The Hidden Risks of "I Know Something You Don't"

Professor Raghavendra Rau

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Introduction

My name is Raghavendra Rau and I'm a professor at the University of Cambridge. This is the second in a series of lectures on the human side of finance.

Let's start by considering what finance is fundamentally about. At its core, finance revolves around promises. These are promises to provide a certain amount of money in the future in exchange for money today. This forms the basis of most financial instruments and transactions. The key question we face in finance is: What are these promises worth today? Examples of these promises include:

- Stocks: A company promises a share of future profits in exchange for investment capital today.
- Bonds: An entity promises to repay a loan with interest over time.
- Insurance: A company promises to pay for potential future losses in exchange for premiums now.

So how do we value these promises? There are two approaches:

1. Rational classical finance: This approach assumes markets are efficient and participants are rational. It focuses on quantitative models and objective data. For example, what is called a Discounted Cash Flow (DCF) Model (usually the favourite approach for MBAs) is based on the time value of money. Here future cash flows are projected and then discounted back to present value. Similarly, another approach called comparative valuation (multiples) values assets based on how similar assets are priced in the market. It is a common approach in stock valuation using metrics like Price-to-Earnings (P/E) ratio.
2. The human side of finance: This approach recognizes that markets are influenced by human behavior and psychology. It introduces questions of trust and information asymmetry. Is the person making the promise being truthful? It introduces the possibility of fraud - deliberate lying - or incomplete contracts, where loopholes allow one party to take advantage of another.

In the first lecture in this series, I covered conflicts of interest between banks and investors. In the second lecture, I examined conflicts between managers and investors. In this lecture, I focus on selection markets such as insurance markets.

Insurance markets

Insurance operates on a fundamental principle of risk pooling across a broad customer base. To maintain profitability and stability, insurance companies rely on two primary revenue streams: underwriting profit and investment income.

Underwriting profit represents the difference between collected premiums and paid claims. Insurance companies strive to price their premiums to reflect each customer's risk profile accurately. They conduct detailed risk assessments considering various factors such as age, health status, occupation, and lifestyle choices. For instance, in health insurance, a young professional with no pre-existing conditions typically warrants lower premiums than someone with chronic health issues.

The second revenue stream comes from investment activities. Insurance companies strategically invest their premium pools in diverse assets - stocks, bonds, and real estate - to generate additional income.

This investment revenue serves two crucial purposes: it helps offset potential underwriting losses and enables insurers to offer more competitive premium rates. Life insurance companies often invest in long-term government bonds, generating steady returns that contribute to their financial stability.

To illustrate these principles in action, consider automobile insurance. Insurers assess premiums based on factors like driving history, vehicle type, and geographic location. These premiums serve dual purposes: funding a pool for potential claims while generating investment income from unused funds. This dual-stream approach helps maintain profitability even during periods of increased claims.

However, insurance markets face a distinctive challenge: information asymmetry. While insurers generally maintain transparency with their customers, they often receive incomplete or inaccurate information from applicants. This creates what we call "selection markets," where individuals effectively select themselves into the risk pool based on private information about their risk profiles.

Consider someone applying for health insurance who omits mentioning a pre-existing condition, or a driver who fails to disclose their history of traffic violations. These omissions force insurers to factor potential misrepresentation into their pricing models, resulting in higher premiums across the board. Consequently, honest policyholders end up subsidizing those who withhold crucial information.

The life insurance market provides a clear example of this dynamic. While companies thoroughly evaluate applicants' health histories, lifestyles, and ages, they can't verify everything. A smoker might claim non-smoker status, or an adventure sports enthusiast might withhold information about high-risk activities, leading to mispriced policies that don't reflect true risk levels.

This challenge is further complicated by adverse selection - the tendency for higher-risk individuals to seek more comprehensive insurance coverage while lower-risk individuals opt out. For example, people with chronic health conditions are more likely to purchase extensive health coverage, while healthy individuals might choose minimal coverage or none. This self-selection process creates an imbalanced risk pool, driving up costs for all participants and potentially destabilizing the market's efficiency.

Selection vs. non-selection markets

Insurance markets come in two main types: selection and non-selection markets. This difference helps us understand how different systems handle risk and healthcare delivery.

Non-selection markets, like the UK's National Health Service (NHS) and similar European systems, provide universal coverage. Everyone pays into the system, and everyone gets coverage, regardless of their health or risk level. The NHS delivers healthcare free when you need it, paid for by taxes. Since everyone participates based on their income rather than their health, these systems avoid the problem of adverse selection. The main challenge? Managing unlimited healthcare needs with limited funding.

Selection markets work differently - they're based on individual choice and risk-based pricing. Life insurance, American healthcare, and car insurance are prime examples. In these markets, people choose whether to buy coverage, and prices reflect personal risk factors.

Examples of selection markets include:

- Life insurance companies look at your age, health, and lifestyle to set prices. If you're thirty, run marathons, and don't smoke, you'll pay less than someone who's fifty, sedentary, and smokes.
- The American healthcare system also shows selection at work. Most people get insurance through their jobs or buy it themselves. Prices vary significantly based on personal factors - quite different from the NHS approach. High-risk individuals often face higher costs or fewer options.
- For car insurance, companies check your driving record, what car you drive, and where you live. A clean record, family car, and rural address typically mean lower premiums than accident history, sports car, and city living.

Selection markets face a consistent problem: high-risk people tend to buy more coverage while low-risk people often skip it. Insurance companies use detailed risk assessment, coverage limits, and various

incentives to stay profitable. This creates tension between making money and providing accessible coverage.

The core difference? Non-selection markets focus on making sure everyone gets care, while selection markets emphasize personal responsibility and paying based on risk.

The origins of selection markets

An example of selection markets can be seen when we trace back the development of annuities and life insurance. These financial tools were designed to address specific societal needs, such as providing financial stability in old age or for dependents after death. Annuities, in their earliest forms, involved a lump sum payment in exchange for regular payouts for the rest of the beneficiary's life. Life insurance, in contrast, promised a payout upon the death of the policyholder. These products gained popularity as tools for managing long-term financial risks.

The concept of actuarial calculations dates to the Roman Empire, where death tables were used to estimate life expectancy. These early attempts to quantify mortality laid the groundwork for modern actuarial science.

During the late 1500s and 1600s, Amsterdam and France became hubs for annuity markets. Governments used annuities to finance wars, such as the Dutch conflict with France and the Nine Years' War led by Louis XIV.

Unfortunately, these markets inherently favored individuals who understood how to exploit longevity statistics. Wealthy investors often selected young, healthy individuals as nominees for annuities. In Amsterdam, nominees for annuities were often children or young individuals, as they were expected to live longer and maximize the payout periods. Over half the nominees were under ten years old. In France, these nominees were typically girls aged five to ten who had survived smallpox and lived in salubrious environments.

As these markets evolved, issuers began adapting their practices to mitigate the challenges posed by selection effects. They started lowering payouts for high-longevity nominees and introducing more rigorous mortality studies to refine pricing models. For example, in England by 1829, lower payouts were implemented for younger nominees.

Several scientists weighed in, including Edmond Halley (of Halley's comet fame) and Abraham de Moivre. In 1693, Edmond Halley introduced the first comprehensive mortality table based on demographic data from the German city of Breslau (modern-day Wrocław). This table systematically recorded birth and death rates, allowing for accurate calculations of life expectancy at different ages. Building on Halley's work, Abraham de Moivre developed mathematical models that further refined mortality calculations. In 1725, de Moivre proposed the concept of a constant force of mortality, assuming a linear increase in mortality risk with age. Although simplified, this model made it easier for insurers to apply consistent pricing formulas.

Unfortunately, none of these models accounted for selection. That meant that early annuity pricing faced significant challenges, such as survivorship bias and incomplete adaptation to demographic changes.

Shifting from non-selection to selection markets: The UK

Pension Freedoms and Annuity Market Shifts Post-2015

The UK’s 2015 Pension Freedoms Act drastically altered the retirement landscape in the UK by removing the requirement for pension holders to purchase annuities. This legislation gave retirees greater flexibility in accessing their pension savings, allowing them to take lump sums, invest in drawdown plans, or leave funds for their heirs.

While these freedoms empowered individuals, they also led to a sharp decline in annuity purchases. Between 2014 and 2019, the number of annuity contracts sold dropped from 189,000 to 49,000. This

decline impacted annuity providers, reducing competition and availability in the market. Additionally, many retirees underestimated the risks of managing their pension savings, such as longevity risk (outliving their funds) and market volatility.

Annuities—contracts guaranteeing income for life or a fixed term—have faced fluctuating popularity due to economic factors. During periods of low interest rates in the 2010s, annuity rates were unattractive, yielding low annual incomes from large pension pots. For example, a £100,000 pension pot might have provided only £5,000 per year, discouraging purchases.

However, though higher interest rates in recent years have revived interest in annuities, many remain cautious due to past experiences of poor value, the irreversible nature of annuity purchases, and what is commonly referred to in the literature as the "annuity puzzle."

The annuity puzzle refers to the paradox where, despite the clear financial benefits of annuities—providing guaranteed income for life and mitigating longevity risk—they remain significantly underutilized. Behavioral and structural reasons contribute to this discrepancy. One major issue is adverse selection. Insurers set annuity prices based on the average health profile of buyers, but individuals who purchase annuities tend to be healthier than the general population. This results in higher premiums because the pool of annuity buyers typically lives longer than expected, creating a bias in the pricing model.

Another factor is psychological resistance. Many individuals dislike the idea of tying up their savings in an irreversible financial product. They worry about dying "too soon" and leaving nothing for their heirs, viewing annuities as a poor return on their investment in such scenarios. This is compounded by a lack of financial literacy, where consumers fail to recognize the long-term value of annuities in protecting against outliving their assets.

Finally, economic conditions have historically impacted annuity demand. In periods of low interest rates, payouts were unattractive relative to the initial investment, further discouraging adoption. Despite recent improvements in rates, the negative perception of annuities as being overly costly or inflexible lingers, reducing their popularity in life insurance policies.

The pricing problem

All these issues mean that insurance companies continue to struggle in setting prices.

- **Examples of Overpriced Policies and Consumer Misconceptions:** Some policies, such as those covering niche risks or offering limited benefits, are priced disproportionately high. For instance, pet insurance for older animals or specialized health policies may offer limited coverage despite significant costs. Consumers often misunderstand the terms and overestimate the benefits, leading to dissatisfaction when claims are denied.
- **Selection and Adverse Selection Effects:** Adverse selection remains a fundamental issue. Higher-risk individuals, such as those with chronic illnesses, are more likely to purchase comprehensive policies, while healthier individuals opt out. This imbalance raises premiums for all customers, deterring low-risk individuals and exacerbating the cycle of adverse selection.

To address these problems, insurers employ advanced data analytics and actuarial techniques to refine pricing models. While these tools have improved accuracy in assessing risks and setting premiums, they have not fully solved the problem of asymmetric information. Individuals often still know more about their health, behavior, and potential risks than the companies assessing them. For example, a person applying for health insurance might hide minor but chronic symptoms that indicate a serious condition, which may only manifest later. Even with advanced analytics, insurers struggle to detect such undisclosed factors upfront.

Additionally, human behavior—such as deliberate misrepresentation or failure to disclose information—continues to create gaps in the data. As a result, insurers often rely on generalized assumptions or past claims data, which may not fully capture individual nuances.

Life insurance markets

The history of life insurance provides fascinating insights into how financial products evolved to manage risk and protect individuals. One of the earliest documented cases is Richard Martin's investment in the late 1500s. Martin purchased a life insurance policy for £30, which promised a payout of £383 if the insured, William Gibbons, died within a year. Remarkably, Gibbons passed away just weeks before the policy expired, yielding Martin a return of 1,250% on his investment. This example underscores how early life insurance was used not only for risk management but also as a speculative financial tool.

As life insurance became more widespread, its sophistication increased. By the 1700s, organizations like the Amicable Society for a Perpetual Assurance Office in England introduced structured policies. Members paid annual premiums and beneficiaries received payouts upon death, reflecting a collective pooling of risk. However, eligibility criteria became stricter over time. Applicants were often screened for health issues and risky behaviors to minimize the insurer’s exposure to high-risk individuals. Letters of reference and personal inspections were common, illustrating the early attempts to manage adverse selection.

Risk Management and Lifestyle Factors

Modern insurers continue to refine their methods of assessing risk, often focusing on lifestyle factors and customer disclosures. Risky activities, such as smoking, skydiving, or scuba diving, significantly influence premiums and coverage decisions. For example, an applicant who enjoys extreme sports may face higher premiums due to the increased likelihood of claims.

Health factors are another critical consideration. Applicants are typically required to disclose pre-existing medical conditions, family history of illnesses, and lifestyle habits, such as diet and exercise routines. Insurers use this information to predict potential health outcomes and calculate premiums accordingly. However, these disclosures are not always accurate, leading to complications during claims verification. For instance, if an individual fails to disclose a smoking habit, their claim might be denied or adjusted posthumously when the discrepancy comes to light.

Verification often occurs at the time of claims, particularly for life and health insurance. Insurers investigate medical records, lifestyle evidence, and other documentation to ensure the original application was truthful. This retrospective scrutiny underscores the importance of accurate disclosures at the outset but also highlights the challenges of managing asymmetric information.

Exclusions, Fine Print, and Consumer Frustrations

Exclusions and fine print are integral to most insurance policies, serving to protect insurers from covering predictable or high-cost risks. One common exclusion in life insurance is the suicide clause, which typically prevents payouts if the policyholder dies by suicide within the first one to two years of coverage. Similarly, risky hobbies, such as bungee jumping or racing, may require additional disclosures or lead to exclusions in coverage.

Waiting periods are another source of frustration for consumers. In dental insurance, preventive care is often covered immediately, but basic procedures, such as cavity fillings, may have a waiting period of three to six months. Major dental work can require waiting up to a year. Pet insurance operates similarly, with shorter waiting periods for injuries and longer exclusions for hereditary conditions.

In health insurance, waiting periods are strategically used to prevent opportunistic behavior, such as purchasing coverage only after a costly medical diagnosis. While these measures are designed to maintain the financial viability of insurance products, they often leave consumers feeling misled or underserved.

Non-selection markets

Non-selection markets, such as the National Health Service (NHS) in the UK, operate under the principle of universal coverage. The NHS is a publicly funded healthcare system that provides free services at the point of use, ensuring that all citizens have access to essential medical care regardless

of their income or health status. This model eliminates the risk of adverse selection by pooling resources from the entire population through taxation.

Despite its foundational principles of universal and equitable healthcare, the NHS grapples with significant systemic issues that threaten its sustainability. A primary challenge lies in the persistent funding gaps. With an aging population requiring more intensive and prolonged medical care, alongside the rapid advancements in medical technology, government funding often falls short of meeting rising demands. This financial strain hampers the NHS's ability to maintain service quality and invest in future infrastructure.

Staff shortages exacerbate these issues. Chronic understaffing is a widespread problem, leading to excessively long working hours for healthcare professionals, increased burnout, and significant difficulty in recruiting and retaining skilled personnel. The high pressure within the system discourages potential entrants to the healthcare workforce, creating a vicious cycle that further intensifies the staffing crisis.

Another critical issue is the length of waiting times for treatments. For non-emergency procedures, such as hip replacements or cataract surgeries, patients often face delays of several months. These prolonged waits are a direct consequence of the system's capacity being stretched beyond its limits, frustrating patients and impacting their quality of life.

The NHS also struggles with outdated infrastructure. Many facilities require modernization to meet contemporary healthcare standards, but capital investments frequently lag operational needs. This mismatch between immediate service delivery and long-term infrastructure planning limits the NHS's ability to provide efficient and effective care.

Public expectations further compound these challenges. The promise of comprehensive care creates high demands, which often exceed the NHS's capacity to deliver. This mismatch between expectations and reality leads to dissatisfaction among patients and criticism of the system.

What can we conclude?

The discussion of insurance markets has shown how insurers try to balance risk, fairness, and financial stability. From the early days of life insurance and annuities to today's complex challenges like pricing and adverse selection, companies face constant difficulties. Advanced analytics have improved risk assessment and pricing, but the problem of asymmetric information remains. People still know more about their own risks than the companies evaluating them.

In comparing selection and non-selection markets, the contrasting priorities of equity and individual responsibility have been evident. Non-selection markets like the NHS emphasize universal access and affordability, but they struggle with funding shortages, staffing crises, and outdated infrastructure. Selection markets, while tailored to individual risks, face their own set of challenges, including adverse selection and consumer dissatisfaction driven by misunderstood policies and exclusions.

Franz Kafka's experiences as an employee of an insurance institute offer a striking metaphor for the intricacies of the insurance industry. Kafka viewed bureaucracy as a system of rules often detached from human needs, much like how modern insurance policies can feel overly rigid or impersonal to consumers. His novels, steeped in themes of alienation and incomprehensible systems, parallel the frustrations many experience with insurance processes. Just as Kafka's characters grapple with labyrinthine institutions, policyholders often struggle to navigate the fine print, exclusions, and waiting periods of their coverage.

References and Further Reading

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