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The Five Neglects:
Risks Gone Amiss

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1. Introduction

We must constantly make decisions in situations of risk. Should we undertake a potentially beneficial medical procedure that has a small probability of harmful complications? Should the local government allow development in the floodplain? How much money should Congress allocate to fighting terrorism?

Economists have developed a "rational choice" based model for making decisions in these situations of risk, called expected utility (EU) theory. Under this approach, a utility value (utility being a measure of satisfaction or happiness) is first assigned to each potential outcome. These outcomes are then weighted by the probability that they will occur given a particular choice. The result is the expected utility reaped from that choice. All alternatives are evaluated in this way and the one with the highest expected utility is chosen. When applied to societal level decisions, often some metric of total benefits to the society is used in place of utility.

A rational choice based approach to decision making is thus comprised of five elements:

1. consideration of probability,
2. valuation of potential benefits and losses,
3. accurate use of (subjective) probability and statistics,
4. delineation and evaluation of all available alternatives, and
5. incorporation of all benefits and costs accruing to the decision maker.

First, probabilities must be considered. In practice, there are only a few real world situations in which objective probabilities are known. In all the other cases, individuals are required to form unbiased assessments of the probabilities, what are labeled subjective probabilities. For policy choices, decision makers often draw on models or historical data to generate such assessments. Subjective probabilities can be broadly interpreted as an individual's degree of belief in an outcome occurring. Comparing subjective probabilities to simple lotteries can often improve subjective estimates. For instance, an individual who assigns a 0.1 subjective probability to the likelihood that his property will be flooded in the coming year could recognize this is the same probability as a number 8 coming up on a 10 number roulette wheel.

Second, consideration must be paid to the potential benefits and costs associated with an option. A common complexity here is that outcomes may only be received in the future. When they are, the utilities they offer are discounted to reflect time preference. Outcomes in the future are discounted to reflect the fact that money invested today gains in value by tomorrow and also to reflect simple impatience and uncertainty. We'd rather have a dollar today than a dollar next year.

Third, the probabilities must reflect all available information and must not be biased. Further, calculations must also obey rules of probability. For instance, the probabilities of all potential outcomes from a choice must sum to one. This allows accurate calculations of the EU of each alternative. Making an optimal choice also requires that the fourth criteria be followed: all possible alternatives get appropriate attention. (In practice, some can be dismissed quickly.)

Finally, the decision maker must be sure to consider all costs and benefits an alternative will provide. Note that a choice which is rational for the decision maker will not be optimal for society at large unless the decision maker considers fully the benefits or costs imposed on others as well. These impacts on others are called externalities. To get a rational choice for society, therefore, requires replacing element 5 with 5a:

5a. incorporation of all benefits and costs accruing to the decision maker and all external parties.

This process is more easily described than followed. Its effective use can be time intensive and may require sophisticated calculations. In everyday life, individuals are likely to deviate considerably from the rational model, often employing the use of mental shortcuts. That is, individuals are only boundedly rational.[i] These shortcuts can produce many systematic biases in decision making.[ii]

Governments and businesses at times employ policy analyses or business plans to help make risky choices. These tools help tame biases. But such organizations fall prey to distinctive biases of their own due to efforts to claim credit or avoid blame, for example. And information often gets hidden in organizations by individuals pursuing parochial interests. These are examples of the so called *agency problem*, where a designated agent is making decisions for a principal and what is best for the agent may not be best for the principal.

This chapter focuses on the shortcomings of individuals making risk-related decisions, whether choosing for themselves or as agents for others or for institutions, including the institution of society at large. Individuals often fail to incorporate in their decision making the five elements we identified as critical for rational decisions. Failure to consider the five criteria give rise to what we label the *five neglects*:

1. probability neglect,
2. consequence neglect,
3. statistical neglect,
4. solution neglect, and
5. external risk neglect.

In Section 2 we introduce each of these five neglects. Each is illustrated largely through examples from decision making regarding environmental risks and natural disasters, though examples from national security or medical choices could easily be provided. In Section 3, we offer two brief case studies that describe the impact of several of our neglects in detail. Section 4 concludes.

2. The Five Neglects

2.1. Probability Neglect

When making decisions under uncertainty, individuals may at times fail to consider the probability of an outcome occurring and focus entirely on the consequences. Cass Sunstein and others have labeled this phenomena probability neglect.[iii] Such neglect is especially likely for emotionally charged risks. Sunstein and Zeckhauser demonstrate probability neglect in an experiment in which law school students are asked how much they would pay to eliminate a cancer risk from arsenic in drinking water. For some subjects the risk was 1 in 100,000, for others it was 1 in 1,000,000, or ten times as great. When the risk of cancer death was described as just that, people paid more to eliminate a higher risk, as would be expected. However, when the death was described in gruesome and graphic terms, it did not matter which risk was faced; people were willing to pay about the same. The authors refer to this result of paying the same to reduce a very tiny risk or a much larger one an "emotion premium."[iv]

Most of the risks described in this volume will stir strong emotions; probability neglect is to be expected. When individuals are neglecting probabilities, they will overreact to low probability events. Love Canal provides a salient example. In this community in Niagara Falls, New York, homes and a school were built on top of a covered chemical waste site where tons of toxic waste had been disposed in an old canal. In the 1970s, the toxic chemicals began seeping into people's homes and yards. Alarmed residents and active media coverage built national concern about Love Canal and toxic waste sites more broadly. Eventually this forced the federal government to relocate the residents and spend massive amounts of money on cleaning toxic sites. However, there is no conclusive scientific evidence that the waste at Love Canal caused any enduring health problems to its residents, and the amount spent on removing those toxic wastes could have led to much greater risk reductions if targeted at other threats.[v] Probability neglect helps explain this outcome. It can lead, as it did here, to spending resources to achieve little relative to what they could achieve in risk reduction elsewhere. This is one of the reasons discussed by Zeckhauser and Viscusi that leads our risk mitigation spending to often be severely cost *in*effective.[vi]

2.2. Consequence Neglect

Individuals can neglect the magnitude of outcomes, what we label consequence neglect, just as they neglect probabilities. Such neglect is most likely for non-salient and difficult-to-imagine risks. These types of risk are often those that individuals have not experienced before nor thought much about; they are "virgin risks".[vii] These are risks that are out of sight and out of mind. Consequence neglect will lead us to prepare insufficiently for very low probability, but very high consequence events. Because the risk is so small, individuals pay no attention to the consequences. If those consequences are extreme, however, some investment in prevention and protection would likely have a positive expected net value. Taking risk aversion into account, and looking at expected utility, such preventative expenditures would likely become even more valuable.

Posner discusses the virgin risk example of asteroid collisions. The probability of a sizeable asteroid—such as the one that might have wiped out the dinosaurs—colliding with the earth in any given year is very low: Posner uses a figure of 1 in 50 million to 1 in 100 million.[viii] This may be why we spend very little on asteroid impact avoidance. Posner notes that with the small amount we are spending, NASA will not even finish mapping all the close, large asteroids for another decade. The small amount of attention spent on preventing an asteroid from hitting us could be due to consequence neglect. People focus on the probability, which appears almost infinitesimally small, and neglect the monumental consequence. Given that consequence, some form of cost-benefit analysis, à la Posner, would likely suggest we should spend more on assessing and possibly combating the risk than we do. One of the cases discussed in Section 3 further illustrates consequence neglect.

2.3. Statistical Neglect

Subjectively assessing small probabilities, and then continually updating them on the basis of new information, is difficult and time consuming. Individuals may just skip the exercise of trying to make an informed probabilistic judgment altogether, perhaps using rules of thumb for estimating risks. Unfortunately, such rules can lead to systematic biases in decision making. Individuals have also been shown to misunderstand the basics of probability, and thus draw faulty statistical conclusions. Here we briefly discuss just four of many examples of statistical neglect that are well documented in the behavioral economics and psychology literature. The first two are biased assessment and updating of probabilities. The second two reflect fundamental misunderstanding of how probabilistic systems operate.

The Availability Heuristic refers to the now robust finding that individuals tend to assess the likelihood of an event by how easily examples come to mind.[ix] Individuals will thus overestimate the likelihood of risks that are particularly salient or have been experienced recently, and underweight risks that are difficult to envision. Threats will get undo attention right after a disaster and too little attention before a virgin disaster hits, or after the past disaster stretches into distant memory. This can lead to too much ex post spending and insufficient ex ante spending on preparation and mitigation. The world reacted strongly to swine flu in 2009, despite considerable evidence that it would not be a massive killer. But the lessons of the 1918 epidemic that killed 50 million people worldwide had been long forgotten before the recent episodes of SARS and bird flu.

Similar to the availability heuristic, individuals are also likely, after an event occurs, to over-update their assessment of the risk if they had never experienced or thought about it before. On the other hand, if they did have previous experience with the risk, they are likely to under-update their assessment, even when evidence indicates substantial updating may be warranted.[x] For example, flood risk can increase in communities as a watershed is developed and pervious surface area decreases, as development proceeds in areas at risk, or potentially as the climate changes. When communities have experience with flood risk, they may fail to appropriately update risk assessments in the face of such changes. A section 3 case study provides another example of failing to update.

Beyond inaccurately estimating probabilities, individuals can misuse them, as well. Individuals have been found to mistakenly assume that small samples are representative of a population.[xi] For instance, with only a century of data or less, we cannot accurately estimate the probability of hurricanes with a return frequency of, say, 1 in 50 years. Still, we often think we know, and after a few calm years, might assume the risk is lower than it is, and after a bad year, assume it is greater.

Individuals have also been shown to fall prone to the so-called Gambler's Fallacy, a related mistake, which refers to the belief that systems are self-correcting.[xii] For example, after a coin has been tossed several times and come up heads each time, someone suffering from the Gambler's Fallacy would think a tail was more likely on the next toss. This might lead residents in disaster-prone areas to assume the risk had declined after a big event. While true for earthquakes, where the event relieves pressure on a fault, this is not true for most disasters.

2.4. Solution Neglect

Failure to consider all promising solutions to a problem represents a fourth neglect. The most optimal alternative cannot be chosen if it is not even considered. To illustrate, a survey of homeowners in 100-year floodplains found that residents had a very narrow view of solutions to the flood problem. Most focused entirely on technological options and neglected to consider non-structural approaches such as mitigation, changes in land use, insurance, or the use of warning systems.[xiii] One of these alternate solutions might offer higher net benefits, but would not be undertaken, since it was not considered. The two case studies below provide detailed examples of solution neglect.

We hypothesize three possible explanations of this phenomenon. First, individuals have been found to have an undue preference for sticking with their current choice, or the current policy, a propensity termed "status quo bias".[xiv] Given this, solutions that are not currently being implemented get too little consideration, and possibly complete neglect. Second, approaches to problems build up political capital the longer they are in existence. This makes it difficult to consider, or even envision, new solutions. Finally, decision makers have limited time and attention to seek out all promising responses to a risk. Given the costs required to get a solution recognized as a possibility in the political arena, some superior solutions will never get considered.

We highlight two classes of solution neglect related to environmental risks: *natural capital neglect* and *remediation neglect*. Natural systems can produce value. Thus, environmental economists have extended the notion of capital to ecosystems, referring to them as natural capital. When natural capital gets neglected, society fails to consider the fact that natural systems can substantially reduce risks. For instance, wetlands act like a sponge, storing floodwaters, and coastal vegetation, such as mangroves, can buffer storm surge. Often only built structures, such as levees and dams, are considered for such tasks.

The few cases where natural capital has been considered as a solution make clear the need to have a vocal advocate for the option to be put on the table. One example comes from Napa, California. Napa had long suffered from floods along the Napa River, but the community

rejected U.S. Army Corps of Engineers proposals for a traditional engineering approach to flood control. In the 1990s, a community coalition developed a "living river" design for the Napa River to protect the community from 100-year flood levels. The project removed levees and restored more than 650 acres of tidal wetlands to absorb flood flows. The Corps ignored natural capital, the coalition introduced that option; the option won and proved successful.

Remediation neglect refers to the fact that we often fail to consider that fixing what is broken can sometimes be the best way to mitigate a risk. Such neglect arises because restoration may appear to be going "backwards" instead of "forwards." But fixing mistakes may be better than letting risky situations lay untouched for long periods of time. This form of solution neglect may be coupled with consequence neglect in situations where a longstanding activity continually creates a small risk of a catastrophe, assuring that a bomb is always ticking. In such cases, remediation is a promising, but frequently neglected, alternative.

2.5. External Risk Neglect

When making decisions, individuals or groups, following self interest, tend to only consider the benefits and costs that accrue to them, and ignore benefits or costs imposed on others. This is rational behavior, but when externalities are great it leads to outcomes that are far from socially optimal. Here, we are mostly concerned with negative externalities, or costs that are imposed on others.

External risk neglect refers to a particular type of negative externality—raising risk levels others face. This is a type of JARring action, discussed by Kousky and Zeckhauser, where costs are imposed on others that are spatially or temporally distant.[xv] When such risk impositions are not considered in decision making, we refer to it as external risk neglect. A prime example of such neglect comes from the "levee wars" in St. Louis, Missouri. St. Louis, located between the Missouri and Mississippi Rivers, constantly faces the threat of floods. Communities adjacent to the river seek protection of their floodplains by building levees. While providing some degree of protection for their own residents, the levees push the floodwaters onto neighboring communities. This leads to the escalating "levee wars." One community's decision to build a levee causes its neighbors to do so as well. When a community decides to build a levee, it neglects the risk this levee imposes on others. The socially optimal level and configuration of protection for the region will have much less of a walled river than results when communities take self interested actions.

The three standard mechanisms to deal with externality problems—bargaining, tort liability, and regulation—encounter difficulties when the externality is an elevation in risk. First, changes in risk levels are not readily visible and may be hard to detect and trace to a source. Second, risk impositions are often created by many and imposed by many. Greenhouse gas emissions are a stellar example. When the creators and recipients are many there can be collective action problems and high transactions costs can impede both bargaining and tort solutions. Third, those creating the risk are often in a different political jurisdiction from those injured, inhibiting direct regulation. Finally, there will be many cases where current generations increase risks for future generations. Those who pass regulations, politicians, are elected by present citizens. Those

receiving the externality are only represented by the altruism of current systems. Regulation is likely to be too lax.

3. Case Studies

We have employed logic and brief anecdotes to argue that our five neglects frequently lead to risks gone amiss. That is, as a society and as individuals, we routinely devote resources to risk reduction where they do little good, and neglect substantial risks that could have been curtailed at prices worth paying. We now turn to two case studies that explore in greater detail the problems associated with some of these risk neglects.

Both cases are examples where there is a compounding of past failures to address risk, and multiple forms of neglect commingle. Both cases also demonstrate a larger, all too common problem: failure to think about a risk in any capacity, or simply generalized risk neglect. Warning signs are too often waved aside, because many of us are imprisoned with an "it can't happen to me" mentality. "Let sleeping dogs lie" may be wise advice for dealing with conflicts, its intended area of application, or for canine management. But it can be a disastrous strategy for risk management, as the world learned to its sorrow with the 2008 financial meltdown, the 2004 tsunami due to the Sumatra Earthquake, and the terror attack of 9/11/2001. To be sure, specific neglects played a role in these disasters: external risks were neglected by financial institutions before the meltdown, potential solutions were ignored by decision makers, and probabilities severely miscalibrated. In this section, we take two lesser known cases to explore in detail how such risk neglects operate, and their resulting consequences.

3.1 The Pontine Marshes

The Pontine Marshes comprise an area measuring 980 sq. km. (378 sq. mi.) just south of Rome on the shore of the Mediterranean. For over two millennia, popes, emperors, and famed hydraulic engineers from around the world attempted to drain this malarial, marshy plain by building canals. Now vast tracks of reclaimed land, the Pontine Marshes are heavily polluted. The Province of Latina's governmental data reveal that nine out of ten macro-basins in the plain are more than 50% polluted.[xvi] The vast majority of the surface and ground waters in the Pontine plain contain high levels of nitrates and phosphorous, not to mention undetermined amounts of hazardous industrial waste pollutants. Contaminated plumes flow from the canals directly into to the Mediterranean Sea. Further, groundwater pumping threatens agriculture with saltwater intrusion. These problems arose primarily from solution and external risk neglect, and are currently plagued by statistical neglect.

Drainage of the marshes began in the 13th century. Drainage was not completed until 1934, however, when Benito Mussolini was able to combine rational planning and mapping techniques, a nationalistic fascist agenda, and modern dredging and pumping machinery. Drainage was a great feat not merely of civil engineering, but of human mobilization. From 1928 to 1935, eighty thousand people were brought in, mostly from the north of Italy, to drain 145,000 hectares (358,000 acres, 600 sq. mi.) of the Pontine Marshes and adjacent provincial areas. Over the 700 years that passed between the first attempts at settlement and Moussolini's project, no

alternatives apart from canal building were considered, an example of extremely long-term solution neglect.[xvii]

This myopic focus has been coupled with external risk neglect. Relatively clean water drains from the Lepini Mountains, but after one kilometer of flow through agricultural and industrial operations, it becomes contaminated. This polluted water creates health risks for the greater seaward population and imposes risks for marine ecosystems. These risks are created by farmers who heavily use fertilizer, polluting industries, and regulators who curb neither activity. Thus, individual decision makers do not consider the risks they impose on others. Further, farmers, attempting to avoid the polluted canals, increasingly turn to illegal wells to pump groundwater for their irrigation needs. As a result, 24,000 illegal wells dot the coastal plain. They weaken the hydrostatic pressures that form a bulwark meniscus against the saltwater intrusion that increasingly threatens agriculturally productive portions of the plain. Thus, external risk neglect results in compounding risks "downstream" in a series of risk-producing byproducts.

Statistical neglect also operates among Pontine Marsh stakeholders. Droughts and rising sea levels exacerbate the risks residents already face. Both residents and policy makers fail to update their risk assessments. If they did, more action to reduce the risk would be taken.

Overcoming years of solution neglect, the Project for Reclamation Excellence (P-REX) is introducing the combined use of natural capital and new ideas for remediation to lower current risk levels.[xviii] Pumps and canals cannot do enough. Indeed, they are part of the problem. Ironically, the drained wetlands would provide precisely the services needed to increase freshwater quality. Extensive fieldwork, provincial cooperation, and regional analyses enabled P-REX to formulate a basic strategy to reclaim portions of the marshes as filtering wetland "machines." Combining properties of industrial efficiency and natural wetland filtering/sequestering, the strategy collects canal water, distributes it across a wetland system to remove the pollutant load, and then re-outputs the treated water to the canals, groundwater, and sea. The wetlands are capable of treating water at modest costs for both construction and long-term maintenance. In addition, they provide benefits in the form of bird, amphibian, and fish habitats, better recreational options, and groundwater recharge potential. Natural capital is an asset to be mobilized, not neglected. Similar forms of pollution conditions due to the neglect of natural capital and external risks are found in agricultural basins worldwide.

3.2 Mining Reclamation in the American West

There are over 600,000 inactive and abandoned mine sites in the United States, heavily concentrated in the western states. These abandoned mines pose numerous risks in the form of potential dam breaks, landslides, or structure collapses. They also represent physical hazards, with 33 people dying at these sites between 1999 and 2007. One of the most significant risks from inactive mines, however, is hazardous chemicals leaching into water systems and spreading into watersheds.

First and foremost, these abandoned mines are an example of external risk neglect. Mining companies did not consider the risks their activities imposed on others living near their operations. The Summitville Mine in Colorado well illustrates this neglect. More than 500 acres

of natural landscape were sullied in Summitville. Underground and surface drainage from the mined areas produces heavy metal-laden, acidic water that laces the Alamosa River and its tributaries with arsenic, iron, copper, aluminum and zinc.[xix] These metals and acidic conditions are known to be toxic in very small concentrations to many forms of aquatic life. Over time, reservoirs holding toxic water from the cyanide heap-leach pad operation (gold mining) leaked into neighboring streams and ultimately proved disastrous for the downstream ecologies. Due to several forms of reclamation, including revegetation, mine shaft plugging, and building water treatment plants, the U.S. government spent over $175 million on this single site.[xx] It is unlikely that the total mined gold and silver amounts to an equal value on a discounted basis, undermining the original logic of the resource extraction.[xxi]

Another example is the largest collective Superfund cluster: the Clark Fork Basin Sites, a collection of former mining operations across southwestern Montana. The area includes 500 underground mines, 3,000 miles of underground workings, and 4 open-pit mines including the Berkeley Pit.[xxii] The Berkeley Pit, a tremendous mile-wide pit lake, contains metal concentrations at levels 18,000 times the concentrations that affect aquatic life.[xxiii] The pit is infamous for a 2005 incident involving 342 snow geese that landed on the pit lake and died soon thereafter, a mega-metaphor relative to the canary in the coal mine. The Availability Heuristic struck home.

The pit's major risk to humans involves the rising lake level due to lack of costly and aggressive pumping of groundwater feeding into the area from underground fissures and mine workings. Above a certain level, the lake will begin to contaminate a local aquifer from which humans partake through both natural and mining-induced underground rock fissures. A water treatment plant has been constructed to eliminate this risk once lake levels achieve a certain depth. However, it is unclear at this juncture whether that measure will suffice.

Today, these abandoned mines are an example of consequence and remediation neglect. The risk from mines is not salient for most of the population, and the costs of remediating the sites are very high, leading to a neglect of the consequences should nothing be done. This situation is further exacerbated by the fact that many of the original owners and operators are long gone.

If we act prudently, significant dollars will be required. But how many? The answer is debated. The Bureau of Land Management (BLM), the agency that oversees the abandoned mine lands program, estimates a mere $130 million in tax dollars will be needed to fund the cleanup of all high priority sites through 2013. However, an inspector general report found that a single district in California will require more than $170 million in clean-up funds.[xxiv] Some estimates by the U.S. Department of the Interior (DOI) place the cost of repairing all dangerous abandoned mine sites conservatively around $3 billion.[xxv] The Abandoned Mine Land Fund (AML), collected by the government through taxes on coal companies, currently holds almost $2 billion but remains notoriously strangled by budget battles and bureaucratic barriers. AML funds must be used to clean up coal mined sites first, before being reallocated to other types of mines on a state-by-state determination. Furthermore, the federal fund is "on budget," requiring its allocation to be held back in order to lower overall budget deficits.

The abandoned mines also represent remediation neglect. As is the case with Summitville, most abandoned mine reclamation proceeds in a stopgap fashion—attempting to remedy former mistakes but never fully addressing the risk-inducing conditions. Thus, in the Clark Fork Basin case, a century of smelting, concentrating, and waste accumulating operations have produced heavy metal contaminated surface water, groundwater and soil. Piecemeal repair of sites will not end the accumulated contamination. The metals are distributed along the stream banks, behind dams, in ponds, and in various soil deposits across a 100-mile expanse. Part of the damage is currently being addressed. The EPA, in coordination with ARCO mining company, is spending over $120 million on the site. Authorities have removed a pollution-collecting dam, re-establishing the open flow of the river confluence, and transported the contaminated sediments to another Superfund site. Yet, considering the numerous potential risks the Clark Fork Basin Sites impose, this major operation could simply open the flow of upstream pollutants to downstream sites. Only a full-scale, comprehensive reclamation effort will lower the combination of the probability and the cost of severe environmental consequences.

Finally, the abandoned mines problem provides an example of statistical neglect. Residential developments are creeping closer to these abandoned sites. This requires updating assessments of the potential risks. As Summitville nears reclamation "completion," it is noteworthy that the EPA describes the site's remoteness as part of its logic for not going beyond a certain level of risk mitigation. As remoteness diminishes with changes in residential land use patterns, will the risk assessments be adjusted accordingly?

4. Conclusion

What basic strategies might stem the five neglects? A conscientious assessment of current risk conditions would be a good start. With the Pontine Marshes, re-mapping the data across the basins and sub-basins showed the pervasive but under-recognized extent of the pollution. Some re-education on environmental systems can help public officials understand risk phenomena. Italian officials detested the very word for marshes (*paludes*). However, they gradually warmed to the idea that these new environments would add both recreational and ecological value to their treatment function (something a traditional treatment plant cannot achieve). Risk deliberations, such as those on the Marshes, involve political, economic, and technical knowledge. Thus, a diverse, workable team or interdisciplinary individuals are critical to craft a vision of proper scale and breadth. Finally, most risk-reducing strategies require a structural shift in mindset from the short-term political timescale to the long-term environmental and economic timescale.

Though our case studies were on the environment, equivalent lessons could be drawn from risks of natural disaster, terrorism, or financial crises. For example, better representation of current knowledge of the active faults in Sichuan Province could have easily justified reinforced building codes in the area before the massive 2008 quake occurred. A long-term perspective would have shown that the consequences of 50,000 dead, millions homeless, and tens of billions of dollars in damages—even if an unlikely outcome—would vastly outweigh any savings reaped by building with cheap, unreinforced brick. Careful assessment of risk levels in financial markets in 2006 and 2007, such as those imposed on external parties through derivatives, as opposed to the happy neglect in those years of both probabilities and consequences, might have saved trillions of dollars to investors and the economy.

We are good at fighting yesterday's fires. But new risks—avian flu, innovative financial crises, pollutants long ignored, climate change—continuously emerge, and old risks wax and wane. Unfortunately, collectively and individually, we have the penchant for neglecting important elements of risks, including determining which ones are important. For that sin, we suffer both higher risks and higher costs.

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