled and encouraged large businesses to decentralize, outsource or off-shore all or part of their operations to different locations worldwide (Castells et al., 2012).

In doing so, businesses have enhanced productivity and profitability by exploiting the comparative advantages of different geographies, such as in countries and cities that offer attractive labour costs and skills, easy access to export markets, good infrastructure, a stable economic and political environment, and many other factors. Although in many cases, low labour costs may have been the principal incentive driving production, distribution, research and development, sales and services to other locations, each business sector responds to a particular range of requirements and incentives.

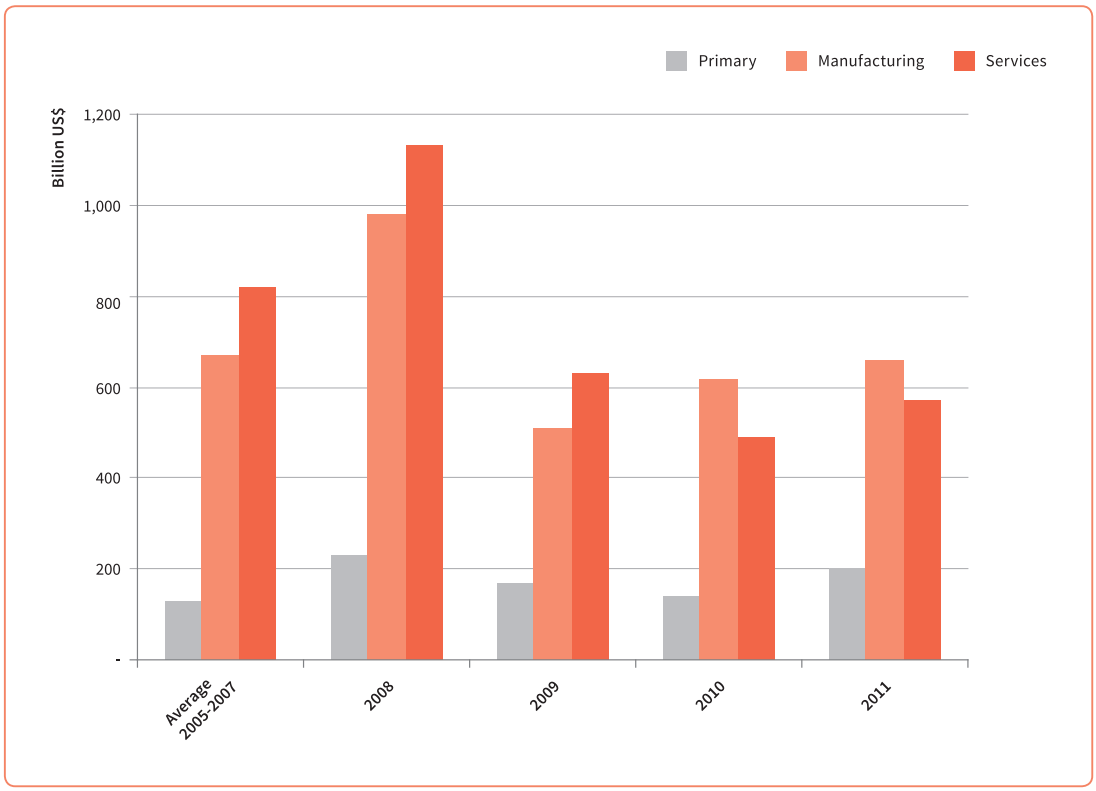
As business investment becomes increasingly footloose and freed from spatial constraints, at the same time, it has become increasingly sensitive to the mix of comparative advantages internalised in each location. In other words, choosing the right location to invest becomes increasingly important to maintain and enhance competitiveness.

At the same time, as business investors scan the horizon in search of locations that can provide a competitive edge, competition between cities and countries to attract investment has become increasingly fierce. National and city governments promote their comparative advantage and attract investors by improving infrastructure, urban development and cultural landmarks.

The volume of foreign direct investment (FDI) provides an indication of the size of global capital flows. As Figure 2.1 highlights, FDI peaked at US$2.35 trillion in 2008, of which US$1.13 trillion went into services, including infrastructure; US$0.98 trillion into manufacturing; and US$0.23 trillion into primary activities such as mining, oil and gas and agriculture.

Globally, one of the results of these flows has been a substantial increase in the value of produced capital. In absolute terms, produced capital remains

Figure 2.1 FDI projects by sector, 2005–2011[ii]



(Source: UNISDR, based on estimates by UNCTAD, 2012)

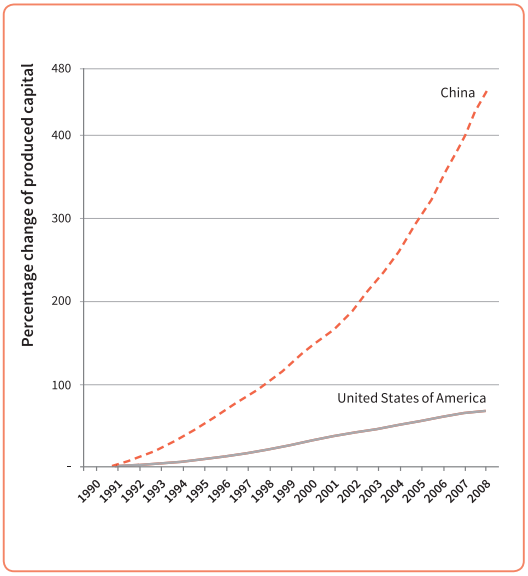
concentrated in OECD countries. The value of produced capital in OECD countries increased by about one-fifth from US$75.3 trillion in 1995 to US$93.4 trillion in 2005 (World Bank, 2011).

In relative terms, however, there have been spectacular increases in the value of produced capital in those low and middle-income countries that have been successful in attracting investment. The value of produced capital in East Asia and the Pacific,[iii] for example, more than doubled from US$4.6 trillion in 1995 to US$10 trillion in 2005.

In contrast, the value of produced capital in regions that have been less successful in attracting investment has grown from a small base and at a slower rate. For example, the value of produced capital in sub-Saharan Africa increased from US$1.1 billion in 1995 to only US$1.3 billion in 2005, representing less than 1% of the world's total.

Figure 2.2 highlights the contrast between China, where the stock of produced capital has more than quadrupled over the last 20 years, and the United States of America, where it has increased by only 70 percent over the same period (UNU-IHDP and UNEP, 2012).

Figure 2.2 Produced capital growth in China and the United States of America



(Source: Adapted from UNU-IHDP and UNEP, 2012)

Since 2009, and as Figure 2.1 previously shows, FDI flows have fallen as a result of the global crisis. FDI flows from countries such as China, however, are growing rapidly, reaching US$77 billion in 2012. Although still relatively small, this trend indicates changes in the direction of capital flows. At the same time, as labour costs increase and access to skilled workers becomes limited in some markets, some previously attractive locations for FDI may lose some of their comparative advantage.

2.2 Increasing exposure

New data confirm that a rapid increase in exposure is a major driver of disaster risk today. Investments in flood plains or on cyclone-prone coastlines lead to spiraling risk levels but are still considered profitable as special industrial zones, a skilled workforce and large markets bring comparative advantages and continue to attract business.

Some regions that are successfully attracting investment and have seen the largest increase in produced capital are also exposed to hazards such as earthquakes, tropical cyclones and tsunamis. As such, benefits to business from globalisation have also been accompanied by major boosts in population and value of assets in hazard-exposed areas. These areas include tsunami and cyclone-prone coastlines, flood-prone river basins and earthquake-prone mega-cities. Seasoned investors have not acted irrationally in flocking to these areas. On the contrary—many such areas offer higher productivity and comparative advantages. For example, export-oriented production and distribution tends to cluster around international ports; tourism is attracted to tropical beaches and islands (Hallegatte, 2011). These areas, however, present disaster risks,

which are not necessarily factored into business investment decisions.

Between 1970 and 2010, for example, while global population growth was 87 percent, populations living in flood plains grew by 114 percent and in cyclone-prone coastlines by 192 percent. Similarly, the proportion of global GDP exposed to tropical cyclones increased from 3.6 percent to 4.3 percent over the same period. Most of this increase occurred in Asia (UNISDR, 2011). This implies that through economic globalisation, populations and assets located in hazard-exposed areas have grown faster than in other areas. Figure 2.3 below, for example, highlights the concentration of produced capital in areas exposed to cyclonic winds in East Asia.

This growth in exposure is one of the principal drivers of increasing disaster risk. Simply put, the concentration of individuals and produced capital in hazard-exposed areas today is greater by an order of magnitude than it was 40 years ago.

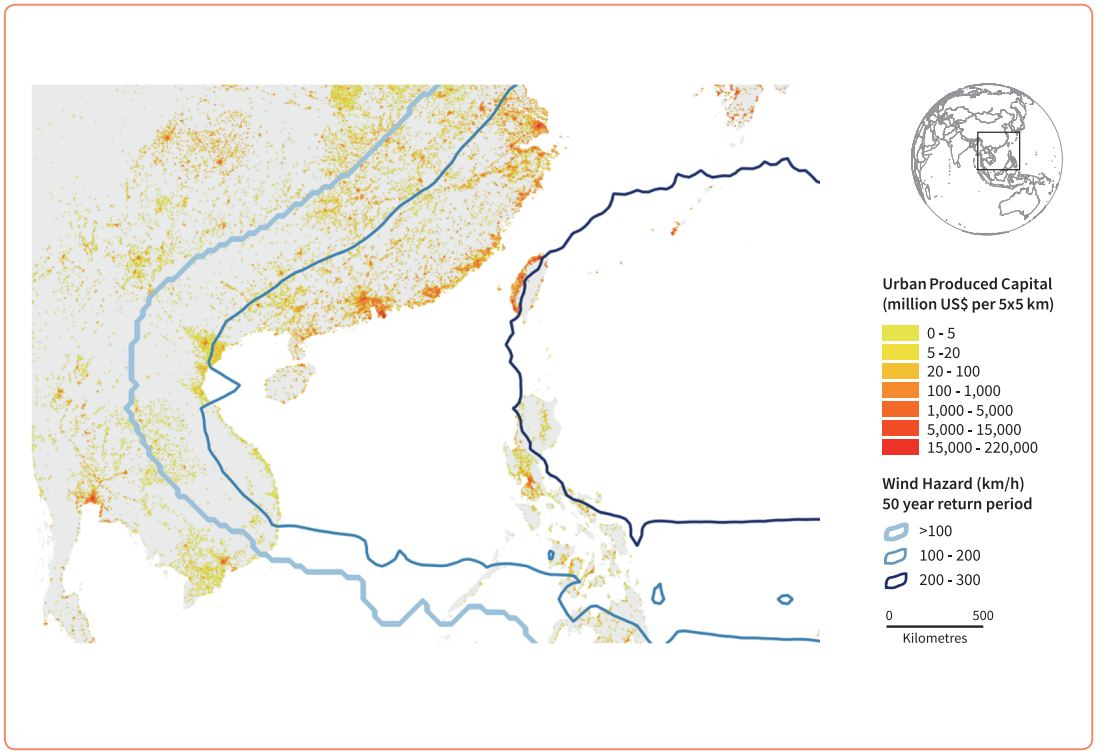
2.3 Reducing mortality risk and increasing economic risk

Exposure is a key driver, but vulnerability levels still strongly shape the different levels of disaster risk that can be found between and within countries. Several countries have been successful in significantly reducing mortality risk. But many countries have struggled to reduce economic risks—particularly those with limited capacities for managing development process and investments.

Disaster risk not only depends on the severity of hazard or volume of population or assets exposed, it also is a function of the susceptibility of people

Cyclonic winds

Figure 2.3 Produced capital stock in Southeast Asia and cyclone wind hazard (50 years return period)



(Source: GAR global risk model)

and economic assets to suffer loss and damage—in other words, their vulnerability. And vulnerability has also been modified by economic globalisation.

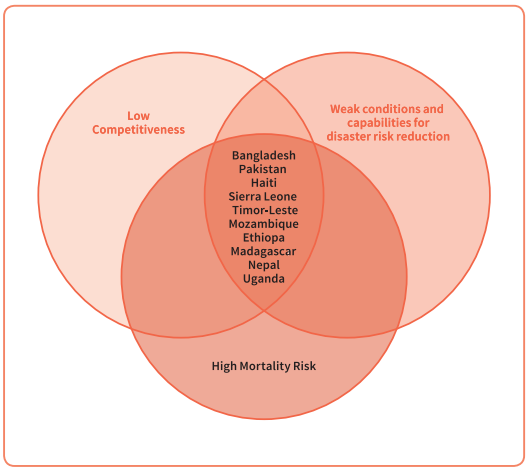
In general, higher-income countries and those with rapid economic growth over recent decades have successfully reduced their mortality risk. With economic development, capacities in disaster and emergency management generally improve. Since 2007, countries reporting progress against the Hyogo Framework for Action (HFA) have consistently highlighted good progress in strengthening disaster preparedness and response and in developing institutional and legislative capacities to do so (UNISDR, 2009 and 2011).

With improved transport infrastructure and health facilities, which facilitate evacuation and prompt medical attention, this leads to reduced vulnerability, at least in the case of floods and tropical cyclones, even though the exposed population increases (Kahn, 2005; UNISDR, 2011). For example, it was estimated that mortality risk associated with tropical cyclones in East Asia and the Pacific fell by 50 percent between 1980 and 2010 (UNISDR, 2011) although exposure increased by about 160 percent.

In contrast, in regions with slower economic growth, mortality risk is still high. For example, in sub-Saharan Africa, flood mortality risk has been growing consistently since 1980 (UNISDR, 2011) because the rapid increase in exposure has not been accompanied by a commensurable reduction in vulnerability. These examples confirm that the underlying risk drivers as identified in previous Global Assessment Reports are key challenges for several countries.

Figure 2.4 compares an index of mortality risk (UNISDR, 2009) with an index of competitiveness (WEF, 2012) and an index of conditions and capabilities for disaster risk reduction—for example, managing urban development, setting up effective governance structures, protecting the environment and alleviating poverty and vulnerability (DARA, 2012). Some countries, such as Haiti, Madagascar and Sierra Leone, have not been successful in attracting investment, have low capacities to manage disaster risks and have high mortality risk.

Figure 2.4 Countries with high mortality risk, low competitiveness and weak conditions and capabilities for risk reduction



(Source: UNISDR, based on the WEF Competitiveness Index 2011; GAR Mortality Risk Index 2011; DARA Risk Reduction Index 2012)

Many countries have been far less successful, in contrast, in reducing the vulnerability of their produced capital, including housing, infrastructure and productive assets. Low and middle-income countries, in particular, report that they are challenged to use tools such as land-use planning, environmental management and building codes to reduce these vulnerabilities (UNISDR, 2009 and 2011). As a consequence, as mortality risk has decreased in successful economies, economic disaster risk has been increasing in concert with the growth in exposure (Neumeyer and Barthel, 2010). In some regions, including in OECD countries, the risk of losing produced capital in disasters may now be growing faster than the capital being produced (UNISDR, 2011; Hallegatte, 2011).

Earthquake mortality risk differs from the mortality risk associated with floods and tropical cyclones. While warning systems are becoming increasingly sophisticated, earthquake mortality is closely correlated to building collapse. This implies that earthquake-prone countries with rapidly growing econo-

mies and the inability to reduce the vulnerability of their building stock may also have increased earthquake mortality risk.

In countries that are not competitive and have been unsuccessful in attracting investment, economic loss risk, in absolute terms, has not risen in the same way. This is not because their produced capital is not vulnerable but because the density of hazard-exposed capital is far lower.

These trends have clear implications for business investment. Although vulnerability may be lower in high-income countries, as the value of produced capital increases, disaster risk also increases simply as a result of increased exposure. However, businesses that invest in low and middle-income countries may face increased disaster risk, not only as a result of increasing exposure but because these countries have not yet developed the capacities to reduce their vulnerabilities. If businesses do not factor these vulnerabilities into their investment decisions, they may be assuming risks and liabilities that will only become apparent when hazard events occur.

2.4 The globalisation of risk: vulnerable supply chains

Today's globalised production systems and supply chains have created new vulnerabilities. While increasing efficiency and saving costs for businesses, global supply chains may contain hidden disaster risks with potentially devastating consequences, including for investors and markets.

Economic globalisation has increased sharply the value of produced capital exposed to hazards in countries challenged to reduce their vulnerabilities; it has also provided changes to the structure of supply chains. These changes magnify and transmit disaster risk to other countries and regions not directly exposed.

As different business functions have been outsourced and decentralised, the global economy has become structured around an integrated web of supply chains.[iv] For example, faced with growing competition, the Japanese automobile industry decentralised production to other countries. As Figure 2.5 highlights, this led to a doubling in the export of automobile parts, from about 1.3 million manufactured parts in 1999 to about 3.2 million in 2010. The industries supply chain has thus become increasingly globalised.

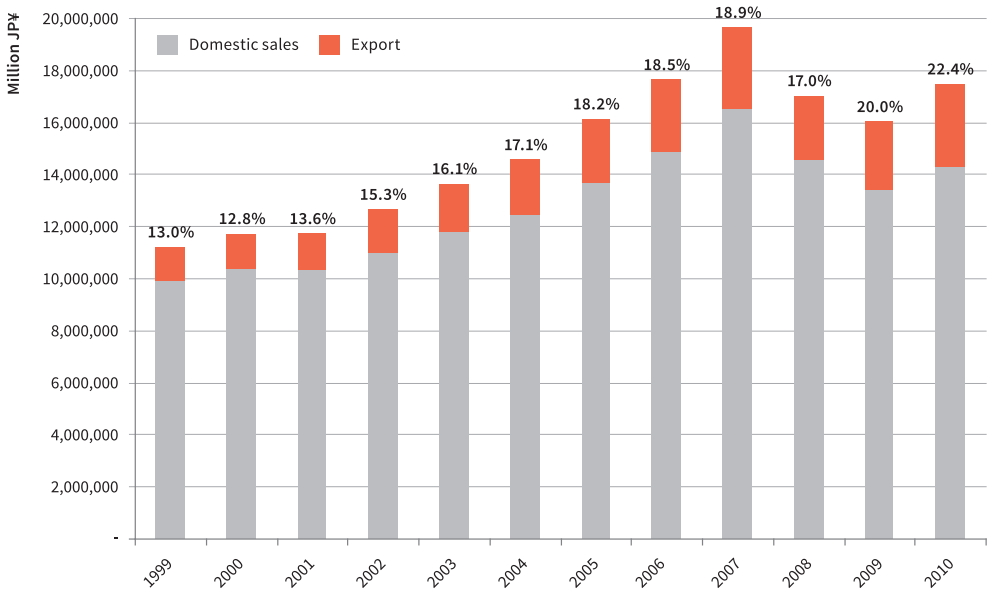
To become successful, businesses not only procure materials and parts from overseas suppliers, but also outsource functions, such as product design and logistics. Productivity therefore increases because each business in the supply chain can strategically allocate resources to those activities where it has a comparative advantage. The supply chain thus becomes a web involving multi-tier suppliers and service providers.

Various trends have characterised global supply chain evolution: the production process has been split into separate nodes in different locations, linked by multi-modal distribution facilities; supplier consolidation has emerged to increase economies of scale and reduced transaction costs; production agglomeration in areas with low transport costs (such as coastal areas and river basins) has facilitated knowledge spill-over, labour market pooling, input sharing, lower product shipping costs and logistics consolidation, increasing the dependence of supply chains on international distribution facilities such as major ports and airports (Ye and Abe, 2012).

Although globalisation of supply chains may have increased productivity, it has also globalised risk; when business at a critical node in a supply chain is affected by a disaster, the effects quickly ripple throughout the entire supply chain.

As highlighted above, as supply chains have evolved, production has been clustered in areas that may provide businesses with low transport costs but are

Figure 2.5 Increased export of parts in the Japanese automobile industry (in JP¥ 1 million)[v]



(Source: UNISDR, based on data from the Japan Auto Parts Industry Association[vi])

Box 2.1 Port cities with high exposure and vulnerability to climate extremes

Maritime transport handles over 80 percent of the volume of global trade and accounts for over 70 percent of its value. Since 1970, global seaborne trade has expanded by an annual average of 3.1 percent and has doubled in the last 30 years (UNDESA, 2012).

Port cities are a vital nexus in global supply chains. In 2005, 13 of the 20 most populated cities in the world were port cities. Many of these are exposed to flooding and storms. An analysis of a sample of 136 port cities with populations of more than 1 million highlighted that currently North America has the highest volume of exposed economic assets and Asia the largest proportion of exposed population (Nicholls et al., 2008).

Owing to economic and urban growth, natural and artificial subsidence, sea level rise and climate change, this exposure is likely to increase dramatically, particularly in low and middle-income countries. Whereas the estimated exposure of economic assets is expected to increase from US$416 billion in Miami, United States of America, in 2005 to US$3,513 billion in 2070, in Mumbai, India, asset exposure would increase from US$46 billion to US$1,598 billion, and in Guangzhou, China, from US$84 billion to US$3,557 billion (Nicholls et al., 2008). In Dhaka, Bangladesh, it would increase from US$8 billion to an extraordinary US$544 billion (Ibid.).

Low and middle-income countries are driving growth in global merchandise trade. For example, the share of low and middle-income countries in total global unloaded goods rose from 18 percent to 56 percent between 1970 and 2010 (UNCTAD, 2012). Increased hazard exposure therefore not only poses a threat to the competitiveness of cities and ports but increasingly to global trade flows and supply chains.

(Source: UNISDR)

often hazard-exposed. As Box 2.1 shows, the dependence of supply chains on logistical and transportation nodes such as ports and airports, further increases risk.

Businesses have demonstrated that supply chain efficiency can be increased by reducing inventories, shortening transportation times and streamlining production. However, these measures may undermine supply chain resilience (Haraguchi and Lall, 2012). Lean supply chains and 'just-in-time' delivery systems require more frequent deliveries of supplies, minimising inventories and turnover time. While maximising efficiency, they further increase the interdependence between businesses and remove the buffer provided by stocks (Ye and Abe, 2012). In turn, this increases the probability that a disaster at one critical point of a supply chain will have a systemic impact.

Investors need to be aware that small and medium enterprises (SMEs) often play a key role in supply chains, providing small quantities of labour-intensive components and services. As noted above, SMEs may be more vulnerable and less resilient than larger businesses, as they are generally undiversified and underinsured.

2.5 Shared risks

The risk of losses and negative impacts from disasters is often transferred or shared over space and time. Business investments that increase disaster risk may directly increase the cost of disasters to affected communities. Government regulation that fails to protect critical infrastructure may result in high costs to businesses from power outages, communications failures and collapse of transport systems. Similarly, today's new risks will be experienced by tomorrow's generations.

As new business investments are made in hazard-exposed areas, disaster risks to the business itself are generated. But other risks, often referred to as external social and environmental costs, are in effect transferred to or shared with other sectors including the public sector. When investment decisions are made, businesses may not take into account how disaster risks may threaten their own operations—it is even less usual for businesses to account for risks that are shared with others. These shared risks are not priced; thus, market mechanisms to account for them usually do not exist.

One of the most well-known examples of risk transfer or sharing is through greenhouse gas emissions. Anthropogenic climate change may exacerbate weather-related hazards in other regions and thus lead to increased disaster losses. However, these costs are not borne by the emitter. Small island developing states (SIDS), for example, are responsible for less than 1 percent of total global greenhouse gas emissions but are likely to suffer disproportionately from the effects of sea-level rise or risks associated with storm surges and coastal flooding.

But climate change is only one mechanism through which risk is shared. For example, new road and real estate developments in urban areas may decrease the capacity of water management systems and soils to absorb excess water during storms in a city. New urban development may therefore produce flood risks, which are then shared with low-income households located in the most flood-prone areas and who would experience the greatest losses. City governments would also lose, as they would have to invest in drainage infrastructure. Box 2.2 highlights how, during the Chao Phraya floods in Thailand in 2011, a transfer of risks to low-income households took place.

Other mechanisms of risk sharing include when business investments contribute to a depletion of regulatory or productive ecosystem services—for example, when mangroves are destroyed for shrimp farms; when groundwater resources are overexploited for commercial agriculture or recreational

Box 2.2 The impact of the Thailand floods on the urban poor

Although media attention on the 2011 Thailand floods focused on the impact on supply chains in the automobile and electronics industries, there were also major impacts on the urban poor.

Located only 1–2 metres above mean sea level, Bangkok is naturally prone to flooding. But flood hazard has been magnified by urbanisation. Canals, which provided the backbone of the city's transport network and fulfilled an important drainage function, have been filled in; dense urbanisation has decreased the area of permeable surface; groundwater extraction is causing the city to subside at a faster rate than climate change-induced sea level rise. Watersheds in the Chao Phraya river basin have been degraded, while weakly implemented urban planning and management led to the growth of both private developments and informal settlements in flood-prone areas. Informal settlements, for example, often encroach on canals and are the first to be affected.

Although approximately 21 percent of the population of Bangkok was affected by flooding, this percentage increased to 73 percent of low-income households affected. The Thai Government's National Housing Authority estimates that 90,362 homes out of a total of 135,582 were of low-income families. Five years ago, the IPCC had issued a warning of the particular vulnerability of the Chao Phraya river basin and the danger to the growing population living there (Nicholls et al., 2008).

(Source: UNISDR)

activities such as golf courses; or when forests are cut down for agricultural or urban development.

According to a recent survey the external environmental costs of eleven key industry sectors rose by 50 percent from 2002 to 2010, from US$566 to 854 billion and are doubling every fourteen years. In the agribusiness sector alone, external environmental costs outweighed the sectors entire earnings (KPMG International, 2012). These social and environmental risks and costs are not on the balance sheets of businesses but are shared with other sectors as well as future generations.

However, risk sharing is not unidirectional. Failure by the public sector to manage risks in public infrastructure shares risks with businesses that face interruption owing to power outages or transport disruption. Similarly, failure to effectively regulate land-use or to control building standards increases risks for city regions. These risks and externalised costs are then borne by businesses.

Ultimately, however, risk sharing may have a 'boomerang effect' (Beck, 1992), given that entities or individuals that produce these risks will also be exposed to them. From this perspective, disaster risk is a shared risk, and businesses, the public sector and civil society all participate in its construction. Disaster risk management, therefore, must be considered a shared value—an issue that we revisit in the final chapter of this report.

Notes

i These categories are those defined and measured empirically by the World Bank (World Bank, 2011) but many other classifications exist. The items included here are only an example of the components included in each category.

ii 'Primary' refers to mainly mining, quarrying and petroleum.

iii Economic regions as defined by the World Bank. East Asia and the Pacific exclude OECD countries such as Australia, Japan and New Zealand.

iv A system of organisations, technology, information and resources that moves products and services from suppliers to customers.

v Figures given at 2010 prices, using GDP deflators from the World Bank database (http://data.worldbank.org/indicator/NY.GDP.DEFL.ZS). The percentage presented is the share of export to the total product sales. The performance for each fiscal year is based on data from 360–450 large automobile parts producers in any given year.

vi See http://www.japia.or.jp/research/index.html.