1. The disaster cycle

There are disasters almost everywhere we look. England's disappointing performance at the 2015 Cricket World Cup was depicted as a 'disaster' in the British media. Team management promised to 'look at the data' in an effort to discover what had gone so badly wrong (Ashdown 2015). Few of us, however, would regard the failure of a cricket team as a disaster when set alongside an earthquake that kills 50 000, an underground explosion that results in the death of many coal miners, or an economic depression such as in the early 1930s. Whether or not an adverse event qualifies as a disaster depends on its scale and the perspective of the observer. Australians, for example, do not regard England's cricketing fiascos as disasters, even from a sporting angle. The purpose of this book is to investigate the extent to which large-scale disasters in different spheres of human activity, as well as the people and organizations caught up in them, follow the same or at least a similar script. The investigative framework is provided by the 'disaster cycle', a device that was developed by social scientists and disaster management practitioners in the twentieth century.

Every scholar comes to their subject from a certain background and perspective, and my origins are in economic and business history. The analysis of disasters has not been a major theme in economic or business history, and the disaster cycle is relatively unknown in those disciplines. Indeed, Adam Tooze (2007, 671) confesses that 'economic historians have a way of making disasters ... disappear from the long-run trajectory of economic growth'. Larry Neal, in a presidential address to the Economic History Association, makes a similar point, and urges economic historians to focus 'an increasing share of [their] research efforts on shocks ... [including] wars, epidemics, famines, natural disasters, or depressions' (Neal 2000, 332). Economic historians do investigate some disasters, not least economic depressions and financial collapses, as will be seen in later chapters, and in consequence their neglect of the area is relative rather than absolute.¹ Nevertheless, I approach the theme of disasters as something of an outsider, or at least as someone with different intellectual baggage. Before starting work on the current project, I published two books on the history of central banking (Singleton et al.

2006; Singleton 2011). The writing of the second of those books overlapped with the economic disaster commonly known as the 'Global Financial Crisis' (GFC). The hypothesis that there might be parallels between financial disasters and other types of disaster intrigued me as the second of those projects approached completion, and inspired research for the current volume.²

This introductory chapter begins with a section discussing the concept of disaster and how it should be defined. In the second section, the potential for making comparisons between different sorts of disaster is explored. The third section distinguishes between crisis and disaster, terms that are often used interchangeably and in a way that sows confusion. The measurement of disasters is discussed in the fourth section. In the fifth section the origins of the disaster cycle are examined. Some modifications to the disaster cycle framework are introduced in the sixth section. The seventh section concerns the drivers of the cycle: they are to be found in aspects of individual and group behaviour.

The approach taken in this volume is positive rather than normative. The objective is to show how people and organizations (firms and governments) behave at different stages of a disaster. No specific policy recommendations are made. Faced with similar dilemmas and incentives, people and organizations are likely to make the same or similar errors over and over again. This rather pessimistic conclusion does not, however, make the book useless for practical purposes. Actors who find themselves in the disaster cycle may benefit from knowing where they stand, and from observing mistakes made in the past, not only in their own area of endeavour but also in quite different ones.

WHAT IS A DISASTER?

Defining the concept of disaster is by no means a straightforward task even for specialists in the field (Quarantelli 1998). There is consensus, however, that all disasters are to some extent social phenomena, and that they are very costly, whether or not that cost is measurable. An earthquake only matters if there are people who, for whatever reason, are in harm's way.³ The authors of the Old Testament understood that many disasters involve a complex interplay between human behaviour and natural – or in this case divine – forces. In Genesis, a mighty flood wiped out the human and animal population of the world, except for Noah and the other passengers on his ark. Rather than an exogenous event, however, the flood was the result of human disregard of God's laws that provoked divine wrath.⁴ Noah, incidentally, was an effective crisis

manager. He listened attentively to God's warnings, prepared for the flood by building an ark, and did not panic when the deluge began. Later, in Exodus, Egypt was devastated by a series of horrible plagues. Pharaoh, unlike Noah, proved to be a hopeless disaster manager, principally because God had hardened his heart. Pharaoh refused to let the people of Israel go, despite being warned that there was no other remedy.⁵ In modern terminology we might say that Pharaoh was in denial. We will meet other Pharaohs in later chapters.

The study of disasters may be approached from several angles. The least sophisticated, a legacy of Cold War social science, treats disaster as an external attack, whether from nature, disease or an enemy force, which must be repelled. A second approach regards a disaster as an event that either stems from or exposes existing social vulnerabilities. The flooding of communities along the Mississippi River, for example, demonstrates their vulnerability in brutal fashion. A third approach focuses on disasters as radically disruptive events that create uncertainty and confusion, or a loss of society's bearings (Gilbert 1998). All three perspectives are useful. Disasters often involve an external shock, reveal weaknesses in individuals and organizations, and induce states of uncertainty and confusion. The Mann Gulch disaster, which claimed the lives of 13 firefighters in Montana in 1949, provides an effective illustration of those points. A team of smokejumpers parachuted into a remote area to combat a forest fire. The team expected to find a routine fire and to extinguish it without too much trouble, but the threat confronting them after landing was far more serious. Weaknesses within the team, including distrust of an unfamiliar leader, Wag Dodge, soon came to the fore. Most of the smokejumpers became disoriented. They ignored Dodge's advice about how to extricate themselves from danger. Unable to make any sense of the situation, they panicked, and most paid with their lives (Weick 1993).

Shock and incomprehension are standard human responses to disaster. The great flood of Paris in 1910 brought much of the city to a standstill, and called into question the belief of many Parisians that their city, reputedly the best planned and most modern in the world, was immune to the hazards of previous ages (Jackson 2011). To Arthur Pigou, the Professor of Political Economy at Cambridge University, the First World War involved the senseless rupture of a regime in which households, firms and nations went about their business harmoniously, a successful regime that generated a slow but inexorable improvement in living standards. He could not comprehend the reasons why, between 1914 and 1918, 'the unconscious processes of normal life were abandoned ... [and] Europe swung reeling to the conscious agony of war' (Pigou 1921, 2).

The financial disaster of 2007–09 and the subsequent Eurozone disaster shattered the comfortable illusion that the developed world had entered an age of moderation in the 1990s, liberated at last from the old boom-and-bust cycle (Reinhart and Rogoff 2009). The situation was hard to fathom. By contrast, hardly anyone was shocked or bemused by England's failure at the 2015 Cricket World Cup, which rather confirms that it was not a genuine disaster after all.

HOW WIDELY SHOULD WE CAST OUR NET?

The disasters analysed in this book are extremely varied, and deliberately so. They consist of a classic 'natural' disaster, Hurricane Katrina; three economic disasters – the depression of the 1930s and the twin GFC and Eurozone disasters of the early twenty-first century; the First World War; two industrial disasters in the Welsh coalfields; and a health disaster – the deadly effects of tobacco smoking. The method is to put the disaster cycle to work in a variety of historical situations in order to see how well it works.

Traditionally, however, the term 'disaster' has been reserved for natural disasters and for man-made disasters such as industrial and transport accidents. In the International Disaster Database (em-dat), maintained by the Centre for Research in the Epidemiology of Disasters (CRED) at the Université Catholique de Louvain, Belgium, there are seven classes of disaster: biological, climatological, complex, geophysical, hydrological, meteorological and technological.⁶ There is no place in the database for financial and macroeconomic disasters, wars or non-biological health disasters such as tobacco smoking. CRED's classification is therefore unduly restrictive, for it excludes many episodes, including some of those discussed in detail in later chapters, which were equally if not more costly and disruptive. Although the designation of systemic banking collapses or significant macroeconomic contractions as disasters is not unprecedented in the literature, it does not have universal acceptance; hence it deserves some justification.

Contemporaries often used metaphors relating to natural disasters, extreme weather events or industrial accidents to describe periods of actual or impending economic turmoil. 'It came upon us as a thunderbolt,' wrote the financial journalist Hartley Withers (1917, 1, 3) of the financial upheaval at the start of the First World War, 'The fury of the tempest was such that no credit system could possibly have stood up against it.' In a survey of competing interpretations of the depression, Myron Watkins (1933, 504) discovered that for many authors, whether or

not they were economists, the depression was ‘the final eruption of social “faults” – a historical earthquake resulting from a tension produced by opposing tendencies or forces in society which could no longer be withstood’. The purple prose of the American agricultural economists G.F. Warren and F.A. Pearson (1932, 24) included metaphors of war and flood. ‘We are like a gassed and wounded regiment in No-Man’s-Land’, they wrote of the USA in the early 1930s. ‘After the deluge is over’, it might be possible to fathom what had gone wrong, but for now everyone including the president ‘was groping for light’.

After the catastrophic Indian Ocean tsunami of 2004, some economists adopted the tsunami metaphor when warning of impending financial doom: ‘the next sovereign debt tsunami will crash on a foreign currency debt market that is by design more accident prone than its predecessors. Whether we will have adequate tools to handle the disaster remains to be seen’ (Flandreau et al. 2009, 54). Criticizing delays in the implementation of measures to avert financial disaster in the USA in 2008, Luigi Zingales wondered, ‘What would one say about a hurricane emergency plan that took two months after the calamity to start working?’ (Stultz and Zingales 2009, 72). The nuclear metaphor was also deployed during the GFC: ‘Deconstructing a mortgage meltdown’ was the title of one article in this vein (Anderson et al. 2011). Each author probably reached for the most convenient and topical metaphor; if so, their choices are suggestive of the parallels that come spontaneously to mind.

Liaquat Ahamed (2010, 501) argues that, during the depression of the 1930s, earthquake, flood and storm metaphors were used strategically by those wishing to absolve either themselves or their allies for the economic collapse. During the GFC, the leaders of major financial institutions resorted to disaster metaphors in an effort to shift or minimize blame. In testimony before the Financial Crisis Inquiry Commission (FCIC), Lloyd Blankfein, the chief executive officer (CEO) of the investment bank Goldman Sachs, mused that in 2007–08 the financial industry was the victim of a freak storm: ‘After 10 benign years in the context where we were, look, how would you look at the risk of our hurricane?’ (Financial Crisis Inquiry Commission 2010, 29; see also Rohrer and Vignone 2012). A former vice chairman of Goldman Sachs, Suzanne Nora Johnson (2010, 156, 157), opted for the language of medical disaster: ‘The 2008–2009 financial crisis – arguably a disaster – was an economic cancer that metastasized.’ The financial system was ‘gravely ill’, and presumably deserved sympathy rather than condemnation. When, however, the former leaders of the troubled British banks, Halifax Bank of Scotland (HBOS) and Royal Bank of Scotland (RBS), were questioned by members of parliament (MPs) on the Treasury

Committee in 2009, it was the politicians who referred to earthquakes, hurricanes and tsunamis, evidently in an attempt to goad their witnesses (House of Commons Treasury Committee 2009).

A few economists and non-economists have gone beyond metaphor, and grasped that severely adverse financial and macroeconomic events are in some objective respects similar to other types of disaster, and should be described in the same terms. According to Robert J. Barro (2006, 826), one of the most influential macroeconomists of the late twentieth and early twenty-first centuries: 'Actual and potential economic disasters could reflect economic events (the 1930s depression, financial crises), wartime destruction (world wars, nuclear conflicts), natural disasters (tsunamis, hurricanes, earthquakes, asteroid collisions), and epidemics of disease (Black Death, avian flu).' What matters to Barro when defining a disaster is purely the magnitude of the event's impact, an issue to which I return shortly. On a smaller scale, Emmanuel Skoufias (2003) shows how a financial collapse and a natural disaster require similar forms of mitigation and response from the perspective of households in developing countries. Both pose threats to the prosperity and stability of the household. In *The Irrational Economist*, Erwann Michel-Kerjan (2010, 41) notes that the early twenty-first century has witnessed a spate of 'terrorist attacks, natural disasters, financial crises, to name a few', and suggests that their increasing frequency reflects a combination of myopia or complacency, the greater interconnectedness of the world, and the concentration of population and assets in risky locations. Seen from such perspectives, an economic disaster is simply another type of disaster. At the same time, all disasters have economic ramifications because they generate large losses.

Non-economists may also be aware of the parallels between financial and other disasters. At the beginning of a study of health and safety on British railways, Bridget Hutter (2001, 3) offers a list of disasters between the mid-1980s and mid-1990s. Within Britain there were 'health and safety' disasters such as the Piper Alpha oil rig explosion, and 'financial' disasters such as the collapse of Barings Bank. Overseas disasters included the Bhopal chemical plant tragedy in 1984, the nuclear accident at Chernobyl in 1986, and the Black Friday crash on Wall Street in 1987. We might question whether the failure of Barings was serious enough to qualify as a disaster. The point, though, is that Hutter recognizes that in practice a financial disaster is simply another type of disaster.

DISASTER OR CRISIS?

A recurring problem during the research for this volume, and in seminar presentations on the disasters theme, was the interchangeability of the words ‘crisis’ and ‘disaster’ in conversation and in the media, and even in some academic publications. To add to the confusion, certain conventions have arisen around the use of those words to describe phenomena in different domains, hence ‘natural disaster’ but not natural crisis, and ‘economic crisis’ but rarely economic disaster. In their influential survey of financial ‘folly’ over the past 800 years, Carmen Reinhart and Kenneth Rogoff (2009) follow convention, describing episodes that were nothing short of economically disastrous as crises. The word ‘disaster’ does not appear at all in their text.

The literature on the economics of natural disasters pays considerable attention to the impact on macroeconomic performance and financial stability (Cavallo and Noy 2011). For instance, the San Francisco earthquake and inferno of 1906 helped to cause the financial panic of 1907. Large payments were made by British insurance companies to policy holders in California, putting pressure on the British balance of payments. After interest rates were raised by the Bank of England, there occurred a severe recession in the USA, which destabilized some important financial institutions (Odell and Weidenmier 2004). Nevertheless, whilst the part of natural ‘disasters’ in causing some economic or financial ‘crises’ is acknowledged, the standard view is that they are conceptually different types of event.

Given the prevailing confusion over terminology, especially in economics, it is necessary to establish a new convention, at least for use in the current volume. The words crisis and disaster will be used in specific ways, even at the expense of some awkwardness. Crisis is defined here as a period of heightened danger that presents urgent challenges to decision makers. Disaster is defined as an event or process that generates heavy costs and severe disruption (Singleton 2015). Two caveats are unavoidable: firstly, when discussing the work of other authors it is not always possible to avoid acknowledging their terminology, especially in quotations; secondly, common phrases referring to particular episodes, such as Global Financial Crisis or GFC, cannot be excluded altogether.

Disasters usually occur within periods of crisis. Indeed, the crisis generally persists while emergency measures are being taken to alleviate or respond to the disaster. Crisis is not invariably accompanied by disaster, for a threat may be averted by good decision making or good luck. Most crises start before disaster actually strikes, although in some

cases, such as earthquakes, they may arrive simultaneously. It is even possible for a disaster to begin before anyone has noticed that anything is wrong. Cigarette smoking began to affect smokers' health long before the rise of lung cancer attracted the interest of physicians in the 1920s. It was not until after the Second World War that the connection between smoking and lung cancer was grasped, and the existence of a crisis acknowledged (Bartrip 2013). For there to be a crisis, then, there must first be recognition that something is wrong.

The line taken here on disasters and crises is different from the approaches of some other authors. For example, the title of Michael Oliver's chapter, 'Financial crises', in a volume on *Economic Disasters of the Twentieth Century*, implies that a crisis is a type of disaster (Oliver 2007). Vincent Gawronski and Richard Olson (2013) argue that the 1976 earthquake, a natural disaster, triggered a political crisis in Guatemala: once again, their take on the relationship between crisis and disaster is different from the one pursued in this volume. The terms 'crisis' and 'disaster' also appear to be interchangeable in the work of some disaster studies experts (Boin 2009; Shaluf et al. 2003). Readers should be aware of the terminological imprecision in the literature, and bear in mind the solution offered above.

THE DIMENSIONS OF DISASTER

Disasters have several dimensions, depending on the size, scope and duration of the impact, and perhaps on the length of the forewarning (Kreps 1998, 34). We tend to think of disasters – floods, earthquakes, transport accidents – as happening very quickly. But some disasters seem to develop in slow motion, especially ones that affect health and the environment (Coppola 2011, 46, 645), such as tobacco smoking.

In everyday life the term 'disaster' is used far too loosely, to describe a missed train, a flood caused by a faulty washing machine, or a lost football match; events that on reflection are quite trivial. But it is not always so easy to determine the boundary between inconvenience and genuine disaster. Practitioners and scholars in disaster studies have devised a number of operational benchmarks, though no consensus has emerged. George Horwich, an economist, offers a very imprecise yardstick: 'We take a disaster to be a loss of resource value beyond some socially specified level' (Horwich 1990, 532). The losses that Horwich has in mind are those to the stock of physical and human capital. In effect he argues that society must exercise a subjective choice (or perhaps

a series of choices) over how much damage is required before an event qualifies as a disaster.

At the other end of the spectrum, CRED attempts to be precise: a natural or technological disaster is an event that meets at least one of these criteria: '10 or more people killed; 100 or more people affected; declaration of a state of emergency; call for international assistance'.⁷ On CRED's definition, there were 18 000 disasters in the world between 1900 and 2013. Given that CRED's list is by no means exhaustive and, for example, fails to record many UK mining disasters, 18 000 is an underestimate. CRED's International Disasters Database also excludes financial and macroeconomic disasters. On the other hand, the criteria seem very generous. An episode that causes ten deaths would hardly constitute a disaster of national importance in most countries, unless there was something special about the people killed.

Robert Barro bases his definition of 'a rare economic disaster' on the extent of the interruption to the flow of income rather than the destruction of the stock of capital. A rare economic disaster is any event that causes real gross domestic product (GDP) per capita to fall by 15 per cent or more (Barro 2006, 828). Employing such a strict definition, Barro finds relatively few economic disasters in his sample of 20 developed countries in the twentieth century. There are in fact just 33 instances of disaster. The First World War accounts for eight, the depression eight more, and the Second World War ten. The Spanish Civil War and the aftermath of the world wars provide the seven remaining cases. Barro also provides results for a second sample of Asian and Latin American countries. World wars and economic depressions are responsible for all of the disasters in the sample of less-developed countries (Barro 2006, 828–9). No natural or technological dislocation was powerful enough to generate a rare economic disaster in either of Barro's groups of countries. Yet natural disasters do sometimes have a devastating impact on poor nations. The Lisbon earthquake of 1755 may have imposed direct costs of between 35 and 48 per cent of Portuguese GDP (Pereira 2009). The 2010 earthquake in Haiti is estimated to have cost a staggering 112 per cent of GDP (Cavallo et al. 2010, 4). Whereas CRED is too liberal, Barro's benchmark of 15 per cent of GDP per capita is too stringent. Barro, however, demonstrates convincingly that economic depressions are disasters.

Agreed definitions are equally elusive for specialists in financial crises, which as discussed above must be translated as financial disasters. Financial and macroeconomic disasters do not kill or maim directly, but are costly nonetheless. Carmen Reinhart and Kenneth Rogoff (2009, 3–14) list the various possible types of financial disaster. The first group

of disasters includes inflation crises, currency crashes, currency debase-ment and the bursting of asset price bubbles. In each of the above cases it is possible to set a quantitative hurdle, such as a percentage fall in a stock market index, for an episode to count as a disaster. A second group is made up of banking crises, external debt crises and domestic debt crises, where disaster is defined not in quantitative terms but rather in terms of the occurrence of a specific type of event such as the declaration of a default. A financial disaster could start in any area of the financial system and then spread rapidly to other parts of the system. Banking disasters merit some additional comment, not least because their definition is so complicated. Type I banking crises involve 'bank runs that lead to the closure, merging or takeover by the public sector of one or more financial institutions'. Type II banking crises are somewhat milder: bank mergers, closures, takeovers or government bailouts occur pre-emptively before a run has started (Reinhart and Rogoff 2009, 11).

The cost of a financial disaster depends ultimately on its impact on depositors who in some circumstances may lose their deposits, on the taxpayers who bear the fiscal cost of bank rescues and depositor compensation, and on the nation as a whole because GDP will be affected through various channels including a sharp drop in the availability of credit, otherwise known as a credit crunch. The fiscal costs alone of banking bailouts may be large but difficult to pin down precisely. For example, the Argentinian bailouts of 1981 may have cost as much as 55.3 per cent of GDP, or as little as 4 per cent of GDP, depending on how the calculation is performed (Reinhart and Rogoff 2009, 164).

But Reinhart and Rogoff have no monopoly over their subject area, and there are other ways of approaching the identification of financial disasters. Luc Laeven and Fabián Valencia (2012, 4), for example, provide an alternative banking disaster database. They define a financial crisis or disaster in a way that combines cost thresholds with significant events. To qualify as a banking crisis, three out of the following six criteria must be met: the provision of liquidity above a specified threshold; bank restructuring costs of at least 3 per cent of GDP; bank nationalizations; the offer of guarantees; asset purchases by the authorities equivalent to at least 5 per cent of GDP; a deposit freeze and/or a bank holiday. They identify 147 systemic banking crises, 218 currency crises and 66 sovereign debt crises around the world between 1970 and 2011 (Laeven and Valencia 2012, 3). Once again, the reader should translate crisis as disaster.

To recapitulate, there are several ways of deciding what constitutes a disaster, but no consensus as to which is best. The issue of cost is crucial to the measurement of disasters, which may lead to a reduced flow of

income, the destruction of capital (whether physical or human), a new fiscal burden on the taxpayer or some combination of the above. Cost itself is a tricky concept that generates debate. The value of life (and the cost of a life lost) continues to be a matter of controversy. Several methods are possible: estimating an individual's future earnings net of consumption, estimating their replacement cost (essentially the cost of bringing up a new person to adulthood) or deriving a capital value from the amount they would be prepared to pay to escape a one-off, low-probability risk of death (Viscusi 2008). Some costs are measurable, but others are not. Social disruption, confusion and anxiety do not lend themselves to measurement (Dynes 1998, 111–12). If one digs deep enough, moreover, the very concept of cost is revealed as subjective. An event such as a major flood will affect different groups in different ways. If property owners are well insured or compensated by the government, then from their perspective the disaster might not seem so bad. The cost has been shifted to others (Hallegatte and Przyluski 2010, 15–16).

No agreed test exists for determining what is and is not a disaster. Fortunately, however, the case studies in this volume do not lie close to the margins. All were unambiguously costly in lives, income or wealth, and some in all three.

THE DISASTER CYCLE

The Asian financial disaster of the late 1990s and the GFC encouraged specialists in economics and scientific disciplines to search for analogies between disruptive events or disasters in the financial system and in ecosystems. As ecosystems grow more complex they become increasingly vulnerable to the rapid spread of disruptive forces. Insofar as financial systems develop along similar lines to ecosystems, they are exposed to the same types of disruption (May et al. 2008; Haldane and May 2011; May 2013). Even before 2007–09 the pandemic analogy was popular amongst commentators on financial disasters. Health officials also studied the way in which economic and financial officials managed outbreaks of instability and contagion that crossed international boundaries, with a view to obtaining hints on how to contain the spread of disease (Peckham 2013).

Ecological and biological analogies for economic disasters are interesting, but the approach taken in this volume does not depend on such analogies. The disaster cycle, the conceptual tool employed below, is a social scientific framework that can be used to illuminate a wide range of disasters. The emphasis here is on recurring patterns of individual and

group behaviour rather than on unconscious ecological processes. It is not contended that there is an analogy between an economic disaster such as the depression of the 1930s and, say, the First World War or Hurricane Katrina. Instead, it is argued that individual and organizational actors behaved in comparable ways at equivalent stages of each of those disasters.

The idea that disasters pass through a series of phases was suggested in the early twentieth century by sociologists. The possibility that in many, though not all, cases there is a disaster cycle was advanced by disaster researchers in the 1970s. When applied by practitioners, the disaster cycle became the disaster management cycle. A recent survey concludes that the 'disaster management cycle has ... been influenced by many disciplines such as sociology, geography, psychology, civil defence, public administration and development studies' (Coetzee and van Niekerk 2012, 2). It is interesting to note that they make no mention of economics. Later in this chapter, however, it will be shown that certain economic ideas do help us to understand the disaster cycle and the forces that might propel it.

Samuel Henry Prince's doctoral dissertation on the great explosion at Halifax, Nova Scotia in 1917 was a pioneering effort to describe, step by step, the process by which a community was affected by, coped with and recovered from disaster (Prince 1920). The accidental explosion of a munitions ship, after a collision in Halifax harbour, wrecked much of the city and caused approximately 2000 deaths. Prince, an Anglican minister, was an eyewitness. Halifax had no contingency plan for responding to a catastrophe. At first, many citizens and officials were confused and did not know what to do. Although there was some looting of liquor supplies, people soon began to rally round. Neighbours helped each other. Troops from the citadel and firemen were amongst the first responders. Yet it was actors from the Academy theatre who, 'forsaking the school of Thespis for that of Esculapius', the god of medicine and healing, 'organized the first relief station' (Prince 1920, 60). The telegraph company restored a line to the outside world within an hour. In other words, the initial response was informal, relying on the bravery and resourcefulness of individuals and small groups. After several days, the city authorities, assisted by a disaster response team from Boston, began to coordinate relief measures through a Citizens' Committee. Aid, both financial and in kind, began to flow in from outside. The homeless and wounded were given food, medical treatment and temporary accommodation. After about a week there was a shift in focus towards rehabilitation, with the aim of returning the city and its inhabitants to normality. Victims of the explosion could eventually claim up to \$5000 compensation for losses,

though Prince (1920, 97) was uncomfortable with such munificence. Halifax was rebuilt and, according to Prince, substantially improved over the pre-disaster city. New regulations were introduced governing the transportation of explosives. Prince, a sociologist, concluded that the disaster resulted in social flux that had positive as well as negative features. Halifax, a rather sleepy place, was 'galvanized into life through the testing experience of a great catastrophe. She has undergone a civic transformation, such as could hardly otherwise have happened in fifty years' (Prince 1920, 139).

Lowell Carr (1932, 211–14), another sociologist, was more systematic in his delineation of the disaster phases. First came the 'preliminary or prodromal' period during which the forces that lead to catastrophe accumulate. The disaster itself – the 'precipitating event' – ushered in the second phase marked by 'dislocation and disorganization'. The third and final phase involved 'readjustment and reorganization' on the individual, interactive and cultural planes.

During and after the Second World War new disaster management legislation was passed, and responsible government agencies established, in a number of countries (Coppola 2011, 5). The US strategic bombing surveys of Germany and Japan in the mid-1940s gave further impetus to the emergence of disaster research as a discipline or quasi-discipline. Disaster studies centres for academics and practitioners were established, especially in the USA, and many new variants of the disaster phase framework emerged (Kreps 1998).

Disaster researchers at Bradford University have been credited with formulating the now familiar concept of the disaster cycle. Their interest was principally in natural disasters in poor countries, but their ideas have a much broader resonance. They noted that many disasters are preceded by warning phases. Relief, rehabilitation and reconstruction phases are observed as victims and the authorities respond to the disaster event. Finally, attempts are made to prevent or mitigate future disasters, and to strengthen relief services. The cycle is completed when new warnings foreshadow the next disaster (Baird et al. 1975, 42).

A simple disaster management cycle of four phases – mitigation, preparedness, response and recovery – was endorsed in the late 1970s by the US National Governors' Association (NGA). Mitigation involves taking measures to reduce the likelihood or severity of disasters, for instance by constructing levees along a river that is prone to flooding. Preparedness entails getting ready to respond to a disaster by accumulating emergency supplies and planning for the evacuation of communities at risk. The response phase includes attempts to contain and control the disaster and provide relief to victims. The recovery phase deals with the

rebuilding and restoration to normality of the stricken area (National Governors' Association 1978). The types of disaster envisaged in the 1970s were natural and industrial. Since the September 11 attacks in 2001, terrorism has also become a major concern. Some modern textbooks on disaster management are organized around the concept of the disaster cycle (Coppola 2011).

The US Government Accountability Office applied a version of the disaster cycle when comparing four episodes of financial turmoil in the 1980s: the Mexican debt crisis, the Continental Illinois failure, the Ohio Savings and Loan meltdown and the 1987 Wall Street crash (Government Accountability Office 1997). In general, however, economists have tended to ignore the disaster cycle, and it does not figure in the collection of essays on *Economic Disasters of the Twentieth Century* edited by Michael Oliver and Derek Aldcroft (2007), or Cormac O'Gráda's (2009) history of famine, or the numerous studies of the depression and the financial disasters of 2007 onwards. Such neglect is a little odd, for economists and economic historians are well versed in cyclical phenomena, and to a lesser extent in stages models. For well over a century, cycles of varying length have been observed in a range of economic variables including prices and production. Such cycles are attributed to various factors including swings in innovation, profitability and investment, and changes in institutional arrangements (Lewis 1978, 17–31; de Groot and Franses 2012). Cycles of boom and bust in financial markets are also familiar to students of economic history (Kindleberger and Aliber 2011). The notion that certain economic processes unfold in stages is well known from the works of Adam Smith and Karl Marx, not to mention some later accounts of modernization (Rostow 1960; 1978). The financial boom-and-bust cycle, however, is the one that comes closest to the disaster cycle, and will be discussed later in this chapter. Unfortunately, there has been little conscious interchange of ideas between economics and disaster management studies. In fact the concept of the disaster cycle is not mentioned in a recent, authoritative survey of the economics of natural disasters (Cavallo and Noy 2011). Disciplinary and subdisciplinary boundaries are observed fairly rigidly within economics.

EXTENDING THE DISASTER CYCLE

The basic four-stage disaster cycle of the NGA does not adequately serve our purpose, which is analytical rather than practical. We examine the disaster cycle as a historical process. The requirements of disaster

managers are of interest, but do not provide the rationale for this investigation.

As the work of early writers such as Prince and Carr established, the social and cultural aspects of disasters are important. Some variants of the cyclical framework make this explicit. Another sociologist, Barry Turner, argued that most disasters are preceded by an incubation phase during which there is an accumulation of anomalies that cannot be explained using conventional thinking. If, as is likely, those anomalies are ignored, the scene is set for disaster. A precipitating event then initiates a period of crisis. Those affected, including organizations, now begin to grasp that their precautions and ways of thinking have been defective. Disaster strikes, and there follows a rescue and salvage stage, which may involve some second thoughts, and then a more reflective period, including a thorough investigation of the errors made during the incubation period (Turner 1976, 381). Although Turner's framework is linear, it could easily be modified to follow a cycle. Already one begins to see how greater sophistication can be added, or perhaps restored, to the four-stage model.

Mark Stein offers a simplified version of Turner's periodization whilst retaining the emphasis on the social and cultural aspects of disaster. Stein's framework has an incubation period, a critical period and an aftermath. The critical period begins when a precipitating or triggering event occurs that 'in the absence of remedial action, almost invariably leads to disaster' (Stein 2004, 1244). Disaster may still be averted, but only if sense is made of the situation and correct decisions taken and implemented. The critical period continues until the immediate impact of the disaster is more or less complete. All actors during the critical period are challenged to make sense of what is happening and adapt their behaviour accordingly. They operate in an environment of uncertainty, ambiguity and pressure. If key decision makers panic or enter a state of denial then, as in the case of the Three Mile Island nuclear accident in 1979, only luck can save them (Stein 2004, 1251).

David Neal (1997, 259) concluded that 'the use of disaster periods provides a useful heuristic device for disaster researchers', but also expressed some reservations. In particular, he felt that it was not always clear whether the stages were meant to be temporal or functional. For Neal, a functional approach was preferable: phases such as mitigation and preparedness, or relief and reconstruction, tend to overlap. He also pointed out that different individuals or groups could experience the disaster phases in different ways, and pass through the cycle at varying speeds. During a natural disaster, for example, wealthier people may be better prepared, and able to extricate themselves faster, than people with fewer resources and less influence. A more recent article by David Neal

(2013) discusses how the concept of social time is germane to the analysis of disasters. Normal routines are disrupted by a disaster, and time takes on a different meaning for those affected. Time is measured not in hours, but in terms of events such as the rescue of victims, the restoration of water and electricity supplies, and the rebuilding of property. Social time may also be relevant to understanding financial disasters, the course of which is marked not by the passing of clock time but rather by the occurrence of key events such as the failure of a well-known bank, the intervention of the central bank as lender of last resort or the announcement of a rescue programme. A series of disasters – an earthquake, the economic collapse accompanying the end of the USSR, and the Nagorno-Karabakh war – in the late 1980s and early 1990s left many Armenians with ‘the sensation that the present time had somehow been detached from the flow of historical, chronological time’ (Platz 2000, 134). Time is different in a disaster.

An extended version of the disaster cycle is presented in Figure 1.1. Instead of the four stages of the NGA’s cycle there are now eight, divided into two groups of four. There is a critical period of four stages, marked by great urgency and pressure, when time speeds up during many but not all disasters. Whilst the stages outside the critical period are no less important, they permit more time for reflection and, perhaps, procrastination. Particular attention will be given to sensemaking and blame, for they are the main additions to the standard framework.

It is convenient to start with mitigation and regulatory change. To an extent that varies from case to case, the environment in which each disaster happens is influenced by the response of people and organizations to a previous disaster, although not necessarily one in the same place or even of an identical type. After a disaster, the authorities may pass new legislation with a view to making future disasters less likely, and firms and households may change their behaviour with a similar end in mind. The appropriateness of the measures taken to avert or mitigate disaster is not the primary concern here. Even if they are half-hearted or ill-conceived, the disaster environment will still be affected in some way. Preparedness, as a separate stage, is dropped, and in effect incorporated into mitigation. Making preparations to cope with a future disaster is a form of mitigation.

The warning stage could be brief or protracted, depending on circumstances. Some organizations may choose to disregard warnings, while others actively seek out evidence of an emerging threat. During the Cold War, for example, intelligence agencies and specialists in the USA devoted a large amount of resources to monitoring and assessing Soviet

Figure 1.1 The disaster cycle

military intentions. The aim was to generate warnings of possible Soviet attack (Wirtz 2013).

The critical period or crisis is initiated by a triggering event. In the absence of a successful response to the triggering event the disaster will take place or, if unavoidable, be worse than it need be. Distinguishing the triggering event from a routine warning may be difficult at the time. Even with the benefit of hindsight it is not always easy to identify the key moment in a train of events. Historians, however, cannot avoid making judgements about which events are crucial, even if their choices are open to dispute. Sorting the past into important and unimportant events is self-evidently one of the key tasks of the historian. The triggering event is vital because it challenges individuals and organizations to think about a dangerous situation, and then act. Whether or not they actually do think and act is another matter. They could well fail to register the significance of the trigger, in which case the situation will soon run out of control.

The triggering event leads immediately into a stage described as sensemaking and decision making. The rudiments of sensemaking were introduced above in the discussion of the Mann Gulch forest fire (Weick 1993). The process of ‘sensemaking begins with the basic question, is it still possible to take things for granted?’ (Weick 1995, 14). After the discovery of an imminent threat, it becomes much harder to take things for granted unless one chooses to make light of the evidence. Sensemaking is an active rather than a passive endeavour. It involves trying to understand a situation that on the face of it is surprising, confusing and possibly overwhelming (Maitlis and Sonenschein 2010). The situation demands a response of some sort, not only from individuals but perhaps more importantly from key groups. The more unfamiliar the circumstances, and the bigger the threat, the greater is the pressure to reach an agreed interpretation and find a solution. A decision on how to manage the threat in order to avert or minimize disaster is required. Even denial constitutes a response, albeit not a constructive one. In *Wrong*, an analysis of nine economic policy disasters since the eighteenth century, Richard Grossman (2013) argues that poor decision making, based on misguided economic ideology, was a central factor in each policy disaster. Although Grossman does not use the concept of sensemaking, his work is essentially about the failure of sensemaking in crises and the disastrous consequences of that failure. Another point needs to be made about sensemaking: it is something that is happening all the time, although usually under less urgency than in the critical period of a disaster (Weick 1995, 43).

If poor choices are made in response to the triggering event, then disaster is unleashed in all its fury. Although some disasters, such as an earthquake or a hurricane strike, cannot be averted by human intervention, the damage to life and property may be reduced by effective sensemaking and timely decision making. The rescue and relief stage could well begin in advance of the disaster proper, as personnel and other assets are martialled and deployed. Nevertheless, much of the activity during this, the final stage, of the critical period will take place in the immediate aftermath of the event, whether it be a hurricane or a financial tsunami.

Once we pass beyond the critical period, if not before, the thoughts of many of those affected, as well as of interested observers, will turn to the apportionment of blame. Experts in disaster management are inclined to skate over, if not ignore, this stage (Coppola 2011). Disasters are always contentious because they impose significant losses on individuals, communities or society as a whole. Culprits are sought even when the disaster could not reasonably have been anticipated. A particularly

striking example of scapegoating occurred after the L'Aquila earthquake in Italy in 2009 in which 309 people died. Four seismologists, two engineers and a government official were convicted of manslaughter and negligence. They were sent to jail in 2012 and ordered to pay compensation to survivors. The court found that they had failed in their duty to assess the risks to L'Aquila and warn the public. Predicting exactly where and when earthquakes will happen is effectively impossible (*Times Higher Education Reporters* 2013). Yet the court, and a section of the Italian public, demanded retribution. The reversal on appeal of most, but not all, of the L'Aquila convictions in 2014 was met with anger amongst some members of the public (Hooper 2014). Less dramatically, Thomas Birkland (2009) argues that official reports following disasters are often designed to protect powerful actors by deflecting blame elsewhere. Such reports, which he describes as 'fantasy documents', may also give the false impression that decisive action will be taken to prevent further catastrophe, when in fact the authorities have little intention of following up the recommendations. In order, then, to achieve a more rounded understanding of the disaster cycle it is necessary to find a place for blame. Birkland takes the concept of fantasy documents from the work of Lee Clarke (1999) who used it in the analysis of plans for averting or coping with possible future disasters. Both applications are equally relevant.

The next stage, recovery and reconstruction, is no less politicized. Interested parties argue over the most suitable recovery programme and over who should provide the funding. The disaster cycle ends and recommences with the implementation of new measures to avert or mitigate disaster. The content of such measures will be determined by negotiation rather than any dispassionate consideration of the alternatives.

DRIVERS OF THE DISASTER CYCLE

Although the disaster cycle was developed primarily as a guide for practitioners in disaster management, it is employed in a different way in the current volume. Each stage of the cycle is to a greater or lesser extent affected by the behaviour of individuals and organizations, as are the transitions between stages. Human and group behaviour drives the cycle and prevents it from becoming a series of self-contained boxes. This section examines the types of behaviour that set and keep the cycle in motion.

Disasters would be less frequent and less severe if mitigation was thorough, warnings heeded, sensemaking and decision making conducted

calmly and effectively, relief and rescue operations carried out efficiently, disaster inquiries objective and reconstruction well planned. But several obstacles stand in the way of the smoothing of the disaster cycle. Those obstacles include conflicts of interest, such as over who should pay for mitigation or reconstruction programmes; the misperception of risk by individuals and groups; and inflexible thinking, especially at the group level.

Conflicts of interest are fairly obvious and need not detain us for long, though they will be visible at various points in later chapters. Whilst the outbreak of the First World War, for example, may have reflected the misperception of risk by the great powers of Europe, also involved were fundamental conflicts of interest over territory and relative power. On a smaller scale, individuals and agencies in control of supplies for the relief of disaster victims may have axes to grind, and discriminate against claimants on ethnic, religious or political grounds (Aldrich 2010). The US government, with an eye on the accumulation of votes, is more generous with the provision of disaster relief in election years (Michel-Kerjan 2010, 46). Charities and other non-government organizations have an interest in using the publicity generated by disasters to replenish their coffers and sustain their bureaucracies. They may even exaggerate disasters in order to achieve their own objectives, as Cormac O'Gráda (2009, 218–25) suggests happened in relation to famine appeals in the late twentieth century.

Building on the work of behavioural scientists, specialists in the economics of risk and uncertainty have devoted considerable effort to investigating how individuals and organizations assess the likelihood of disaster, whether natural or other. Experimental evidence suggests that humans are poor at estimating the probability of infrequent events such as disasters. Consequently, they may allocate too few resources to trying to prevent and mitigate them. The length of time since the last disaster of a similar nature also affects perceptions of risk. When calamity is fresh in the memory, mitigation and preparedness are taken very seriously. Once memories have faded, however, individuals and organizations, including firms, political parties and government agencies, may be inclined to discount the risk of recurrence, and to neglect precautions. Behavioural research also suggests that the probability of certain types of disaster will be overestimated relative to others. Particularly startling or horrifying events attract more attention than more mundane disasters. In the wake of the September 11, 2001 attacks on New York and Washington many individuals, as well as government agencies and airlines, overestimated the probability of future terrorist assaults. Resources were diverted from the mitigation and relief of other disasters, such as floods, to dealing with

the perceived terrorist threat (Michel-Kerjan and Slovic 2010; Kunreuther and Useem 2010).

Research in political science suggests that the public only bothers about disasters when they are in the news. Strong public support exists for the US government to take the lead in rescue and relief efforts after a disaster, but there is far less support for spending taxpayers' funds on mitigation and preparedness, regardless of the fact that a dollar spent on mitigation and preparedness brings a much higher return than a dollar spent on rescue and relief. Natural and other disasters are news for a while, but the attention of the public soon moves on (Healy and Malhotra 2009).

Behavioural economists accept that humans are more than satisfaction-maximizing calculating machines, and that their actions are influenced by the narratives or stories they construct, often in conjunction with other people. At times they will be inclined to optimism, but at others to pessimism. When they believe that they have been treated unfairly they adhere to narratives based on the corruption of those in positions of economic or political power (Akerlof and Shiller 2009). The notion that confidence or emotions may have a significant economic impact has been endorsed by Alan Greenspan, chairman of the Federal Reserve Board from 1987 to 2006, and someone who could hardly be classified as a behavioural economist. According to Greenspan (2008, 17), 'Economists cannot avoid being students of human nature, particularly of exuberance and fear', emotions that sometimes cause markets to act apparently irrationally.

The financial instability hypothesis, developed by Hyman Minsky (1982; 2008), and applied to financial history by Charles Kindleberger and Robert Aliber (2011), shows in more detail how emotions may influence economic and financial behaviour. Minsky was concerned with the misperception of risk by borrowers and lenders. A cycle of boom and crash is set off by a positive exogenous event, such as the diffusion of a new technology, which prompts a perfectly reasonable increase in borrowing and lending. At some point, however, the expectations of borrowers and lenders about returns from new projects become detached from reality. Credit now expands at an accelerating pace, and the prices of the assets against which loans are made, including property and equities, begin to soar. Euphoria grips borrowers and lenders, and loans are extended to households and firms with no prospect of repaying unless asset prices continue to rise. After a while, however, borrowers and lenders become nervous, possibly when they observe that the boom has bid up interest rates (Minsky 1982, 33). The rate of credit expansion slows, and selling pressure halts the ascent of asset prices. If there is now

an adverse shock, such as the failure of a big financial institution, asset prices may go into reverse, exposing both borrowers and lenders to ruin. The authorities must now step in to contain the disaster.

Kindleberger and Aliber (2011, 39–45) explain the changes in sentiment that drive the cycle by suggesting that rationality is an ideal that may not be achieved in practice. Human behaviour is influenced by feelings and hunches, and at times people may even be carried along by mob psychology. Even when attempting to calculate the best option, we are constrained by limitations in data availability and reasoning power. David Tuckett and Richard Taffler, a psychologist and a finance scholar respectively, employ psychoanalytic theory to analyse the dotcom bubble and collapse of 1998–2002. They argue that ‘in the face of uncertainty’, such as that routinely pervading financial markets, ‘there is increased scope for emotional and unconscious phantasy to shape reactions to news’ (Tuckett and Taffler 2008, 89). Financial assets, including internet stocks, become ‘phantastic objects’ representing the deepest desires of investors. In their ‘paranoid-schizoid’ state they suppress all doubt and make light of risk, but when the markets turn against them they resort ‘to denial, to anger, and then to paranoid efforts to find scapegoats’ (Tuckett and Taffler 2008, 404). Similarly, Mark Stein (2011) describes the culture of mania that gripped financial markets before 2007–09. Every setback was treated as a challenge to stake even bigger bets and prove the doubters wrong. It would appear, then, that the dynamics of the disaster cycle are at their most manic in the financial sphere. Similar frenzies are not evident in the world of natural or industrial disasters, although they might be in the realm of warfare. The reason for dwelling on the financial case is that the fluctuating emotions of greed, bravado, denial and panic, which to a greater or lesser extent saturate all disasters, are most transparent in the financial arena.

At the heart of the disaster cycle, however, is the need to identify and make sense of the triggering event. Sensemaking may be successful or it may fall flat. The Apollo 13 space mission in 1970 and the Three Mile Island nuclear accident in 1979 illustrate the contrast between successful and unsuccessful sensemaking. Despite a serious malfunction during the early stages of the Apollo 13 mission, Flight Control and the astronauts kept their heads, worked hard on containing the problems, and brought the craft back safely to earth. At Three Mile Island, however, the plant operators did not respond well to stress and chose to ignore inconvenient information. Persuading themselves that the problem with the reactor was under control, they dismissed new instrument readings that suggested it was still heading for complete meltdown, and assumed that the readings must be incorrect. It was by sheer luck that the plant avoided catastrophe.

Apollo 13, then, was an instance of creative sensemaking; Three Mile Island was the reverse. One team reacted creatively under stress, but the other went into denial, preferring not to contemplate the possibility of disaster (Stein 2004). Three Mile Island was the inspiration for Charles Perrow's theory of normal accidents. With technologies that are complex and tightly coupled, and have little inbuilt redundancy, unexpected combinations of malfunctions are bound to occur from time to time, and will be very difficult to understand and manage (Perrow 1984). Financial systems exhibit similar features of complexity and tight coupling.

Barry Eichengreen (2012) argues that in times of crisis, especially when information is scarce and misleading and there is no agreement on first principles, decision makers may reach for an analogy in order to frame the threat and devise a solution. Moreover, they are likely to grab the most obvious analogy – the 1930s depression in the case of the GFC in 2007–09 – whether or not it is the best one. Collective sensemaking is not necessarily a recipe for success. The outcome of a group discussion may be imposed by the most powerful member, or reflect a compromise between the competing views of members, as Mitchel Abolafia (2010), a sociologist, finds in a study of interest rate setting by the Federal Open Market Committee in the USA. 'Groupthink', the tendency for groups to reach a firm view, then ignore contradictory evidence and stifle dissent, is a concept that was first employed to explain US foreign policy and military mishaps, including the failure to anticipate the Japanese attack on Pearl Harbor in 1941 (Janis 1972).

Several types of crisis manager have been identified in the literature. Collectivists cooperate effectively with other crisis managers, delegate tasks and adapt their plans to the situation. Integrators are determined to follow best practice methods; although laudable in principle, in practice this may lead to delays until all assets are in place. Reactives lack a consistent strategy, fail to communicate effectively, and are inclined to autocracy. Finally, paralytics have no idea what to do or how to do it, and often lapse into passivity (Olejarski and Garnett 2010). Although developed in the context of natural disasters, this typology is potentially of far wider relevance. In practice, however, it has proven difficult to assign individuals and organizations to particular categories.

Whether or not a crisis leads to disaster, and whether or not the response to that disaster is effective, depends on the judgement and behaviour of human beings and organizations. Both judgement and behaviour may be clouded by favouritism, misperception and emotion, especially when crucial decisions have to be made at a time of extreme stress.

CONCLUSION

The central argument of the current volume is that disasters in different fields share many characteristics and pass, more or less, through the same phases. The unfolding of those phases is determined less by clock time than by the thought processes and actions of the individuals and groups experiencing and seeking to avert or minimize the disaster. Although a basic four-stage disaster cycle framework is preferred by many disaster management agencies, a more refined framework is needed for the purposes of historical analysis. The template developed above gives special attention to the distinction between those parts of the disaster cycle that lie within the critical period, when an urgent response is demanded, and those that lie outside the critical period. Emphasis is given to the phase of sensemaking and decision making that occurs in response to the triggering event. Much rests on the success or failure of sensemaking and decision making, which if done well may avert or at least lessen the impact of disaster. Prominence is also given to a stage in which blame for the disaster is determined and allocated. Inquests into disasters, whether in the financial, political or natural spheres, are invariably politicized. Our aim is not to offer practical advice on preventing or coping with disasters but rather to show how the same behaviour and mistakes recur across a range of disaster types.

The following chapters apply the modified version of the disaster cycle developed above to a variety of cases. Chapter 2 deals with a classic natural disaster, Hurricane Katrina, which inundated New Orleans in 2005. Hurricane Katrina is chosen as the first case study because the disaster cycle was designed with such events in mind, and it makes sense to move from the familiar to the unfamiliar. Chapter 3 discusses a particularly topical disaster, the First World War, which in many respects changed the course of European history 100 years ago. The challenge is to see to what extent the disaster cycle can help us understand a major war, and the behaviour of the people who started and attempted to manage it. Chapter 4 concerns the depression of the 1930s. It has already been established above that there is a financial disaster cycle, and Chapter 4 shows how it follows the essential contours of the broader disaster cycle. Chapter 5 investigates two disasters that are on a smaller scale to those discussed elsewhere in this volume, namely the Senghennydd and Aberfan mining disasters in Wales in 1913 and 1967, respectively. The objective here is to demonstrate the versatility of the disaster cycle framework. Chapter 6 is on the face of it the most problematical. Although the smoking of tobacco has hastened the death of millions of

people over the past century, it has done so extremely slowly, so that each stage of the disaster has stretched out to years or even decades. If we remember, however, that some disasters are slow onset, and that the disaster cycle is about social time rather than clock time, the inclusion of the smoking case study is fully justified. Chapter 7 brings us up to date with an analysis of the Global Financial Crisis and the Eurozone episode.

Some time ago I contributed a chapter on the First World War to a volume on *Economic Disasters of the Twentieth Century* (Oliver and Aldcroft 2007). Chapters in that collection ranged over a wide area from global war to depression to financial crisis to economic decline in post-independence Africa and the failure of the Soviet Union. As one reviewer pointed out, however, neither the editors nor the contributors attempted to draw comparisons between those disasters (Jacks 2008). Nor were readers offered any conceptual framework that would let them make their own comparisons. The purpose of the current volume is to supply a conceptual framework that will be useful when comparing historical disasters of all sorts.

NOTES

1. Cormac O'Gráda's research on the history of famine is another important exception (O'Gráda 2009).
2. Whilst working on the present volume I completed chapters on the theme of comparative disaster for two collected volumes (Singleton 2015; 2016).
3. For 17 years I accepted the risks associated with living in Wellington, New Zealand, a city built on top of several earthquake faults.
4. Genesis, Chapters 6–8.
5. Exodus, Chapters 7–11.
6. The database may be found at www.em-dat.be.
7. www.emdat.be/frequently-asked-questions (accessed 30 September 2013).