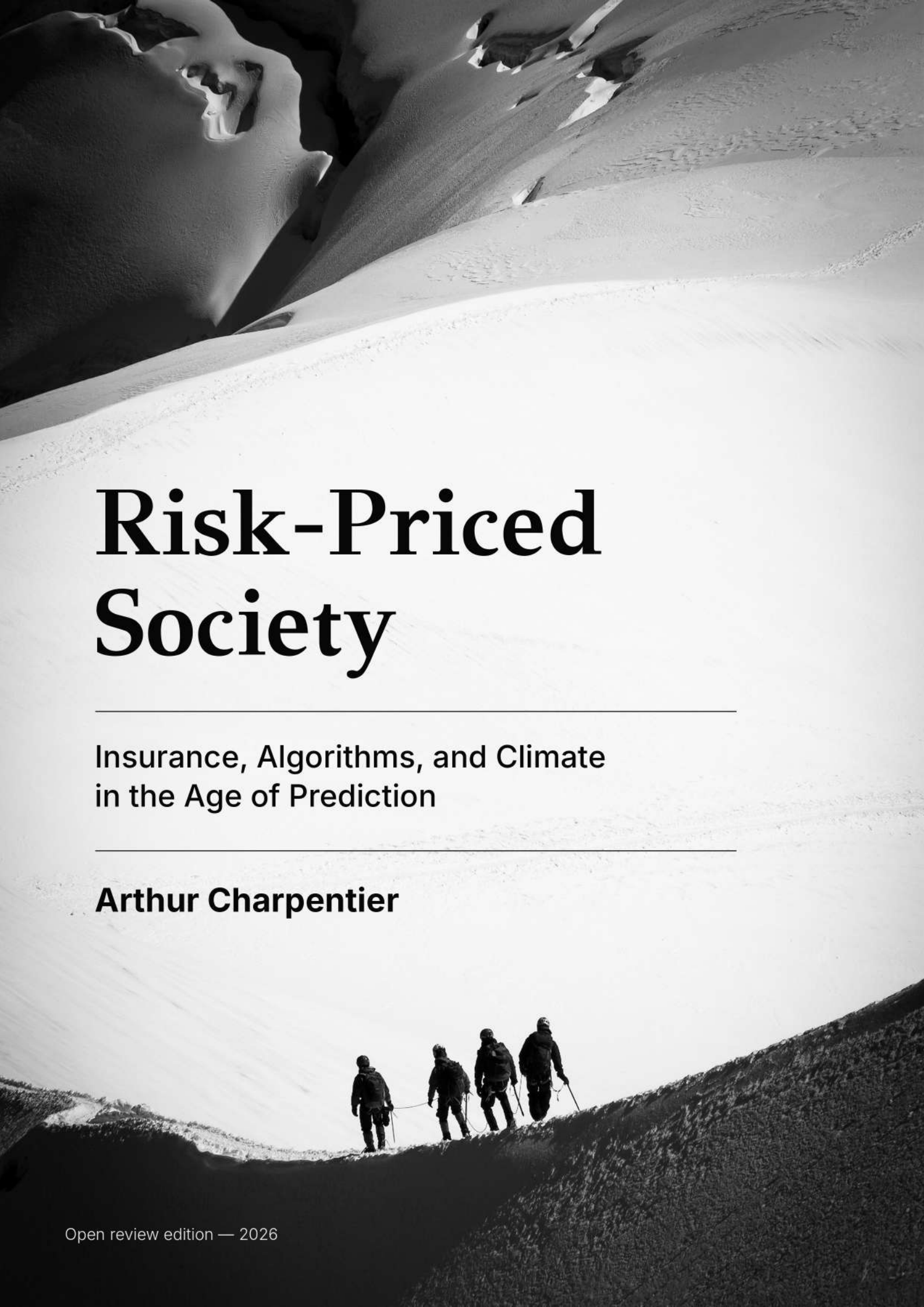

Risk-Priced Society

Insurance, Algorithms, and Climate in the Age of Prediction

Arthur Charpentier

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Prologue — When Risk Maps Set the Price

The price of homeowners insurance can double even though the house has not changed in appearance, ownership or use. The house has suffered no loss. Sometimes a new map is enough to place the address in a more exposed zone. The insurer may then raise the premium, impose new conditions or stop offering the policy.[1]

Composite scene

The Morenos had bought their home in Altadena, California, in the early 2000s. Pasadena was still close, and the San Gabriel Mountains were visible from the street. Their 1920s bungalow had three bedrooms, a porch, a garage and a garden planted with a few agaves. It was not a luxurious property, but a family home with land and light.

For years, homeowners insurance had been an ordinary household expense. It cost about $2,400 in 2023. The renewal quotation rose to nearly $4,100 in 2024. The insurer then announced that it would no longer offer a policy. The broker mentioned the cost of reinsurance, a difficult market and the area's new classification. He also used an industry expression. Mainstream insurers no longer had much "appetite"[a] for the neighbourhood.

By the end of 2024, the Morenos had to turn to the California FAIR Plan, California's insurance scheme of last resort.[b] With the additional cover needed alongside its basic fire policy, the annual cost approached $8,200. The protection was narrower and the deductibles[c] were higher [1].

On 7 January 2025, the Eaton Fire began near Altadena [2]. Part of the community was devastated, but the Morenos' block remained standing. California's insurance commissioner then imposed a one-year moratorium on cancellations and non-renewals within the fire perimeter and nearby areas. The measure protected policies that were still in force. It could not restore the ordinary-market policy the Morenos had already lost [3].

They had seen the smoke and heard the sirens. No wall of their house had burned. Yet their address now occupied a different place in the insurance market.

[a] In insurance, *risk appetite* refers to the types and levels of risk that a company is willing to cover.

[b] The California FAIR Plan, whose name stands for Fair Access to Insurance Requirements, is California's property insurance scheme of last resort. It provides basic cover to owners who cannot find a policy in the ordinary market. It is administered by an association of property insurers licensed in the state.

[c] In property insurance, a *deductible* is the part of a covered loss that the policyholder must pay.

[1] Composite scenes bring together observed situations, published cases and documented orders of magnitude. They do not describe identifiable people and do not constitute evidence. Documented cases are identified as such and accompanied by sources.

Composite scene

Thousands of miles away, the same mechanism could take a less dramatic form. The Faures had bought a 1930s house on the hills of Saint-Étienne in the early 2000s. It had beige stucco, a tiled roof, a sloping garden, a garage partly below ground and a basement office fitted out during the Covid-19 pandemic. Nothing marked the neighbourhood as a particularly threatened area.

After heavy rain, the storm drains became overwhelmed. Farther down the street, basements filled with water and furniture emerged coated in mud. The water did not cross the Faures' doorstep. Insurers nevertheless stopped looking at the address in the same way.

The premium, below €500 in 2023, rose to about €670. The following year, a broker offered a policy costing close to €760. The family would have to install a backflow valve, raise the boiler and stop listing the basement office as living space. It was becoming difficult, the broker said, to obtain several quotations in the neighbourhood.

The family home had suffered no damage. In underwriting systems, it was now an address in a "blue zone". The risk had not yet produced a claim at the Faures' home. It had already changed their contract.

From Map to Contract

A map does not raise a premium by itself. It becomes decisive when an institution connects a colour, class or score to a consequence. This process extends beyond California and France.

In the United Kingdom, Flood Re allows insurers to transfer part of the flood risk of eligible homes to a common scheme in order to preserve access to cover [4]. Across the Caribbean, Africa and the Pacific, regional mechanisms release funds quickly to governments when a hurricane, earthquake or drought crosses a threshold defined by a model [5].

The contracts differ, but they rely on a similar operation. An estimate made before a loss changes the terms of a future payment. A wildfire map may raise a premium. A flood zone may require work. Under parametric insurance[2] purchased by a government, a drought index crossing a threshold may trigger a payment for emergency assistance.

[2]Parametric insurance pays a sum fixed in advance when a measurable indicator crosses a threshold set in the contract. Payment depends on that indicator, such as rainfall or wind speed, rather than on a detailed assessment of each loss.

When risk rises, the insurer must account for expected losses, reconstruction costs and reinsurance. A premium that remains too low can weaken its ability to pay. A sharp increase, however, can make coverage unaffordable, lead households to give it up or prompt insurers to withdraw [6–8].

The effects do not remain within the policy. A high premium can make a sale more difficult, weaken a mortgage, lead a household to reduce its cover or hasten its departure. Flooding can also lower property prices and increase the time needed to sell a home [9]. The map then affects whether people can remain in a place.

To become usable, a map simplifies a complex territory. It selects a scale, period, event, scenario and resolution. It then draws boundaries and assigns classes. These choices make the territory legible to a public authority or a company [10]. They also shape what the map shows and what it leaves outside the frame [11]. Even a satellite image must be dated, documented and interpreted before it becomes information for action [12].

Fire, water and the shrinking and swelling of clay soils are real. The exact boundary between a red zone and an orange one does not exist in nature in a ready-made form. It depends on the scenario, the period and the threshold selected. Its significance depends above all on what the institution attaches to the colour. The consequence may be protective work, financial assistance, a higher premium, a lending condition or non-renewal.

A map can save lives and guide investment. It is not enough when it merely announces the price of danger without providing the means to reduce exposure.

The Judgement behind the Price

Risk does not arrive on an actuary's[3] desk ready to be priced. Categories, observation periods, coverage, thresholds and underwriting rules[4] must all be chosen. Two insurers may therefore classify the same house differently. They do not have the same portfolio[5] or the same strategy.

[3] An *actuary* is a professional who translates risk into financial quantities. Actuaries estimate claim probabilities, premiums and the future cost of commitments. Their work helps determine what a risk costs and how that cost will be shared.

[4] In insurance, *underwriting* is the process of examining a risk and deciding whether to accept it, reject it or cover it under specified conditions.

[5] An insurer's *portfolio* is the set of policies and risks it covers at a given time.

The physical hazard remains, but these choices shape the contract that covers it [13].

Statistics give the decision a numerical and impersonal form. They do not determine which variables are admissible, where thresholds should be placed or which consequences should follow from each category. Nineteenth-century British actuaries already had mortality tables and formulas. Those instruments did not tell them which lives to accept, which rate to charge or how to interpret the particular experience of a portfolio [14].

Judgement has not disappeared from contemporary models. It has been distributed across data, code, underwriting rules and automated procedures. This makes it harder to identify. Law acts before the price appears. It determines who may sell insurance, what can be covered, which duties bind the parties and which routes of appeal remain open [15].

Insurance law and regulation also shape coverage, permitted variables, cancellation rules and the capital a company must hold. They do not simply correct a market that already exists in finished form. They help construct it.

A price may reveal a genuine market limit. It may also move that limit. A house remains insured, but a higher premium weakens the mortgage. A policy continues, but with a larger deductible and narrower cover. A decision made within insurance then affects credit, property values and the possibility of remaining in the neighbourhood.

Introduction — The Price Assigned to Us

An insurance price distributes a cost among people whose risks differ. Actuarial pricing seeks to measure these differences so that an insurer can estimate the resources it will need to pay claims. It considers how often claims occur, how much they cost and what the contract covers. It may also vary the deductible, which is the part of a covered loss that remains with the policyholder.

From the first mortality tables to contemporary scores, insurance professionals have learned to distinguish increasingly precise groups. They speak of segmentation, adverse selection,[6] credibility[7] and expected cost [16, 17]. The question is not whether differences should ever matter. It is which differences should change the premium or coverage and which should continue to be carried together.

Composite scene

Vincent had spent seven years in the home insurance pricing team of a large insurer. One Monday morning, he presented the results of a new model. In several municipalities, water-related damage was costing more than expected. The model could now distinguish addresses according to the slope of the land, their proximity to drainage networks, the type of soil and the local history of claims.

The total increase that had to be financed was known. The question was how to distribute it. One option was to raise premiums slightly across the whole portfolio. Another placed most of the increase on the addresses with the highest estimated exposure. A third combined a smaller increase with assistance for installing backflow valves, raising equipment or improving drainage.

Vincent preferred the second option. It seemed more accurate. A European insurance federation had expressed the principle simply. Each policyholder should pay a premium that reflects the risk of loss they bring to the pool [18]. In insurance economics, a premium equal to the average expected cost of the risk is often described as actuarially fair [19].

A colleague asked what the risk belonging to each house meant in this case. Some pipes belonged to the municipality. Planning rules had allowed basements to be built. Some owners could afford protective work and others could not. The increase arose from the same set of losses, but several ways

[6] Adverse selection refers to the tendency of people with greater exposure to buy or retain more coverage when the price does not distinguish risk levels well [16].

[7] In actuarial work, credibility describes how the experience of a particular group is combined with information from a larger population when the group contains too few observations for its own record to be fully reliable [17].

of sharing it remained possible.

The model had measured a difference. It had not decided who should pay for it.

I trained as an actuary and worked in the profession for several years. I know this reasoning from the inside. Part of the job is to identify differences, measure them and calculate the resources an insurer needs to keep its promise. Without that work, prices become arbitrary and the contract may be impossible to finance.

Yet the move from an estimated cost to the price charged is never automatic. An insurer can assign the additional cost to one address, spread it across a wider group, alter the coverage, finance preventive work or withdraw. Calculation informs these choices. It does not make them for us.

A Promise under Strain

Insurance rests on a simple idea. The financial consequences of a fire, illness, death or flood should not fall entirely on the person affected. Contributions are gathered before the event so that the person who suffers the loss can make a claim on collective resources [20, 21].

This promise has never been unconditional. Contracts contain exclusions, limits, deductibles and duties to disclose information. Insurers select risks, investigate claims and sometimes dispute requests for payment. The history of insurance is also a history of conflict over who may enter, which losses deserve cover and what evidence must be produced before payment is made [13, 22].

Policyholders pay before they can fully know the value of the contract. They may never learn how the company would have handled their claim. When a loss occurs, they discover the real reach of the coverage at the moment when they depend on clauses, deadlines, loss adjustment[8] and the insurer's interpretation. Trust is therefore part of the product itself.

Data now allow institutions to distinguish more finely among places, bodies, behaviour, histories and trajectories. People once placed in the same class receive different estimates. Greater precision can correct crude categories and better recognise actions that genuinely reduce risk.

[8] In claims handling, loss adjustment is the technical assessment of the cause and extent of damage and of the cost of repair or replacement. The insurer appoints its own adjuster. A policyholder may also appoint an independent expert, particularly when the assessment is disputed.

It can also reduce the uncertainty that policyholders carry together. Personalised pricing is then presented as a requirement of fairness. Why should a careful driver pay for a dangerous one? Why should a home with lower exposure contribute to the losses of a threatened area? Why should someone who follows preventive advice pay as much as someone who ignores it?

These questions are legitimate. They are not enough to define a just price. A premium that is too low can conceal danger, preserve exposure and weaken the insurer that will later have to pay. A highly precise premium can instead make protection inaccessible to the person who already carries the risk. The disagreement concerns how the burden should be shared. Which differences should alter the price? Which should remain within the pool? What should be offered to someone who is warned about a danger they can neither reduce nor bear alone?

Can We Really Refuse Insurance?

The significance of a price depends on the real freedom to refuse the contract. In some markets, policyholders can compare offers, reduce their coverage or decide not to buy. That freedom is often imperfect, but going without insurance remains possible.

In other situations, insurance controls access to a good or an activity. Motor insurance is required to drive. A lender will usually require insurance before financing a home. Some professions cannot be practised without liability cover. In the United States, health insurance remains closely tied to employment [23].

The contract remains private in form, but its absence can close access to mobility, credit, work, housing or care. Looking elsewhere is not always an answer. Another insurer may not make an offer. The price may exceed the household's resources. A scheme of last resort may provide narrower cover at a higher cost.

The state is never absent from these markets. It requires some forms of insurance, defines benefits and duties, supports credit, organises public schemes and absorbs part of the loss when private arrangements no longer suffice [15, 24]. The more a person depends on insurance to lead an ordinary life, the less formal freedom of contract can justify the price, selection and conditions imposed upon them.

From Contribution to Personal Price

French uses two closely related words. *Prime* suggests the price of a contract. *Cotisation* recalls membership in a fund, mutual or social scheme. English does not preserve the distinction as sharply, but *premium* and *contribution* still direct attention in different ways.

In both cases, the money paid supports a common capacity to meet claims. It must be calculated so that the institution can pay losses, cover operating expenses and retain enough resources for bad years [16]. The two words do not describe entirely separate worlds. They change what comes into view. A premium draws attention to the exchange between a company and a customer. A contribution recalls that many people finance the same promise.

The shift occurs when a common contribution is presented as the exact bill for a profile. Future risk then appears to belong to the person before the event has occurred. Classification no longer serves only to estimate what the group will have to pay. It determines where each part of the cost will be sent.

This changes the meaning of insurance. The institution becomes less concerned with making vulnerability bearable and more concerned with bringing each person closer to the price of their exposure. The solidarity that remains can then appear as a measurement error or an unjustified subsidy rather than a decision about what should continue to be shared [25, 26].

Owning One's Risk

This shift belongs to a broader transformation of responsibility. Institutions increasingly ask people to construct their own trajectories, anticipate difficulty and answer for outcomes whose causes often extend far beyond their choices [27].

Policyholders are asked to preserve their own access to protection. They should choose the right neighbourhood, avoid certain hours, maintain the home, drive according to the model's indicators and provide the data that demonstrate prudence. Prevention can then become a series of individual tests that must be passed in order to remain insurable.

The means to act are very unevenly distributed. Moving, strengthening a house, leaving an exposed occupation, replacing a vehicle, correcting a

file, understanding a model, paying for an expert assessment or renegotiating a loan all require money, time and alternatives. A premium may reflect the calculated risk and still push a household below a minimum level of material security [28].

Collective protection gives substance to autonomy. It allows people without substantial wealth to depend less completely on the next wage, accident or refusal [29, 30]. Returning risk to individuals in the name of freedom can remove the resources that made choice possible.

Composite scene

A local authority, a bank and an insurer use the same flood map. For a house near a river, the model indicates high exposure.

The local authority uses the map to offer assistance with removable flood barriers and raising the boiler. The bank asks for an assessment before approving a loan for the work. The insurer raises the deductible and announces that it will review the policy at the next renewal.

None of the three institutions disputes the map. They do not give it the same role. The local authority uses it to open access to prevention. The bank treats it as a reason for further verification. The insurer uses it to reduce the protection it provides.

The owner therefore receives three different messages from the same estimate. The risk should be reduced. The proposed work must be documented. A larger share of any future loss will remain with the household.

These decisions were not contained in the map. Each institution made them.

What Numbers Do Not Decide

Insurance protects by drawing boundaries. It sets the conditions of entry, the price, the coverage, the duration of the contract and the events that create a right to payment. It allowed some accidents to be treated as risks to be shared rather than as private faults or misfortunes [20, 31].

This book takes price as its starting point in order to examine how contemporary societies distribute protection. Numbers inspire confidence because they appear to stand outside judgement. Yet data never arrive alone in a file. A claim, an exposure, a behaviour, a neighbourhood and an observation period must first be defined [13, 22].

The expression “raw data” is misleading. Data result from choices about what will be observed, retained and made comparable [32]. This does not

make numbers arbitrary. Statistical categories rely on conventions that allow institutions to compare distant situations and coordinate decisions [14, 33].

Calculation does not remove choice. Choice enters the definition of the variable, the collection of information, the construction of the model, the placement of the threshold and the consequence attached to the result. In insurance, that consequence may be a premium, a deductible, a request for protective work, an investigation or a refusal.

Older rating tables already used age, sex, occupation, vehicle use and family status. They confined people within group averages and gave economic force to social categories. Their rules were nevertheless relatively easy to identify. An agent could open a manual, ask a few questions and point to the line that determined the price.

A contemporary score may combine far more attributes, their interactions and their changes over time. It can correct some of the approximations found in older classes. It can also make it harder to know which information mattered, who received comparable treatment and which rule should be challenged [25, 26].

A prediction must therefore be judged by more than its statistical quality. We must also examine the institution's right to use it, the decision it prepares and the route of appeal left to the person [34, 35]. An accurate score does not by itself justify the consequence attached to it.

Another asymmetry runs through this chain. The institution chooses the model, threshold and action. The person receives an increase, investigation or refusal they did not choose. A future loss may be a risk to manage for the actor making the decision and a danger for the person who bears its effects [36]. Analysis must therefore address power as well as accuracy. Who defines the boundary? Who lives with its effects? Who can ask for it to be corrected or redrawn?

Climate as a Test

Climate disruption makes these questions harder to avoid. Past series describe some possible futures less reliably. Losses can become concentrated in the same place and at the same time. Models then acquire greater authority over premiums, coverage conditions and decisions to withdraw.

In the United States, the conflict appears directly between affordable premiums and the continued availability of homeowners insurance in several markets [37]. France and the United Kingdom distribute more of some costs through national arrangements. No architecture removes the danger. Each decides when it enters the household budget and how the collective takes over what a private contract cannot carry alone.

A map may open access to protective work, assistance or a negotiated relocation. It may also announce a higher premium, non-renewal and a decline in the value of a home. Greater precision does not choose between these uses. Institutions decide what follows from the classification.

Climate therefore reveals a tension already present in all insurance. Calculation must make risk visible without serving only to identify the people who will now have to bear it alone. A society must be able to signal genuine exposure, finance its reduction and share the part of the loss that could not reasonably have been avoided.

The Route through the Book

The book focuses mainly on French, American and British systems. It also draws on European comparisons and several regional arrangements in the Caribbean, Africa and the Pacific. It is not a global history of insurance. It compares different ways of turning knowledge of risk into a price, a right, a procedure or a withdrawal.

The first part, **"Insuring, or Carrying the Promise"**, begins with the institutions that organise and own the pool. It then asks what makes cooperation durable. It follows the fragmentation of protection, the transformation of private misfortune into a collective claim and the moment of loss, when the value of the contract depends on evidence, delay and the power of the institution expected to pay.

The second part, **"Pricing, Seeing, Classifying, Judging"**, enters the making of prices. It shows how insurance brings contributions together while distinguishing among policyholders. It examines the blind spots of the portfolio, behavioural data and the conversion of a score into a procedure.

The third part, **"When Protection Withdraws"**, begins when insurance becomes too expensive, offers only reduced coverage or disappears. Climate brings choices about planning, prevention and adaptation into the contract. The final chapters follow people and places made uninsur-

able, collectives that bring separate files together and institutions able to finance prevention over time.

No actor possesses the right answer alone. The whole chain must be followed, from information collected to consequence imposed. At each stage, we must ask who decides, who pays, who can act and who can challenge the result.

Chapter 1 — When Those Who Bear the Risk Govern the Promise

We increasingly buy insurance after completing a form and comparing a few prices on a screen. The transaction appears individual. Yet no contract stands alone. One person's premium joins those paid by many other policyholders and contributes to a common capacity to pay. Behind every quotation lies a collective that the interface does not show.

Composite scene

Martine is looking for home insurance for the flat she has just bought. A comparison site asks for the address, floor area, storey, year of construction, value of the contents and the existence of a cellar or alarm. Some answers seem straightforward. Others do not. Does the study in her daughter's former bedroom count as a main room? Must the cellar where she stores a few boxes be declared separately?

A few seconds after she submits the form, four prices appear. The first policy costs €112 a year. The others cost €168, €247 and €391. All mention fire, escape of water, theft and liability cover, which pays for damage caused to other people. The differences lie in the excess, meaning the part of a covered loss she must pay herself, the maximum payment, the situations excluded and the way property will be valued after a claim.

Martine opens the document attached to the cheapest offer. It runs to about thirty pages. She recognises the main terms, but cannot judge how much each clause matters. Will depreciation[a] reduce the payment substantially? Is the garage covered as an outbuilding? How long will temporary accommodation be paid for?

She returns to the comparison table, looks at the prices, ratings and coloured boxes, then chooses.

She has not ignored the information. She has mainly read what the screen made easy to compare. The price was visible. The collective that would make payment possible was not. Nor could she see who owned the reserves, who would decide how any surplus was used or who might change the rules before the next renewal.

[a] In property insurance, depreciation is the reduction in the value assigned to an item because of its age, use and condition.

Martine has bought a contract from a company. If a fire destroys her home, however, the payment will not come from money kept in her name. It will come from premiums gathered in a portfolio, meaning the set of contracts and risks carried by the insurer. This collective is often called a pool. Those who do not suffer a loss will finance those who do. The

relationship among policyholders remains largely invisible in the way the product is sold [21].

A family can rarely save enough to rebuild a home after a major fire. A large group can gather the necessary resources in advance because not every member will be affected at the same time. When losses remain sufficiently dispersed, their total cost becomes more predictable. This is the role of the law of large numbers. It does not make accidents disappear. It helps estimate what they will cost the group as a whole [16, 17].

The insurer must also pay operating expenses, establish technical provisions,[9] retain capital that can absorb unexpected losses and purchase reinsurance when some claims could be too large to carry alone. Reinsurance is insurance bought by an insurer to share part of those losses with another company. Pooling does not remove the need for calculation or financial caution. It turns a loss that would be difficult for one household to bear into a collective expense that an institution can prepare for.

This operation gives power to whoever organises it. The insurer decides who may enter, which losses will be covered and which differences will alter the price. It also sets the conditions under which the common fund will be opened to a claimant. The issue is not only how money is gathered. It is who governs the promise.

Pooling is not confined to insurance companies. Some Amish communities share major medical expenses and the cost of rebuilding after a fire [38, 39]. In nineteenth-century Britain, friendly societies collected regular contributions and paid benefits during illness or after a death [40]. In southern Africa, burial societies finance funerals and may also organise meals, transport and support for the family [41].

These arrangements differ greatly. They nevertheless rely on the same basic elements. A group prepares resources before the loss, a rule determines when assistance is due and an institution keeps the fund together. Calculation is necessary. It is not enough. Someone must maintain the pool, oversee its use and answer for the decisions made in its name.

[9] Technical provisions are amounts recorded in an insurer's accounts for payments it expects to owe policyholders. A claim reported today may lead to payments over several years.

Who Builds and Owns the Pool?

From Wager to Provision

Insurance history is sometimes told as the almost natural application of probability to an old need for protection. Mathematicians learned to measure uncertainty, then insurers used their formulas. The transformation was less direct.

For a long time, insurance stood close to gambling in legal and moral thought. Putting money on a death, fire or shipwreck could look like a wager. Life insurance became legitimate only after protection for a family had been distinguished from speculation on the life of a stranger. The same financial technique could appear prudent when it secured a household and suspect when it allowed someone to profit from another person's death [42, 43].

Insurance practice also preceded much of its present statistical machinery. Before 1840, French companies were already managing fire and life risks by limiting commitments, accumulating reserves, organising networks of agents and supervising their work [44]. They had neither climate models nor large digital databases. They still understood that a durable promise required selection, retained resources and the ability to survive bad years.

Probability later connected singular cases to collective regularities. It gave financial caution the form of a table, a premium or a provision [45]. It did not create the institution that assembled policyholders. It supplied a language through which that institution could calculate and justify its choices.

Every Insurer Pools, but Not Every Insurer Is a Mutual

Three related ideas must be distinguished. Pooling is the technique of gathering contributions to pay the losses of those who are affected. A company owned by shareholders, a mutual insurer, a public fund or a reinsurance arrangement can all organise a pool.

Mutuality is a form of ownership. In a mutual insurer, policyholders are also members of the organisation. They do not each own a freely tradable share in the manner of shareholders in a listed company. They own the institution collectively.

Mutualism adds a broader political ambition. It seeks to build through association a form of security that neither an ordinary market nor charity

can guarantee on its own. Members need not know one another personally. François Ewald uses the idea of abstract mutualities for collectives connected by rules of contribution and protection rather than by close personal ties [46].

The difference between these forms does not lie in whether a pool exists. Every insurer needs one. It lies in who owns the resources, who appoints the leaders, where any surplus goes and whether policyholders can debate the rules.

Swiss natural hazards insurance shows that a common layer can be organised within a competitive market. Several natural perils are covered on broadly uniform terms. The premium for this part of the contract does not vary with regional exposure. A common mechanism also redistributes part of the claims burden among insurers and purchases reinsurance for the system as a whole [47].

Companies continue to compete over other parts of the contract. The choice is therefore not between a pure market and complete pooling. It concerns which part of the protection will remain common.

The mutualist tradition defended a move from assistance granted by others to a guarantee built among members. It treated mutual aid as a stable form of organisation rather than an exceptional act of kindness [48, 49]. Collective organisation does not remove rules, mandates or funds. It makes the location of power more important. Members must be able to know who decides and whether they can change the institution acting in their name [50].

Collective ownership alone does not guarantee democratic government. A large mutual can become a distant bureaucracy. Meetings may attract few members, information may be difficult to interpret and management may hold most of the practical power. Participation depends on procedures, countervailing powers and decisions over which members have a real influence [51–53].

Albert Hirschman's distinction between exit and voice helps clarify the problem [54]. A dissatisfied customer may sometimes change insurer. A member should also be able to challenge an increase, exclusion or use of resources before leaving becomes the only possible response. Competition offers an exit to people who still have alternatives. It gives much less power to those who have nowhere else to go.

When Membership Becomes a Market Price

French distinguishes between *prime*, which suggests the price of a contract, and *cotisation*, which recalls membership in a fund or scheme. English does not draw the distinction as sharply, but *premium* and *contribution* still direct attention towards different relationships.

A premium invites the policyholder to compare what they pay with the service they expect to receive. A contribution recalls that several people finance an institution before knowing which of them will need the others. Both amounts must be calculated and both finance future payments. The difference lies in what becomes visible when insurance is described only as the purchase of a product.

From Assistance Granted to a Right to Claim

Confraternities, workers' societies, occupational funds and fraternal organisations long provided part of the protection against illness, death and inability to work. They were often fragile, moralising and exclusionary. They nevertheless changed the position of the person receiving support. A member did not merely ask for charity. They could demand the application of a rule they had helped finance.

In the United States, fraternal societies provided protection to working people and immigrant communities that often struggled to obtain it from ordinary institutions [55]. For Black Americans, controlling a fund, bank or insurance company also meant controlling reserves, agents and the authority to recognise a loss in a market where Black policyholders frequently received more expensive or more limited protection [43, 56].

This autonomy had boundaries. A fund distinguished members from nonmembers, regular contributors from those who had fallen behind and accepted conduct from conduct it considered dangerous. In France, public authorities first tolerated, then supervised and eventually incorporated parts of working-class mutual aid into larger institutions [57, 58].

The history does not place pure solidarity from below against cold administration from above. Small associations could exclude and discipline. Larger schemes could broaden rights while moving decisions farther from those who depended on them. In both cases, the pool accumulated more than money. It gathered records, skills, paid positions and the authority to decide which misfortune would create a right to assistance.

Documented case

In the late nineteenth century, large American companies sold small life insurance policies to working families, often to cover funeral expenses. The market was known as industrial life insurance. Agents visited homes each week to collect small payments [43].

This form of collection made protection available to households unable to pay a large amount at once. It was also expensive to administer. A substantial share of premiums financed agents and the management of thousands of small policies. More importantly, continued protection depended on regular payment. A loss of income could cause the policy to lapse[a] after years of contributions.

Scandals in the life insurance industry led New York State to appoint an inquiry in 1905 under Senator William Armstrong. Its report, published the following year, documented concentrated managerial power, conflicts of interest and disputed uses of the funds entrusted to insurance companies. The inquiry led to tighter rules [59, 60].

For insured families, the problem did not consist only of spectacular misconduct. It also arose from the ordinary design of the product. A person could pay for years, lose a job, miss several instalments and discover that the protection intended for their family had disappeared. The contract had made insurance accessible, but its structure placed a large part of the risk on households whose income was already unstable.

[a] A policy lapses when the conditions required to keep it in force, especially payment of the premium, are no longer met.

This example shows why a small periodic payment is not enough to make protection fair. We must also ask what remains after an interruption, how much collection costs, whether cover can be restored and who controls the funds. Access to a contract does not ensure lasting membership in the collective.

The market form can hide this distinction. The policyholder sees a premium and a promised benefit. They see less clearly the rules governing resources between claims. Those rules determine whether a surplus strengthens protection, rewards capital, lowers contributions or finances prevention.

Solidarity, Surplus and Discipline

Who Owns the Surplus?

An insurance year does not end when the last visible claim has been paid. Money must remain available for claims that are still uncertain, files that have not been closed and years in which losses will be higher. After claims, expenses, provisions and reinsurance, however, a surplus may remain.

In a shareholder company, this surplus must be considered in relation to the capital supplied by its owners. It may be distributed to shareholders, retained or invested. In a mutual, policyholders are in principle the organisation's residual beneficiaries. Resources left after its obligations have been met are retained or used on their behalf [61, 62].

Economic theory partly explains the presence of mutuals in insurance through this ownership structure. Policyholders find it difficult to observe the future quality of a contract or monitor how funds are used. Collective ownership can reduce the conflict between customers and outside owners [63, 64]. The solution remains imperfect. Managers may operate far from the members, while members may lack the time or information needed to oversee them.

The use of surplus matters especially when losses are rare but very large. A year without catastrophe can produce a strong result. That does not mean every remaining amount is free to distribute. Part of it supports a promise made for the exceptional year in which a fire, storm or flood affects many policyholders at once [16, 17].

Reserves therefore connect several generations of members. They were built by people who contributed during favourable years. They may be used for people who have not yet joined the institution. Distributing them too quickly can benefit present members while weakening those who remain when losses rise.

The opposite problem also exists. An organisation that accumulates resources without explaining their use becomes more distant from the people who finance it. Governing the surplus requires an account of what is retained for solvency,[10] what stabilises contributions, what improves coverage and what reduces future risk.

[10]Solvency is an insurer's ability to meet its obligations, including when losses exceed ordinary expectations. It depends in part on technical provisions, capital and reinsurance.

Prevention makes the choice concrete. An insurer can wait for a fire and pay for reconstruction. It can also support detection systems, safer materials or work that limits the spread of flames. The immediate expense reduces a future loss that may never be directly observed. The benefit may also pass to another insurer when the member changes provider. These difficulties do not make prevention pointless. They show that it requires a longer horizon than the annual renewal.

A mutual may be better placed to connect this investment to the lasting interests of its members. It is not automatically led to do so. Current members may prefer an immediate reduction in contributions. Managers may favour growth or larger reserves. Collective ownership makes the choice open to discussion. It does not settle it.

Prevention and Control

Every pool must protect its resources. It must verify declarations, limit abuse and prevent conduct that endangers the promise made to other members. Mutuality is not an institution without discipline.

Contracts also change the behaviour they appear merely to cover. An excess may encourage maintenance or discourage the reporting of small losses. An inspection may reveal a hazard and lead to repairs. A prevention rule may reduce risk or become a condition that the policyholder cannot meet. The risk observed after the contract has been introduced already bears its imprint [65].

Fire mutuals linked compensation and prevention early in their history. In the United States, the Factory Mutuals were created by factory owners who believed ordinary insurers did not sufficiently recognise their investment in safety. They combined insurance, technical inspection, engineering and prevention requirements [66–68].

This history shows that classification does not always serve only to increase a price or reject an application. Inspection can identify a weakness, propose a correction and check that the work has been completed. It can also prepare the exclusion of a member considered too costly. The difference lies in the means of action opened by the diagnosis.

Requiring a backflow valve, stronger roof or detection system may be reasonable when the institution explains the hazard, allows time and helps finance the work. The same requirement becomes a form of withdrawal when it imposes unaffordable work without assistance or another route to cover.

Control exercised in the name of a collective is not necessarily gentler than control by a private company. It may be intrusive, moralising or conservative. Its possible advantage lies elsewhere. People subject to the rule may know why it exists, discuss its cost and ask for it to be revised.

The Ambivalence of Mutual Protection

A mutual can defend solidarity among its members while selecting applicants severely. The two positions are not contradictory. Protecting a group always involves drawing a boundary around it. Benefit societies already distinguished admissible misfortune from conduct they considered blameworthy. Alcohol use, irregular payment, mobility or participation in a strike could sometimes end the right to assistance [57, 61].

Mutuality should therefore not be judged against an ideal image of community. It must be examined through its practices. Who may join? Which losses are recognised? How are managers chosen? Who can understand the accounts and challenge a decision?

A large organisation may retain the legal form of a mutual while giving its members little practical influence. Meetings can become ritual events. Documents may provide many figures without revealing the choices that matter. An annual report will usually state premiums, claims and reserves. It is less likely to show which groups faced the largest increases, how many policies were not renewed or what share of resources financed prevention [51, 52].

Challenge should not be reserved for people who still hold a policy. An institution that listens only to current members may treat as reasonable the rules that already pushed others away. Rejected applicants, former members and territories from which cover has retreated provide essential information about the boundary of the collective.

Competition makes this governance more difficult. A mutual that keeps more costly risks may have to raise contributions. Members with better offers elsewhere then leave first. The remaining portfolio becomes more fragile, and later increases accelerate the process. Legal form alone cannot preserve solidarity when competitors can attract the least costly groups [69].

Common rules may be needed to prevent selection from undoing the pool. They can restrict some rating variables, compensate insurers that cover more costly groups or create a common guarantee for the hardest

risks. Swiss natural hazards insurance provides one example. Other arrangements will appear later in the book.

Voice must also come before the decision becomes irreversible. A new map, revised model or revived piece of old information can quickly move a member into a more expensive category. An institution governed by its members should explain the change, provide a transition and allow challenge before departure becomes the only option.

Starting from the Collective

A mutual offers no miraculous solution. Its history includes exclusion, discipline and forms of power that may be difficult to challenge. It nevertheless recalls something that an individual quotation almost entirely hides. A pool is not only a portfolio to balance. It is an institution financed by people who live under its rules and whose future depends on how the promise is governed.

Ownership does not by itself keep this collective alive. Even when policyholders own the organisation, why should those with lower exposure continue to contribute more? Why should they remain when a competitor offers a lower price? How can the pool be protected without turning every claim into suspicion?

These questions no longer concern only ownership. They concern the reasons that allow members to continue acting together. That is the problem of the next chapter.

Chapter 2 — What Makes the Pool Hold Together

An institution can calculate with great precision what each member costs the group and still lose sight of why those with lower exposure would agree to remain with everyone else. Pooling does not depend on uncertainty alone. It also rests on rules that make contributions intelligible, prevent individual departures from dismantling common protection and distribute obligations among policyholders, companies and public authorities.

Composite scene

For years, the people living on a plateau and those living in a valley had been covered by the same mutual insurer. Homes on the plateau rarely flooded. In the valley, water reached basements and ground floors more often. Contributions reflected the difference, but only in part.

No one described the arrangement as a transfer. Each household received its own bill, and some later reported a claim. Then a new map made it possible to estimate exposure almost address by address. A competing insurer offered a substantial reduction to households on the plateau.

Several members asked their mutual to match the price. They did not say that they wanted to abandon the valley. They simply wanted to pay an amount that corresponded more closely to the risk of their own home.

The board divided. Reducing contributions on the plateau could require a steep increase in the valley. Refusing the reduction might cause the least exposed members to leave, forcing those who remained to carry an even larger share of the losses.

One board member asked why the people on the plateau should continue to contribute more. They might face a different risk tomorrow, another member replied. The two territories shared roads, public services and the same river, said a second. A third asked what would happen to homes in the valley if insurance withdrew. A final member argued that none of these reasons entitled the mutual to preserve a transfer that no one had clearly discussed.

The map had made the difference visible. It had not chosen the common rule.

The previous chapter examined who owns the pool and who has the power to allocate its resources. That question remains important, but it is not enough. Even in a mutual owned by its members, each person may prefer an immediate reduction to a solidarity whose benefits remain uncertain. An institution does not endure simply because its members

own it. It must give them reasons to keep financing a promise that may mainly benefit other people.

Uncertainty provides one reason. People contribute because they do not yet know whether they will experience a fire, illness, accident or flood. This solidarity through chance makes pooling easier. It becomes less obvious when data distinguish exposures more closely and some policyholders know that they are likely to remain less costly than others [70, 71].

Altruism provides another answer. Less exposed members may support more vulnerable people because they care about them. Generosity exists, especially after disasters. It is not enough to finance an institution year after year. Policyholders do not know most of the people whose claims their contributions will pay. They must be able to support common protection without feeling personal concern for every beneficiary.

Anonymous blood and organ donation show that an institution can organise a relationship among strangers. Donors do not necessarily choose the recipients. Rules collect, check and distribute the resource [72, 73]. Insurance is not a gift, because a contribution creates a possible right. Yet the arrangements share an important property. The person who suffers the loss does not have to persuade each contributor separately that they deserve help.

Sociologists speak of *generalised exchange* when assistance does not return directly from the person who received it. One person contributes for another, who may later contribute for a third. Reciprocity passes through the group rather than taking place face to face between two individuals [74]. The pool turns this chain into lasting rights and obligations. It holds when members understand their contribution as financing common protection rather than as money taken from them for the benefit of strangers.

Solidarity without Heroism

Cooperation means producing together a form of security that no participant could obtain alone [53, 75]. Few households can keep enough savings to rebuild a home, replace income for a long period or pay for very costly care. A pool gives them access to a collective capacity to pay.

This interdependence does not remove conflict. Someone who has never made a claim may regret the contribution after the fact. Someone

who knows that their exposure is low may look for a cheaper contract. A claimant wants prompt payment, while the institution must retain enough resources for future demands. A common interest does not make every position identical.

Cooperation does not require all members to bear the same cost. It requires differences to be governed by a rule that could still be defended if each person's position changed. Someone may live on the plateau today, be in good health or hold a stable job. Tomorrow they may move, become ill or lose protection tied to employment. A rule appears less just when it convinces only those who already know that it places them on the favourable side.

The legal philosopher Ronald Dworkin asked us to imagine the insurance people would choose before knowing their health, disability or future ability to earn an income. This hypothetical insurance market does not describe an actual market. It asks what protection people might reasonably choose before knowing whether they would belong to a costly group [76, 77].

The thought experiment does not automatically turn protection into a premium. Nor does it replace rights. A society may have to guarantee care, a minimum income or continuity of housing even when it cannot prove that every citizen would have bought such cover. The experiment nevertheless rules out an overly simple objection. Durable solidarity does not require every contributor to expect to receive more than they pay. It can rest on a rule that each person would have had reason to accept before knowing their own trajectory.

Cooperation also needs recognised positions. A person becomes a policyholder, member, contributor, claimant or creditor because an institution attaches rights and duties to that status [78, 79]. They no longer ask strangers for relief. They demand performance of a promise financed in advance.

This common status can remain abstract. Members need not share an occupation, religion or neighbourhood. They must still be able to understand the principles of sharing. Which differences alter the contribution? Which remain pooled? How are very large risks financed? What limits an abrupt reclassification?

Understanding these principles does not require public disclosure of diagnoses, incomes or addresses. Transparency should concern the rules and their collective effects. An institution can show what share of contributions pays claims, operating expenses and reinsurance, which groups

face the largest increases, how many contracts are not renewed and how much is invested in prevention. It can make sharing visible without presenting every beneficiary as personally indebted to the rest of the pool. Participation then depends less on an abstract appeal to commitment than on the ability to understand a decision and exercise real influence over it [51].

Documented case

In 1882, the 102 farms of Canillo, in Andorra, created a mutual fire insurer called *La Crema*. The roads through this mountainous region made outside firefighting assistance difficult. The organisation had to coordinate fire protection and compensate members whose buildings were destroyed [80].

The members met each year in an assembly. Each declared the value of the home, barn, stable and other buildings they wanted to protect. These amounts were recorded in several registers. When a fire occurred, compensation could not exceed the declared value. The other members financed the payment after the loss, each contributing in proportion to the value they had declared for their own property.

The rule was easy to understand. Declaring a higher value increased the possible compensation, but it also increased the amount owed when a neighbour suffered a fire. Elected commissioners assessed the damage, monitored building maintenance and managed firefighting equipment. The common council then approved the payment.

La Crema was not free of conflict or strategic calculation. Members could be tempted to overstate or understate the value of their property. Its longevity nevertheless shows what a visible rule can make possible when it is connected to an assembly, local knowledge of the buildings and reciprocal obligations. The contribution did not arrive as a price produced at a distance. Members could relate it to another member's loss and to a procedure known by the group [80].

A small collective such as *La Crema* makes relationships easier to see. It is not a model that can simply be transferred to millions of policyholders. Proximity helps members know the buildings and monitor conduct. It can also intensify social surveillance, exclusion and pressure on those who depart from the group's norms. A larger pool spreads losses more widely and reduces some of the transactions needed to share them. It also makes it harder to connect contributions to beneficiaries [81–83].

Insurance must therefore connect several scales. Diagnosis, some prevention work and part of the deliberation can remain close to the people concerned. Capital, reinsurance and protection against catastrophe of-

ten require a much larger population. *Subsidiarity* refers to this search for the appropriate level of decision. It does not mean abandoning each group to its own resources. It places a decision where it can be understood and challenged, then distributes losses at a level broad enough to carry them.

Cooperation Must Be Protected

A willingness to cooperate does not survive on its own. It depends on what each person expects others to do and on whether the institution can prevent some actors from benefiting from the pool during favourable years, then leaving as soon as their contribution rises [84].

A member pays today because they expect the promise still to be financed when they need it. This confidence rests on observable practices. Are recognised claims paid without unjustified delay? Do managers explain how resources are used? Is proven fraud addressed without turning every claim into suspicion? Are rules changed with enough notice and a clear explanation?

Control can protect the common fund. Verifying a declaration, requesting evidence or sanctioning demonstrated fraud prevents a person from receiving money to which they are not entitled. Sanction can also reassure members who are willing to contribute because they believe that the same obligations apply to others [85].

This discipline loses its justification when it falls only on the least powerful member. The policyholder is responsible for accurate declarations and for prevention measures genuinely within reach. The insurer is responsible for continuity of cover, solvency and fair claims handling. The owner, municipality, developer and network operator must answer for decisions that create or maintain exposure. An institution destroys the trust it claims to protect when it monitors small individual actions precisely while allowing powerful actors to shift their costs into the pool.

Competition makes this protection more difficult. An insurer can attract less costly people with a lower premium. The institution left with more high risks must then increase its prices, which encourages further departures. This mechanism is called *adverse selection* when those who remain, or buy more cover, are on average more exposed than those who leave [86, 87].

Compulsory insurance can limit this flight by keeping a broad popula-

tion in the same system. It is not enough when companies still gain from selecting the least costly members. Transfers among insurers can then direct resources towards organisations that cover more high-risk people. This mechanism, usually called *risk adjustment* or *risk equalisation*, aims to make firms compete over service, expenses and the quality of prevention rather than over their ability to avoid costly members [86, 88, 89]. European social health insurance systems have developed several forms of solidarity and equalisation to preserve a common arrangement despite the presence of several funds or insurers [90].

No equalisation mechanism removes every difference. A model can underestimate some needs and leave insurers with an incentive to discourage people for whom compensation is inadequate. It can also become so complex that only a small group of specialists understands its effects. The principle remains important. Freedom to choose a provider does not imply freedom to dismantle all solidarity. Several providers can operate within common rules that remove at least part of the gain from selection.

Stability also requires time. Members may contribute for years without receiving a payment. Reserves were built by contributors who have since left the group. Prevention work will benefit future residents and policyholders. The pool therefore connects several generations of members. A decision confined to the current accounting year may distribute accumulated resources too quickly or reject an investment whose benefits will appear later.

Price Changes the Relationship

A premium, discount or excess does more than alter the policyholder's budget. It also gives meaning to their relationship with the group. Incentives send messages as well as changing economic choices [91].

A discount after preventive work may recognise a genuine contribution to common security. It may encourage the installation of a backflow valve, reinforcement of a roof or safer driving. It may also suggest that each person alone owns the benefits of their prudence and that any remaining vulnerability should be borne as a personal fault.

Conversely, a contribution that never recognises effort may discourage people who have paid for useful work. Cooperation does not require institutions to ignore conduct. It requires them to distinguish an accessible action that genuinely reduces risk from a social constraint merely

recorded as individual behaviour. Effort can be recognised without treating the observed outcome as a complete measure of merit.

Personalisation also changes how policyholders imagine the other members. Someone whom the model labels a good risk may feel wronged whenever they pay more than their expected cost. Someone who receives an increase may be presented as the beneficiary of a favour granted by everyone else. Relations of solidarity then become hidden subsidies that ought to be removed [25, 26].

This reading forgets that insurance exists precisely to separate the present contribution from the future loss. People pay before knowing who will need the resources. The contract creates a right without requiring the claimant to obtain the personal approval of every contributor. It protects the claimant from dependence on charity.

The institution can still reintroduce a test of merit through exclusions, controls and conditions of cover. The policyholder must prove that they belong to the accepted category, declared the risk correctly and followed the expected conduct. Such checks are sometimes necessary. They cease to serve the promise when every vulnerability becomes grounds for suspicion or every difficulty in preventing loss is treated as fault.

A captive population requires stronger rights. When insurance is necessary to drive, borrow, work or obtain care, a formal choice among several contracts is not enough. Continuity of cover, justification of the price, minimum quality of protection and a practical route of appeal become central duties of the institution.

When Leaving Becomes Rational

The board of the plateau and valley mutual could not avoid the conflict simply by asking the model for a more accurate price. Every household on the plateau had an understandable reason to accept the cheaper offer. If they all did so, however, the valley would lose part of the contributions that still made insurance possible there.

An appeal to generosity would not solve the problem. The mutual could make the transfer explicit, limit the speed of increases, reserve a common part of the premium for the largest losses and use another part to signal differences in exposure. It could also finance work in the valley so that solidarity did not merely preserve the same danger indefinitely. Each

solution would create new disagreements about the amount, duration and beneficiaries of the effort.

The decisive point was not to let a series of individual departures silently produce the collective rule. Competition can improve service and contain expenses. It weakens pooling when it chiefly rewards the ability to attract the least costly members [88]. The common rule must organise freedom of choice without allowing one person's exit to remove another person's access to essential protection.

When such a rule is missing, a society may have many insurers and many contracts while leaving a growing share of loss with households. Protection then depends on employment, income, provider networks, legal status and the ability to absorb an excess. The next chapter examines this fragmentation through the American system.

Chapter 3 — The Fragmented Promise: A Warning from the United States

A society may insure a large share of its population while leaving much of the loss with the people affected. The United States[11] provides an especially clear example. Insurance organises a large part of health care, housing, motor protection and retirement. It is also closely tied to employment. This extensive presence guarantees neither adequate coverage nor straightforward access to payment. Protection depends on the contract a person holds, the network it opens, their employment status and their ability to pay what insurance leaves behind [23, 92, 93].

Composite scene

Marcus worked in a logistics warehouse outside Atlanta, Georgia. He prepared orders, moved pallets and scanned parcels. His annual pay was about $40,000, with some overtime when activity increased. His health insurance came with the job.

He had chosen the least expensive individual plan offered by his employer. The amount deducted from his pay already seemed high. He had paid less attention to the annual deductible, which exceeded $2,500, the provider network attached to the plan and the copayments required for some services.[a]

In the spring, chest pain sent him to the emergency department. The tests ruled out the heart attack he feared. After several hours, he returned home with a prescription and a recommendation for follow-up care. He was relieved. He was also insured and expected most of the cost to be covered.

The bills arrived separately. The hospital sent one, the laboratory another and the imaging department a third. The insurer had negotiated some of the charges and paid part of the care. The rest counted towards the deductible or required a copayment. Marcus still owed more than $1,400, a substantial share of his monthly income.

The insurer had not denied the claim. It had applied the contract. Marcus was covered, but only part of the financial loss had been transferred. His insurance card showed that he had coverage. It did not show what he would have to pay when he needed care [94, 95].

[a] In American health insurance, the *deductible* is the cumulative annual amount the patient pays before much of the coverage begins. A *provider network* is the group of professionals and hospitals covered on negotiated terms. A *copayment* is a fixed

[11] In this chapter, *American* refers to the United States. For convenience, the chapter sometimes speaks of an American market in the singular. Insurance is largely regulated by individual states, each with its own rules and supervisory authorities. Federal laws, public programmes and large national companies connect these markets without making them identical.

amount charged for a covered service.

The scene is composite, but the mechanism is ordinary. A person may pay a premium every month without receiving complete protection. A high deductible, a percentage of the bill, an out-of-network provider or a prior authorisation requirement can leave the patient with a large expense or delay care. The contract exists, but it divides the loss among several actors and several administrative stages.

Fragmentation does not mean that insurance pays nothing. It means that no institution necessarily takes responsibility for the whole problem. The insurer pays part of the bill. The employer finances part of the premium. The patient pays the remainder. A public programme may intervene according to age, income or health. Each institution applies its own rule and leaves the rest outside its perimeter.

Insured, Yet Still Exposed

American health care shows that holding a contract is not the same as receiving effective protection. Illness comes with an additional administrative risk. The care must fall under the correct plan, provider network, billing code and period of coverage. The patient must understand what is required while often facing dependence, pain or urgency.

This architecture has a long history. Proposals for national health insurance were blocked or redesigned by professional, industrial and political coalitions [96]. American medicine gradually developed around hospitals, medical professions, employers, private insurers and separate public programmes [97]. Much social protection therefore takes the form of private benefits supported through the tax system and governed by law [23].

The system is not an insurance desert. It produces an abundance of administration. Employers select plans. Insurers build networks. Administrators check authorisations. Providers send separate bills. Patients receive statements distinguishing the amount charged, the negotiated amount, the insurer's payment and the balance they owe [94].

These procedures serve a purpose. They verify eligibility, limit improper payments and apply the benefits set out in the contract. They can also discourage legitimate claims through repeated forms, delays and appeals. Administrative cost is not measured only by the number of employees or documents. It includes the time, uncertainty and abandonment imposed on people seeking a benefit [98, 99].

The boundary of coverage can move throughout the process. A person is insured, but the doctor is outside the network. The treatment is covered, but only after approval. The claim is eligible, but the deductible has not been reached. The decision can be appealed, but the patient must know the procedure and have enough time to follow it.

This problem should not be reduced to a simple opposition between an insurer and a patient. Medical care must be financed. No contract can promise to pay every bill without rules or review. The difficulty begins when complexity makes the scope of protection impossible to know in advance and leaves the person who needs care to reconstruct the chain of responsibility alone.

Protection Tied to Status

In the United States, protection often follows the position a person occupies. Stable employment may provide access to health insurance subsidised by an employer. Losing a job, having working hours reduced or becoming self-employed can change income and coverage at the same time. The labour market therefore distributes wages and degrees of security [23, 95].

Public programmes reduce part of this dependence. Medicare mainly covers older people and some people with disabilities. Medicaid is jointly financed by the federal government and the states and covers some people with low incomes under rules that vary across states.[12] Other arrangements subsidise the purchase of insurance or organise regulated marketplaces. American protection is therefore assembled from public rights, employment benefits and private contracts.

This combination can protect some people effectively. It also creates breaks in continuity. Moving to another state, changing employer, experiencing a change in income or altering family status can change the available plan. Protection does not always follow the person as continuously as illness or the need for care. Commercial health plans also experience substantial turnover among their members, which makes investments with benefits appearing several years later more difficult [100].

Jacob Hacker describes this development as a transfer of risk towards households. Illness, interrupted employment and uncertainty in retire-

[12] *Medicare* is a federal programme that mainly covers people aged sixty-five or older and some people with disabilities. *Medicaid* is financed jointly by the federal government and the states. It covers eligible people with low incomes under rules that differ from one state to another.

ment do not become more individual when protection is reduced. Their cost is simply shifted to family budgets that are less able to absorb it [92, 95].

The state does not disappear. It defines tax advantages, contract rules, eligibility conditions, appeals and the mechanisms that intervene when a company cannot pay. Private markets operate within a legal architecture that already distributes risk [15, 24]. Speaking only of individual choice assigns to the person a situation produced by several institutions.

Fragmentation also creates a particular morality. Protection appears to depend on choosing the right job, contract and level of cover. A difficulty can then be presented as the consequence of a personal decision even when the available choices were narrow and their effects difficult to foresee [93, 101].

What the Law Refuses to Turn into Price

The Affordable Care Act, usually called the ACA, limited some forms of selection in health insurance. A *pre-existing condition* is an illness, diagnosis or health condition already present before coverage begins. For plans subject to the reform, an insurer cannot refuse a person or increase the premium because they previously received a diagnosis of diabetes, asthma or cancer. Pregnancy cannot be used to deny coverage or impose a health-related increase [102, 103].

Rating criteria are also restricted in the individual and small-employer markets. Age, tobacco use, family composition and place of residence may affect premiums within limits set by law. Health status, medical history, sex and occupation cannot be converted directly into differences in price [104].

The law does not claim that these characteristics are unrelated to future spending. It decides that predictive value is not sufficient permission for use. Information may be statistically relevant and still be removed from pricing because using it would make access to care depend too directly on illness itself.

Genetic information shows that this boundary varies across forms of insurance. Federal law restricts its use in health insurance and employment. It does not impose the same federal prohibition on life, disability or long-term care insurance [105]. The same information may therefore be inadmissible in one contract and available in another.

Prohibiting a variable does not remove the expected cost. The cost still has to be distributed. A wider group of policyholders may carry part of it. A risk-adjustment mechanism may transfer resources towards insurers that cover more costly populations. A public subsidy may reduce the premium paid by the household. The legal rule moves the question away from the precision of the individual price and towards the organisation of sharing [86, 103].

This decision is essential. Without it, the person with the greatest need for protection becomes the person the market has the strongest reason to avoid. Illness raises expected spending. If every known difference must be charged immediately, the premium rises at the very moment when the ability to pay may fall.

When the Claim Arrives

Fragmentation does not end when the contract is purchased. It returns when the policyholder asks the promise to be honoured. A single hospital stay may involve the hospital, doctor, laboratory, insurer, employer and sometimes a public programme. Each actor classifies a different part of the expense.

Prior authorisation is approval required from the insurer before some care, tests, medicines or treatments are provided.[13] It may prevent an unnecessary intervention or direct the patient towards a less expensive treatment. It can also turn access to care into a procedure. The decision then arrives before the bill, when the insurer decides whether it will finance the service.

Chapter 5 examines this asymmetry more closely at the moment of loss. The policyholder becomes the creditor of a promise, while the company retains much of the power to classify the request, demand evidence and set the timetable. In the American system, the number of intermediaries and the separation of bills intensify this difficulty.

Justice does not require every request to be paid. It requires the rule to be understandable and a refusal to be challengeable before delay makes care, housing or income inaccessible. An appeal that exists only on paper offers little protection to someone who does not know the precise reason for the decision or the documents needed to contest it [98, 99].

[13] *Prior authorisation* is approval required by the insurer before certain care, examinations, medicines or treatments are provided. Without it, coverage may be denied even when the service appears among the benefits described by the plan.

When the Private Promise Returns to the Collective

A private contract gives the impression that one company alone carries the promise made to its policyholders. That image disappears when several insurers become insolvent after the same catastrophe. Guarantee mechanisms, law, surviving insurers and sometimes taxpayers must then assume part of the commitments.

Documented case

On 29 August 2021, Hurricane Ida reached Louisiana. Wind, rain and flooding caused extensive damage to homes. Policyholders submitted claims to companies that had sometimes already been weakened by previous storms.

In the months that followed, seven property insurers operating in the state became insolvent. They no longer had the resources required to meet all their obligations. The Louisiana Insurance Guaranty Association had to assume part of the claims left by the failed companies.

In 2022, the association sought to borrow $600 million to settle about 24,000 claims without making households wait for several years. The loan was to be repaid through assessments imposed on insurers still operating in the state. Tax credits then allowed those companies to recover part of the amounts they had contributed [106].

The loss had begun in private homes. It had been submitted to private insurers. After their failure, it moved through an association created by law, surviving companies, credit and public finances. The contracts remained individual in form. Their continuity depended on a collective arrangement established in advance.

A guaranty association does not replace an insurer in ordinary circumstances. It intervenes when the company can no longer honour its promise and assumes covered obligations within limits fixed by law.[14] Its existence shows that solvency is not purely a private matter.

The state also acts before failure. It requires reserves and capital, supervises companies, sets some terms of coverage and may organise an insurer-of-last-resort scheme. These interventions do not abolish the market. They make possible a promise that no company could guarantee alone against every accumulation of loss [24].

The Louisiana case does not mean that every increase or withdrawal is

[14] A *guaranty association* or guarantee fund assumes some obligations of an insolvent insurer within limits set by law. It is generally financed through contributions required from other insurers operating in the market.

unjustified. An insurer that does not finance catastrophe risk adequately promises protection it will be unable to provide. Preventing all adjustments without addressing claims costs may weaken the supply of insurance. Affordability must therefore be connected to prevention, capital, reinsurance and an explicit allocation of losses.

Need as a Basis for Selection

In insurance understood as protection, need is a reason to enter the collective. In a highly segmented market, it can become a reason for exclusion. The sick person, exposed home or frequent driver is first described through the cost they may impose.

This tension does not arise from simple malice. An insurer that accumulates costly commitments without adequate premiums, capital or reinsurance threatens everyone to whom it has promised payment. A regulator that prevents every price change may accelerate company withdrawal. Poorly targeted public assistance may preserve dangerous exposure or provide the largest subsidy to the wealthiest property owners.

The conflict begins when these constraints are presented as a complete answer. Expected cost does not decide who should bear it. It does not determine the minimum protection that should remain accessible, the differences that may enter the price or the obligations that should fall on employers, insurers and public authorities.

The United States did not wait for contemporary algorithms to fragment protection. Models can nevertheless accelerate reclassification. A person who appeared to belong to the ordinary market can move into another category after a diagnosis, a change in status or a new estimate. Protection becomes a succession of contracts, each of which reassesses whether the person still belongs.

Withdrawal does not always take the form of a refusal. The premium may exceed the household's resources. The deductible may absorb its savings. An appeal may succeed only after the patient has abandoned the treatment. A residual market may maintain a policy while offering narrower protection.[15] The promise then shrinks in stages without any institution announcing that it has disappeared.

[15] A *residual market*, or insurer-of-last-resort scheme, offers coverage to people or property that cannot obtain it from ordinary insurers. Coverage may be narrower and the price higher.

Holding an insurance policy[16] is therefore not enough to turn a loss into a claim that can genuinely be enforced. Coverage must remain accessible, the amount left to pay must be bearable and an institution must be able to assume the commitment when the private contract fails. The next chapter returns to the historical moment when some forms of misfortune ceased to be treated as family matters and became collective claims.

[16] An *insurance policy* is the contractual document describing the coverage, exclusions and obligations of the insurer and policyholder.

Chapter 4 — The Insurance Promise, from Private Misfortune to a Collective Claim

Social insurance did not prevail because societies finally discovered the right formula. It changed the status of certain losses. An accident, illness or loss of income could still strike a particular person without falling entirely on that person and their family. This shift required contributions, categories, procedures and an institution able to recognise the loss. Above all, it turned a request for assistance into a right to claim [20, 107].

Composite scene

Jules is twenty-four in 1897. He has worked since the age of fourteen in the workshops of a shipyard in Nantes. He knows how to file, drill and fit metal parts. He also knows the belts that slip, the machines restarted too quickly and the tasks performed because the foreman is waiting.

His wage supports his wife and their young child. Another child is due in the spring. One November morning, a transmission jams and production slows. Jules approaches with another worker. His sleeve is caught in the mechanism. A few seconds are enough to break his arm.

The injury immediately brings another ordeal. Who was at fault? Should the employer have made the machine safer? Should the foreman have stopped the work? Should Jules have refused to intervene? Everyone knows the habits of the workshop, but those habits are difficult to turn into evidence before a judge.

The employer speaks of carelessness. The family speaks of a task that Jules could hardly refuse. While responsibility is debated, the wage disappears. His wife borrows money, postpones the rent and asks for relief. The accident arose within the organisation of work. Its cost still falls on the household as a private misfortune.

The French law of 9 April 1898 on workplace accidents changed this situation without removing every conflict. It allowed an injured employee to receive compensation without having to prove a specific fault by the employer. The accident became an occupational risk, meaning a loss connected to productive activity and financed through rules prepared before it occurred [20, 31].

This change involved more than paying a sum of money. It determined whom the worker should approach, which facts had to be established, how long the worker might wait and which resources would finance payment. The injured person no longer depended only on a judge identifying a wrongdoer or a benefactor agreeing to help. The worker could assert

a claim, a recognised right to require a payment or service under an established rule.[17]

Insurance acquired political force through this change. It no longer treated the accident only as an encounter between a careless individual and a dangerous machine. It connected the injury to an activity that regularly produced harm and therefore had to bear part of its cost. This socialisation protected workers. It also gave institutions the power to define recognised accidents, covered people, benefit levels and required evidence [57, 107].

Fault, Relief, Rights

Fault remains an essential response to harm. A person who injures another through negligence should be held responsible. The principle becomes harder to apply when loss results from an entire organisation. In a workshop, machinery, pace, fatigue, incomplete training and fear of losing one's job may all contribute to the accident. No single action then captures its full cause.

Fate offers another interpretation. Fire, illness or early death can be received as misfortunes of the world. This view may inspire compassion, but it does not identify who must pay.

Charity responds by providing money, food, shelter or care. It may save a family. It nevertheless preserves dependence on the person who gives. Assistance remains revocable, and the recipient must often show that they deserve it.

Mutual aid and benefit societies began to change this relationship. Members contributed before knowing which of them would become ill, injured or unable to earn. The recipient was no longer only the object of generosity. They belonged to the group that had prepared the assistance. These organisations could be disciplinary and sometimes excluded people who did not meet their standards. Even so, they turned a favour into a reciprocal obligation [48, 49, 57].

The language of risk adds another operation. Accidents must be brought together, their frequency estimated and resources collected before they occur. Attention moves from the singular case to a series.

[17] In this chapter, a *claim* means a recognised entitlement to require a payment or service from a person or institution. In insurance, the word also commonly refers to the request submitted after a loss.

This shift does not remove morality. Risk also identifies people who supposedly should have anticipated, avoided or protected themselves. A person is judged not only on what they did, but also on their presumed ability to foresee and manage the future [108, 109].

Insurance therefore did not carry society from a moral world into a purely technical one. It reorganised responsibility. It distinguished accident from fraud, covered loss from negligence and reasonable prevention from impossible obligation. Contemporary models continue this history when they turn an address, behaviour or past event into evidence of prudence. Their novelty lies less in judgement itself than in the volume of traces that can now give judgement an impersonal appearance.

Bringing Accidents into a Series

An accident remains a singular experience for the person who suffers it. Insurance places it beside other accidents to estimate a frequency and a cost. During the nineteenth century, expanding statistics on births, deaths, crime, illness and injury revealed regularities that individual stories could not show as clearly [110].

Putting events into a series opened rights. When accidents cluster in particular occupations, places or groups, it becomes harder to attribute them only to the carelessness of their victims. Statistics can show that working and living conditions produce recurring losses. They also give administrations and insurers the means to classify situations, set benefit schedules and process many cases under a common rule [14, 33].

The categories are not labels attached to a world already arranged. Someone must define what counts as an accident, select an observation period, identify a population and decide which cases can be compared. The resulting frequency depends on the offices that receive declarations, the forms people complete and the rules that make two events comparable. Risk is therefore also a way of processing situations. It gathers cases and relates them to a population [46].

This construction does not make loss imaginary. Jules's broken arm remains real. It requires us to separate two questions. The first concerns measurement. How many accidents occur and how much do they cost? The second concerns use. Which activity should finance the loss, who may claim and what share will remain with the household? Statistics can inform these choices. They cannot settle them alone.

An average may protect and discipline at the same time. It makes collective exposure visible, then sometimes becomes a norm that every file is expected to fit. A person who falls awkwardly within the category may have to provide more evidence. Quantification removes part of the decision from personal judgement, but it can move arbitrariness into the definition of categories, thresholds and exceptions [14, 33].

The Workplace Accident Changes Status

The workplace accident was one of the first major sites of this transformation. The question was no longer only who had acted wrongly. It became what an industrial society owed to those injured by its industry.

Germany introduced compulsory workplace accident insurance in 1884. The United Kingdom adopted legislation in 1897 and France followed in 1898. Ontario created its system in 1914. In the United States, reform proceeded state by state during the early twentieth century [111–114].

These systems were not identical. Some relied on private insurers, others on funds or public administrations. Courts, employers and worker representatives were given different roles. All responded to the same difficulty. Requiring an employee to reconstruct a precise fault left many injuries uncompensated. The cost of industrial activity then fell on the families least able to absorb it [107, 114].

Recognising occupational risk made this cost more predictable for employers. It also pacified part of the conflict by replacing some litigation with schedules and procedures. That pacification was not neutral. A struggle over employer responsibility could become a technical debate about contribution rates or degrees of disability. Social insurance protected workers while administering their injuries [20, 57].

The reform also recalled that labour cannot be separated from the person who performs it. Karl Polanyi described labour as a fictitious commodity because it is not produced for sale like an ordinary object. It is carried by human beings whose lives do not stop when employment becomes dangerous [115]. Treating workplace injury as a cost of production makes the company and the wider collective bear part of the harm created by the activity.

This reasoning extends beyond the nineteenth-century factory. Roads produce collisions. Planning decisions concentrate some flood losses. Digital systems can spread the same failure across many organisations.

Individuals experience the damage, but its conditions were often created long before the event. The same difficulty returns whenever causation is dispersed and an institution must decide who will bear the uncertainty.

Documented case

In the spring of 2020, workers' compensation systems encountered a difficulty that older factory machinery had made less visible. A nurse, firefighter or other essential worker could contract Covid-19 after many possible exposures. It was often impossible to establish exactly when and where infection had occurred.

Requiring precise proof could preserve a right in theory while making it almost impossible to use. Several American states therefore created a presumption of occupational origin for certain groups. A presumption is a legal rule that treats a fact as established unless sufficient contrary evidence is produced.[a]

The rule did not state that every infection had been contracted at work. It changed the burden of proof. The employee no longer had to reconstruct an invisible transmission. The employer or insurer could still dispute the occupational connection, but had to provide evidence for doing so.

This shift immediately raised another question. How many workers would be covered and what would the cost be for compensation systems? The debates of 2020 returned to the conflict of the late nineteenth century. When individual causation cannot be proved with certainty, should the uncertainty remain with the person who became ill or be carried by the activity that exposed them more heavily? [116, 117]

[a] In law, a *presumption* allows one fact to be treated as established on the basis of another known fact. Some presumptions can be rebutted when the opposing party provides sufficient evidence.

From Assistance to a Claim

Social insurance changes the position of the recipient. Under charity, the person asks for assistance that depends on discretion. Under a right, the person can invoke a rule against the institution. The patient, injured worker, unemployed person or pensioner becomes entitled to a benefit defined in advance. Solidarity no longer depends only on the emotion inspired by an individual story [118, 119].

This claim gives autonomy a material basis. Income replacement, a pension or payment for care can prevent an accident from leading immediately to loss of housing, dependence on relatives or lasting exclusion from work. Robert Castel used the expression *social property* for pro-

tections that give people without substantial assets some of the security once reserved for property owners [29, 30].

Protection does not connect an isolated individual directly to the state. Mutuals, occupational funds, unions, employers, municipalities and insurers stand between them. European health insurance systems developed partly from occupational funds and associations before public authorities supported, required or consolidated them [90]. In the United States, employment based benefits provided important protection while giving large firms a central role in access to social rights [120].

Socialising a risk therefore does not necessarily mean assigning all protection to a central administration. It means building a chain of obligations strong enough to prevent loss from falling directly on the household. Every intermediary may protect while also creating dependence. The continuing questions are who governs the institution, who is represented and who remains outside its reach.

The payments that finance this chain do not organise the same relationship. A private premium buys a contractual promise and reflects expected losses, expenses, resources for bad years and sometimes profit. A social contribution finances a common scheme and may depend more on income than on individual expected cost. Taxation supports a political obligation without requiring a direct correspondence between what each person pays and receives.

These forms mix in practice. Private insurance depends on public rules. A social scheme uses actuarial calculations. A state guarantee may support reinsurance, and a mutual may operate much like a large company. The distinction still matters. The same payment may purchase a contract, open a right or mark membership in an institution. Reducing all three relationships to the question of individual cost would erase what they organise in common.

Law Protects and Filters

Turning relief into a right does not guarantee that everyone will receive the benefit. A person must enter the correct scheme, report the event, provide the expected documents and have the case recognised under the relevant definition. Administration protects and filters in the same movement. The claimant no longer depends on the compassion of a benefactor, but does depend on a qualification.

Qualification may be simple when the accident is visible and the rule clear. It becomes harder when several causes combine, symptoms emerge gradually or the person does not understand the procedure. A right can then exist without being practically accessible. Learning the process, waiting for a decision and pursuing an appeal require time, money and sometimes specialist help. People with the fewest resources are also most likely to abandon the process before receiving what they are owed [30, 118].

The insurance market itself depends on legal rules. Bernard Harcourt reminds us that a market never exists before the institutions that define contracts, participants and sanctions [15]. In insurance, law determines who may sell a policy, which information may be used, how a contract may be cancelled and which appeals are available. Prudential rules also require insurers to retain enough resources to meet future commitments.

The state is not external to insurance history. Insurers helped build instruments of credit, information and finance that public authorities also used. Hannah Farber shows how marine insurers contributed to the financial architecture of the early United States [121]. Law makes contracts enforceable. Insurance techniques, in turn, allow companies and governments to undertake commitments in the face of uncertainty.

This organisation retains an ambiguity. Insurance moves away from fault by recognising that loss may arise from collective exposure. It can bring fault back through prevention requirements. Making a machine safer, maintaining a building or financing early care can genuinely reduce danger. Prevention becomes punitive when a person must prove, alone, a degree of prudence that their income, work or housing does not allow. An obligation that is reasonable for a large company may be impossible for a household or insecure worker [108, 109].

The passage from private misfortune to a collective claim is therefore never completed by legislation or by signing a contract. The claim must still be recognised in an individual file. The policyholder contributed before the loss. After the accident, they depend on the institution that verifies coverage, assesses damage and decides when payment will be made. The next chapter examines this unusual relationship in which the claimant is legally a creditor but rarely controls the procedure that gives the claim practical value.

Chapter 5 — Trusting the One Who Will Pay

Insurance is a service paid for before its quality can be tested. Policyholders hope never to need the promised payment. When a loss occurs, they discover the contract at the very moment when they can no longer replace it for the event already under way. Trust is therefore not an extra feature of insurance. It is part of what the policyholder buys [21, 122].

Composite scene

The fire had started in the electrical panel behind a piece of furniture in the entrance hall. Firefighters prevented the flames from reaching the upper floor, but smoke travelled through the house. The walls were blackened. Water used to extinguish the fire had run into the basement.

For three weeks, Nora had been staying with her sister with her son. The insurer had made an advance payment for the first expenses, then asked her to keep every receipt. A loss adjuster had photographed the rooms, measured moisture and listed damaged appliances. Another professional still had to decide which pieces of furniture could be cleaned and which had to be replaced.

Nora had sent the fire service report, photographs taken on the night of the loss, the electrician's quotation and a list of damaged belongings. She now had to find the receipts. When had she bought the family computer? What was the dining table worth? Was her son's coat three years old or four?

A new email asked when the electrical panel had been installed and what work the former owner had carried out. It also reminded her not to throw anything away without authorisation.

Meanwhile, the bank continued to collect the mortgage payment.

Nora remembered the price of her insurance, the deductible and a guarantee that would replace some belongings without deducting all the value lost through age and use. She had not realised that the procedure would require so much time and so many documents. Before the fire, she could change insurer. After the fire, she depended on the one she had chosen.

A Promise That Cannot Be Tested

When a bank grants a loan, it gives the borrower money immediately and organises repayment later. Insurance reverses this movement. The policyholder pays premiums for months or years. They become the cred-

itor of a payment only if an event covered by the contract occurs and the claim is accepted.

This position does not give them the ordinary power of a creditor. The insurer checks whether the policy applies, requests documents, assesses the damage and applies exclusions, limits, the deductible or excess and deductions for wear. It decides when the file is complete enough for payment. The policyholder financed the promise, but the company retains much of the power to decide whether its conditions have been met.

This power cannot simply be removed. Claim payments come from resources collected from many policyholders. Paying without checking would weaken the common fund and pass the cost of abuse to the other members of the pool [21, 122]. The problem begins when review no longer serves mainly to establish entitlement, but becomes a way to reduce, delay or discourage payment.

Most products can be inspected before purchase or returned soon afterwards. A home can be visited, a car tested and a faulty device taken back. Insurance resists this ordinary test. Policyholders can compare prices, advertised cover and the availability of customer service. They cannot test in advance how a fire, disability or hospital admission will be handled.

They therefore rely on indirect signs. The name of the company, the presence of an agent, the experience of a relative and the observation of a real payment become evidence of quality. In microinsurance, which offers low value policies to people with limited resources, trust in the provider and payments observed within the community strongly influence demand [123–125]. A contract may be correctly priced and still attract little interest when people doubt that it will pay.

Trust concerns three promises. The insurer must have enough resources to meet its commitments. The contract must define cover that will not be interpreted opportunistically after loss. The procedure must allow the policyholder to understand the decision, receive an advance when entitlement appears established and challenge the outcome before waiting has exhausted their resources.

Solvency rules mainly protect the first promise. Contract law frames the second. The third is less visible in financial accounts, although it determines the practical experience of protection.

The Los Angeles fires made this distinction particularly clear. Some houses had not burned, but residents reported ash, soot, persistent

odours and possible contamination. Before estimating compensation, someone had to decide whether these effects counted as covered physical damage. In 2025, a California judge found that the wording used by the California FAIR Plan for smoke damage provided less protection than state law required. The insurance department then opened proceedings concerning the presentation of cover, the quality of investigations and the reasons given for refusals [126, 127].

An assessment does not always measure a loss whose status has already been settled. It also helps determine whether the damage falls within the contract. The adjuster examines its cause, extent and the cost of repair or replacement. An insurer's adjuster is appointed by the company. The policyholder may hire their own expert to defend another valuation and, where necessary, take part in an assessment in which the two positions can be compared.

The Loss Must Become a File

A standard contract makes it possible to manage thousands of comparable risks, but leaves little room for individual negotiation. A household chooses among several packages. It does not rewrite the definition of fire, the conditions for temporary accommodation or the evidence that will be required. Information provided before purchase remains useful, but it cannot reveal which clause will become decisive several years later.

The experienced loss must then be translated into the language of the contract. A fire becomes a cause, date, inventory and amount. A theft becomes a police report, a list of property and supporting documents. An illness becomes a diagnosis, code and request for authorisation. These documents allow the institution to process claims under common rules. They can also move the procedure away from what the person actually experienced [122, 128].

Documented case

One day, my family and I went for lunch in a small restaurant near Montparnasse station in Paris. We had a train to catch early that afternoon. The dining room was crowded, so I left my travel bag in the entrance hall. Soon after we sat down, the waiter warned me not to leave anything unattended. When I returned to the entrance, the bag had disappeared.

It contained some clothes and books. I called my insurer to ask whether one of my policies covered the theft. I was asked for a police report. I had

not filed one. For a limited loss, I did not want to spend part of the day at a police station. I only wanted to know whether the property could be compensated.

Without a police report, the claim could not proceed. My account first had to be given to another institution, dated and turned into an official document before it could enter the insurance procedure.

The police report would not have proved that the theft occurred. It would have certified that I had formally reported it. The insurer therefore required more than a plausible account. It required a statement already recorded by an institution authorised to receive it.

The requirement may be reasonable. It dates the declaration, engages the responsibility of the person making it and limits some opportunistic claims. It also shows that entitlement depends on a documentary chain. The loss must become an event that the administration can recognise before it can be paid.

Insurance therefore rests on trust organised through suspicion. The insurer knows that a declaration may include an omission, exaggeration or fraud. The policyholder knows that the company understands the contract better and has an interest in controlling payments. Adjusters, investigators, external data and detection tools organise this mutual mistrust [122].

Investigation protects the common fund when it examines a real inconsistency and distinguishes error from fraud. It weakens the promise when every claim is treated as evidence of bad faith. The claimant must then prove not only the loss, but also that they deserve to be believed.

Claims handling always contains judgement. After Hurricane Andrew, adjusters had considerable discretion over the order of payments, the evidence accepted, deductions for wear, the duration of temporary accommodation and the choice between repair and replacement [129]. The same study found differences in the speed of payment between white and Hispanic policyholders, without reducing every difference to individual intent.

The lesson concerns procedure. Apparently minor decisions accumulate. Manner of speaking, knowledge of the policy, access to an intermediary, neighbourhood and ability to insist may affect the timing and amount of settlement. Price is not the only place where insurance distributes protection unequally [129, 130].

Time Does Not Cost the Same

For the insurer, a pending claim belongs to a collection of files. It must be registered, completed, assessed and closed. The company allocates claims among its teams and seeks a balance between speed, review and administrative cost.

For the policyholder, the same delay may mean an uninhabitable home, a vehicle needed for work, an interrupted business or postponed care. Waiting consumes savings and gradually reduces the ability to argue. A further request for evidence may be justified. It may also postpone payment at the moment when the person is least able to bear the delay.

Advances and partial payments reduce this imbalance. They do not remove the need to verify the final amount. They prevent material urgency from settling the dispute before the procedure has done so. Someone who can no longer finance accommodation, a lawyer or an expert will more readily accept a low but immediate payment.

The insurer is a repeat participant. It handles thousands of claims and has lawyers, adjusters, medical advisers and comparable files. The policyholder may be experiencing a first fire or disability. They must learn the vocabulary and the route of appeal while dealing with the loss. The contrast between an organisation familiar with the procedure and a person entering it only once creates a structural advantage [131].

Help from a lawyer, association, ombudsman or policyholder's expert may rebalance the relationship. Access still depends on the amount at stake and the person's resources. A promise that becomes genuinely defensible only after another professional intervenes remains unevenly accessible.

A procedure may also reduce compensation without producing an explicit refusal. Some policyholders give up because they cannot find a receipt, do not understand a request or believe that an appeal will cost more than the disputed amount. Others accept an inadequate offer because they cannot wait any longer. Statistics record payments and refusals more easily than abandoned claims, requests never made and agreements accepted through exhaustion [128].

An absence of complaints does not prove that the procedure works. It may show that challenge appears too costly or too late.

When Everyone Claims at Once

A catastrophe magnifies each of these difficulties. Thousands of households seek an adjuster, temporary accommodation, a contractor and an advance at the same time. Communications are disrupted, reconstruction prices rise and supporting documents may have disappeared with the property. Insurance plays an important role in the speed and quality of recovery, but that role depends on the content of cover and the ability to release funds quickly [132–134].

The procedure then demands precisely what the catastrophe may have made harder. People must prepare an inventory, recover dates, answer emails and meet deadlines. After the Camp Fire in California, an ethnographic study recorded the local expression *fire brain*. It described the forgetfulness and difficulty concentrating that followed the fire [135]. A study of people exposed to the disaster also found greater difficulty in a task that required them to ignore distracting information [136].

The insurer has prepared procedures, standard letters and teams that can be reinforced. The household must rebuild both its claim file and the ordinary conditions of daily life. Adapting evidence requirements to the circumstances does not mean abandoning review. It prevents the effects of the loss from becoming another cause of abandonment.

Catastrophe also increases the power to set priorities. Which homes will be inspected first? Which missing documents will be tolerated? How long will temporary accommodation continue? Which estimate will be accepted when materials and labour have become more expensive? Imperfect information and unequal bargaining power justify supervision that extends beyond the insurer's solvency [134].

Payments are then compared among neighbours. Delays and reasons for refusal circulate. An institution can gain trust by making advances, explaining its rules and adapting its demands. It can lose trust for years when it responds to a collective disaster with a procedure designed for isolated claims [132, 133].

Trust Is Judged in Practice

Insurance companies often speak of trust, proximity and solidarity. These words reveal little about how a claim will be handled. Policyholders judge the institution through the decisions they observe. A prompt payment may strengthen the credibility of the promise beyond the person who

receives it. A poorly explained refusal or repeated delay can have the opposite effect [123, 125].

Solvency shows that the insurer can pay. Claims practice shows how it chooses to pay. A reliable company is therefore not identified only by the number of closed files or its average processing time. An ordinary policyholder must be able to understand the decision made on their claim.

Indicators can help. Delays by type of claim, further requests for evidence, appeal rates and final payments make some practices visible. A general average may still conceal the people who wait longest, the places where refusals are concentrated or the forms of cover that generate the most disputes. Numbers create trust at a distance only when their construction and limits can be examined [14].

Trust therefore requires countervailing powers. It becomes reasonable when betrayal is difficult and challenge remains practical.

Making Challenge Practical

When the principle of cover appears established, an advance should prevent material urgency from giving the insurer a decisive advantage. After catastrophe, realistic deadlines, simpler forms and the ability to correct an inventory serve the same purpose.

A reduction or refusal should identify the clause applied, the facts accepted, the missing documents and the available route of appeal. The words “incomplete file” do not provide a reason when the policyholder does not know what is missing or why it is needed.

Access to the file is equally important. Expert reports, photographs, valuations and communications used in reaching the decision should not remain only with the organisation that decides. Without access to the evidence, an appeal requires the person to argue without knowing what must be challenged.

Expert assessment must be open to discussion without its cost reserving that possibility for the largest disputes. Ombudsmen, consumer organisations, legal assistance and some forms of shared expertise can turn an isolated confrontation into a more balanced procedure.

Public supervision should examine claims practices as well as accounts. Aggregated data on delays, further requests, deductions for wear, refusals and appeal outcomes would help identify where the promise narrows through procedure [130]. The insurer should also answer for the

adjusters, repair firms, medical advisers and platforms to which it delegates part of the process.

These safeguards do not assume that the policyholder is always right. They recognise that, at the moment of loss, the two parties are not in an ordinary bargaining situation. One controls a repeated procedure. The other depends on a promise purchased before its quality could be tested.

The next chapter moves upstream from claims handling. Before deciding how a loss will be paid, the insurer has already chosen whom it will bring together, which differences it will measure and which it will turn into price.

Chapter 6 — Pooling, Segmenting

A premium distributes expected claims costs among the members of a portfolio. It does more than add up expenses. It decides which differences will alter the price and which will continue to be borne together.

Documented case

In the 1950s, North American motor insurance still relied on categories that an agent could name one by one. The rating table distinguished how a vehicle was used, the distance between home and work, the place of a young driver within the household and marital status. For a time, it even mattered whether a driver under twenty-five had legal custody of a child. Farmers and members of the clergy could receive special treatment [137].

The table changed through successive experiments. In 1955, insurers created a class for some cars driven by a woman under twenty-five. At about the same time, parenthood ceased to be used and recognised driver training could improve the rate. Roughly a year later, the special category for young women was itself removed [137]. Classification advanced by adding visible boxes, then taking some of them away.

In the 1970s, the scale changed. The insurer no longer classified only the driver or household. It also classified the place where they lived. In Chicago in 1976, State Farm used ZIP codes to draw the boundaries of two motor insurance rating territories. The address linked each driver to the average experience of a neighbourhood without observing how that person drove [138].

This territorial approach fed the controversy over insurance redlining. An administrative boundary could change the price or access to insurance while the driver and vehicle remained the same. Place of residence condensed differences in traffic, theft and claims costs. It also carried the history of housing, segregation and underinvestment. Classification became more geographically precise, but less transparent about what the address truly represented.

A further step came in the 1990s with credit-based insurance scores. Fair Isaac marketed a score for homeowners insurance in 1993, then one for motor insurance in 1995. Insurers could combine numerous items from credit records to estimate the future frequency or cost of claims [139].

The policyholder was no longer placed in a class through an identifiable question about age or marital status. They received a number derived from their financial history. Late payments, debt, the age of credit accounts and recent applications for credit could affect the price of motor insurance without describing how the person drove.

These scores separated some risks more effectively, but moved classification into another area of life. Illness, separation or loss of employment

could damage a credit record and then raise an insurance premium. The controversy therefore concerned more than the score's ability to predict claims. It concerned the right to turn financial hardship into an insurance characteristic [139, 140].

Within a few decades, the table had moved from explicit family categories to territory and then to a composite score. Each stage promised better knowledge of risk. It also widened the area of life in which insurers sought reasons to differentiate prices. Progress in classification did not consist only in measuring more precisely. It also meant deciding that new parts of life should now count.

A predictive variable does not become a pricing rule by itself. Between data and premium, an institution chooses what it wants to predict, which people it regards as comparable and what consequence will follow from the observed difference [33, 141]. Technique can improve measurement. It does not decide what should be paid separately.

Why Classify?

An insurer cannot ask exactly the same contribution for every contract. Buildings do not have the same value, policies do not cover the same losses and uses differ. Even a highly pooled price must distinguish at least the amount insured and the extent of coverage.

Classification also addresses a problem of stability. Suppose the same policy is offered at the same price to people who know more about their own exposure than the insurer does. Those expecting high costs have a stronger reason to buy or keep the policy. Those who believe they are less exposed may seek a cheaper offer or leave the portfolio. This mechanism is known as adverse selection. It can lead to higher premiums, followed by more departures, until the coverage becomes difficult to maintain [142, 143].

Segmentation attempts to bring the contribution of each class closer to the cost it brings to the portfolio. It can preserve a promise that would become unstable if prices remained too far from expected losses. Solvency is part of insurance justice. An affordable contract offers no protection if the insurer cannot pay when a claim occurs.

This argument deserves to be taken seriously. A uniform premium is not fair by definition. It may require a household with fewer resources to finance a large and highly exposed property. It may ask someone who drives very little to contribute as much as someone who travels long

distances every day. A price difference can also recognise equipment or maintenance that genuinely reduces risk [144, 145].

Segmentation may also replace a crude category with information closer to the exposure. Mileage can replace sex. The condition of a building can replace the reputation of a neighbourhood. Completed work can replace a territorial average. Personalisation then carries an emancipatory promise. It may release a person from a stereotype by relying on information closer to their actual situation [141, 146].

These arguments do not lead to a single correct price. Even when some distinctions are necessary, decisions remain about how far to go, which variables to retain, which differences to neutralise and how much equalisation to preserve. Classic work on insurance classification already separated predictive value, causation, the person's control over the risk, economic necessity and social acceptability [147, 148].

A difference in claims experience[18] does not settle those questions. A classification may be useful without being reliable enough to justify a large increase. It may predict correctly while relying on something the person cannot change. It may protect a portfolio while closing access to a necessary good such as housing, credit or care.

Classification must also be distinguished from correlated losses. An insurer can differentiate very precisely among houses whose fires would still occur separately. A storm or flood may instead strike thousands of policies at once even when each one has been correctly priced. In the first case, the issue is how costs are distributed among policyholders. In the second, it is whether the portfolio, its reinsurance and sometimes the state can absorb a common shock [16, 149].

A material limit of insurance should therefore not be confused with a decision to return a difference to the person who carries it. The first depends on the size and concentration of losses. The second depends on the pricing rule.

A Probability for One Person

Insurance estimates risk by observing groups. It does not know which driver will have an accident or which house will burn during the year. It

[18] *Claims experience* refers to the frequency and cost of claims observed within a portfolio or category of policies.

can estimate how many claims are likely to occur in a sufficiently large population. Actuarial certainty is collective before it is individual.

Saying that a policyholder has a risk of 2 per cent does not mean that a small part of the accident will happen to them. The event will occur or it will not. The number means that the model places this file near other situations in which roughly two policies out of one hundred produced the event being studied. Even when presented as individual, risk is built from the experience of other people.

Every probability applied to a single case therefore assumes a reference class. Should a driver be compared with everyone of the same age, people who own the same vehicle, live in the same area, travel the same distance or have the same history? Each additional item changes the relevant group and may change the estimate. There is no unique class waiting for the data to reveal it [150, 151].

Contemporary models make these comparisons less visible. They do not necessarily place policyholders in a small number of explicit boxes. They construct similarities from many variables. Yet when a profile becomes highly specific, the insurer does not possess a long series of observations about that person. The model must still borrow information from cases treated as comparable.

Actuarial practice calls this credibility.[19] Dividing a portfolio into more homogeneous groups may improve the accuracy of a price. Each division also reduces the number of observations in the group. Beyond a certain point, the class becomes too small to support a stable estimate. Pricing must then combine the experience of that class with information from a wider population [152, 153].

Personalisation therefore contains a tension. Moving the price closer to a particular situation requires more distinctions. Estimating risk with enough stability requires many observations to be brought together. The more a model claims to treat one person as a class of their own, the more it depends on information borrowed from others.

Calibration checks one part of this reasoning. When a model assigns a risk of 2 per cent to a large set of policies, about 2 per cent of them should produce the relevant claim [154]. This property does not show that the probability was true for each person. It shows that groups receiving similar predictions experience the event at roughly the predicted rate.

[19] *Actuarial credibility* measures how much confidence can be placed in the experience of a particular group or policyholder. When observations are scarce, that experience is combined with evidence from a wider group so that an accidental result does not determine the price on its own.

A score does not uncover a risk that was waiting inside the individual. It offers a conditional estimate based on a population, a period, an objective and a set of similarities. The estimate may be useful. It must remain open to revision and should not be confused with certainty about a person's future.

This limitation clarifies the promise of individualisation. The group does not disappear. It moves into the training data, the variables and the way the model defines proximity. The price appears to belong to one person. The knowledge supporting it remains collective [70, 146].

The Table Does Not Discover Its Categories Alone

Many factors may be associated with a loss. Statistics do not require the insurer to retain sex rather than mileage, occupation rather than working hours, or address rather than the condition of a building. The choice depends on what the company can measure, what its systems can store, what the law permits and what the public accepts as a basis for price.

Sex long had several practical advantages for insurers. It was inexpensive, stable, easy to verify and available in long historical series. It divided the population into groups large enough to retain a statistical basis while appearing to bring the price closer to each person [141].

A variable already embedded in forms then accumulates the data that confirm its usefulness. The pricing category becomes a reporting category and later a historical series. That history becomes a reason to keep the distinction. The insurer can present itself as merely observing a difference in its portfolio even though the portfolio was selected and priced through the same categories whose effects it now records [56, 141].

The form does not always reveal all the information used. A vehicle registration number can identify the model, engine, power, weight and other technical features. A few characters entered by the applicant can therefore enrich the file considerably [155, 156]. The information visible during a quotation does not necessarily show which variables truly determined the price.

Removing an explicit category does not mean that identity has ceased to matter. Address, schedules, travel, purchases and digital habits may reconstruct socially significant characteristics. A prohibited or abandoned variable can return through a set of proxies. A proxy is an observable

item used to approximate something that is not measured directly. Removing sex from a file does not ensure that a model will stop reproducing its effects from other information [157, 158].

This problem requires two uses to be distinguished. A characteristic may be inappropriate for setting a price and still be needed to test whether the model systematically disadvantages a group. Refusing to use a characteristic in pricing does not require institutions to stop measuring the effects that it helps reveal.

Documented case

In 2016, the British insurer Admiral announced a product for young drivers with no previous insurance record. The product, called *firstcarquote*, was intended to analyse part of their Facebook activity with their consent. The stated aim was to identify personality traits associated with careful driving and offer a discount of up to 15 per cent [159].

The proposed algorithm was not limited to photographs of cars or accounts of dangerous driving. It was meant to interpret writing style and the organisation of daily life. Short sentences, lists and precisely arranged meetings could be treated as signs of conscientiousness. Ordinary posts became answers to a pricing questionnaire that the applicant had never explicitly completed.

The system was not ultimately used as planned. Shortly before its launch, Facebook concluded that using its data to determine eligibility or the financial terms of a service breached the platform's rules. Admiral had to offer a reduced version in which the Facebook account was used only for login and identity checks [160].

The episode matters precisely because the variable did not reach the price. The data existed. The insurer claimed that they contained predictive information and some customers might have accepted their use in return for a discount. Another institution nevertheless decided that personal posts should not be converted into an insurance price.

The possible correlation had not vanished. Its use had been blocked. Rules, power and judgements about legitimate institutional conduct always stand between available information and a pricing category.

From the Cost of Risk to the Price Charged

In its strict sense, actuarial fairness requires differences in premium to reflect differences in the future costs attributed to policies. The technical

premium[20] estimates expected claims and the expenses involved in managing them. It also takes account of the resources needed for the insurer to keep its promise. Professional doctrine distinguishes this estimate from the commercial and legal choices entering the final price [152].

The move from estimated cost to the price charged is not new. Insurers round rating factors, smooth changes, offer temporary discounts and observe competitors' prices. The final amount may also reflect acquisition expenses, growth targets and the desire to retain particular customers.

Modern optimisation makes this process more systematic. Demand models estimate the probability that a customer will accept a quotation, renew a policy or move to a competitor. The insurer can then select a price in pursuit of profit, volume or retention targets [161, 162].

One form of this practice is known as *price walking*. The price rises over successive renewals for customers thought unlikely to compare offers or leave. Not every renewal increase follows this logic. Claims costs, exposure and coverage may genuinely have changed. Price walking means a gradual increase relative to expected cost based on the customer's low probability of departure.

The justification has then changed. Two people with similar risks and costs may pay different prices because one appears less likely to reject the offer. The distinction no longer concerns the insured risk. It concerns the customer's position in the negotiation.

Low price sensitivity may reflect trust in the company or a desire for stability. It may also result from the cost of searching, limited digital confidence, fear of interrupted cover or the absence of an alternative. What looks like a high willingness to pay may therefore reveal a weak ability to leave.

This difference explains the regulatory controversy. In the United States, several authorities challenged the use of elasticity or willingness to pay when it differentiates between policyholders with comparable risk profiles for reasons unrelated to expected losses and expenses [163]. The customer sees only one amount. They may believe that every difference says something about their risk even when part of the price says what the company thinks it can obtain from them.

Solvency and profitability must therefore be separated. Solvency concerns the capacity to meet commitments, including during a bad year.

[20] The *technical premium* is the estimated amount needed to finance expected claims and the expenses directly linked to coverage. The amount paid by the policyholder may also include other expenses, taxes and commercial adjustments.

Profitability concerns the return earned by those who supplied capital or could invest it elsewhere. A portfolio may be financeable without offering the desired return. An activity that has been profitable for years may still be too fragile to withstand a catastrophe.

An insurer's withdrawal does not always mean that a contract is technically impossible to maintain. It may mean that the capital appears more rewarding in another activity or territory. Confusing the two ideas presents a required return as a purely actuarial limit. Chapter 1 showed that ownership changes where surplus goes without removing the financial constraints on the institution.

Three Uses of Price

A price increase can perform at least three different functions. It can distribute a cost, signal danger or close access to the contract. These functions often appear in the same amount, but they should not be confused.

First, price distributes expected expenses. A class with more frequent or more costly claims contributes more. This may protect the balance of the portfolio and reduce the risk that lower-cost policyholders will gradually leave.

Second, price can act as a signal. A higher premium can reveal exposure and encourage work, a change in use or a reduction in coverage. This function is credible only when the person understands what changed and has an accessible response. A warning that a roof needs strengthening does not have the same effect when grants, credit and contractors are available as when the household must bear an unaffordable cost alone [7, 8].

Third, price becomes a boundary when it makes coverage impossible or empties the guarantee of value. A high deductible can leave the policy in force while returning most of the loss to the policyholder. A premium may accurately reflect expected cost and still close access to a mortgage or home. Consistency in calculation does not resolve the social problem created by the result [28].

These three uses clarify the idea of cross-subsidy. In insurance, the term describes a transfer through which some policyholders pay more than their expected cost so that others can pay less. It often sounds like an

anomaly that finer segmentation should remove. Yet these transfers are not all just and not all unjust.

A uniform premium may protect a household with limited resources or subsidise an expensive property. An artificially low price may also hide danger and encourage more construction in an exposed area. The judgement depends on who benefits, the good being protected, the visibility of the transfer and the prevention measures accompanying it [164, 165].

Defensible pooling does not require every price to remain identical. It decides which differences will remain shared and which will alter contributions. It can cap an increase, retain broad classes, reserve information for prevention or organise equalisation among territories and insurers. Knowledge may become more individual without all of its consequences doing the same [166].

The motor insurance bonus-malus system provides an example of reclassification that is often easier to accept. It is a renewal rule under which claim-free experience gradually lowers a coefficient, while an at-fault claim raises it for later years [167, 168].

Individual history contains information that was unavailable when the policy began. It does not establish merit on its own. An absence of accidents may reflect care, low mileage or luck. An at-fault accident does not necessarily reveal a lasting tendency to drive badly. A higher future premium can also encourage someone not to report a small claim when the expected increase exceeds the likely payment.

The rule remains relatively intelligible. It is announced, its effect can be traced on the renewal notice and the coefficient changes over time [169]. This visibility does not make the system perfect. It at least allows the policyholder to understand why the price changed and how a more favourable position may be regained.

Insuring against Reclassification

Insurance protects against an uncertain event. It can also protect against the possibility of becoming a more expensive risk in the future. A healthy person may receive a diagnosis. A house may enter a newly designated flood zone. An occupation may be reclassified and old information may acquire new force when a model changes.

This possibility distinguishes insurance from a simple annual purchase. The customer does not seek only the lowest price for the risk already

known. They also seek continuity when their position changes. Extensive personalisation may reduce the price today while weakening protection against tomorrow's reclassification.

Chapter 2 presented the idea of insurance chosen before people know their future position. It invites us to ask which differences they would accept as grounds for pricing before knowing whether they themselves would stand on the favourable side of the classification. The argument does not require identical premiums. It prevents those whom the table currently favours from writing the rules alone [76, 77].

New information does not have to become a price immediately. Law can prohibit some uses, cap differences, maintain a right to be forgotten or require continuity of cover. An institution can provide a transition when a map or model changes. Continued pooling then rests not on ignorance, but on an explicit decision.

The freedom not to be confined by a group average remains important. A regularity that is true for a population does not necessarily describe each member. In the *Ten Oever* case, Advocate General Van Gerven observed that women's longer average life expectancy could not determine the life expectancy of one particular person. Turning a group average into an individual destiny creates injustice through generalisation [170, 171].

Escaping a category nevertheless has its own cost. Every insurance estimate applies information derived from other people to one person. Finer segmentation may release the individual from a stereotype while reducing the group that carries their loss. A broad class can protect and constrain. A fine classification can recognise a difference and undo solidarity [172].

The issue is therefore not a choice between the category and the individual. It is which generalisations are acceptable, what consequences they may carry and how a person can challenge their classification.

Actuarial Fairness Is Not Enough

Actuarial fairness has strong moral appeal. It says that each person should contribute according to the cost they bring to the portfolio. A careful driver should not finance a dangerous one without limit. A home with little exposure should not indefinitely bear the cost of one in a fire zone.

The concept serves a precise professional purpose. It prevents a class from paying a price durably unrelated to the future costs attributed to

it [152]. It is not a complete theory of justice. It does not determine whether the variable is legitimate, whether the person could change the exposure, whether the policy protects an essential need or whether the price remains affordable [173, 174].

The difficulty also lies in the possessive. Speaking of a person's risk suggests that they fully own the exposure assigned by the model. An address condenses infrastructure, planning decisions and a housing market. Driving reflects working hours, distance and the availability of public transport. Health carries the effects of work, housing, environment and access to care [175, 176].

A variable described as behavioural does not escape this problem. Delaying a medical consultation may result from neglect. It may also reflect fear of the bill, an inability to take time off work or the absence of an accessible professional. Driving at night may be a leisure choice or part of a hospital job. Producing an unfavourable trace does not show that a reasonable alternative was available.

Behavioural data may describe exposure more closely without describing responsibility more closely. Chapter 8 will examine this conversion of observed behaviour into apparent merit in more detail.

Information itself does not necessarily reduce loss. It may only reveal who carries it. Information can have private value for the actor able to select and negative social value when it destroys the conditions of sharing without reducing the total number of claims [177]. A test, map or score then allows those regarded as favourable risks to demand a lower price, while those remaining in the pool must bear a growing share of the cost.

Personalisation is especially attractive because most people hope to be recognised as good risks. In classic studies, a large majority of drivers judged themselves safer or more skilful than the median driver [178]. Comparative optimism also leads people to view unfavourable events as less likely for themselves than for similar others [179]. Many imagine that the model will reveal that they have been paying for everyone else. Fewer begin by imagining that it may identify them as the expensive risk.

Insurance does not rely on pure ignorance. It organises a compromise among what is known, what can be prevented and what people still agree to share. Common uncertainty is itself a resource. It allows contributions to be gathered before the positions of the fortunate and unfortunate have been finally assigned [70].

A premium does not remove politics from calculation. It gives politics

an amount. Classification determines which differences become differences in price. Segmentation decides how far members remain connected despite them. Greater precision can correct a stereotype, recognise an effort and protect solvency. It can also turn vulnerability into a bill, information into a boundary and a collective into a collection of profiles.

The next chapter begins from the other side of classification. The insurer sees a portfolio shaped by its own acceptances, refusals and prices. The policyholder sees a personal history, practical constraints and an event that has not yet occurred. The two views do not contain the same information and do not have the same power to impose their account of risk.

Chapter 7 — What Each Side Cannot See

Risk does not look the same to a policyholder and an insurer. The policyholder encounters it through a personal history, practical constraints and the possible consequences of loss. The insurer estimates it from a portfolio shaped by accepted contracts, prices, refusals and departures. Neither view is complete.

Composite scene

For twenty-seven years, Marianne has lived about a hundred metres from a river. She has known warnings, closed roads and a damp cellar, but never a serious flood. When her premium rises sharply, she opens the shutters and looks at the garden. Nothing seems to have changed. The river still runs behind the trees. The new map appears to exaggerate a danger she has never experienced directly.

At the insurer's head office, an analyst studies the same area on a screen. He sees coloured plots, insured values, claim dates and estimates of frequency. The company's records cover thirty years and thousands of contracts. They point to growing flood exposure.

The history is still incomplete. It excludes houses the company declined to insure and owners who walked away when they saw the price. It also misses repairs made without a claim, sales completed before the next flood and households that never managed to enter the portfolio. The insurer observes a population already shaped by its underwriting rules and by policyholders' decisions.

Marianne relies on her own experience, that of her neighbours and the apparent stability of the landscape. The insurer has a broader but selected history. Neither sees the whole risk.

Their errors do not have the same consequences. Marianne may underestimate her exposure and remain insufficiently protected. The insurer's assessment may change premiums, access to credit and eventually the future of the neighbourhood.

The psychology of risk has studied the limits of individual judgement in great detail. A blind spot appears when bias is attributed only to policyholders, as though the organisation classifying them observed the world without its own selection effects, routines or constraints.

The Event That Never Happens

A house that has not burned for thirty years seems to offer daily proof of its safety. Someone who has never been seriously ill may postpone buying protection. An old warning loses force as time passes. An abstract danger struggles to compete with present expenses.

Optimism bias, present bias, the illusion of control and the availability heuristic name some of these regularities. A recent or spectacular event appears more likely. A catastrophe never experienced remains remote. After a flood, demand for insurance may rise, then decline as the memory fades [123, 179].

These mechanisms do not produce one universal response. An extreme event changes resources, emotions, beliefs, networks of assistance and relations with institutions at the same time. It may increase caution, strengthen some forms of solidarity or create the feeling that no protection can be trusted [123].

The absence of insurance does not necessarily reveal a poor understanding of probability. It may reflect an unaffordable price, a contract that is difficult to understand, uncertain payment or greater trust in relatives and neighbours than in a company. It may also come from a forced choice between an immediate premium and needs that cannot wait.

The explanation matters because it shapes the response. Describing a household as irrational leads to better information, simpler messages or stronger warnings. Recognising that the contract itself may appear risky requires attention to its price, quality, provider, payment timetable and claims process.

When Insurance Itself Appears Risky

Microinsurance makes this problem especially visible. Microinsurance refers to policies designed for households with low incomes, usually with small premiums and limited benefits. It may cover health, crops, death or catastrophe. The apparent simplicity of the product does not remove the difficulty of paying the premium, understanding the terms or trusting the provider.

Households that face illness, crop failure or natural disaster should, according to standard models, place a high value on protection. Yet many do not buy the products offered [180, 181].

An explanation based on bias is tempting. Households may misunderstand probabilities, underestimate catastrophe or give too much weight to current spending. These factors matter, but they do not exhaust the decision. Price, limited cash, contractual complexity and the timing of premium payments also play an important role [182–184].

For a poor household, insurance can itself look uncertain. The premium immediately reduces scarce resources. The benefit depends on a future event and then on an institution that must recognise the loss and apply the contract. The household is not only judging the probability of damage. It is also judging whether the promise will respond to what happens.

Index insurance shows the problem clearly. Payment depends on a measure fixed in advance, such as rainfall at a weather station or the average crop yield in an area. A farmer can suffer a poor harvest without receiving anything if the index does not cross the contractual threshold. The gap between the loss experienced and the payment triggered by the index is known as basis risk. It can make low demand entirely rational even when the product is correctly priced [125, 185].

Trust in the provider matters as well. Research in rural Cambodia found that hypothetical demand for microinsurance depended on price, previous experience of disaster, financial knowledge and the credibility of the organisation selling the policy [124]. Having suffered a loss did not automatically increase the desire to insure.

Formal insurance is only one way of coping with damage. Households may rely on family, neighbours, savings, credit or local forms of mutual aid. These networks can respond quickly and reduce the appeal of a contract. They become fragile when the same shock reaches the whole community at once [186, 187].

Buying insurance therefore involves judging two risks. The first is the possible loss. The second is the contract expected to carry it. The insurer classifies a person according to the risk they bring. The person also classifies the insurer according to the trust they place in its promise. Pricing and underwriting models rarely make this second assessment visible.

Two Views of the Same Future

Composite scene

In the early 1990s, David lives in San Francisco. He is thirty-six and has left a job in advertising. He holds a life insurance policy bought several years earlier. He has known for three years that he is HIV-positive. After a bout of pneumocystis pneumonia, the discussion no longer concerns HIV alone. It concerns AIDS.

Treatment is expensive, work is becoming harder and the rent still has to be paid. A broker offers to arrange a viatical settlement.[a] *David will receive part of the death benefit immediately. The purchaser will pay the remaining premiums and collect the insured sum when David dies [188, 189].*

For David, the transaction turns a promise that would arrive too late into money available now. For the investor, it turns a life into a probable duration. The sooner David dies, the higher the return. Both parties know the same diagnosis, but they do not see the same object [190, 191].

David sees months of housing and treatment, along with some remaining autonomy. The investor sees an uncertain timetable. The doctor sees a disease and changing therapies. The insurer sees an obligation that will be triggered by death.

More effective antiretroviral treatments disrupt the market. Policyholders live longer. This medical progress is good news for them and bad news for investors who had priced an early death. The same information takes on a different value according to the actor receiving it and the decision it informs [192].

[a] In a *viatical settlement*, the holder of a life insurance policy sells the right to receive the death benefit to a third party. The purchaser pays an immediate sum, usually takes over future premiums and later receives the insured amount when the policyholder dies.

An estimate of life expectancy can guide treatment, release cash, set a price or organise an investment. Data do not contain their own use. Their meaning comes from a relationship and an institution.

This plurality does not mean that every viewpoint is equally powerful. The imbalance begins when one actor alone can convert its interpretation into a price and a decision. David knows his illness from within. The investor holds the capital and the contract that turn this knowledge into a market.

One Person's Risk, Another's Danger

The distinction between risk and danger depends on a person's position in the decision [36]. A consequence appears as a risk when it is con-

nected to a decision the actor controls. It appears as a danger when it is experienced as coming from outside.

An insurer chooses a model, deductible, underwriting threshold and portfolio composition. It may describe withdrawal as a prudent decision in response to a possible loss. A household does not choose the reclassification of its neighbourhood or the disappearance of available offers. What is a balance-sheet risk for one actor becomes a contractual, housing or financial danger for another.

This distinction prevents exposure from being confused with choice. A loss can be attributed to a personal decision only when a genuine alternative was available. The abstract possibility of moving home, changing employment or taking another route does not turn every vulnerability into a voluntary risk.

Both views may be rational without being equivalent. The actor making the decision can define a situation as a risk to manage. The person receiving its consequences must often adapt to a danger they did not choose.

The View from Above

Aerial and satellite images give insurers a perspective residents do not have. They allow a company to inspect roofs, vegetation, debris and the distance between buildings. This view covers a wider area than the homeowner's daily experience. It remains fallible.

American regulators have received complaints about refusals and non-renewals based on images that were old, unclear or attached to the wrong building. West Virginia and Tennessee reminded insurers that an image should remain one piece of evidence among others. When its interpretation is uncertain, the insurer should seek more information, show the image to the policyholder and accept recent photographs or a physical inspection [193, 194].

A policyholder cannot correct information they do not know exists. A tarpaulin may be mistaken for a swimming pool, a structure on a neighbouring property may be assigned to the wrong parcel and old equipment may remain visible after it has been removed. The error stays silent until it produces a higher premium, a demand for work or a non-renewal.

The answer is not to oppose the resident's eye to technology. Both can be wrong. The answer is to organise a process in which the interpretation

can be challenged before it becomes a decision. The power to see from a distance should come with a right to see what the institution claims to have observed.

Homes can also produce data from within. Energy use, temperature, door openings, smoke detection, presence, water leaks and alarm activation can help prevent damage. They can also turn the home into a continuously observed space. The boundary between prevention and surveillance depends less on the sensor than on the uses authorised for the information it produces [195, 196].

The Portfolio Is Not the Population

An insurer may hold millions of observations. Such abundance creates an impression of completeness. Yet a portfolio is a filtered population.

It contains those whom the company accepted, those who accepted its price, those whose contracts were retained and those who reported a loss recognised by the claims process. It makes declined applicants, uninsured households, former customers, losses below the deductible and repairs paid by relatives less visible.

Credit offers a simple comparison. A lender observes repayment among the applicants to whom it granted loans. It does not directly observe what rejected applicants would have done. The earlier decision removed part of the information that a later model would need. Insurance faces the same problem. The results observed depend on the rules that governed entry into and exit from the portfolio [197].

Older categories also acquire a cumulative advantage. They have generated long series, stable forms and professional routines. Groups excluded or poorly described rarely return to contradict the insurer's statistical history. A variable may survive because it is built into systems, not because it offers the best available account of risk [141].

Before saying that the data show a difference, we should ask whom they describe and after which refusals, deductibles and departures.

Data Are Produced

The word *data* suggests something already present and waiting to be collected. A trace becomes data only when an institution decides to

retain it, format it, attach it to a unit and make it comparable [32, 198, 199].

There is no completely raw braking event. A device selects a recording frequency and an acceleration threshold. An application decides when a journey begins and how to treat a switched-off phone, a steep road or a stop forced by another driver. A claims database depends on reports, benefits, deductibles, assessments and administrative categories.

Calling data constructed does not make all measures equivalent. Some are more precise, more complete and better suited to a decision. It does require the institution to document their origin, transformations and blind spots. When a measure raises a price or closes access to a market, the insurer is responsible for the whole chain and not only for the final calculation.

When Data Change Function

Information does not necessarily remain where it was collected. Data gathered to prevent damage become a pricing factor. Information created for treatment enters underwriting. A map designed for emergency planning accompanies a non-renewal letter. Ordinary information can become sensitive when several sources are combined [195, 200].

Meaning depends on the context through which information travels [196]. Medical data do not perform the same function when they guide care and when they decide access to insurance. A climate map creates a different relationship when it opens financial assistance rather than justifying withdrawal. This gradual extension of use is often called *function creep* [201].

The change rarely arrives through one dramatic decision. The data already exist and reusing them appears inexpensive. Another department gives them an additional task. A prevention tool slowly becomes a selection tool without the people concerned having had a chance to discuss the change.

A trace does not carry the story that explains it. A purchase may indicate risky consumption or an ordinary errand. Presence in a neighbourhood may reflect work, a medical appointment or a family visit. A predictive model may establish that a variable improves an estimate without showing why the association exists [202].

Actuarial work cannot demand a complete causal demonstration for every

variable. Insurance data are largely observational. A stable association may still provide useful information. It does not determine the meaning of the variable or the consequence that should follow.

Professional actuarial work in the United States has proposed requiring a *rational explanation*. The insurer should provide a plausible and understandable account linking the variable to circumstances that may contribute to the risk [157]. This test can exclude accidental correlations. It still does not decide whether the information should produce a premium, an underwriting condition or suspicion of fraud.

Losses That Never Become Claims

A loss enters an insurer's data only after several steps. It must be noticed, understood as potentially covered, reported, documented, accepted and valued. At every stage, some damage disappears from the file.

A household may expect the amount to remain below the deductible. It may fear a future increase or non-renewal. It may repair with help from relatives, postpone the work or fail to realise that the policy could respond. A tenant may live with damp while having no control over the owner's insurance. A small business may absorb an interruption to preserve a commercial relationship.

The practical threshold for making a claim may therefore be higher than the contractual deductible. The additional amount that the policyholder absorbs before deciding to report a loss has been called a *pseudodeductible* [203].

The absence of a claim is not the absence of loss. It may show that the contract left part of the cost with the person it was meant to protect.

The decision to claim also depends on resources. Faced with the same damage, a household with savings may pay for repair, avoid the procedure and preserve its claims history. A household without cash is more likely to use the cover it purchased.

American controversies over credit-based insurance scores reveal this ambiguity. These scores predict the number and cost of claims, but the association does not prove that people with lower scores cause more accidents. In the data examined by the Federal Trade Commission, much of the difference concerned claim frequency rather than average claim cost. No definitive causal explanation was established [139, 140].

One possible explanation is the ability to absorb a small loss without using insurance. The score may partly measure the need to claim rather than the tendency to cause damage. The hypothesis remains debated. It is enough to show that observed claim frequency combines exposure, reporting decisions and available resources.

Pricing can then charge more to those least able to do without insurance. Claims procedures also select what becomes a recognised expense. An assessment may exclude a cause, reduce an amount or demand evidence that is difficult to produce. A complex process retains mainly those who know their rights, have time and can bear the cost of a challenge. Abandoned files disappear more easily from statistics than from the lives they have weakened [98, 99, 133].

A public account of damage must therefore bring several sources together. Paid claims are essential, but they should be supplemented by household surveys, health data, appeals, municipal expenditure, postponed work and residential trajectories. Insurers possess valuable knowledge. They are not comprehensive accountants of social harm.

Organisations Have a Psychology Too

Institutions do not feel fear or hope in the way people do. They still produce regularities that resemble biases. A recent event receives more attention in committees and models. A long period without loss normalises exposure. Annual targets make immediate prevention spending more visible than future losses avoided. Teams favour available data, established methods and categories regulators already understand [204–206].

This short-sightedness comes partly from the division of work. The underwriter watches the composition of the portfolio.[21] The actuary seeks a defensible price. Finance protects capital. Legal staff limit disputes. Claims handlers process and close files. Each person may perform a task properly while the combination of these local rationalities produces a decision no one has examined as a whole [207].

An organisation sees precisely what it has learned to count and much less of what crosses its boundaries. It knows the claims burden, but not all the damage retained by households. It measures the cost of prevention assistance, but not always the value of loss avoided. It records

[21] Here, an *underwriter* is the professional who examines risks and decides whether the insurer will accept them, decline them or cover them subject to particular conditions.

cancellation, but often does not know what happens to the person after departure. Categories and procedures select which information can travel to the places where decisions are made [14, 206, 208].

Technological announcements also direct attention. Connected objects will reveal conduct, artificial intelligence will personalise policies and decisions will become almost instantaneous. Such announcements do not always describe settled practices. They still influence budgets, recruitment, partnerships and expectations. An experiment can help create the market it predicts [209].

Hype around artificial intelligence does more than exaggerate performance. It presents adoption as inevitable. An organisation that does not automate appears to be falling behind. Discussion then moves away from whether the project is useful, which task it will automate and who will benefit. It turns instead to the speed of deployment [210].

The label *artificial intelligence* also groups together very different techniques and uses. Speaking more precisely about automation forces a simpler question. Which task will be transferred to the system, for whose benefit and with what possibility of reversing the decision? This precision resists the idea that a general technological advance requires the same response everywhere [210].

The announced future becomes a present constraint. A company builds a database, selects a provider, modifies procedures and trains staff before establishing the real value of the tool. Once these investments have been made, abandoning the project becomes harder. A provisional decision gradually acquires the durability of infrastructure.

The idea of continuous insurance gives this horizon a name. A contract was traditionally organised around distinct moments such as application, renewal and claim. Connected devices and external data make it possible to imagine a relationship in which exposure is observed throughout the contract. Industry writing sometimes calls this *continuous underwriting* [211, 212].

Continuous observation can support very different operations. Data may warn the policyholder, update an internal assessment or change the terms offered at renewal. Observation, intervention and conversion into price should not be confused. An early alert may prevent damage without every short-lived variation becoming a premium change.

Even a disappointing experiment may teach the company to gather traces, build an interface or coordinate partners. Research on behaviour-

based motor insurance calls some of these projects *happy failures*. The actuarial proof may fail while the organisation still acquires useful infrastructure [213]. Experiments should therefore be examined early, while several uses remain possible and withdrawal is still realistic.

Absences, Departures and Displaced Losses

Unreported losses are not the only elements missing from a portfolio. Departures also change the population observed. After an increase, policyholders who switch company, reduce coverage or become uninsured may differ from those who remain. The results of the surviving portfolio can improve while protection deteriorates across the market [86, 87].

A territory may appear less risky in one insurer's accounts after its hardest contracts have moved to a residual market or lost coverage. Residual mechanisms concentrate the risks the ordinary market did not retain. Their results reflect both the properties covered and the selection process that sent them there [214, 215].

Behavioural programmes face a similar difficulty. A sensor describes people who agree to be monitored and remain in the programme. It says less about those who decline, withdraw or leave the insurer. The observed population is also the result of a participation decision [197, 216].

No insurer sees all these trajectories alone. It knows that a policy was not renewed, but rarely what followed. Did the household find another insurer, reduce coverage, enter a residual market or give up insurance? Market-wide observation must connect premiums, deductibles, benefits, non-renewals and departures. Without that view, protection may shrink through the accumulation of private decisions, each of which appears defensible when considered separately [214, 215].

The Loop That Manufactures Its Evidence

A classification can predict the future and help produce it. It first changes what the institution observes. A territory inspected more often generates more recorded defects. A group exposed to stronger controls produces more alerts and cases. These observations then seem to confirm that the group deserved special attention. The defects may be real, but the

probability of detecting them depends on the initial classification. Similar feedback loops have been studied in predictive policing [217, 218].

A decision can also alter the risk it claims only to measure. A higher premium leaves less money for maintenance. A larger deductible delays repair. A credit refusal prevents adaptation work. Insurer withdrawal affects property values and may accelerate the departure of households able to move.

A few years later, the neighbourhood may indeed be more vulnerable. The prediction has become performative. By changing the options available to people, it enters the causal chain of the outcome that it will later appear to have anticipated [219, 220].

Another loop appears when a measure becomes a management target. Goodhart's law is commonly summarised as the idea that a measure loses reliability once it becomes a target [221, 222].

An insurer seeking to reduce reported claim frequency may raise deductibles, complicate procedures or remove highly exposed contracts. The indicator improves without any reduction in loss. Costs have been left with policyholders or moved outside the portfolio. A target for rapid closure may shorten the average life of files while weakening the review of complex cases. Staff do not need to manipulate figures. They only need to adapt their work to the criteria by which it will be judged [223].

These loops do not make every prediction false. They require a distinction between predicting an external condition and evaluating a situation the institution helps transform. Good performance on later data is no longer enough when the decision changes the population observed, the resources available or the events that will be recorded.

A portfolio is therefore an archive of losses and of the policies that shaped them. It records the effects of planning, credit, refusals, deductibles, claims procedures and management targets. Treating it as a natural mirror of the world erases the institutions already present in the data.

Data Do Not Speak Alone

The rhetoric of scoring often contrasts objective data with human judgement, which is presented as intuitive and biased. Yet an institution chooses the outcome to predict, the reference population, the information retained, the treatment of missing values and the consequence attached to the number. Data choose neither the question nor their use.

The same requirement applies to systems sold as artificial intelligence. Strong performance on a standard test does not show that the system is suitable for the precise task, population and consequences planned by the organisation [210].

Mechanical objectivity has its own history [224]. Standardised instruments were intended to limit the observer's visible intervention. The absence of a hand at the moment of calculation does not abolish judgement. It moves judgement into the design of the instrument, the selection of cases and the definition of categories.

Brian Glenn describes an insurance version of this belief as the myth of the actuary. Risk selection presents an outer face of numbers and objective criteria. It retains a less visible face made of stories about prudence, character and policyholders' responsibility [22, 225].

Frederick Hoffman's work offers an important historical example. At the end of the nineteenth century, the Prudential statistician assembled extensive data to argue that African Americans formed a population that was difficult to insure. The volume of tables gave the argument an appearance of impartiality. W. E. B. Du Bois and other critics showed that the comparisons grouped people living under very different social and economic conditions. Race had been retained as the central explanation when a different organisation of the data would have made other mechanisms visible [226].

The numbers had not invented the story. An earlier story had determined which data should be compared and which cause should be sought. Contemporary procedures can make such choices harder to see, but they do not remove them [227, 228].

The alternative is not untidy human subjectivity on one side and automatic objectivity on the other. An objective practice states its choices, documents its limits and makes challenge possible. A score becomes dangerous when the procedure disappears and the number arrives alone, as though reality itself had chosen the question and the decision.

Errors That Do Not Carry the Same Power

It would be easy to conclude that policyholder and insurer each make their own kind of mistake. That symmetry would be false. A policyholder may underestimate a danger. An insurer may confuse an unreported loss

with no loss, learn from a selected population or treat as external a vulnerability that its own decisions help strengthen.

These errors do not have the same reach. Marianne's mistake first affects her own protection. The insurer's mistake enters a model, underwriting rule or pricing procedure. It can reach everyone sharing the misunderstood characteristic, then be repeated by a bank, reinsurer, regulator or public authority.

The authority of an estimate depends on the quality of the measure and on the position of the actor able to attach a consequence to it. Searching for an institution with no blind spots would be futile. The practical task is to confront perspectives that do not observe the same things. Residents reveal losses absent from files. Associations connect refusals. Researchers study selection. Regulators compare portfolios and follow people who disappear from the ordinary market.

This confrontation does not require every decision to yield to personal testimony. It requires the insurer to state what its data support, what they do not see and how the policyholder can provide contrary evidence.

The partial view of risk then begins to serve another function. It no longer predicts expenditure alone. It starts to qualify the effort, choice and merit of the person being classified. The next chapter examines this movement from an observed trace to a judgement about behaviour.

Chapter 8 — The False Merit of Behaviour

Behavioural data seem to offer an answer to the limits of older classifications. Instead of charging a person for what they are, insurers can claim to take account of what they do. The idea is easy to understand. Careful driving, home maintenance and other preventive efforts can reduce losses. The policyholder should receive part of the benefit.

This form of personalisation can correct a category that is too broad. It can also turn protection into a continuing test. Avoiding an accident is no longer enough. The policyholder must produce the right traces, satisfy the indicator and show that they deserve to contribute less. Several different steps are folded into one another. A trace becomes the description of a behaviour. The behaviour is treated as a choice. The choice becomes a responsibility. That responsibility is then used to justify a price [173, 229].

Documented case

In 1982, the National Organization for Women, widely known as NOW, launched its Insurance Project against the use of sex in American insurance pricing. Motor insurance raised a particular difficulty. Under the rating systems challenged by the organisation, women under twenty-five generally paid less than men of the same age. Beyond that age, men and women were often placed in the same classes [26, 141].

Insurers could therefore present sex classification as discrimination in women's favour. NOW activists replied that the advantage was limited. Adult women drove fewer miles on average than adult men, but that difference in exposure was not always reflected in premiums. A woman who used her car very little could pay as much as a man who drove much farther [141, 230].

NOW did not simply ask insurers to remove the lower rate for young women and apply the male rate to everyone. In proceedings in Pennsylvania, the organisation argued that classes based on sex should not disappear until pricing took greater account of mileage. The disputed variable was to be replaced by a more direct measure of vehicle use [141].

The demand sought to loosen the hold of an assigned identity. A woman should not be treated as the representative of a group average when her own use of the vehicle could be observed. The challenge nevertheless helped establish another view of fairness. A price would be fairer when it came closer to the conduct of each person [26, 172].

A few decades later, telematics devices[a] would record much more than distance. They could collect information on time of day, speed, acceleration, braking, routes and sometimes location. A demand for individual

treatment, made in order to escape a social category, opened the way to much closer observation of driving [146].

[a]In motor insurance, *telematics* refers to a device or application that records selected information about journeys and driving. The data may be used to advise the policyholder or adjust the contract.

NOW was not asking for continuous surveillance. It was challenging a classification it considered unjust. The history shows how a criticism can be absorbed by the system it seeks to change. Removing one variable does not necessarily change the idea of justice behind the price. It may simply send insurers looking for more data, often closer to private life.

Observing behaviour is not the issue in itself. A measure closer to action can recognise a real reduction in risk. Difficulty arises when every gain in precision is assumed to require a more individual price.

Composite scene

Claire and Nadia agree to install the application offered by their motor insurer. For three months, it records their journeys before calculating a score. The programme is not presented as compulsory. It promises a discount to careful drivers.

Claire teaches at a secondary school fifteen minutes from home. She drives mainly in the morning and late afternoon, rarely travels at night and parks in her driveway. The application records low mileage, few night journeys and few instances of sudden braking. At the end of the observation period, her annual premium falls from €680 to €520.

Claire finds the result fair. She drives carefully and sees no reason to pay for people who take more risks.

Nadia works as a care assistant at a residential facility on the edge of town. Her shifts change from week to week. Sometimes she starts before dawn. At other times she returns after ten in the evening. She drives farther on roads used by lorries, with roundabouts and congestion that sometimes require rapid braking.

Nadia has never had an accident or received a fine. Her score nevertheless records night driving, high mileage, repeated braking and street parking. Her premium rises from €720 to €960.

The application records several real differences between their journeys. It does not show why those differences exist. It does not bring Nadia's home closer to her workplace, change her shifts or repair the roads. It classifies traces produced by two very different arrangements of daily life.

The discount given to Claire does not by itself create new resources. When total losses remain unchanged, asking less from some policyholders means asking more elsewhere. The score decides which differences will remain

shared and which constraints will be returned to the people who bear them.

Claire is not inherently more prudent than Nadia. She has more room to arrange her life around what the application rewards. Behavioural pricing can be defended when the measured action really reduces risk. The action must be reasonably accessible, and the policyholder must receive part of the benefit. False merit appears when these conditions are assumed rather than established.

From Category to Behaviour

Traditional segmentation uses age, address, vehicle, occupation or claims history. Behavioural pricing claims to move closer to action. It observes driving, steps, sleep, home equipment or photographs requested by the insurer. It does more than estimate a future loss. It also tries to change what may cause that loss [65, 173].

This aim is not foreign to insurance. A contract can affect the risk it covers. A deductible may encourage care or discourage small claims. A maintenance requirement may reduce some forms of damage. A prevention visit may identify unsafe wiring or a leaking pipe. Insurers estimate future claim frequency while also trying to influence its causes [65, 144].

Connected tools extend that logic. They make conduct more visible and allow the insurer to intervene during the life of the contract. Research on motor insurance based on vehicle use suggests that some drivers change their behaviour when they receive feedback or know that they are being observed. The effect varies with the design of the programme, the variables recorded and the way rewards are calculated [213, 216].

The same technology can serve different purposes. It can inform a driver, help explain a particular journey, recognise a measurable reduction in risk or identify policyholders who are already less costly. These are not equivalent uses. An application that gives advice does not exercise the same power as a score that raises a premium or prepares a non-renewal [201, 231].

The language of reward tends to blur the distinction. The good policyholder is said to be recognised at last. The person who pays more is invited to change. Producing favourable data, adapting a home, buying a newer vehicle or changing working hours requires time, money and alternatives. Those resources are not distributed equally.

An incentive also carries a judgement. It changes the cost of an action and signals which conduct the institution regards as normal, responsible or deserving [91]. A discount for affordable safety work may recognise a contribution to common protection. An opaque score may instead turn insurance into a contest in which policyholders are ranked by their ability to conform [232].

From Trace to Merit

A sensor never observes the whole situation. It records a change in speed, a location, a time or a number of steps. The trace must then be interpreted as a behaviour. Sudden braking may follow from distraction, a child crossing the road, poor road design or dense traffic. The sensor measures the movement. It does not record the story of the act.

The behaviour is then treated as a choice. Driving at night may be leisure or a hospital shift. Walking little may reflect preference, disability, sedentary work or the absence of a safe public space. High heating use may come from a chosen temperature or from poor insulation that a tenant cannot change.

The choice is finally turned into responsibility. Even when a person can act, they are not the sole cause of the risk. Driving depends on roads and working hours. Health also depends on housing, income, environment and access to care. The condition of a house depends on its owner, but also on builders, local authorities and surrounding infrastructure.

Responsibility for conduct is not the same as responsibility for the loss that occurs. Driving farther can increase the probability of an accident. It does not mean that the driver chose the particular accident that happened. The part of risk connected to a decision must remain distinct from bad luck [233].

The last step gives this attribution a financial consequence. The person who receives a good score appears to have earned the right to contribute less. The person with a poor score appears to owe the cost revealed by their conduct. The classification no longer measures exposure alone. It also distributes approval and suspicion [234, 235].

The history of credit helps explain the change. Before automated scoring, lenders explicitly judged an applicant's character, reputation, stability and presumed willingness to keep promises. The score made this

judgement less visible without removing it. The morality of the reliable borrower moved into the language of risk and regularity [236].

Disputes become sharper when the statistical division between good and bad risks does not match ordinary ideas of responsibility. A credit-based insurance score may predict claims without describing how a person drives. Illness, separation or job loss can damage a financial record and later raise the price of insurance. Predictive value alone does not justify the use [140].

A technology can be closer to action than a postcode without being closer to responsibility. Between the trace and the price, the institution constructs an account of what the person could have done and what they must now bear.

Prediction Is Not Attribution

A variable is predictive when it improves an estimate of future loss. This property does not explain why the relationship exists. An address may be associated with fire risk without the act of living at that address causing the fire. A time of day may be associated with accidents without explaining all the danger of the journey [157].

Causation asks a different question. Would changing the factor really change the probability or severity of the damage? A statistical association may reflect other features that have not been measured. A factor that directly contributes to loss may also be difficult to observe.

The distinction matters for prevention. Telling a driver that some roads or hours are more dangerous may help reduce exposure. An association between vehicle colour and accidents would not mean that repainting the car would make the journey safer. A useful predictor is not automatically a useful lever.

Even when a factor contributes to risk, the person may not have the means to change it. Housing, working hours, infrastructure and the money required for repairs are rarely matters of free choice. Conduct that can be changed in theory is not necessarily an option available in practice.

The next question concerns attribution. What part can reasonably be assigned to the person? The relevant comparison is not with a life from which all risk has been removed. It is with the situation the person could have reached by taking an accessible precaution at a bearable cost [233].

One decision still remains. Even when a difference is predictive, causal and partly controllable, should it become a premium, deductible, restriction or refusal? The answer depends on the good being protected, the size of the consequence and the alternatives left to the person. An accessible precaution may justify assistance, a limited requirement or a modest price difference. It does not follow that the policyholder should bear the whole loss when bad luck occurs.

Prediction, assistance, attribution and pricing are separate operations. Putting them into one score makes it appear that a statistical measure already contains the rule that should govern its use.

When a Body Becomes Behaviour

Body weight shows how a physical characteristic can be read as the trace of conduct. Body mass index, usually called BMI, relates weight to height. It is simple to calculate and allows comparisons across populations. A BMI of 30 or more is commonly used to define obesity in adults [237].

The simplicity of the measure explains its wide use. It also marks its limits. BMI does not directly measure the quantity or distribution of body fat. It does not describe the effects on organs, physical ability or daily life. Two people on opposite sides of the threshold may be more similar than two people placed in the same category.

A threshold does not necessarily reveal a natural break. It marks the point at which an institution has decided to act. It may trigger an examination, open access to treatment, determine eligibility or produce an administrative consequence. Its value depends on the decision attached to it [238, 239].

An international commission recently proposed separating screening by BMI from clinical diagnosis. It uses the term *clinical obesity* when excess body fat is already accompanied by impaired organ function or a serious limitation in everyday activities. It uses *preclinical obesity* when these effects are not present but future risk is higher [240].

This distinction reduces the risk of treating an indicator as a complete diagnosis. It also shows why weight cannot by itself tell the story of a behaviour. Weight is shaped by biological mechanisms, sleep, some medicines, work, income and the food environment. Common forms of

obesity are associated with many genetic variations, most of which have small effects and interact with living conditions [241].

Recognising this complexity can counter the simple story of insufficient willpower. Medical classification can still create new boundaries. A more precise category may open care and also become a condition of eligibility. One person is recognised as ill and receives treatment. Another is told to change their way of life.

Two changes are then confused. An approximate indicator becomes a complete description of the body. A partly modifiable characteristic becomes evidence of a free choice. The same number appears to measure health, reveal conduct and justify a consequence.

Medical knowledge does not authorise every use. BMI may open a discussion or support further examination without acquiring the power to set a premium, select an employee or close access to protection. A category that is defensible in a clinical setting should not travel alone into every institution interested in ranking the person.

Data Do Not Determine Their Use

The word *personalisation* covers very different operations. An application can adapt advice, award points, offer a discount, decide entry into a contract or affect a claim. The person is treated individually in each case. The data do not create the same value or the same power.

Health programmes such as Vitality show this range. Steps, activities and reported behaviours can lead to rewards and maintain a continuing relationship with the brand without directly recalculating each medical risk. The data then have commercial and relational value as well as possible actuarial value [242].

Uses also differ across contracts, lines of insurance and countries. Information that changes a motor premium may remain excluded from health pricing. A programme bought by an individual does not operate in the same way as one arranged through an employer. An experiment may be designed mainly to retain customers or sell other services [213, 231].

Personalised data do not always describe insured risk. They may estimate whether a customer will buy, compare offers, cancel or accept an increase. The price then reflects the customer's value as a buyer as well as the expected cost of claims. A reward described as recognition of prudence may work mainly as a tool of retention.

Information collected for advice may later be used for selection. This change in purpose does not require the data to be false. It changes the relationship in which the data act [201]. A step count may help someone follow a personal goal without deciding access to insurance. A photograph of a roof may support repairs without automatically becoming a reason for non-renewal.

This development is part of a broader movement. Households are asked to manage health, housing, retirement and mobility as a portfolio of risks. A walk or a journey acquires monetary value when an application converts it into points. Security becomes continuing work on the self [243–245].

The institution has not disappeared. It still defines the indicators, rewards and consequences. It asks each person to produce evidence of prudence and to answer for the result.

The Discount and Its Other Side

Behavioural programmes often begin with an invitation. Accepting the sensor brings a discount, points or services. Refusing is said to leave the contract unchanged. This neutrality may not last if the reference price rises or if people who refuse monitoring are gradually treated as less transparent.

When expected losses remain the same, a discount does not create new resources. It must be offset by a higher contribution elsewhere, a larger deductible, narrower cover or a reduction in the insurer's margin. A bonus also determines the burden left to others [229, 246].

The calculation changes when the programme really reduces the frequency or severity of claims. The discount can then share part of the benefit created by prevention [144, 216]. This reduction must be distinguished from three other outcomes. The programme may simply identify policyholders who were already less costly. It may discourage some claims. It may move risks to another contract or to people who have left the portfolio.

The score should therefore be judged by losses actually avoided and not only by the improvement of its indicator. Once a measure becomes a target, people and organisations learn to satisfy it, sometimes without achieving the purpose it was meant to serve. This problem is commonly associated with Goodhart's law and Campbell's law [221, 222, 247].

A driver may learn to avoid the braking events recorded by the application without becoming more attentive in every situation. A policyholder may decide not to report a problem in order to preserve a score. A company may increase enrolment in a prevention programme without reaching the people who need help most. The measure improves faster than safety.

Personalisation can also remove from the common price those who know how to produce the conduct the system rewards. The group left behind then contains more night work, long commutes, chronic illness, disability, older vehicles and poorly equipped neighbourhoods. Its average claims cost rises and appears to confirm that it always contained the expensive risks.

A prevention policy should not begin by measuring the people who already have the means to succeed. It should first distribute the means to act, then decide carefully what should be recognised in the price.

Taking Behaviour into Account without Converting Everything

Rejecting behavioural merit does not mean ignoring conduct or making every premium identical. Some actions increase avoidable harm. Some forms of prevention work. Pooling does not require indifference to what people do [232, 234].

It does require the institution to separate operations that behavioural programmes often merge. The insurer can help reduce risk. It can consider the part reasonably attributable to an available decision. It must then share the loss that remains and decide whether the observed difference may alter the price without closing access to protection.

The result is a need for zones of non-conversion. Information may be used for advice, care or prevention without gaining an automatic right to enter selection [201, 229]. Genetic information, an old diagnosis, a climate map and a driving score are not the same. They raise a common question. What consequence may an institution attach to what it knows?

Any answer must consider whether the person can understand the rule, act on the information and challenge an error. It must also consider what options remain after an adverse decision. Insurance often controls access to housing, credit, health or work. In those settings, a statistical

difference requires a strong justification before it becomes an increase, exclusion or refusal.

Older categories are not a safe alternative. Sex, social origin and place of birth do not become fair criteria because individual tracking is intrusive. The choice lies between these extremes. It concerns permitted uses, available assistance and the part of risk that the collective will continue to carry.

A trace never possesses the force of a sanction by itself. An organisation must still choose a threshold, a procedure and a consequence. The next chapter begins when the score stops being information about a person. It becomes a decision that they must accept or challenge.

Chapter 9 — When the Score Becomes a Decision

A score is only a statistic. It becomes a decision when an organisation attaches a threshold, a procedure and a consequence to it. The person concerned must then accept the result or find a way to challenge it.

Documented case

Frances was eighty-five. After a serious fall, she had to learn to live with a broken shoulder, severe pain and a body that moved more slowly. Getting up, dressing, moving from the bed to a chair and using the bathroom had become tasks she had to learn again.

She entered a rehabilitation facility. Staff recorded her progress, but also what she still could not do without help. Her cover came through Medicare Advantage.[a]

A tool used by the insurer calculated an estimated length of stay. It drew on her diagnosis, age, living situation and the abilities of patients judged to be similar.

In the case reported by *STAT*, the figure displayed was 16.6 days. Public information does not show exactly what this value represented or which rule gave it practical force. On the seventeenth day, the insurer stopped paying for her care.

Her medical record still described a woman who could not perform several essential tasks on her own. The estimate had first summarised the experience of other patients. It then became a timetable and, finally, a threshold. Frances now had to show why her actual condition justified going beyond the number [248].

[a] Medicare is the American federal health insurance programme mainly for people aged sixty-five or over and for some younger people with disabilities. Under Medicare Advantage, private insurers administer publicly funded plans. These plans may use provider networks and prior authorisation, which requires the insurer's approval before some care will be covered.

Frances's case is not a story about a machine deciding on its own. An organisation chose the tool, the outcome to predict, the weight given to the estimate and the point at which payment could stop. The prediction gained force inside a procedure designed in part to control expenditure.

Debates about algorithms often focus on bias, error and opacity. These questions remain important. They do not settle the use of a model. A more accurate and better explained score can still serve an unjust rule. The decisive step comes when an insurer, bank, public authority or court

decides what the number will do. A probability can then become a premium, an investigation, a delay, an authorisation or a refusal.

Classification as a Grip

From the Person to Risk Factors

Robert Castel described a change in psychiatry from judging the dangerousness of a particular person to managing combinations of risk factors. The institution no longer has to begin with an encounter. It can combine characteristics, assign a probability and direct people towards different forms of intervention [249].

A professional may still meet the person. The meeting often takes place after an infrastructure has selected the file, set its priority and defined the problem. The profile does not erase the person. It prepares the way the institution will see them. It may lead to another examination, prior authorisation, a specialist market or closer monitoring.

Insurance cannot operate without categories. It must identify the person and property covered, define the guarantee and determine whether a loss falls within the contract. Classification itself is not the problem. What matters is which distinctions are retained, which information supports them and what follows from them.

A category prepares an action. It is built into forms, software, budgets and routines [208]. A medical code opens a protocol. A postcode changes a premium. A flood zone affects the value of a house. Béatrice Hibou describes bureaucratisation as a set of abstractions that make cases comparable and allow organisations to act at a distance [207].

Distance can limit arbitrary treatment and improve consistency. It can also remove circumstances that matter. Classification protects when it opens care, assistance or prevention. It becomes restrictive when it raises a price, triggers surveillance or closes access.

States have long simplified territories and populations in order to govern them [10]. Companies now build their own systems of legibility. They classify to set prices, arrange portfolios, detect fraud and select customers. Insurance stands where these two histories meet.

The file also preserves a memory. An old illness, a conviction or a series of claims can become a lasting feature of the person. A right to be

forgotten limits this power. Information may once have been accurate without deserving to govern access to credit and protection indefinitely.

Scores extend the same logic. They assemble more traces, infer properties that were never declared and move boundaries quickly. They appear to treat each person individually, but they still work through comparison. A person resembles other cases and is placed among them. In an ordinal society, people are continually ranked as more or less reliable, solvent, risky, profitable or suspect [25].

From the Form to the Score

A form made part of the classification visible. It asked about age, address, occupation, medical history or income. The applicant could at least see the question. They might challenge it, and lawmakers could prohibit it.

Inference makes the question less visible. An institution combines traces and reconstructs a characteristic without asking for it directly. An address may carry information about residential segregation. Connection times may reveal working conditions. Purchases may suggest health. A prohibited variable can return through a proxy, meaning another item of information closely associated with it.

Banning one variable therefore has limited effect when other data can reproduce part of its influence. Interpretation creates another difficulty. Passing near a place of worship does not establish religious practice. A purchase in a shop that sells tobacco may concern postage stamps. Being close to a demonstration may simply reflect a route through the city. The model reduces several possible stories to the categories it has been asked to recognise.

With a score, a person may have to challenge an architecture they cannot see. They may know neither the data used, the weight of each factor, the threshold nor the role of an outside provider. The institution may cite trade secrecy or fraud prevention without explaining what placed the file on the wrong side. This asymmetry is central to the black box society [250].

Organisations collect traces and produce rankings. People mainly receive the consequence. A premium rises, an application is delayed, treatment ends or an investigation begins. Opacity lies in the organisation of the decision as much as in the code [34].

An explanation that permits neither correction nor appeal is only a formality. A right to reasons must offer some hold over the decision and, in some cases, over the use of the score itself. Insurance gives the black box a particular power. It turns classification into a premium, deductible, limit or non-renewal.

A Score Becomes Social through What It Is Made to Do

A score does not contain its consequence. The organisation decides which decision it will inform, what threshold will trigger action and how much room remains for professional judgement.

Nathan Genicot argues that social scoring cannot be identified from the form of a model alone. The same score may remain a limited aid in one setting and become a system of adverse treatment when it is moved to another use, given decisive weight or attached to a disproportionate consequence [251].

The ordinary path of the number therefore matters. Does information collected for advice become a condition of access? Does an estimate supplied by a vendor lead in practice to refusal, even when an employee formally signs the decision?

The SCHUFA case made this problem concrete.[22] The Court of Justice of the European Union held that a score supplied to a lender could fall within the rules on automated decision-making when the lender gave it a determining role [252]. The power of the score depends less on who calculates it than on its actual influence. An estimate need not officially replace a professional to organise their work and make disagreement harder.

COMPAS and the Distribution of Errors

In the United States, COMPAS assigns scores intended to estimate the likelihood of reoffending.[23] Depending on the jurisdiction, these scores

[22]SCHUFA is Germany's main private credit reporting agency. It collects information from partner organisations and produces scores intended to estimate whether a person will meet financial commitments. These scores can affect credit, housing and other contracts.

[23]COMPAS stands for Correctional Offender Management Profiling for Alternative Sanctions. The American assessment tool uses information from a file and a questionnaire to produce several scores, including estimates of reoffending risk.

may inform decisions about detention, sentencing or release. The legal system is then concerned not only with a past act, but also with a forecast of future conduct [253, 254].

A ProPublica investigation found that among people who did not reoffend, Black defendants were more often classified as high-risk than white defendants. Among those who did reoffend, white defendants were more often classified as low-risk [255]. The company that developed the tool replied that people assigned the same risk level had broadly similar observed rates of reoffending across racial groups [256].

Both claims can hold at the same time. A score can be approximately calibrated while producing different false positive and false negative rates.[24] When outcome rates differ between groups and prediction remains imperfect, several plausible fairness criteria generally cannot all be satisfied [257, 258]. Choosing between calibration and a more equal distribution of errors means deciding which mistakes the institution regards as most serious.

The controversy made important problems visible. It also showed the limits of a discussion centred on metrics. Even a score corrected on every chosen fairness measure would not decide what role a prediction of reoffending should have in criminal justice. Insurance faces the same prior question. Should an estimate set a premium, trigger an investigation or stop care? Fairness in the score does not justify the use on its own.

Medicare Advantage and Coverage under Authorisation

Medicare Advantage provides an example within insurance itself. A patient has coverage and a clinician has prescribed care. Payment may still depend on prior authorisation. The procedure can prevent unnecessary treatment and make decisions more consistent. It becomes a form of rationing when medical need is treated mainly as expenditure to be stopped.

Investigations have described the use of models to predict or constrain the length of post-acute care after hospitalisation. The name nH Predict became associated with this practice. Reports and legal complaints

[24] A score is calibrated when events occur at roughly the stated rate across many cases assigned the same probability. If one hundred people receive a probability of 20 per cent, calibration means that about twenty experience the event. This is a property of a group of predictions. It does not establish whether a single prediction was true or false after one outcome.

suggest that its estimates sometimes operated as rules in practice, even when doctors and families described a more complicated situation [248].

A report by the United States Senate Permanent Subcommittee on Investigations documented a broader pattern. Major insurers targeted costly post-acute care through prior authorisation, decision support tools and expenditure reduction targets. Denial rates for this care were much higher than overall denial rates [259].

The number gains force from its place in the procedure. The predicted duration appears at the point when a claims manager can stop payment. The patient must then gather documents, secure support from a doctor and appeal. The score does not replace procedure. It shifts the burden to the person who must show that their case deserves an exception.

A score can direct resources towards people who need them. It can also make exclusion faster and easier to defend. Information does not choose between those uses. Where an institution lacks staff, time or resources, automation may simply accelerate sorting and rationing. It cannot supply the missing care or decide how scarce resources should be distributed. Emily Bender and Alex Hanna describe how promises of automation can present a technical system as the only possible response to public and social services that have already been weakened [210].

Coverage can then become a route through forms, calls and expert reports. A doctor objects, a family telephones and a clinical note qualifies the estimate. The process may continue until the routes of appeal are exhausted. Protection is no longer lost only when a contract is refused. It can recede while the contract is being performed.

From Technical Opacity to Organisational Opacity

Automation can reduce some inconsistencies. It can also make error harder to negotiate by turning it into a state of the system. A missing document, a badly recognised address or a discrepancy between databases becomes a defect that the person must disprove.

Documenting the model and its data remains necessary. An explanation matters only when it supports correction, suspension or appeal. The black box is not confined to code. It also lies in the objective, the measure of success, the time allowed to review a file and the consequence attached to the result.

Documented case

In an article on the accounts of a life insurance company, Claude Bébéar imagined an actuary who feared that his work was becoming too easy to understand. To protect his authority, the character invented an esoteric language. He then joined the accountants in producing reports that nobody dared question for fear of appearing ignorant [260].

The satire does not reject technical work. An insurer needs complex calculations to estimate future commitments. It targets jargon used to protect a decision from criticism. Numbers can be correct and still remain politically opaque when policyholders, shareholders or supervisors cannot see which assumptions produced them or what decisions they authorise.

Professional standards have gradually strengthened duties of documentation and communication. American actuarial principles for property and casualty ratemaking expressly recognise the role of judgement and require important assumptions to be supportable. Transparency does not remove expertise. It makes discussion of the work done by expertise possible [152].

Contemporary opacity often comes from the dispersal of judgement. One team chooses the data. Another builds the model. A vendor supplies a score. An operational unit sets the threshold. Each part may be visible to someone, while nobody can readily explain the whole route from trace to refusal.

Governing by numbers can also turn a disputed rule into a target. An organisation seeks to reduce a duration, increase a detection rate or lower a cost [261]. Bureaucratic justice must still balance accuracy, efficiency, fairness and access [128]. The model formalises those compromises. It does not remove them.

The presence of a human reviewer is not enough. A professional may receive files after they have already been sorted, work under volume targets and have little time to depart from the recommendation. Human review then becomes another stage in the system rather than a genuine challenge to it. The relevant questions concern the information available, the authority to make an exception and the time allowed to examine a case [210].

Travelers has described a system in which home insurance policies receive a score and higher risk files are sent to underwriters with the information the system considers relevant [262]. A professional remains involved, but only after the initial ranking and after the file has already been framed.

A bill passed by the Florida House of Representatives in March 2026 would have prohibited an algorithm from being the sole basis for denying

an insurance claim and required review by a qualified professional. It did not complete the legislative process [263]. The proposed rule addressed a real problem. A signature alone would still have been insufficient. The reviewer would also need access to the full file and a practical ability to depart from the score.

The National Institute of Standards and Technology treats these systems as sociotechnical.[25] Their effects depend on the model, the people who use it, outside providers and the procedures that give its output force [264]. A system may be valid and explainable while serving a policy of rationing. The institution remains responsible for the consequence, not only for the quality of the calculation.

What Is Being Optimised?

The expression *artificial intelligence* groups together very different operations. A system may read a document, label an image, estimate a loss, rank files, recommend a review or draft a letter. The label gives these tasks a misleading unity. It is often clearer to speak of automation and say what has been automated [265].

Saying that artificial intelligence denied a claim conceals the chain of responsibility. A company chose a tool, designed a procedure and used the output to produce the refusal. Naming the task makes the people and institutions behind it visible again.

The political choice begins with the target. Improving claims management can mean paying more quickly, detecting more fraud, reducing average compensation or ending some benefits earlier. These aims are not equivalent.

A system designed to miss fewer cases of fraud will direct more legitimate claims towards investigation. A model of recovery time may reproduce an average accurately while treating slower recoveries as anomalies. The objective function gives these priorities a mathematical form.[26] It determines which error matters, which cost becomes visible and which harm remains outside the calculation [266].

[25]The National Institute of Standards and Technology is a scientific and technical agency of the United States government. Its Artificial Intelligence Risk Management Framework asks organisations to assess models within their actual context of use, including the people, vendors and procedures that give them practical effect.

[26]In model building, an objective function states what performance the system is designed to improve. It may give more weight to detecting fraud than to avoiding unnecessary investigations of legitimate claims. The choice expresses a priority of the organisation rather than a conclusion supplied by data.

The position of the output in the procedure matters just as much. A score may trigger a second review or suspend payment. An estimate may assist an adjuster or cap the offer the adjuster can make. A predicted duration may alert a doctor or become a presumption that care should end.

The practical choice is rarely between a human and a machine. It is between different arrangements of decision-making. Automation can deal quickly with straightforward files and leave more time for difficult cases. It can also identify the first defensible moment to reduce a benefit. Both uses may lower costs. They do not serve the same promise.

The Organised Production of Indifference

A decision may be spread across an insurer, data provider, model developer, claims manager and regulator [207]. The provider produces the score. The insurer chooses the threshold. The manager applies the procedure. The regulator checks selected obligations.

Each actor may complete the assigned task correctly while the whole process excludes a person. No single actor needs to have intended that outcome. The division of work creates distance and makes indifference easier.

Responsibility requires the chain to be reconstructed. Who selected the purpose? Who supplied the data? Who set the threshold? Who could depart from it? Who designed the appeal? Dividing responsibility does not make it disappear.

Beyond Algorithmic Fairness

Research on algorithmic fairness has made indirect discrimination more visible and supplied metrics, audits and methods of correction. This work remains necessary [267]. Fairness in the score does not by itself justify the use of the score.

Correcting an error rate does not decide whether a premium should depend on a variable, whether prior authorisation should be automated or whether a high-risk case should instead open access to assistance. When a model is isolated from its setting, the social and historical relations in which it acts disappear from view [35]. A technology may reproduce hierarchy while satisfying a chosen parity measure [268, 269].

Evaluation must therefore address three objects. It must establish what the model estimates and how well it does so. It must examine the task assigned to the estimate. It must also ask what the person can do after the decision. Performance on a test does not show that a system belongs in a real setting where professional relations and the consequences of error matter [210].

In pricing, a predicted frequency does not say what will happen to one policyholder. It describes an average among risks judged comparable. Even a well-calibrated model leaves substantial uncertainty in each case. A sound portfolio estimate can still become an automatic condition of access when the person has no practical way to understand or challenge its use.

The Person without a Common Category

Older actuarial tables placed people in a limited number of recognisable classes. These categories could confine, but they sometimes made a common fate visible. Women priced as women could name the rule and organise against it.

A score places a person on a finer scale. A category reappears when the institution chooses a threshold. The file becomes ordinary or urgent, the risk low or high, the contract accepted or refused. Scores do not remove boundaries. They allow those boundaries to move more easily and become less visible.

Individualised ranking still relies on comparison. Two people may receive the same consequence without knowing that they crossed the same threshold or which characteristics placed them together [26]. Each refusal then appears to result from a unique combination of attributes. One rule produces a series of problems presented as personal.

The score can dissolve the group able to contest the classification. Correcting one item may improve one file without changing the system. An appeal process must therefore reconstruct what the model separates. It must allow decisions to be compared, reasons to be brought together and recurring patterns to become visible.

A right of appeal remains largely fictional when a person must understand the model alone, obtain every document, pay for expert help and wait without provisional protection. In disability procedures, people are more likely to regard a process as fair when they can understand the standard,

present relevant evidence and see that the administration has considered it [128].

Challenge must work at several levels. The policyholder needs access to the decisive data and facts, a means to correct an error and a review that is more than confirmation of the first result. Where health, housing or income is at stake, appeal should prevent an irreversible decision from taking full effect before review.

Control must also be collective. Regulators, associations, researchers, trade unions and policyholder representatives need to compare decisions and audit their effects. A person should not have to discover alone that a threshold is shifting denials across a whole market.

An audit checks how a rule operates. Deliberation concerns the rule itself. The more data and expertise an institution possesses, the greater its duty to explain. A right to explanation is not a tour of the model. It must create a real possibility of having the consequence reconsidered.

Governing Uses

Models can speed up access to a right, identify an inconsistency, target prevention or document discrimination. Their value depends on the task assigned to them. The same prediction can open assistance, change a premium, impose a demand for evidence or stop care.

The stronger the effect on essential protection, the stronger the requirements of public justification and practical appeal. The purpose, data, threshold, role of professional judgement and route of challenge must be known. Institutions must also check whether an apparently limited use has changed over time. A tool introduced to draw attention to a file can gradually become a rule of refusal.

A map showing the exposure of a house may open access to work or assistance. It may also raise a premium, become a condition of credit or prepare withdrawal. A climate model operates at another scale, but the mechanism is the same. An organisation fixes the consequence, then asks the territory and its residents to adapt.

Chapter 10 — When Climate Enters the Contract

Climate enters homes through water, fire and cracks in walls. For many people, it will first appear in another form. A map will change colour. A premium will rise. Coverage will shrink. A bank will request further evidence, or a municipality will prohibit occupation. Risk will alter the present before it destroys the building.

Documented case

At Soulac-sur-Mer, on the Atlantic coast of south-western France, the apartment block known as *Le Signal* did not first disappear beneath the water. It began by losing its use.

The seventy-eight apartments were built in the second half of the 1960s, when the building stood well back from the shore. Several decades later, coastal erosion had brought the edge of the dune within a few metres of the property [270, 271].

The building was still standing. Its balconies, walls and windows remained visible. Storms and erosion had reduced the strip of land separating it from the ocean. In January 2014, when only about nine metres remained between the building and the edge of the dune, the municipal authorities ordered an evacuation and permanently prohibited occupation [271, 272].

The loss fitted badly into the categories already available. This was not a house swept away in a single night, a sudden flood or a fire with a clear before and after. Erosion advanced gradually. It was too foreseeable to resemble an accidental event, yet its effects had become too certain for residents to remain.

In 2018, France's highest administrative court confirmed that the erosion of the dune did not allow the owners to receive compensation from the national fund for major natural hazards, commonly known as the Barnier Fund [270]. The owners had to leave while remaining tied to their properties. They continued to face condominium charges, insurance costs and, in some cases, mortgage repayments. Some also had to pay for another home [273].

A special solution was eventually created. Legislation allowed compensation for the loss of use, and the first settlement agreements were signed in 2021 [274]. By the time demolition began in February 2023, the building had long since disappeared from the ordinary lives of its former residents. The concrete remained, but the homes did not [275].

Le Signal shows that social ruin can precede physical destruction. A property may lose its use, value or access to insurance while the walls

are still standing. Climate then acts through law, credit and contract.

This reclassification is not confined to the coast. After several catastrophic floods in Canada, the Intact Centre on Climate Adaptation found lower final sale prices, longer selling times and fewer properties placed on the market [9]. Physical danger can therefore affect the liquidity of housing, meaning the ability to sell it within a reasonable time without accepting a steep discount.

Behind the premium lies a politics of territory. A house depends on a watershed, coastline, soil, road network, evacuation route and history of building permits. Construction standards, levees, drains, emergency services and public guarantees reduce some risks while shifting others [276]. An insurer never prices a place left in a state of nature. It prices a territory already protected, developed, neglected or exposed through collective decisions.

An address carries this history without explaining it. The wildfires that struck the Landes de Gascogne in 2022 affected a cultivated forest shaped since the nineteenth century around maritime pine. The area had also experienced intensified commercial use and the expansion of suburban housing. The exposure of homes came from the meeting of forestry, land policy, urban development and a changing climate [277–279].

Documented case

In the autumn of 2022, a few weeks after the major fires in south-western France, a public meeting was held in Belin-Béliet. During the summer, fire had crossed the Landes de Gascogne, forced thousands of people to evacuate and burned tens of thousands of hectares. The town had not been destroyed, but everyone knew it might have suffered much more [279].

Residents, elected officials and forest owners tried to understand what had happened. A forester pointed to the housing developments built along the edge of the woodland. In his view, the problem came from homes placed too close to the forest. The nearer residents lived to the pines, the greater the chance of ignition and damage.

A resident replied that the pines had also been planted too close to the houses. She refused to let residents be treated as the sole authors of a danger from which they would be the first to suffer. The forest around their homes was not an untouched natural environment. It had been cultivated, harvested and replanted around one dominant species [277].

Another participant observed that the existing neighbourhoods could not simply be removed. The forest, however, could be managed differently.

Why should the discussion concern only the houses, rather than the continuity of plantations, the diversity of species, firebreaks and the maintenance of forest roads?

They were speaking about the same place, but telling different histories. Some saw residents moving into contact with an activity that was already there. Others saw forestry and planning choices that had made the territory more vulnerable. Between these positions stood the municipalities that issued permits, households searching for affordable housing, landowners and businesses dependent on the forest [278, 279].

An insurance map can represent this proximity with a colour or score. It can estimate the chance that a house will be reached by fire. It cannot decide how much of the exposure belongs to the homeowner, forester, municipality or economic organisation of the region. By charging the address, the premium risks giving an individual answer to a question the meeting left open. Are the houses too close to the forest, or is the forest too close to the houses?

Geographers use the term *riskscape* to describe the meeting between a material hazard and the ways a territory is inhabited, governed and modelled [280]. The fire remains real. The disagreement concerns the causes retained, the responsibilities assigned and the scale at which action should occur.

A climate premium can therefore be accurate within a model and still leave a household without a solution. To judge it, we must ask what the household can still do. Can it pay, borrow, complete the work, challenge the information, sell or leave? A price becomes a boundary when it signals exposure without opening any realistic way to reduce it.

From Map to Contract

Insurance has long dealt with storms, floods, earthquakes and fires. It knows that some events strike many contracts at once. It builds reserves, holds capital and buys reinsurance. Climate change is not confronting an industry that had never encountered catastrophe.

What is changing is the combination of several trends. Some hazards are becoming more frequent or intense. Dangerous seasons last longer. Reconstruction costs are rising. Buildings, infrastructure and insured values continue to concentrate in exposed areas. Historical series then provide a weaker guide to future losses [281].

Three ideas help separate these changes. A *hazard* is the possible physical event, such as a flood, drought or fire. *Exposure* refers to the people,

buildings and activities that may be affected. *Vulnerability* describes how severely they will be damaged and how well they can resist. The same rainfall can produce very different losses depending on sealed ground, the state of drains, basement construction and the resources households have to protect their property.

Climate changes the hazard. Urbanisation and planning change exposure. Standards, investment and unequal resources change vulnerability. Attributing every increase in losses to the natural event alone therefore misses part of the problem. Research on avalanches, for example, shows that exposure changes over long periods as building expands and also varies with seasonal movements of people [282].

Several Models for the Same Territory

Insurers can no longer extend past frequencies without adjustment. They use catastrophe models to simulate possible events, identify the buildings affected, estimate physical damage and convert it into financial loss. These models are especially important when claims are rare, records are short and portfolios are concentrated.

They do not produce a single future. In urban flood modelling, several approaches may explain past observations reasonably well and still disagree about which streets will flood next. A static map, a surface runoff model, a representation of the drainage system and a model connecting drains to the street do not describe exactly the same mechanisms [283].

This is sometimes called *equifinality*. Different models may fit observed events similarly while giving different results for rare events. For an insurer, these differences can alter expected loss, the capital required, the premium and the decision to cover an address [283].

Each projection also assumes a climate pathway, a condition of infrastructure, an adaptation policy and an evolution of exposed values. A premium therefore contains a view about collective decisions that have not yet been made. A municipality that maintains its networks, restricts new construction and finances protective work does not create the same future as one that postpones those choices.

Two forms of uncertainty are useful here. One is aleatory. No one knows which house will burn or which street will flood in the next event. The other is epistemic. It comes from incomplete knowledge, missing data or decisions not yet taken. It concerns the state of soils, the actual

resistance of buildings, the effectiveness of levees and the maintenance of forests [284].

Some epistemic uncertainty can be reduced through inspection, research, maintenance or public action. Converting it immediately into an individual premium may make a household pay for ignorance or delay that is not entirely its own. A better model can reduce uncertainty. It cannot decide which increase is affordable, which place should be protected or how the cost of leaving should be shared.

Ortwin Renn and Andreas Klinke distinguish the complexity of causal mechanisms, scientific uncertainty and ambiguity about values [285]. The first two call for more knowledge and comparison between models. The third concerns what society chooses to protect and whom it asks to pay. More data do not resolve that disagreement.

When a Map Changes Function

A map may represent a past event, a modelled hazard, exposed property, vulnerability or possible loss. It may inform residents, guide emergency services, prohibit construction, open access to assistance or alter an insurance price [286]. These uses are not equivalent.

The prologue showed that a map does not set its own consequence. Here, the change of function matters. Moving from a hazard map to a pricing map is not the automatic continuation of a calculation. An institution decides to use the result to allocate a charge. Moving from the same map to non-renewal adds another decision. The institution no longer wishes to carry the risk.

A map selects a phenomenon, period, resolution, scenario and threshold. It may describe its chosen object well while saying nothing about debt, tenancy, the cost of work, the availability of contractors or the resources of a municipality. Like any map, it offers a way of seeing a territory and leaves some things outside the frame [11].

These omissions do not make the map false. They only mean that it cannot decide alone who should remain insured, at what price and for how long. Physical danger constrains the available choices. It does not choose the colour, premium or right attached to a zone.

The same information can therefore support prevention, pricing or withdrawal. This shift is especially important when insurers, banks and public authorities rely on the same data [201]. An exposed zone may open

access to a survey and a grant. It may also make credit more expensive and insurance harder to find. The quality of the model does not remove the need to examine the decision that gives it force.

Three uses of price follow. A blind price keeps contributions relatively broad while concealing an important difference in exposure. It may preserve access in the near term, but it can also support new construction or subsidise valuable property. A signalling price makes danger visible and is accompanied by time, assistance, credit or protective work. A boundary price raises the premium, deductible or conditions without opening a realistic route to adaptation.

The distinction does not depend on the amount alone. The same price may alert a household with savings and quietly force out a household that can neither finance work nor find another offer. A price has a preventive role only when an institution organises what comes next.

Four Architectures of Climate Insurance

No country chooses between a wholly free market and solidarity without prices. Climate insurance combines pricing, pooling, reinsurance, legal duties and public guarantees. The main differences concern how quickly exposure becomes an individual charge and which institution takes over when the ordinary contract reaches its limit.

France and National Pooling

France's natural catastrophe regime, commonly known as CatNat, rests on national pooling. When an event receives official recognition as a natural catastrophe and the property policy covers the relevant damage, compensation is supported by public reinsurance and a state guarantee.

The CatNat surcharge does not vary directly with the exposure of each home.[27] For the hazards covered, the address does not determine the whole contribution. The rule expresses a national solidarity towards catastrophes whose causes and effects often extend beyond the owner.

The first report from the French Observatory of Natural Risk Insurability gives a partial view of what this architecture still achieves. Using

[27]The CatNat surcharge is an additional compulsory contribution applied to French property insurance contracts. Since 1 January 2025, it represents 20 per cent of the part of the premium covering property damage in home and business policies. Its rate does not vary with the particular exposure of the insured property.

data from forty-one insurers representing more than 90 per cent of the detached home market, it classified 97.7 per cent of municipalities in metropolitan France as showing no tension in insurer presence. A further 1.6 per cent showed slight tension and less than 1 per cent moderate tension. None was classified as facing severe tension in the 2022 data [287].

The measure does not capture prices, the quality of coverage or the ease of obtaining a new contract. Several insurers may remain present in a municipality while particular homes receive no affordable offer. The indicator provides a useful baseline for observing withdrawal. It does not measure insurability on its own.

Address level data can also serve opposing aims. They can reveal whether selection is concentrated in exposed areas. They can help each company steer its portfolio towards less costly locations. The Langreney report warned of gradual demutualisation, as each insurer improves its own position while the companies that remain inherit a more exposed portfolio [288].

The increase in the CatNat surcharge on 1 January 2025 reflects the financial pressure on the regime [289]. It does not solve coastal retreat, disputes over drought related subsidence or delays in adaptation. France's Court of Accounts has pointed to weaknesses in anticipatory policy, including the management of the coastline [290, 291].

National pooling protects against immediate fragmentation. It can also create the impression that compensation will be enough. Coastal erosion requires decisions about habitation. Some places will be protected and others left. The timetable and compensation must also be decided. Insurance can finance a loss, but it cannot choose the future of the coast by itself.

The United Kingdom and Flood Re

Flood Re creates a different compromise in the United Kingdom. Insurers can transfer part of the flood risk of eligible homes to a common pool. The household retains a policy sold in the ordinary market, while an industry wide levy helps finance highly exposed properties.

The scheme prevents flood risk from being converted immediately into a fully individual price. It is designed as a temporary arrangement. Its purpose is not only to subsidise current cover, but to buy time in which

homes and territories can become less vulnerable before the scheme is due to end [4, 292].

The practical question is what happens during the time bought by pooling. Without work, planning rules and finance for adaptation, the promised transition becomes a delayed increase in price.

The United States and Residual Markets

The United States has a more fragmented architecture. The National Flood Insurance Program made flood insurance available in places where the private market was insufficient. It also supported development and property values while accumulating debt and implicit subsidies. Reforms intended to bring premiums closer to risk exposed the conflict between a more accurate signal and the ability of households to pay, adapt or leave [7, 165].

California places insurance prices within a more visible regulatory procedure. Since Proposition 103, rates must be open to review so that they are not excessive, inadequate or unfairly discriminatory [293]. This review does not remove increasing losses. Tight price constraints may encourage insurers to reduce supply. Greater pricing freedom may preserve supply while making coverage unaffordable [294].

The California FAIR Plan then acts as a residual market, meaning a last resort arrangement for homes that cannot readily obtain ordinary cover. It prevents complete exclusion, but concentrates difficult risks and often provides narrower protection. Evidence from mortgage lending suggests that reliance on the plan has spread beyond the best known wildfire areas and entered the ordinary financing of housing [295].

The risk has not disappeared. It has moved to another institution. A residual market can leave a door open while separating ordinary policyholders from those dependent on a more expensive or fragile contract. The insurance crisis then becomes a credit crisis before every house has suffered a loss.

Regional Pools and Public Capacity

For a government, catastrophe creates an immediate need for money. Emergency shelter, water, roads, imports and public services must be financed before international aid, tax revenue or borrowing can arrive.

Several regions have therefore created catastrophe pools. The Caribbean Catastrophe Risk Insurance Facility, African Risk Capacity and comparable arrangements pool part of the risk across countries and buy reinsurance internationally [5]. They are not designed to reimburse every loss. They release funds quickly so that governments can act during the first weeks.

These covers are often parametric. Payment depends on an index, wind intensity, rainfall or a modelled loss rather than a detailed assessment of every damaged property. Speed comes with basis risk, meaning the risk that the index and the actual loss do not match [296]. A population may suffer severe damage without triggering payment, or receive an amount far from the loss experienced.

Malawi faced this problem after the drought of 2015 and 2016. The African Risk Capacity model initially underestimated the number of people affected because an assumption about the maturity of maize did not fit the varieties being grown. After dispute, correction and recalculation, a payment of $8.1 million was made in 2017 [5].

The conflict had moved into parameters, the crop chosen as a reference, the threshold and access to expertise. Parametric insurance shows that rapid payment also depends on a prior representation of the world. The model can provide resources for action. It must still be open to evidence from the people and institutions whose exposure it describes.

Climate Injustice Has an Address

Climate effects unfold across territories that were already unequal. In the United States, home insurance now connects physical danger more directly to credit prices and property values. The Congressional Budget Office describes the central tension. Rising losses and uncertainty push premiums upwards, while strict price regulation may reduce the supply of insurance [37]. A household may therefore face either a price it cannot afford or the absence of an offer.

This mechanism operates in places shaped by segregation, differences in income and unequal infrastructure. Climate does not create those divisions. It carries them into maps, property values and terms of cover.

Research on climate gentrification in Miami-Dade County shows how elevation and anticipated risk can affect residential change [297]. Areas on higher ground or with better protection become more desirable. House-

holds able to pay, wait or renovate have more choices. Others remain in homes whose value is becoming less secure while the cost of insurance rises.

Insurance can then turn a map of hazards into a map of solvency. The history of insurance redlining is relevant here. Refusals were once justified through congestion, crime, building condition and supposed neighbourhood quality. Territorial reasons presented as technical extended racial hierarchy and restricted access to credit [93].

Climate maps now rest on better established physical processes. They still enter territories produced by that history. The truth of the hazard does not make the distribution of its consequences just. An address may be objectively exposed even when the resident had little part in creating the exposure.

Property value is not a pure measure of danger either. It reflects the quality of the home, services, scarcity of land, coastal access, available credit and expectations of public protection. In Carteret County, on the coast of North Carolina, some highly exposed properties retained high values because access to the ocean and the view outweighed the expected discount for flood risk [298].

Uniform assistance for coastal property may therefore support a household with no realistic way to move, or preserve an expensive second home. A fair policy must read the hazard map together with income, debt, occupancy and the ability to leave. Equal exposure does not create equal social vulnerability.

That difference also appears in mobility. An owner with savings may complete work or accept a loss on sale. A heavily indebted household may become trapped in property that is difficult to sell. A tenant may face displacement and higher rent without receiving compensation for the building. Territorial classification has different effects depending on a person's position in the housing system.

A territorial bad risk is not always abandoned at once. It may remain insured at a price that removes the resources needed for work, through a segment offering less choice and more uncertainty. Exclusion then takes the form of degraded inclusion.

Private Models, Public Decisions

Catastrophe models are often built by specialist firms. Insurers, reinsurers, investors and regulators use them to estimate future losses. Their expertise becomes public in effect when their results organise access to housing, credit or insurance.

Preparing Scenarios without Mistaking Them for the Future

A scenario does not state exactly what will happen. It tests what institutions might still be able to do if losses exceeded recent experience [299]. Its value depends on the decisions, budgets and responsibilities it activates.

In Japan, flood maps prepared for very heavy rainfall show expected inundation, water depth, shelters and evacuation routes. The model is connected to decisions about warning, movement and the continuity of services [300, 301].

Preparation does not guarantee that the worst event has been imagined. In 2011, the tsunami exceeded several local assumptions. At Rikuzentakata, thirty-five of the sixty-eight designated evacuation areas were inundated [302]. The lesson is not to abandon scenarios. It is to treat them as revisable tools rather than boundaries of the possible.

A report cannot replace the means to act. Before Hurricane Katrina, evacuation scenarios existed, but the resources needed to carry them out were not always available [303]. An institution can describe a catastrophe reasonably well and still fail to protect those most exposed.

From Scenario to Price

A catastrophe model links several operations. It creates possible events, places them in space, identifies the buildings affected, converts physical intensity into damage and then converts damage into financial loss. At each stage, uncertainty may be summarised or made less visible.

The final map can look more certain than the calculation behind it. A comparison in Los Angeles County found substantial differences between a private model of future flood risk and an open method developed by researchers. The two tools assigned similar vulnerability levels to only a minority of the properties studied. Other comparisons have also found disagreement between vendors [304].

The Los Angeles fires of 2025 revealed a related problem. Some models represented fire spreading from wildland into developed areas more effectively than fire moving from building to building through embers, wind, density and construction materials [305]. A home could appear relatively safe on a vegetation map and still be vulnerable to an urban conflagration.

Disagreement does not mean that all models are equally useful. It means that disagreement should travel with the decision. When a premium, refusal or planning rule depends on a model, the institution should disclose the main assumptions, uncertainty and credible alternatives.

Ulrich Beck uses the expression *relations of definition* for the rules and powers that determine what will count as risk, cause, evidence and damage [306]. In climate insurance, those relations distribute authority among researchers, model providers, insurers, public authorities, courts and residents.

Comparing predictive performance is therefore not enough. We must also ask who controls the data, chooses the scenario, fixes the threshold and can challenge the consequence. A private model becomes a territorial decision in practice when banks, insurers and public authorities adopt its categories without independent expertise.

Models translate local environments into distributions of loss, capital needs and reinsurance products [307]. This translation is necessary to finance insurance. It captures only what enters the estimate of possible loss. Attachment to place, local activity and the ability to leave must be brought back when the institution decides what follows.

The Last Payer

The insurer stands at the end of a long chain. A public authority allowed construction. A bank financed it. A developer chose materials. The municipality maintains networks. The owner completes or postpones work. When water or fire reaches the house, the claim file brings together the effects of these decisions.

The insurer is neither responsible for the whole climate problem nor a witness without power. It cannot remake a watershed or move a neighbourhood. It does possess a particular form of knowledge. Claims bring together damage that had appeared isolated and reveal weak construction, fragile networks and territorial concentrations.

This position has historically led insurers to support inspection and safety standards. It creates a duty to warn and cooperate. It does not confer government of the territory.

The company itself is divided. Underwriting considers which risks enter the portfolio. Actuaries measure commitments. Finance follows capital and investments. Reinsurers, regulators, rating agencies, banks and model providers add further constraints. No single actor has to decide that a municipality should be abandoned. Each protects its own balance sheet, and their combined choices may produce withdrawal without a clear author [16].

Insurers are also investors [232]. On the liability side, they promise to pay future losses. On the asset side, they invest the resources supporting that promise. Through commercial underwriting, they also decide which activities to cover. A coherent climate policy cannot examine home insurance premiums while ignoring these other decisions.

The insurer's role remains limited, but it is real. It can publish aggregate information on losses and non-renewals, recognise effective adaptation, finance assessments and warn before damage makes action more expensive. When it benefits from public reinsurance, a state guarantee or the administration of a compulsory scheme, those advantages may justify duties of transparency, continuity and prevention.

From Compensation to Adaptation

Insurance finances the loss that remains after reasonable precautions. It cannot make every accumulation of exposure sustainable for ever. With climate risk, insured loss is often formed long before a claim, through zoning, permits, standards, maintenance and work that was never completed.

The Sendai Framework distinguishes the creation of new risk, the reduction of existing vulnerability, preparedness and the financing of residual loss [308]. This sequence places insurance more accurately. It acts mainly when possible loss must be shared. It can also act earlier through data, advice, incentives and rules for rebuilding [309].

The floods around Valencia in October 2024 show the difference between paying and transforming. One year later, Spain's public catastrophe compensation consortium had processed 98 per cent of claims for property damage and business interruption and paid about €3.84 billion [310].

The compensation system had mobilised substantial resources. Major flood protection works and lasting changes in planning remained slower [311].

An institution may be effective at settling an identified loss and much slower when it must finance a catastrophe that may never occur. Chapter 13 returns to this problem of the non-event. Here, it shows why the strength of an insurance regime cannot be measured only by the amount paid after disaster.

Many levers lie outside the policy. Flood damage depends on sealed surfaces, drainage, zoning and protective works. Wildfire damage depends on vegetation, electricity lines, materials, distance between buildings and evacuation routes. The risk of a home develops throughout its life, from planning and permitting to finance and maintenance [312].

When these decisions are postponed, their cost returns as a premium, deductible or non-renewal addressed to the household. Pricing then individualises a collective failure. This does not justify keeping prices artificially low. A price that conceals danger can support new construction and shift costs to future generations [313]. Bringing the price closer to risk without acting on its causes is not a prevention policy either.

Moving from sorting to adaptation changes the order of decisions. A map should not lead first to an increase and only later to a search for solutions. Where risk can be reduced, it should open an assessment, identify the actor able to act, estimate the cost and organise finance.

Insurance can contribute without governing the process alone. Municipalities control planning and some infrastructure. Banks finance property. Owners act on buildings. The state sets standards, redistributes resources and can carry losses that no private portfolio can retain. A risk signal becomes useful when these powers are connected.

Organising Retreat

In some places, remaining will become too dangerous or costly. Denying that possibility would prepare further disasters. Departure, however, cannot be left to non-renewal letters.

Managed retreat concerns timing, compensation, debt, tenants, owners, employment, public services and social ties [314]. It is not simply the movement of buildings away from danger. It requires decisions about who can leave, who may return and what the vacated land will become.

The contract can restrict this possibility after disaster. Compensation calculated for rebuilding in the same place may be insufficient to buy elsewhere, even when the household does not wish to remain [135]. Claims rules therefore govern geography as well as payment. Before loss, they should state how debt, replacement value and rehousing will be handled when rebuilding in place is no longer reasonable.

Retreat may also redistribute land. After the 2004 tsunami, safety zones prevented some fishing communities in Sri Lanka from rebuilding along the coast, while tourism projects received more favourable treatment [303]. A rule presented as protection from danger can displace residents and open valuable land to other uses.

A policy of retreat therefore needs public expertise, understandable information, contestable models, support for protective work, a transition timetable, relocation funding, tenant protection and rules for debt. Without such a procedure, climate is governed by an accumulation of private decisions. A premium rises, an insurer refuses, a bank withdraws finance and a municipality gradually loses its residents.

Private withdrawal creates a policy without a name. It does not announce that a territory is being abandoned. It says only that cover is unavailable, the deductible has risen or the market is under strain. Residents discover separately that the place where they live has already left the ordinary promise.

This leads to the next chapter. Calling a territory uninsurable may describe a real technical limit. Losses may be too correlated, too certain or too costly for a particular contract. The word may also hide the end of a chain involving models, reinsurance, delayed prevention, credit and public support. Before treating uninsurability as a state of the world, we should ask which institution can no longer carry the risk, with what coverage, for how long and after which opportunities for adaptation.

Chapter 11 — The Uninsurables

No one is born uninsurable. A person, activity or place becomes so when a contract, market or institution decides that the risk will no longer be carried under ordinary conditions.

Composite scene

Émilie was forty-four when she and her partner applied for a mortgage. The bank approved the application. One step remained. In France, mortgage protection usually requires borrower insurance*, which repays the loan if the borrower dies, becomes disabled or, under some policies, is unable to work.*

Ten years earlier, Émilie had been treated for breast cancer. Regular checks followed, then the appointments became less frequent. She returned to work and lived without a recurrence. In ordinary life, the illness belonged to the past. On the insurance questionnaire, it returned to the present.

The right to be forgotten does not claim that the illness never existed. It decides that, after a specified period and under certain conditions, the illness may no longer be used to refuse insurance or impose an additional premium. True information need not be allowed to act for a lifetime [315].

Karim was thirty-eight. He employed two people and ran a small renovation company. When he tried to strengthen his professional liability cover, the form asked whether he had ever been convicted of an offence.

The conviction was fifteen years old. After a fight and a short period in prison, Karim had worked, built his company and paid his bills. None of that later life fitted into the box on the form.

One insurer declined the application. Another offered cover at a higher premium with several exclusions. The broker spoke of a specialist market. Karim could still obtain insurance, but he no longer belonged to the ordinary market. Another institution had extended the sentence without a new judgement.

A house can follow a similar path. It remains standing, but a letter announces that the policy will not be renewed. Another company accepts it with a very high deductible, meaning the part of any loss the household must pay itself. A third requires work the owner cannot finance. The bank hesitates, the sale becomes harder and the home loses part of its role as a source of security.

The word *uninsurable* covers several situations. It may describe a material limit. Loss has become almost certain, too concentrated or too large for a particular contract. It may also mark the end of a chain made up of

models, thresholds, underwriting rules, inadequate income and missing assistance. In the first case, an insurer cannot reasonably promise to pay. In the second, a particular arrangement has stopped making protection accessible.

Insurance without boundaries does not exist. Some risks exceed the resources of a private portfolio. Some places will need to be adapted and others left. The difficulty begins when a technical boundary is presented as a complete answer. A claim that something is uninsurable should always specify for which insurer, with what cover, for how long and after which preventive measures.

How a Boundary Is Made

A Technical but Situated Limit

A risk becomes difficult to insure when loss approaches certainty, when many contracts are affected at the same time or when the possible cost requires too much capital. Catastrophes often combine these problems. A flood, wildfire or cyclone can trigger payments across an entire area while also placing pressure on reserves, claims teams and reinsurance [316, 317].

The previous chapter showed how climate change adds uncertainty about the world to come. Insurers combine past observations with scenarios for infrastructure, urban development, forests and adaptation. A climate premium extends more than previous losses into the future. It also contains a view of what that future will be.

Moral hazard[28] matters as well. Poorly designed cover can encourage building in an exposed area or reduce the incentive to complete useful work. This does not mean that every exposure follows from personal carelessness. Someone may have inherited a house, bought before the maps were revised or chosen the only home compatible with their work and income.

A technical diagnosis narrows the available responses without selecting one by itself. Highly correlated losses may call for compulsory reinsurance, a public fund or a larger pool. An unaffordable premium may call

[28] In insurance, moral hazard refers to the possibility that cover changes behaviour or precautions. The term does not necessarily imply moral wrongdoing.

for targeted assistance, a loan for preventive work or supported relocation [164, 165]. The limit of a private contract is not yet the limit of every collective response.

Moving to a larger scale does not solve everything. A public guarantee uses resources and may sustain development that should not continue. Uniform assistance can benefit owners of valuable property as well as households with no practical alternative. These are questions about how costs should be shared. They do not prove that the whole risk should fall on the person who happens to occupy the property today.

Supply, Membership and the Guarantee

Insurability cannot be measured simply by asking whether a company is present in an area. France's Observatory of Insurability identifies several separate conditions. The hazard must be identifiable, people must have the financial capacity to buy cover, insurers must be willing to offer it and prevention must be sufficient to keep the system viable [287]. These conditions can change independently.

The first boundary concerns supply. A person receives no quotation, or only an offer from a last-resort scheme. The second concerns membership in the ordinary market. A policy exists, but it belongs to a specialist segment in which more costly profiles are concentrated. The third concerns the content of protection. The policy remains in force, but an exclusion, limit or deductible removes most of its value [318].

A home can be insured on paper and poorly protected in practice. The presence of a few policies in a municipality does not show whether new applications are accepted, premiums are affordable or required work can be financed. The same is true for a person. An extremely expensive offer or a policy emptied of its main guarantee preserves the appearance of choice while organising departure from the ordinary market.

Several decisions make this boundary. The contract defines the loss that will be covered. A model estimates its cost. An underwriting rule determines which applications will be accepted. Reinsurers and regulators influence the capacity available. Public authorities decide whether to finance work that could reduce exposure. No actor controls insurability alone, but their decisions combine to produce a concrete line.

An insurer's withdrawal does not create an empty space. It moves loss towards the family, bank, municipality or state. Public authorities already redistribute risk through infrastructure, liability rules, emergency

assistance and financial guarantees [276]. Insurance also distributes risk rather than merely compensating it [148]. Refusing a contract does not remove the cost. It changes the institution that will bear it.

The same information can move the boundary. A map created to guide public works may later support non-renewal. A medical diagnosis recorded to guide treatment may affect access to a mortgage. This change of purpose does not make the information false. It changes the power attached to it [201].

The Prudent Bad Risk

Insurance debates often feature the careless person. They build too close to water, drive too fast, smoke or neglect maintenance. When the bad risk is assumed to be at fault, a high premium can look deserved. Contemporary uninsurability brings a less comfortable figure into view, the prudent bad risk.

This person has not necessarily ignored a known danger. They may find themselves on the wrong side of a map after buying before it was revised. They may work in an exposed occupation, live in an underprotected municipality or carry the trace of an illness they could not avoid. A risk can be costly without the person carrying it having deserved the cost.

The language of risk still distributes blame easily [108]. A higher premium suggests that the policyholder should have been more cautious. Yet an address carries a history of infrastructure, land values, segregation and planning. Health bears the imprint of work, housing and access to care. A model sees the outcome more easily than the chain that produced it.

Collective contradictions are then returned as individual tasks [27]. A resident must move in response to failed planning. A worker must change their conduct to offset occupational exposure. A former patient must prove recovery to the institution financing their home. Yet autonomy requires money, time, credit and real alternatives [29].

Poverty acts several times. It increases exposure, reduces the ability to prevent loss and makes the price harder to bear. The same deductible takes a larger share of a modest income. Work is postponed for lack of credit. Ordinary cover may then be replaced by a more expensive and more limited policy.

David Caplovitz showed how limited cash and restricted access to ordinary markets led poor families to pay more for goods that were often worse [319]. Contemporary classification continues this mechanism. It does not always close the door. It may open a more expensive one, with conditions that accumulate disadvantage [320].

The premium does not call the person guilty. It simply presents the cost as theirs. That attribution is often enough to hide the decisions about work, housing and planning that also contributed to the exposure.

The Household as Silent Insurer

When institutional protection recedes, loss does not always fall on an isolated individual. It enters the household. A relative advances the deductible, provides a place to stay after a flood, completes forms or reduces working hours. The family becomes a small insurer without capital, reinsurance or a meaningful right to refuse.

Households with more resources can buy time, expertise and services. Others absorb loss through debt, additional work or giving something up. This transfer rarely appears in official accounts. It is also unevenly distributed. Care and administrative work still fall disproportionately on women [27].

A delayed payment or exclusion creates unpaid work somewhere. Help given today may postpone a parent's retirement, reduce a child's education or become a moral debt between relatives. People without available family reach the boundary sooner. A policy that quietly assumes the presence of a protective household turns the absence of relatives into another disadvantage.

Collective protection is not meant to abolish family assistance. Its purpose is to prevent access to care, housing or reconstruction from depending entirely on the availability of a partner, daughter or friend. Withdrawal appears cheaper while this time, labour and uncertainty remain outside institutional accounts.

Inclusion without Belonging

The uninsurable person or place does not always disappear from the market. It may be moved into cover that is more expensive, narrower and less stable. Last-resort schemes prevent immediate abandonment,

but they concentrate risks that ordinary insurers no longer want. They should be judged by the protection they offer and by whether people can eventually leave them.

California's FAIR Plan illustrates the tension. It maintains basic fire cover for property owners who cannot find an ordinary policy. That continuity is essential. The cover is often narrower and has to be combined with costly supplementary protection [1, 321]. When the scheme grows for many years, it ceases to be a temporary refuge. It becomes the normal market for some territories.

Documented case

When Glenn and Lorraine Crawford bought their home in Agoura Hills, north-west of Los Angeles, in 2012, insurance cost about $500 a month. The amount was substantial, but it still belonged to the ordinary expenses of owning the property.

Fourteen years later, the insurer did not formally reject the house. State Farm offered a new premium of more than $44,000 a year. The policy would still not have covered the full cost of rebuilding after a total loss. The Crawfords searched for an alternative. The only reported offer was about $80,000 a year through Lloyd's [322].

On paper, the market was working. Two firms had named a price. In practice, an offer that almost no household can pay is not a real choice. Withdrawal can take the form of a premium that keeps the contract alive while placing it beyond reach.

Formal availability is too weak a test. The premium, deductible, exclusions, stability of the policy and adequacy of the possible payment all matter. An exchange can remain contractual and still be deeply unequal when one party has no realistic alternative [323].

A household trying to preserve access to credit or remain in a home that cannot be moved does not enter the market as an ordinary consumer. Lack of alternatives can become a source of revenue for a specialist segment. In a society organised by rankings, a poor score can lead to refusal and create markets for more expensive products [25].

Degraded inclusion can make the original problem worse. An extreme premium reduces the savings available for work that might restore access to ordinary cover. A large deductible delays repairs and increases vulnerability to the next event. A last-resort scheme should provide a route back. The required work, its financing and its effect on the premium should be known in advance.

Territorial uninsurability often emerges from many separate decisions. One insurer stops writing new business. Another raises deductibles. Reinsurance becomes more expensive and banks grow more cautious. No one announces that the neighbourhood is being abandoned, but the combined decisions change property values and the possibility of staying [324].

After the 2018 Camp Fire, some Californians whose houses had burned referred to owners whose homes remained standing as *the unlucky ones*. An insurance payment could allow the first group to rebuild or leave. The second remained tied to a property in a threatened area that had become difficult to insure and sell [135]. The house had survived the fire but was ceasing to function as financial security.

Some places will have to be adapted and others left. These choices affect property, debt, jobs and attachments to place. They become governable only when they are recognised as collective decisions [314]. Insurance can signal urgency. It should not become the quiet authority that decides by itself who may continue to live somewhere.

Tenants also experience this change. Higher insurance costs may return through rent. Repairs may be postponed and some landlords may sell. A municipality can lose residents and revenue at the moment it most needs to finance adaptation. The risk signal then weakens the institution that might have responded to it.

How Long Should the Past Act?

Uninsurability can attach itself to a biography. A cured illness, old debt, completed sentence or database error may continue to act when a person seeks work, housing, credit or insurance. The past becomes a predictive resource for institutions for which the information was not originally collected.

Some institutional memory is legitimate. Recent fraud, continuing exposure or a poorly reported loss may matter when a contract is assessed. The duration and permitted use of that information are still choices. Information relevant to medical care need not become credit information. A conviction may be examined for a particular position without following a person into every professional activity.

The right to be forgotten for some cancers places a limit on this memory. It does not change the medical past. After a specified period and under

certain conditions, that past can no longer be treated as an admissible reason for different terms in French borrower insurance [315]. Recovery must allow a return to ordinary conditions of protection.

The same reasoning can apply to criminal records. When employment, housing, credit and insurance keep renewing the effect of a completed sentence, punishment continues without a new decision. Traces produced by one institution feed tools that allow others to keep the person at a distance [253].

A deletion date is not enough. Purpose must also be limited. Information may remain stored without being available for every decision. Correction matters just as much. A conviction attached to the wrong person, a medical code interpreted incorrectly or a debt already repaid can circulate for years. The person receiving the consequence must know which trace was used and be able to reach an institution capable of changing it.

The Right to a Fresh Start

The right to be forgotten belongs to a broader idea, the right to a fresh start. A conception of freedom extending across a whole life cannot require every illness, error or past difficulty to retain the same force forever. A just institution must allow changed circumstances to open new possibilities [233].

This does not erase responsibility. When a person has harmed someone, the repair owed to the victim remains a separate question. Repair does not require exclusion from employment, credit or insurance without an end date. The duration of institutional memory, the area in which it may be used and the severity of its consequences must each be justified.

A fresh start also has an insurance logic. Before knowing who will experience illness, bankruptcy, error or regret, people may have a common interest in living in a society where return remains possible. Collective protection then finances more than payment after loss. It also protects the possibility of regaining a place within ordinary institutions.

Return may require time, obligations or a new assessment. Its essential condition is reversibility. A person should know what they can do, how long the restriction will last and under what conditions the past will stop deciding on their behalf.

The bad risk is not simply the person or place that costs more. The category often appears at the point where collective explanation stops.

A health cost is attached to a body rather than to work, housing or access to care. A flood cost is attached to an address rather than to a century of urban development and sealed ground. Pricing assigns loss to the actor the contract can reach. Politics must travel back through the chain that produced the exposure.

The threshold of minimum security helps identify the point at which this attribution becomes untenable [28]. A premium may reflect risk and still make the home impossible to keep. A deductible may be technically defensible and still empty the policy of value. Accurate information may close access to credit for years.

When housing, work and the body become fully priceable, they risk being treated as mere supports for a price [115]. They are also the settings in which a life is lived. Calculation can make their fragility visible. It does not acquire the right to decide alone who may continue to inhabit them.

A Politics of Insurability

A politics of insurability begins by naming the boundary. A refusal, extreme increase or transfer to a specialist market should identify the peril involved, the information used, the duration of the decision and the cover that can no longer be offered. The phrase “risk too high” is not enough when the consequence closes access to housing, credit or work.

It must then make return possible. A last-resort scheme should not become a permanent destination. A person or territory needs to know which work, change in circumstances or passage of time could reopen access to the ordinary market. When the necessary measures are beyond reach, policy should finance them rather than turn an inability to act into fault.

It must also limit institutional memory. A cured illness, repaid debt or completed sentence should not retain the same force indefinitely. An appeal must be able to challenge inaccurate information, the legitimacy of its use and the scale of the consequence.

These requirements do not remove financial limits or difficult choices. They prevent a boundary made by several institutions from presenting itself as a natural fact. An isolated person cannot see other refusals, compare reasons or challenge the rule. Their dispute remains confined to one file. The next chapter examines how people classified separately can turn their experiences into a common problem.

Chapter 12 — Those Who Refuse to Be Classified

A category appears solid while each person receives its consequences alone. One person challenges a surcharge, another a medical record and a third a refusal of cover. Each file seems particular. The category becomes less obvious when the people concerned compare their experiences and discover that the same rule has organised their difficulties.

Documented case

In the early 1980s, riders of motorcycles and other powered two-wheelers in France often struggled to obtain insurance at an affordable price. The market gathered them under a familiar figure. The motorcyclist was assumed to be young, reckless and exposed to serious accidents. Insurers presented the premium as the translation of a cost.

Riders did not deny the falls or the vulnerability of a body without the protection of a car. They challenged the way an entire practice was reduced to a category that almost automatically led to a high premium, cancellation or refusal.

The movement of angry motorcyclists did more than ask insurers to correct their prices. It organised training, developed knowledge about riding and tried to create an institution able to cover its members. In 1983, this mobilisation led to the creation of the Mutuelle des Motards [325].

The people whom the market had grouped together as bad risks became member-policyholders. They were insured by the mutual and also belonged to the organisation that owned it. They had not abolished calculation. They had gained a voice over cover, prevention and the use of common resources. Refusing the price assigned to them had led them to take back part of the rule that produced it.

An individual appeal remains essential. An address may be wrong, a claim may have been attached to the wrong person or a model may describe the situation badly. Correcting the file can reduce a premium or reopen access to cover.

That victory leaves the rule intact. To win, the person often has to show that they do not resemble the other members of the disadvantaged category. They leave the bad group without questioning its existence.

A challenge takes on a different meaning when the person no longer says only that their file was misread. They show that the same rule repeatedly produces the same wrong. The question then extends beyond data

accuracy. It concerns the way the problem was defined, the evidence accepted, the consequence attached to the classification and the alternatives the institution had set aside.

From an Individual File to a Common Wrong

The effects of an insurance policy are often scattered. One household receives an increase, another a narrower offer and a third no answer at all. An owner learns that the policy will not be renewed. A tenant encounters the consequence later through a rent increase or the sale of the building. Each situation can be explained by a local reason. While the files remain separate, no one knows whether the problem is recurring.

The insurer sees something different. It knows its acceptance rates, nonrenewals, territorial differences and the categories in which adverse decisions accumulate. This asymmetry often determines who can recognise a policy in what looks to those affected like a series of isolated misfortunes.

The first task of a collective is to bring together what the organisation treats separately. Letters are compared, testimonies collected, reasons coded and maps annotated. A common wrong does not arise simply because several people suffer. It becomes visible when their experiences can be connected to the same rule.

Documented case

In October 1987, Julius Joseph, Samuel Parker and John Moore contacted a lawyer and the Milwaukee branch of the National Association for the Advancement of Colored People. The three Black insurance agents had more than fifty years of experience between them. They described practices that restricted access to homeowners insurance in Black neighbourhoods.

The problem did not always take the form of an explicit ban. Some calls went unanswered. Vague criteria were applied differently from one neighbourhood to another. Maps and instructions directed agents away from certain areas. Residents knew that obtaining cover was difficult. They did not yet possess the documents needed to show that the difficulty formed a pattern.

A redlining committee brought the evidence together. Residents described their attempts to obtain motor and homeowners insurance. Former agents explained internal instructions. Paired tests sent otherwise similar applicants to the same providers and compared the responses. Statistics revealed the geography of policies. No single form of evidence would have been enough [326].

The action against American Family involved the NAACP, the American Civil Liberties Union, residents and the United States Department of Justice. The settlement reached in 1995 provided $14.5 million. It also required changes to underwriting rules, the rules used to decide which risks to accept and on what terms, as well as new agent locations in the affected neighbourhoods, development targets, loans and support for home repairs [326].

The mobilisation had not merely demonstrated unequal treatment. It had helped define the material conditions for a return to the ordinary insurance market.

A statistical category does not become a collective by itself. The people it gathers may not know one another. They may not even realise that the same rule applies to them. Older rating classes at least had names. An individual score gives each person a result assembled from many changing attributes. It is harder to connect that result to a shared experience [26].

Associations, meeting places, aggregate data and common accounts are needed to move from the file to the collective wrong. The group may form during the dispute. Its members do not necessarily share a prior identity. They share the fact of being affected by a decision and the wish to intervene in the definition of the problem [327].

In insurance, this intervention often comes late. The product has been designed, the rating system adopted and the model built into routine procedures. Discussion begins when the increase or refusal has already reached the contract. Publishing refusal rates, reasons for non-renewal and territorial effects would allow action earlier, before isolated decisions accumulate into a boundary.

Bringing Other Knowledge into the Room

Challenging a classification sometimes requires learning the language of those who built it. The AIDS movement offers an important example. By the late 1980s, ACT UP activists were not only denouncing slow research and poor access to treatment. They were discussing virology, clinical trials and the rules used to recruit patients. AZT, or azidothymidine, was among the first antiretroviral medicines used against HIV, the human immunodeficiency virus [328, 329].

Activists gained scientific credibility without becoming assistants to researchers. They challenged trials conducted on highly selected populations. Excluding people who had already received some treatments could

make analysis easier, but it also reduced the reach of the results and sometimes kept those most in need out of the trial. Activists helped change the criteria used to decide which knowledge and which study populations were acceptable [329, 330].

Counter-expertise means the capacity to examine the questions, methods and conclusions of official expertise. It does not claim that every personal experience is equivalent to a scientific study. It shows that technical skill alone cannot decide which effects deserve to be measured or which solutions should be considered [331, 332].

Different forms of knowledge concern different parts of a situation. An actuary knows claim frequency, selection and the cost of capital. A resident knows which roads become impassable, which work has already been completed and who will be unable to evacuate. A policyholder knows what a deductible means for a household budget, how an illness has changed and why recorded behaviour may not reflect a free choice.

The expert usually answers a precise question. They estimate a cost, assess damage or measure the effect of a variable. The quality of the work depends on how well that question is answered. The group concerned may show that the question is too narrow. It asks what will happen after a refusal, who produced the exposure and why the means to reduce the risk were not financed. Research carried out in laboratories and organisations then meets knowledge produced in direct contact with the situation [327].

This encounter reveals effects that the model left outside its frame. A flood map measures water depth but may not show that a household has no car or includes a dependent person. A health model predicts expenditure but does not count the work transferred to relatives when care is refused. An underwriting rule describes a building without tracing the decades of disinvestment that made repairs unaffordable.

Learning institutional codes opens a door and creates a risk. To be heard, a collective adopts specialised vocabulary, evidence formats and timetables. This translation can distance its representatives from people who do not have the same time or training. ACT UP experienced this tension. Expertise enabled intervention, but it also created divisions within the movement [329].

The answer is not to reject competence. Knowledge must be shared, spokespersons must remain replaceable and decisions must remain open to those who will bear their consequences. Counter-expertise does not succeed when it replaces the institution's specialists with a small group of permanent specialists from the movement. It succeeds when it changes

the questions that can be asked and the conditions under which evidence circulates.

Producing Data against Data

Institutions classify with the information they possess. Collectives often begin by seeking access to refusal rates, territorial differences, variables and decision histories. They then discover that some decisive information does not exist. No database records every call that received no answer or every person who gave up before submitting an application.

Other costs remain outside the files. Time spent on procedures, repairs paid without making a claim, unpaid family work and consequences for tenants are rarely connected to the insurance decision. Counter-data make some of these absences visible. A collective can record refusals, map non-renewals, organise paired tests or follow the effects of a score over time.

These numbers do not speak for themselves any more than the insurer's numbers do. Cases must be selected, testimonies checked, records cleaned and limitations explained. This work requires resources and reflects values. Its force does not come from a claim to offer pure truth. It comes from challenging the organisation's monopoly over the description of its own effects [333].

Data activism refers to practices through which citizens produce, reuse, challenge or protect data. Some build databases and display disparities. Others limit collection, obscure a trace or prevent it from circulating [334]. This second form matters. Resistance does not always mean giving an institution more information about oneself.

A person may want an address corrected while disputing its use as a substitute for a history of segregation. A collective may ask for a more accurate map while refusing automatic withdrawal from every area it marks as exposed. An old illness may be recorded correctly without being an acceptable reason for a higher premium. Accuracy does not settle the legitimacy of use.

Algorithmic categories create profiles designed for an operation. They help sell, direct, monitor or decide. They do not necessarily seek to recognise the identity a person claims for themselves [335]. Offering a fuller account of who one really is can therefore leave the main question untouched. The conflict concerns the authority to turn traces into

consequences.

Challenging a system does not always mean asking for a more accurate or better trained model. The disagreement may concern the task itself, the information the institution claims the right to use or the consequence attached to the result. Rejecting automation does not mean rejecting all technical tools. It may mean that this decision should not be delegated, or that this classification should not produce this price, scrutiny or refusal [210].

Counter-expertise must therefore be able to reach two different conclusions. The measurement may be poor and require correction. It may also be accurate enough but unsuitable for the proposed use. Rights to be forgotten and zones of non-conversion protect this second possibility. A democracy of risk does not demand that every difference be measured more precisely. It also decides which differences will not become prices.

Producing counter-data takes time, skill and legal protection. People already weakened by refusal often have the fewest resources with which to become experts in their own exclusion. Checking records, understanding a model and lodging an appeal become additional work. When that burden rests entirely on the individual, failure may be mistaken for acceptance [336].

Access to data, support from associations, adequate deadlines and independent expertise determine who can genuinely take part. They prepare the next step, when the knowledge produced must enter a procedure capable of changing the rule.

Entering the Procedure

An ordinary appeal begins after a premium increase, refusal or interruption of a benefit. It may correct an error, but sometimes comes too late to prevent a sale, a loss of care or departure from a neighbourhood. Effective participation must be possible before the decision is fixed.

California's Proposition 103, adopted in 1988, allows consumer organisations to intervene in the examination of some insurance rate applications. They may recover their costs when their participation makes a substantial contribution to the proceeding [293, 337]. The system does not guarantee low premiums. It prevents the insurer's expertise from being the only source used to define the relevant evidence, the effects of the rate and the possible alternatives.

This counterweight must also account for its own practices. A reform debated in 2026 proposed clearer standards for substantial contribution, closer review of fees and wider publication of documents. Consumer organisations feared that making funding harder to obtain would reserve technical proceedings for groups that already had substantial resources [338, 339].

Professionalisation can be expensive and can produce its own routines. It may still be necessary when the other party has permanent legal, actuarial and regulatory teams.

A serious challenge brings together several capacities. The rule and its effects must be known. Intervention must occur before the consequence becomes irreversible. The collective must then be able to act on the purpose, data, thresholds and alternatives [340]. Transparency without power merely leaves people better informed about what is happening to them.

Collective action also protects those who do not wish to reveal a diagnosis, conviction or financial condition in public. An association, trade union or municipality can carry the dispute without making every individual the public face of their vulnerability.

Participation is not yet governance. Consultation after a model has been built can absorb criticism without changing the decision. Participation becomes political when it can alter the definition of the harm, the information admitted, the consequence and the composition of the body that decides [36, 207].

From Counter-Expertise to Counter-Institution

An association can document refusals, argue for broader rating classes or defend an obligation to offer cover. It does not necessarily have to establish reserves, buy reinsurance or maintain supply after a bad year. Reserves are funds set aside for future claims. Reinsurance is cover purchased by an insurer to share unusually large or concentrated losses.

This difference does not make the criticism illegitimate. It shows what changes when a collective decides to carry a promise itself.

The Mutuelle des Motards crossed that threshold. From 1981, tens of thousands of people financed the creation of an insurer before the first policy was sold. By September 1983, around forty thousand subscribers

had supplied the necessary resources [325]. They were not yet buying cover. They were financing the possibility of offering it.

Collective ownership removed none of the constraints of insurance. The mutual had to estimate losses in a population it knew imperfectly, set contributions, negotiate reinsurance and retain enough capital for difficult years. The members who had rejected a category imposed by the market had to distinguish among motorcycles, uses, experience and riders themselves.

Their advantage did not lie in abolishing classification. It lay in more situated knowledge of the practice and in the ability to debate how that knowledge would be used. The mutual could connect prevention to training that riders could actually attend, examine difficult files with elected representatives and adapt cover to the particular vulnerability of two-wheelers [325].

A crisis at the end of the 1980s also showed the limits of the experiment. Poorly controlled diversification weakened the accounts. Mutual ownership did not protect against strategic mistakes or governance conflict. It did, however, allow an *additional assessment*, a further contribution requested from members when ordinary resources were no longer sufficient.

Members had to decide whether to finance an institution in difficulty. Other mutual organisations and reinsurers also supported its recovery [325]. Solidarity was no longer an abstract principle. It became money to be paid, a narrowing of the mutual's activities and a debate over the decisions that had caused the crisis.

A counter-institution becomes credible when it remains answerable for its promise over time. It must say who will pay during a bad year, who will decide how balance is restored and how those classified by the new rules can still challenge them. Owning the institution does not remove the duty to account for its decisions.

Mutuals can be understood as user-owned firms created when ordinary market relations protect users' interests poorly [61, 62]. Ownership changes who controls the remaining surplus and who holds final authority over the organisation. It does not guarantee equal prices or active democracy. Members do not examine every model, and management can move away from the movement that founded the institution.

Nor is a counter-institution limited to a mutual insurer. A data cooperative, a territorial prevention fund, a public utility or a community organisation able to finance repairs can take back part of the rule. What

matters is the combination of three powers. The institution must be able to define needs, administer resources and remain responsible over time for what it has promised.

Few groups can create their own insurer. There are intermediate forms between an individual complaint and that solution. An association maintains a database of refusals. A trade union negotiates cover. A municipality finances work. A regulator gives affected groups a right to intervene. Knowledge can remain close to lived situations while capital and reinsurance are organised on a wider scale. Local autonomy would lose its meaning if it forced the group to bear alone a catastrophe beyond its capacity.

The Boundaries of "We"

Not every category becomes a collective easily. Motorcyclists shared meeting places, associations and a visible practice. AIDS activists had political networks. In Milwaukee, agents understood the internal practices of insurers. Other people may not know that the same rule has brought their situations together.

Individualised scores disperse the wrong. Tenants receive its effects indirectly through rent or the sale of a building. People with old illnesses or convictions may hesitate to organise around a history they are trying to leave behind. Personalisation can turn a collective effect into a series of apparently private results [26].

Public statistics, aggregate data and rights of collective action can help the group discover itself. This representation must include those who were refused. An appeal available only to policyholders already admitted to the pool leaves outside the people whom the rule excluded [318].

The collective has boundaries of its own. It may protect its members by shifting costs to a less organised group. A specialist mutual may improve cover for those who enter and become a closed club. A professional association may concentrate speech among a few experts. A counter-institution remains open only when the next groups it classifies still have the means to challenge it.

This requirement returns us to the difference between consumer choice and citizen judgement. Comparing quotations allows someone to choose among products. It does not decide which differences should remain pooled, which needs require a guarantee or which obligations institutions

should accept [341]. Taking back the rule means moving from a choice among offers to a discussion about the architecture of protection.

People who are classified no longer seek only to prove that they do not belong to the bad group. They can turn an assigned risk into a shared experience and build the means to act. A legal victory, a counter-database or a new mutual does not, however, solve the problem of time.

Infrastructure must be maintained, work financed and the benefits of prevention preserved when the policyholder, contract or owner changes. Counter-expertise can alter a decision. Preventing losses over the long term requires resources and an institution able to recognise the value of an event that may never happen. That is the problem of the next chapter.

Chapter 13 — Building an Institution for the Non-Event

The Portfolio That Leaves

A counter-institution can take back part of a rule. It must still pay for whatever will prevent the damage. Prevention then meets a simple difficulty. The expense is certain and immediate. The loss avoided will never appear in a claim file.

Composite scene

The town had flooded twice in four years. The first time, local officials called it an exceptional event. The second time, no one knew what to call it. An exception could not become permanent.

Water had entered through the same streets, cellars and garages. Residents brought out the same pumps, mops and insurance files. The council approved a programme of work. A retention basin would be enlarged, backflow valves installed, riverbanks repaired and several paths rerouted.

For two years, the town lived with machinery, dust, closed roads and slightly higher taxes. Then nothing happened. Five years passed without a major flood. Neighbouring towns that had not completed the same work did not flood either. The question returned. Had it been right to spend so much to prevent an event that might never have occurred?

At an insurance company, an actuary proposed paying for part of the protection needed by the most exposed homes. The programme covered backflow valves, raised boilers, flood barriers and drainage work. The expense would be immediate. Fewer claims would appear gradually. After five years, the expected reduction in losses was meant to cover the programme's cost.

The pilot was approved. Two years later, almost half the contracts concerned had left the portfolio. Some households had sold their homes. Others had found a slightly cheaper premium elsewhere. They took better protected buildings with them, while another insurer would receive the future savings.

Prevention had reduced the risk. It had also exposed a weakness in the annual contract. Protection remained attached to the building, while the policy and premium moved on.

The problem does not require a choice between prevention and compensation. Even after serious work, some losses will remain too uncertain, too closely linked or too large for one household to bear. Insurance re-

tains its own purpose. It gathers resources before the event and pays the part of the loss that could not reasonably have been avoided.

The imbalance appears when insurance is expected to compensate indefinitely for exposure that planning, standards or poor maintenance continue to increase. It also appears when the absence of collective prevention becomes a reason to withdraw cover from a household that had no power to act. An institution for the non-event must connect two operations without confusing them. It reduces possible loss before the event, then shares what remains.

Giving the Non-Event a Status

Prevention must justify spending through a catastrophe that did not occur. Without the levee, wetland or warning system, the losses would have been greater. This is a counterfactual claim. It compares the world we observe with another possible world in which the intervention did not exist. Archives, comparable territories and models can make the comparison credible. They can never give it the visible force of a collapsed wall.

Old catastrophes are forgotten. People tend to be optimistic and to favour spending whose results appear quickly. These tendencies encourage underinvestment in protection against rare events [342]. Annual budgets, terms of office and short contracts make the problem worse. Present expenditure is certain. Future benefit remains open to argument.

The Sendai Framework asks governments and other institutions to prevent new risks and reduce existing vulnerability rather than concentrate resources on emergency relief and reconstruction [308]. The principle does not provide a budget. It does require inaction to be treated as a decision rather than as the absence of one.

Extreme scenarios serve a related purpose. They do not predict the next event in detail. They test whether warnings, shelters, networks and responsibilities would still work in a situation more severe than those already observed [299]. Their value lies in the decisions they prompt and in their revision when experience contradicts the assumptions.

A counterfactual can also be assessed across a programme. France's state-owned natural catastrophe reinsurer, Caisse Centrale de Réassurance, estimates that one euro spent on natural hazard prevention avoids about

three euros in damage on average.[29] The results vary greatly with the hazard and the measure used [287]. This ratio does not prove that every project pays for itself. It does prevent prevention from being described as spending with no measurable return.

Assessment is harder at the level of one building. Institutions have little consistent information about work that was actually completed, what it cost, whether it was maintained and what public support helped finance it [287]. They may be able to estimate the collective value of a programme without following the precise history of one roof, valve or elevation.

The benefits are also dispersed. A strengthened roof protects the owner, insurer, bank and sometimes neighbouring buildings. A retention basin reduces claims, protects property values, lowers emergency expenditure and helps public services remain open. No actor receives the whole benefit. This helps explain why none has a strong incentive to finance the entire project [276].

Giving the non-event a status means identifying the risk, the intervention, its cost, its duration, those who benefit and the scenario against which it is assessed. This visibility must not turn prevention into a test of merit. A map serves prevention when it opens an assessment and practical means of action. It becomes an instrument of selection when it leads only to a surcharge, an unfunded requirement or non-renewal.

Warning Without Losing Trust

Chapter 5 examined trust when the insurer had to honour its promise. Here trust matters before damage. A siren, bulletin or evacuation order works only when people believe that the authority has good reasons to demand immediate action. Yet the alert must be issued before danger is certain. Otherwise it arrives too late.

In 1976, unrest at La Soufrière volcano in Guadeloupe first led people to leave on their own, then to an official evacuation of southern Basse-Terre. The major eruption that had been feared did not occur. Its absence did not erase months of displacement, interrupted work, business failures and permanent departures. It did change how the decision was judged afterwards. If the catastrophe had not occurred, had evacuation been unnecessary? [343]

[29] Caisse Centrale de Réassurance is a French public reinsurer owned by the state. It provides reinsurance for natural catastrophes with a state guarantee.

This is the cry wolf dilemma. A lower warning threshold reduces the chance that disaster arrives without notice. It also creates more evacuations that are not followed by the feared event. A higher threshold reduces false positives, which are warnings not followed by the event. It increases the risk of an accurate warning that comes too late. The threshold chosen today therefore affects how tomorrow's message will be received [344].

Trust does not always collapse after a false alarm. One study followed communities that had evacuated twice before hurricanes changed direction and struck farther north. It found no general refusal to leave when the next storm approached [345]. Residents did, however, rely less on the official order alone. They looked for other information about the storm's path, intensity and proximity. The authority did not become inaudible. It lost its monopoly over interpretation.

Trust is better protected by explaining why action may be reasonable before certainty than by promising that every warning will be followed by disaster. Adding a probability can improve understanding and decisions more than simply reducing the number of false alarms [346]. But the same probability can produce different choices when expressed in words or numbers. People also often misunderstand the time window to which it applies [347].

A warning institution should say what it knows, what remains uncertain, how much time action requires and what follows from each possible error. It should also explain afterwards why the decision was reasonable, what was learned and what will change at the next alert. An evacuation without catastrophe is not necessarily a failed warning. It becomes corrosive when no one accounts for the decision.

When the Insurer Also Carries the Long Term

Documented case

In the early nineteenth century, some New England manufacturers installed fire walls, water reserves and safer processes in their mills. They complained that ordinary insurers continued to price them like less protected businesses. The cost of the work remained with the manufacturer, while the policy barely recognised its value.

In 1835, several manufacturers gathered around the industrialist Zachariah Allen to create a mutual insurer for companies willing to

accept inspections and improve their sites. The organisations that became the Factory Mutuals did more than compensate fire losses. They sent engineers, compared processes and tested equipment in order to prevent fires before having to pay claims [66–68].

Collective ownership reduced the problem of the departing portfolio. Savings from fewer fires strengthened reserves, supported lower rates or returned to members. Engineering became a common investment rather than a benefit that a customer could immediately carry to a competitor.

The organisation also produced knowledge that no single mill could have built alone. A fire in one establishment changed recommendations in others. Inspections made buildings, machines and protections comparable. Engineers, archives and a budget gave an institution to the fire that should not happen again.

The model had clear boundaries. A mill that refused the work could pay more or leave the group. Businesses able to invest formed a collective that was easier to protect than poor households or indebted municipalities. The mutual could become a club for good industrial risks.

Its lesson is narrower, but important. The annual horizon of a policy is not inevitable when the people who finance prevention, carry the losses and retain the surplus belong to the same architecture.

Prevention Must Outlast the Contract

Physical protection stays with the property when the policyholder, owner or insurer changes. The duration of the policy must therefore be separated from the duration of the investment. An annual insurance contract can recognise a measure that remains useful for twenty years, provided that the work leaves a credible and portable record.

Portability means that completed work remains recognised when the policy or owner changes. A strengthened roof, building elevation or drainage system can receive a certificate attached to the property. The certificate records the measure, its date, the evidence supporting it, its useful life and its maintenance requirements. A buyer, bank, municipality and new insurer can then rely on the same information.

Recognition requires checks. Roofs age, vegetation grows back and safety procedures are sometimes abandoned. Certification must be capable of renewal, reduction or withdrawal. Such a decision should be explained and open to challenge.

Another mechanism could compensate an insurer that paid for work when the contract ends before the expected savings have been realised. The system would be difficult to design. It would nevertheless make explicit

what the annual contract hides. The institution paying for prevention is not always the one that receives the avoided loss [348].

Benefits also move between properties. In places where homes meet forests and dense vegetation, a burning building can project flames and embers towards its neighbours. The resistance of one roof, the maintenance of one plot and the spacing of buildings therefore alter other people's exposure [349].

Economists call this an externality. It is a cost or benefit that affects people who were not direct parties to the decision. Strengthening one home in a neighbourhood exposed to wildfire may protect nearby homes. The effect also depends on how many other buildings are protected. An isolated improvement may do little for the whole area. Once a neighbourhood approaches a sufficient level of protection, one further intervention may interrupt more chains of fire spread [350].

Prevention must therefore be organised at the scale at which loss spreads. A homeowner can act on a building. They do not control the evacuation road, sewer network or permit issued for the neighbouring plot. A premium reduction can recognise individual effort. It cannot finance common infrastructure on its own.

Making Prevention Visible without Capitalising the Invisible

Making prevention visible also creates a risk that appearance replaces substance. A communication campaign, a new underwriting tool or an ordinary management expense can be presented as risk reduction. Each programme should therefore identify the hazard, intervention, expected mechanism, people or places concerned, time horizon and level of evidence [348].

The evidence will not always take the same form. Some measures rest on tests. Others rely on engineering standards, catastrophe models, actuarial experience, epidemiological research or an audit. Serious reporting should distinguish certified, observed, modelled and experimental interventions. Demanding perfect certainty would prevent investment. Accepting every claim would empty prevention of meaning.

Recognition does not justify treating an avoided loss as an accounting asset. An asset is a resource that can help meet future obligations. An

insurer cannot pay claims with a hypothetical saving. Prevention expenditure may remain an expense while being reported separately, with information on amounts, beneficiaries, methods, duration and observed results [348].

The non-event then becomes visible and open to scrutiny without being turned into fictional capital. Reporting makes commitments comparable, shows how benefits are distributed and preserves a record when managers, owners or contracts change.

Markets sometimes recognise prevention when its benefit is durable and attached to the property. Measures that reduce hurricane damage can be partly reflected in real estate values [351]. Recognition is weaker when the work benefits neighbours, depends on continuing behaviour, reduces a rare risk or requires coordination across a territory.

Public action does not need to replace what markets can already recognise. It should concentrate on benefits that markets observe poorly or cannot attribute to one person. It should also prevent future value from going only to households able to pay the initial cost.

Turning the Signal into a Route to Action

Chapter 10 distinguished a signal from a boundary. The difference becomes concrete when information about risk opens a solution before it changes the premium or cover. An assessment without finance leaves the household with an obligation. Assistance without a verifiable standard gives no assurance that the work will reduce vulnerability. A discount without portability may vanish when the insurer changes.

Louisiana's FORTIFIED programme connects these elements.[30] It combines a technical standard for roofs, a public grant, certification and mandatory premium discounts based on the level of reinforcement and the region. By March 2026, more than eleven thousand roofs had been certified. More than four thousand had received support through the grant programme [352]. A model estimates avoided losses, an independent body verifies the work, public funding reduces the initial cost and the premium returns part of the benefit to the household.

The arrangement does not remove inequality. The household must qualify, may need to advance part of the cost and must maintain the pro-

[30]FORTIFIED is a voluntary programme developed by the Insurance Institute for Business & Home Safety. It certifies building improvements that go beyond ordinary construction standards.

tection. It does, however, turn prevention into more than advice addressed to people who can already afford to act. The signal opens finance, portable proof and a reduction attached to the property.

The principle extends beyond housing. Information about health, driving or exposure serves prevention when it opens support and leaves enough time to act. It becomes selection when an organisation demands action that a person cannot finance or obtain permission to complete. A surcharge or requirement affecting an essential need should therefore come with an assessment, time and proportionate means. Without an instrument, a warning becomes an announcement of withdrawal.

Those means should not be limited to people who already hold insurance. A levee also protects tenants, declined households and future residents. A programme confined to each insurer's portfolio would reproduce the blind spots described in Chapter 7. Prevention must follow the property, territory or exposed community beyond the commercial relationship.

Building Institutions That Can Carry the Long Term

Several principles can guide funding. An actor that created or increased exposure bears some responsibility. An actor that benefits from collective protection may also contribute. Duties should follow the power to act. Municipalities control planning, owners control some work, infrastructure operators control networks and the state sets standards [276, 353]. These principles must be adjusted for ability to pay. Otherwise adaptation will remain reserved for secure property owners.

The role of insurance becomes clearer when three capacities are separated. Insurance produces knowledge about risk, transfers residual loss and can contribute to long-term investment. Residual loss is what remains after reasonable prevention. These capacities support resilience only when they sit within public risk management, infrastructure investment and social protection [354].

Insurance does not replace planning, a hospital, a levee or a sewer network. It finances some consequences, produces signals and may help fund particular works. When the contract becomes the last defence against the failure of a network or housing policy, the premium absorbs costs that the insurer can neither prevent nor control [16].

Individualising risk does not mean that government disappears. It often demands more evidence and surveillance. Each person must document

conduct, complete work and answer for the result [355]. An institution for the non-event should reverse this logic. It should not merely ask individuals to behave prudently. It should organise the collective means of prudence.

Elinor Ostrom's work offers principles of governance rather than a model to copy. Rules should fit local conditions. Monitoring should be accountable, sanctions graduated, appeals available and several levels of decision connected [83, 356]. Protection adds another requirement. Its boundaries cannot exclude those who have already been pushed out of the market.

A meeting without data, a budget or influence over the decision remains consultation [357]. A collective must be able to follow the work, discuss priorities and revise the rules. It may take the form of a prevention fund, territorial governance or national pooling of particular hazards. The form matters less than the powers and resources it brings together.

Procedure must also act before an irreversible consequence has produced all its effects. People should know which data were used, correct errors and have access to an appeal. Aggregate results should be published. Institutions should track non-renewals, increases, completed work, abandoned applications and returns to the ordinary market. Without such information, a sequence of private decisions can transform a territory without ever appearing as a collective decision [358].

An institution for the non-event does not promise to prove every catastrophe it prevented. It organises collective action despite that impossibility. It makes spending visible, distributes its cost, preserves a record of completed work and prevents the institution that paid from systematically losing the benefit when the policy or owner changes.

Returning to the Map

The house in the prologue had not burned. A model had nevertheless changed its social future. Prevention must intervene before catastrophe, at the point when the map becomes a bill or a withdrawal decision.

The map can then open something other than classification. It can trigger an assessment, identify who controls the means of action, preserve evidence of completed work and organise funding. It does not remove danger or the need to share residual loss. It prevents more precise information from being used first to isolate the person who remains exposed.

An avoided catastrophe produces no dramatic photograph and no compensation file. A warning not followed by damage may even create suspicion that the danger was exaggerated. Both still need a budget, a memory and rules. People who receive the map before the water, the score before the care or the price before the loss should not have to wait for destruction before receiving the means to act.

Conclusion — Leaving No One Alone with Risk

The tools described in this book provide real knowledge. Insurers now have access to larger datasets, more detailed maps, connected devices, climate models and systems that can classify thousands of files quickly. They can estimate some losses more accurately, identify concentrations of risk, adjust reserves and take effective prevention into account. These advances are neither imaginary nor useless [16].

They nevertheless change the insurance promise. The same tool that makes risk more visible can be used to screen risks earlier, differentiate prices more sharply and withdraw before catastrophe. A difference once absorbed by a pool can become a surcharge, a deductible, an exclusion or a refusal. Calculation has not simply become more precise. It now plays a more direct part in deciding who will remain protected and who will be left to carry a growing share of exposure alone [25]. A score may look individual while making it harder for people affected by the same rule to recognise their common position [26].

Climate change makes this tension impossible to ignore. It increases some losses, concentrates them in places that may already be fragile and tests contracts designed for events that were more dispersed [281]. Climate is not the sole cause of the insurance crisis. It reveals what the personalisation of risk had already begun to displace. As exposure becomes more visible, sharing becomes harder to avoid as a political question. Who should pay when a danger is known but the person carrying it can neither reduce it nor leave the place where they live?

This book has not argued for a return to blind pricing. A premium with little relation to expected losses can weaken the insurer, discourage prevention and make others bear a cost that no one has discussed. The issue is whether greater accuracy is being mistaken for a complete answer to a question of justice.

Precision Does Not Decide How Risk Is Shared

A premium is addressed to one person, but it distributes a burden among many. Adding a variable to a pricing rule does more than reveal a difference that was waiting to be found. It gives that difference an economic consequence. A model may show that one group has a higher average

cost. It cannot decide by itself whether that cost should be paid by the group, spread more widely, reduced through prevention or covered as a matter of right.

The phrase *individual risk* can hide how this estimate is produced. Every individual estimate is built from comparisons with other people, data collected from particular contracts and losses recognised through particular claims procedures. People who were refused, those who gave up on a claim and those who paid for repairs themselves are less visible. Even the most personalised price is produced by an institution, a portfolio and a history of classification.

Behavioural data do not solve the problem. They may connect price more closely to an action that genuinely changes danger. They may also turn a constraint into an apparent choice. Driving at night may be required by work. Repairs may be delayed because credit is unavailable. Limited physical activity may reflect disability. Information can be closer to an action without being closer to responsibility.

More information can even reduce the scope for sharing without reducing total loss. As people are classified more finely, those who appear less exposed may refuse to contribute to others. The pool fragments while the danger remains [177]. What remains common is not merely what the model failed to explain. It also reflects what an institution decides not to turn into an individual charge.

Automation does not remove this decision. The language of artificial intelligence can make a tool appear to impose its own logic. We should instead name the task assigned to the system, the information it uses and the consequence attached to its output [210]. Estimating, ranking, recommending and refusing are different operations. They exercise different forms of power.

Risk Remains When the Market Withdraws

A person or place declared uninsurable does not stop being exposed. The possible loss moves elsewhere. It may fall on the household, property owner, municipality, bank, hospital or taxpayer. Withdrawal transfers a burden. It does not make the burden disappear.

This point takes us beyond a simple opposition between market and state. Insurance markets are constituted through public rules, coverage obligations, last resort arrangements, reinsurance and insolvency procedures

[15]. Government also intervenes when catastrophe exceeds private reserves or when an essential need cannot depend on an ordinary contract [24]. Private insurance and public protection are not separate worlds. They form an architecture whose division of responsibilities is often difficult to see.

Not every risk should be made insurable. Necessary medical care, a minimum income, emergency housing and evacuation may be direct rights rather than conditional promises. Nor is it always desirable to preserve insurance at any cost. A guarantee that repeatedly finances rebuilding in the same place may maintain exposure. An artificially low premium may delay work and hide a danger that has become persistent.

Information should instead become the starting point for action. A map or score can trigger an assessment, provide finance for building work, create a transition period, support relocation or organise collective prevention. Price alone is inadequate when the person has no means to change the risk. Warning someone without giving them any capacity to act often amounts to announcing their exclusion earlier.

Affordability cannot be separated from the protection that remains. A premium may reflect the risk and still be impossible to pay. A deductible may protect the balance of the contract while making coverage unusable when loss occurs. An insurance architecture must therefore be judged by more than its price. We must ask what protection remains accessible, how much loss stays with the person and what happens when ordinary coverage is no longer available.

A Promise Must Be Enforceable

Insurance turns a contribution paid today into a future claim. Its value becomes visible when loss occurs and the policyholder depends on clauses, evidence, assessment and the organisation's timetable. A credible promise requires more than financial solvency. It also requires enforceable deadlines, reasoned decisions, access to the file, the possibility of obtaining an independent assessment and an appeal that can be used before the claimant has exhausted their resources [20]. Insurance produces solidarity only through the concrete rules that determine who can claim and under what conditions [21].

The same requirement applies before loss. People must be able to access the data behind a decision, report an error and understand the consequence attached to a category. The presence of a professional who

formally approves the result is not enough if that person lacks the time, information or authority to depart from it. Responsibility cannot be divided among the model, vendor, caseworker and final decision maker until no one can be held to account.

Individual appeal remains necessary, but it rarely reaches a rule that produces many similar decisions. Files must be brought together. Aggregate outcomes must be published. Refusals must be documented. Affected groups need a way to intervene before the consequences become irreversible. Counter-expertise then becomes collective. It does not merely ask for a more accurate model. It can challenge the information admitted, the task automated and the right to attach a price or refusal to the result.

An insurance architecture can be assessed by following this entire chain. What problem is it meant to solve? Who enters the pool? How are contributions calculated? What does the guarantee actually pay? Who controls the data and reserves? Who can challenge the rule? Which forms of prevention are financed? What happens to the person left outside? These questions extend existing approaches to public insurance and prevent financial balance from becoming the only measure of success [359].

Following the chain may lead beyond the existing contract. It may require a wider pool, an obligation to offer cover, a public fund, a minimum guarantee, a territorial policy or the removal of some needs from the insurance market altogether. Whatever the solution, a decision about sharing should not be presented as the natural consequence of a model.

Solidarity Is an Institution

Solidarity is not a permanent moral disposition and not the unexplained remainder of a tariff. It depends on rules, resources, rights and organisations able to survive bad years. A mutual insurer, public scheme or territorial fund must also set contributions, choose priorities and decide who may enter. No arrangement eliminates boundaries.

The difference lies in whether those boundaries can be discussed. People affected by them should be able to know how risk was defined, which information was retained, who receives protection and who bears the cost. Ulrich Beck used the term *relations of definition* for the powers that decide what will count as risk, evidence and a legitimate response [306]. A model is only one part of that chain.

Choice among providers still matters. It does not replace the ability to debate guaranteed needs and acceptable transfers. A person is more than a consumer who can leave a contract. In housing, health, credit and mobility, the exit of some people may weaken protection for others and make the market narrower still [341].

Prevention shows why solidarity must also endure over time. When it works, the house does not burn, hospital admission is avoided and a warning does not become a catastrophe. The expenditure appears in the accounts while the avoided loss remains a counterfactual. Institutions must still finance that absence, preserve a record of the work and prevent the benefit from disappearing when the insurer, contract or owner changes [348].

Elinor Ostrom's work on resources managed in common remains useful here. Rules must reflect local conditions, responsibilities must be identifiable and avenues of challenge must be accessible [83]. Decisions must also be coordinated across several levels when no single organisation can carry the whole problem [356]. Protection against flood, wildfire or epidemic often extends beyond one property. It requires an institution able to connect private action, common infrastructure and national resources.

Conflict remains, but it has a place. Difficult choices can be discussed before they appear as a series of private refusals, homes that can no longer be sold or treatments that are interrupted. It turns exposure assigned to one person into a problem that several institutions must address.

The Price Must Not Have the Last Word

A *risk-priced society* is not simply a society that measures a great deal. It is one in which prices and scores increasingly condition access to housing, care, credit, work and territory. The disputes may appear technical. They concern a variable, a map, a threshold or a model. That language can hide a simpler and harder decision. Who should remain in solidarity with whom as danger grows?

Climate change makes the question urgent, but the question extends much further. It arises whenever an institution uses finer information to move each person closer to the cost they are expected to bring. Risk then appears to be a personal property even though its causes and consequences remain largely collective. Infrastructure, work, inherited circumstances, housing policy, access to care and planning decisions continue to shape exposure.

The answer is not to remove numbers. It is to deny them the final word. Models should help anticipate losses, finance promises and guide prevention. They should not decide on their own which vulnerabilities deserve protection, which differences should be charged and who may be abandoned.

We will probably become better at identifying who is exposed, where and when. That knowledge can open rights, finance work and direct resources. It can also give each person an ever more precise explanation of why they will be left to manage alone. The choice between these two uses belongs neither to the algorithm nor to the climate. It belongs to us.

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