P&C Insurance:

Training and Self-study Material (Module L1)

Tiger Analytics

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About this document

- This presentation is created for Property and Casualty (P&C) Insurance – with focus on US P&C Industry only
- Unless this presentation states otherwise, the scope of all the terms and definitions is limited to US Property and Casualty Insurance
- This presentation mentions Insurtech innovations across globe and not limited to US
- This presentation has a ‘glossary of terms’ section which can be used by readers to quickly get acquainted with the terminologies used

Target audience

1. **Project Delivery Teams**:
   - To gain better understanding of insurance terms and processes

2. **Business Development Team**:
   - To gain better understanding of insurance terms and processes
   - To understand US insurance market (and trends) for better targeting and making client conversations relevant

3. **Capability Team**:
   - To gain better understanding of insurance terms and processes
   - To identify key areas to invest in to build strategic capabilities and solutions

1. P&C Insurance Overview

- How Insurance works
- Types of Insurance
- US P&C Insurance Market

How Insurance Works?

- What is insurance and why is it required
- How insurance companies manage risk
- Commonly used terms in insurance
- How insurance companies make money
- The 7 principles of insurance
- Regulation in insurance
- Insurance Value Chain
- Key Roles in insurance

What is insurance and why is it required?

What is insurance?

A process of transferring the risk of incurring loss by the owner of an asset to the other party (**Insurer** - Insurance company) who can bear the risk in return for a consideration (**premium** payment).

Why insurance?

- Life and assets can be destroyed before the expected lifetime due to **perils*** which can cause significant economic and emotional hardship.
- Insurance plays a critical role in reducing this hardship.
- For few assets (e.g. auto), insurance is legally required.

* Examples of perils can be fire, flood, earthquake, lightning, landslide, theft, etc.

What insurance doesn't do?

- Loss cannot be avoided through insurance.
- Is not a means to profit – It places the insured in the same financial position after the loss, neither better nor worse – no profit, no loss.

What are other ways to manage risk other than Insurance?

If a peril can cause damage to an asset, we say the asset is exposed to that **risk** (also called as **loss exposure**). Risks can be managed in different ways –
prevent, reduce, retain or transfer.

- Some risks can be prevented, their impact can be reduced.
- If retained, the damage must be met internally (self insurance).
- When risk can't be borne, it is transferred to an insurance company.

How do Insurance companies manage risks

RISK POOLING

- People exposed to similar risks are brought together and contribute premium to the common pool.
- When a member suffers a loss, compensation is paid from this common pool.
- The risk is thus **spread among the members -** big loss on one is reduced to smaller, manageable impacts on all.

LAW OF LARGE NUMBERS

- Based on theory of statistics - when the sample size increases, variation around the mean observation declines.
- Since insurer groups a large number people of similar risks, the “actual money to be paid per policy holder” will equal the “expected loss per policy holder”.
- Enables accurate future loss prediction and fix right premium in advance.

Commonly used terms in insurance world (Part 1)

INSURED

Business / person covered by the insurance policy

CLAIM

A formal request by a policyholder to an insurance company for coverage or compensation for a covered loss or policy event

LOSS

The basis of a claim for damages under the terms of a policy

SUM ASSURED

Maximum amount of insurer's liability under the policy; becomes the basis for payments made by the insurer upon claim

DEDUCTIBLE

Amount the insured must pay before insurer starts to pay some or all the remaining costs

EXPENSE

All the expenditure associated with acquiring, underwriting, and servicing premiums (claims). It also includes advertising, salaries, and commissions paid

Commonly used terms in insurance world (Part 2)

EXPOSURE

The state of being subject to loss because of some hazard or contingency. Also used as a measure of the rating units or the premium base of a risk, e.g. area of the property, no. of vehicles etc.

RATE

Pre-estimated cost of providing insurance for each unit of exposure being insured.

PREMIUM

Amount of money an individual or business pays for an insurance policy. Calculated by multiplying Exposure units with the Rate

DIRECT WRITTEN PREMIUM (DWP) OR DIRECT PREMIUM WRITTEN (DPW)

Total amount of an insurance company's written premiums during a given year without accounting for the amount ceded to reinsurance

GROSS WRITTEN PREMIUM

The total premium (direct and assumed) written by an insurer before deductions for reinsurance and ceding commissions

EARNED PREMIUM

Represents the portion of the written premium for which coverage has already been provided as of a certain point in time

NET WRITTEN PREMIUM

Premiums the company gets to keep after removing all costs (brokerages, commissions re-insurance, etc.) from gross written premium

UNEARNED PREMIUM

Represents the portion of the written premium for which coverage is yet to be provided as of a certain point in time.

Commonly used terms in insurance world (Part 3)

LOSS RATIO

A measure of the portion of each premium dollar used to pay losses and is calculated as: Loss ratio = **Losses** / **Premium**.
Typically, the ratio uses total reported losses and total earned premium; however, other variations are common. For example, companies may include Loss Adjustment Expenses (LAE) in the calculation of loss ratios

EXPENSE RATIO

A measure of the portion of each premium dollar used to pay for loss adjustment and underwriting expenses and is calculated as: Underwriting Expenses / Written Premium + LAE / Earned Premium

COMBINED RATIO

It is the combination of the loss and expense ratios and is calculated as: Loss Ratio + (LAE / Earned Premium) + (Underwriting Expenses / Written Premium). LAE (Loss Adjustment expenses) refers amount of expenses incurred to adjust claims

LOSS RESERVE

An insurance company's best estimate of what it will pay in the future for claims

The 7 principles of insurance

Utmost Good Faith

- Insured has a legal duty to disclose all information about policy contract whether requested or not. It is breached by non-disclosure and misrepresentation.

Insurable Interest

- Prerequisite for purchasing insurance. A person has 'insurable interest' when they stand to gain or benefit from the continued existence/ well-being of the person or property insured and would suffer a financial loss on its damage.

Proximate Clause

- If there is a chain of events leading to a loss, it should be determined if the nearest cause of loss is an insured loss or not. Claim is paid if identified proximate cause is insured and it is responsible for the loss.

Loss Minimization

- It is the insured's responsibility to take all precautions to minimize the loss on the insured property.

Indemnity

- Insurance is meant to indemnify (i.e. compensate for losses). Insurance should place the insured in the same financial position after the loss, as they enjoyed before it; neither better nor worse– no profit, no loss.

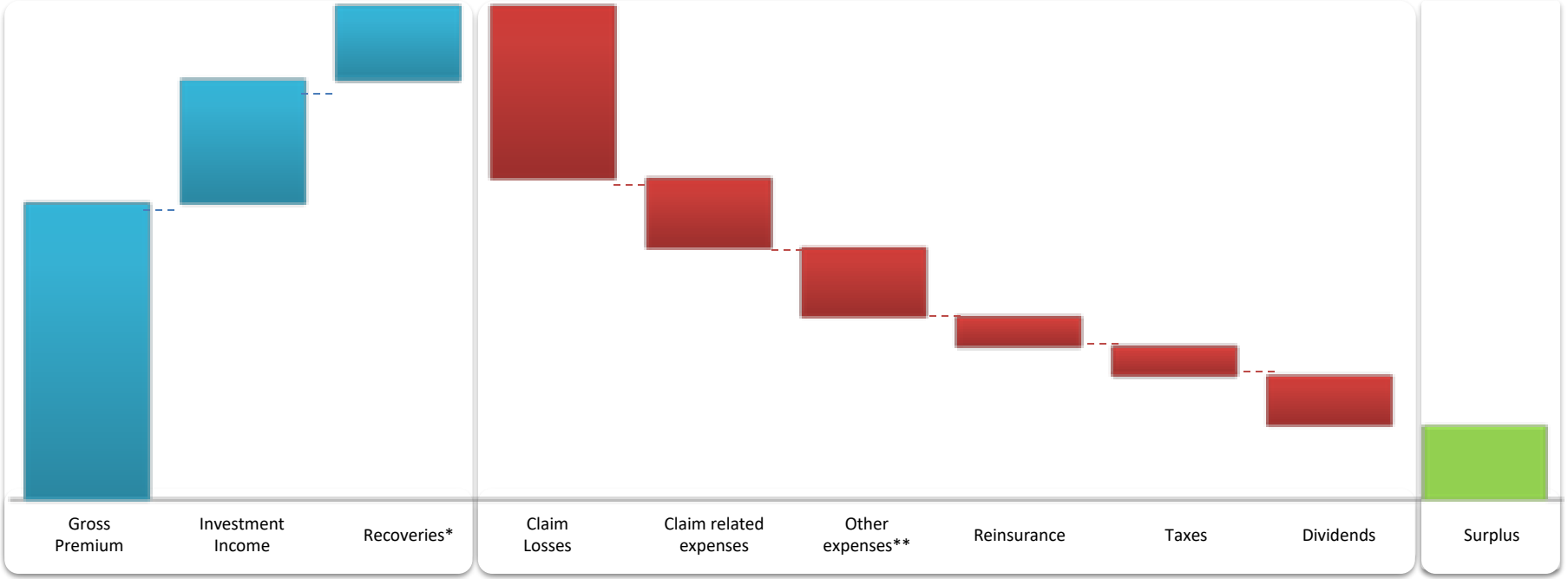
Subrogation

- Once the insurance company compensates the insured for the financial loss, the company receives the rights to subrogate (i.e., to recover any damages from a third party who was at fault or contributed fault to the loss event). Example, Insurance company A paid $1,000 to repair insured's car for an accident where Insurance company B's insured was 100% liable. Insurance company A will send a subrogation request to recover the $1,000 from the Insurance company B.

Contribution

- If there is more than one insurer for the same asset, the insured cannot recover loss from all insurers and make profit by making separate claims. Each insurer pays a proportionate share of the loss.

How do Insurance companies make money



** Recoveries are from subrogation, salvage, etc.*

*** Marketing, underwriting expenses, etc.*

Proportion of bars are illustrative

- Insurance company primarily makes money through underwriting profit and investment income.
- The premiums collected by the insurer are put in the investments market, to increase its revenue.

U.S. Insurance Regulations (Part 1)

In U.S., Property-casualty insurance is heavily regulated at the state level. Generally speaking, state regulators have oversight of market conduct; insurance company and agent licensing; insurance rates; policy language; financial condition (solvency) of insurance companies; and consumer protection in insurance transactions.

Regulators make sure that insurance rates are adequate to cover losses, so that insurance companies are in sound financial condition and able to pay covered claims in full.

Another key regulatory duty is to make sure that insurers remain solvent, i.e., that they maintain enough capital to pay policyholder losses as they come due.

All states provide a mechanism, or “residual market,” for relatively high-risk individuals or businesses who seek insurance from the private market but are unable to find it.

Laws like Unfair Trade Practices Acts (prohibits coercion of consumers during the sales process) and Unfair Claims Practices Acts (provides additional protection to claimants) are in place to protect insurance consumers

U.S. Insurance Regulations (Part 2)

How is Insurance Industry regulated

- **Licensing** – Insurance professionals (sales/claims etc….) making key decisions are required to be licensed by the state's insurance department. Each state may have its own licensing requirements
- **Insurance rates** – Rates should be adequate, not excessive and not unfairly discriminating. All rate changes are typically approved by respective state's DOI (department of insurance)
- **Insurance policies** – Regulated by DOI for the purpose of ensuring that policies are clear and readable
- **Market conduct** – audits by state's DOI to keep a check on unfair practices in sales, underwriting (Including unfair discrimination and cancelling or not renewing policies, contrary to state regulation) and claim handling

Impact on Analytics projects

- While doing analytics projects related to core underwriting/pricing processes, keep the regulator aspect in mind – Most of the **algorithms will have to be filed with the regulator**
- Be cautious that your algorithm should not have any **variable that may cause unfair discrimination** against a specific segment of customer

P&C Insurance value chain

The value chain below provides a summarized view of different business functions in a P&C insurance company. Primary activities below show the core functions of insurance. Support activities especially Analytics and IT have become strategic enablers for the core functions in the last decade or so.

Value Propositions

Primary Activities

Marketing & Distribution
- Promotion
- Target Markets
- New Customers
- Cross Selling
- Up Selling

Underwriting/ Pricing & Reserving
- Underwriting
- New Products
- Product Management
- Pricing & Reserving
- Delivery Channels
- Prevention & Mitigation

Claims
- Claims Submissions
- Claims Settlement
- Payments and recovery
- Fraud
- Litigation

Operations
- Policy Administration
- Claims Operations
- Contact Center

Investments
- Portfolio Management
- Asset & Liability Mgmt.
- Risk Analytics

Support Activities

Data Analytics , Predictive Modeling , AI

Company Infrastructure (Finance/IT/Risk Management/Corporate Legal)

Reinsurance

Human Resource Management

Margins

Value to Customers

P&C Insurance Industry - key roles by business function

Role Name	Business Function	Responsibilities
Sales Rep / Agent	Distribution	Insurance Sales Rep / Agent sell insurance policy to the customers. There are different types of agents (independent, captive) and this will be described in more detail in the Marketing & Distribution section
Territory Manager	Distribution	Territory managers are responsible for sales at the territory (as an example, group of states) level and typically manage the sales reps or relationship with the agents
Underwriter	Underwriting	To determine loss exposures that will be insured, amount of coverage, price, under specific conditions
Actuary	Pricing & Reserving	Actuaries are insurance professionals that work closely on insurance pricing and reserving. Pricing and Reserving sections will be covered in future slides. At a high level, Pricing refers to the determination of insurance rates based on risk and Reserving aims at ensuring that the company has sufficient funds to pay for future obligations (example, claims, refunding unearned premiums when customer cancels policy etc.)
Claims Adjuster	Claims	To determine if the insured is covered for the accident and check for coverage, coverage/policy effective dates
Claims Appraiser	Claims	To do the damage evaluation and to evaluate the estimated cost required to fix the loss by applying experience and using software that captures cost of parts/labor required

Types of Insurance

- Personal and commercial insurance
- Reinsurance

Property and Casualty / General Insurance

General insurance typically comprises of any insurance that is not determined to be life insurance. It is called property and casualty insurance (P&C) in the U.S. and non-life insurance (or general insurance) in continental Europe.

Personal Lines (PL) Insurance

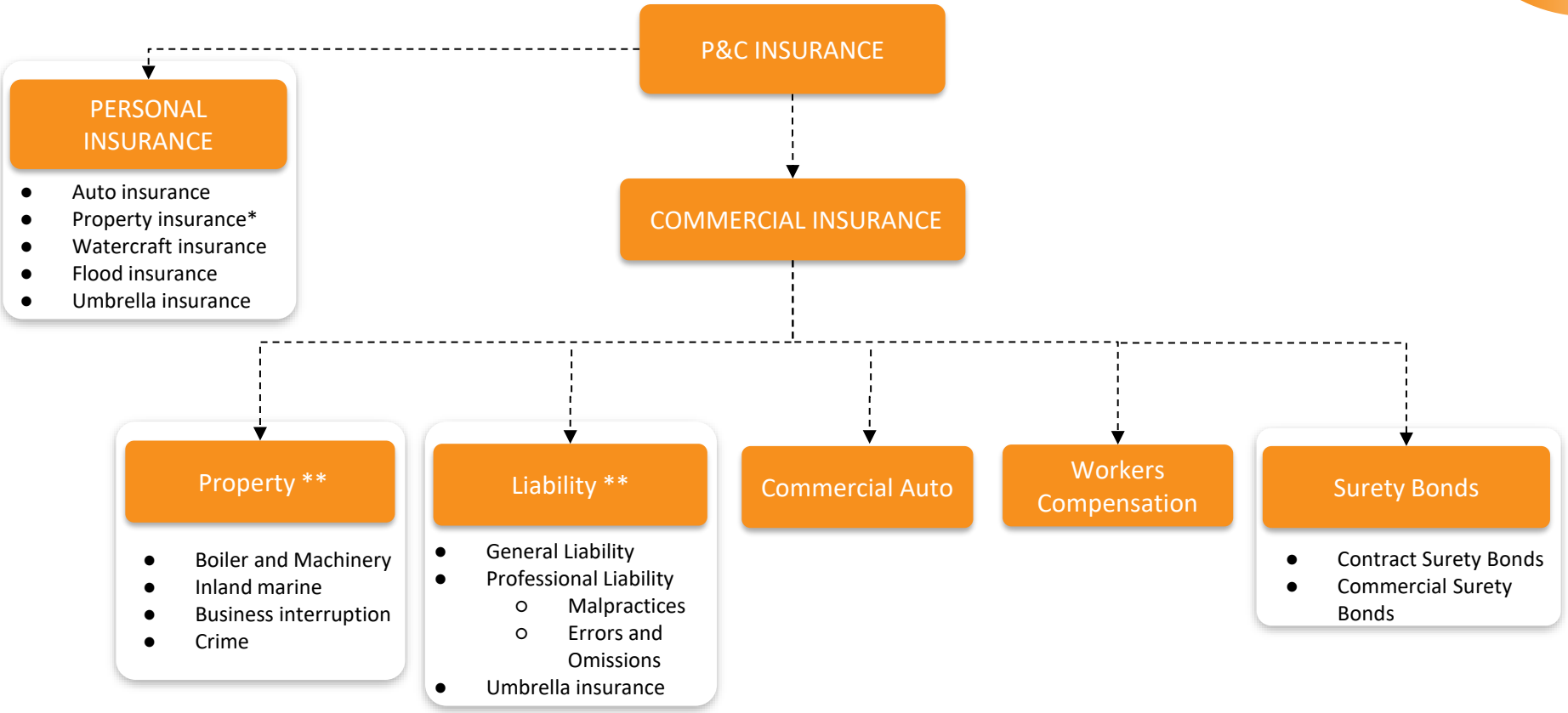
Policyowner/Policyholder is an individual. These policies are designed to be sold in large quantities to individuals e.g. auto insurance, homeowners insurance

Commercial Lines (CL) Insurance

Policyowner/Policyholder is a business establishment. These policies are usually designed for business entities e.g. general liability, workers compensation.

Difference between PL and CL auto insurance: Auto insurance can be offered in both commercial lines and personal lines and have different characteristics. Personal auto insurance will cover one car / driver and has limits accordingly, however a single commercial policy can cover entire fleet of vehicles with one set of coverage limits.

Types of Property & Casualty (P&C) insurance policies



* Personal Property Insurance includes homeowners, renters, condo, and landlord
** Property & Liability insurance together is called Business Owner Policy (BOP)

Personal Auto insurance – Coverages

Personal automobile insurance covers private passenger vehicles and provides the following coverages.

1. Liability

- **Bodily injury liability (BI):** Covers injuries caused by policyholder/insured to others. Insured is also covered when driving someone else's car with their permission or other people occasionally driving insured's car
- **Property damage liability:** Covers the damage that insured (or someone driving the insured's vehicle with permission) may cause to someone else's property. Usually, this means damage to someone else's car, but it also includes damage to lamp posts, telephone poles, fences, buildings or other structures your car hit.

2. Comprehensive

Covers damage to insured's vehicle from events such as fire, falling objects, missiles, explosion, earthquake, windstorm, hail, flood, vandalism, riot, or contact with animals.

3. Collision/ Physical damage

Covers damage to insured's vehicle resulting from a collision with vehicle/ object.

4. Medical payment(MP)/ Personal injury protection (PIP)

Covers for the treatment of injuries to the driver and passengers of the policyholder's car. It can cover medical payments, lost wages and the cost of replacing services and funeral costs for someone injured in the accident.

5. Uninsured motorist and Underinsured motorist

Pays if an insured incurs bodily injury (or property damage) caused by an uninsured motorist or underinsured (insufficient coverage to cover for the loss), hit-and-run driver or a driver whose insurer is insolvent.

In U.S., buying liability component of auto insurance is compulsory, though enforcement varies between states. Penalties for not purchasing often involves fine, license and/or registration suspension or revocation, possible jail time in some states.

Personal Auto insurance – Additional Details about PIP coverage

Goal of Personal Insurance Protection (PIP) coverage:

Prompt payments for car accident injuries as these claims are paid irrespective of who is at fault for the accident. One doesn't have to wait for the BI related negotiations or settlement of a liability suit.

Example: (Person A) in (Car A) hits (Person B) in (Car B) and is liable for injuries to the (Person B)

- As person B gets treatment, he/she has two options:
  1. Pay for the treatment and send a demand package to person A's insurance company to compensate for the injury and suffering due to the accident. In this case, person A's bodily injury coverage will get triggered and there may be negotiation between claims adjusters of A's insurance company and B's insurance company to determine what's the right compensation for B's injury and suffering. This entire process will take some time.
  2. If person B has PIP coverage, then B's insurance company can cover the costs under the coverage. Note that once PIP coverage limits are exhausted, B will still pursue the recovery sending the demand package to A's insurance company (triggering A's BI coverage)
- If person A also got injured and has PIP coverage, then his/her injury treatment will be covered up to the PIP coverage limit

PIP coverage is not available in all states. It's a required coverage in some states and optional in a few. Almost 30 states don't have any PIP coverage.

Property insurance – different types of insurance

Property insurance provides financial reimbursement to the owner or renter of a structure and its contents in case there is damage or theft—and to a person other than the owner or renter if that person is injured on the property.

Homeowners Insurance	• Homeowner's insurance protects the owner of housing properties from incurring financial losses in case of any untoward incident. • This is the most common and most widely purchased type of property insurance. This has been elaborated on in one of the subsequent slides.
Renter's Insurance	• This type of property insurance is exclusively meant to cover a tenant's personal belongings stored inside his/her rented house. • It may include clothes, jewelry, furniture, electronic appliances etc. • Some policies also cover additional liabilities a tenant may incur towards his/her landlord.
Condo Insurance	• Condo insurance is coverage that helps protect against losses and repair costs for a condominium unit. • Condo insurance often provides protection for theft, vandalism, fire damage, water damage, and more.
Landlord's Insurance	• A landlord Insurance is a coverage that offers financial protection to landlords renting out their property. • It is designed keeping in mind the interests of the landlords so that their property and contents of the property are insured against untoward incidents.

Homeowners insurance – Perils covered & excluded

A form of property insurance that covers losses and damages to an individual's residence and assets in the home.

What perils are covered?

Fire or lightning, windstorm or hail, explosion, riot or civil commotion, aircraft, vehicles, smoke, vandalism, theft, falling objects, weight of snow, ice, or sleet, accidental overflow of water or steam, sudden & accidental tearing apart, cracking, burning or bulging, freezing of plumbing, accidental damage from electricity, volcanic eruption

What perils are excluded?

- Extra hazardous perils - earthquakes, landslides, flooding, surface water, waves, a sewer backup, or groundwater seepage
- Losses controllable by insured- power failure, neglect, intentional loss, mischievous acts, birds, vermin, rodents, or insects, animals owned by an insured, mold, fungus or wet rot
- Catastrophic losses – storms, earthquakes, war, nuclear hazard
- Governmental action

Other personal insurance products – Umbrella & flood

Umbrella Insurance

- Broad liability policy intended to provide high liability limits in excess of basic liability policy coverage.
- E.g. A catastrophic auto accident occurs and the damage caused by it exceed an insured's auto liability limit, the insured's umbrella policy would pay the excess of the loss up to its limit of liability.

Flood Insurance

- A type of property insurance that covers a dwelling for losses sustained by water damage specifically due to flooding.
- Coverage for the peril of flood is excluded by homeowners policy. However flood damage is covered under most auto policies; Federal government provides flood insurance through private insurers.

Innovative personal insurance products

Smart Home insurance

Many insurance companies such as American Family, State Farm, Equitable have partnered with Smart device players and provide discounts to the customers for the usage of smart home products. Smart home devices are helpful in minimizing (or in some cases avoid) losses. Example, a Water hero product can detect excessive water flow in the event of leakage in plumbing and automatically shut the mains thereby limiting the flooding in basement of the house.

Flight delay insurance

Fizzy by AXA is an automated flight delay insurance that runs on blockchain and allows customers to get indemnified as soon as they arrive their destination.

Pay-As-You-Park

Private passenger auto policy from Progresso, driven by IoT, rates are based on how long the vehicle is not driven. Premium discount given every 15 mins the car is parked.

Pay as you drive

Allstate, Nationwide, Metromile (regulatory approval pending for acquisition by Lemonade) offer car insurance based on miles driven. Cuvva provides car insurance that is based on hours on the road.

Pet insurance

Nationwide, PetAssure, Healthy Paws offers insurance covering wide range of pets. Bought by Many, UK further offers insurance that adapts premiums and features by breed of pet owned.

Jewelry, Drone, Gadgets

USA provides Insurance for specific items such as jewelry, drones, gadgets, for renters.

Pooled Car insurance

Guevara, UK provides pooled car insurance where users can pool their premiums online and reduce them up to 50%.

Bicycle Community insure

Unique insurance from Laka for the Cyclist community to protect their bikes and gear without paying upfront premiums. Instead, Laka settles claims first and shares the cost with the community at the end of the month. No claims mean no pay.

Commercial Property insurance - Types

Commercial property insurance is used to cover property and equipment from the risks such as fire, theft, and natural disaster.

Boiler & Machinery Insurance	• Also called equipment breakdown insurance, **covers the cost of repairing or replacing the damaged equipment** and **business losses** incurred from the equipment not functioning. • Covers a wide range of equipment, including HVAC systems, ovens, boilers and furnaces, refrigeration units, elevators, and office equipment.
Inland Marine Insurance	• Provides insurance to **property in transit over land,** property in the **custody of a bailee,** property deemed to be an **instrumentality of transportation/ communication,** such as bridges and radio towers, mobile medical equipment, contractors equipment. • For example, damage to customer's clothing from a fire at insured's dry-cleaning business.
Business Interruption Insurance	• Business interruption insurance **covers lost income and expenses resulting from property damage or loss**. • For example, if a fire forces business to close for few months, it would reimburse for salaries, taxes, rents, and net profits that would have been earned during the downtime.
Crime Insurance	• Crime insurance **covers theft, burglary, and robbery of money**, securities, stock, and fixtures from employees and outsiders.

Commercial Liability insurance (Part 1)

Protects the purchaser from the risks of liabilities imposed by lawsuits and similar claims that come within the coverage of the insurance policy.

Commercial General Liability (CGL)

- It is the "first line" of coverage that a business typically purchases.
- It covers many common risks such as bodily injury or property damage on the premises or due to business operations, personal and advertising injury, and medical payments.

There are two types of CGL policies

- A claims-made policy that covers claims regardless of when the event took place.
- An occurrence policy where the event must take place during a set period.

Malpractice Insurance

- A type of professional liability insurance that pays for losses resulting from injuries to third parties when a **professional's conduct falls below the profession's standard of care**.
- Malpractice insurance is available for **doctors, dentists, accountants, real estate agents, architects,** and other professionals.

Commercial Liability insurance (Part 2)

Errors and Omissions Insurance	● Another type of professional liability insurance. ● **Protects service businesses from errors and /or omissions** made by a business owner, employee or contractor working on behalf of the company. ● Generally covers judgments, attorney fees, court costs and settlements – up to the limits of the policy.
Commercial Umbrella Insurance	● Protects against ruinous claims that go **beyond the liability limits stated in basic general liability, business auto liability, and other commercial liability coverages**. ● Also to fill in coverage gaps in underlying policies.

Commercial Auto insurance

Commercial auto insurance is liability and physical damage protection for vehicles, such as cars, trucks and vans, that are used for business. Commercial vehicles require a separate policy because they're typically exposed to more risk than personal vehicles.

Commercial Auto Insurance	
	● Commercial auto insurance is a policy for vehicles used for business. ● Can cover from single vehicles to large fleet of trucks. ● Has all coverages as personal auto insurance but higher premiums and loss coverage limits. ● Also has additional components like non-owned vehicle coverage, hired vehicle coverage, trailer interchange coverage, rental reimbursement with downtime, etc.

Workers compensation insurance (WC)

A type of business insurance that provides benefits to employees who suffer work-related injuries or illnesses.

Employee Benefits include

- Medical treatment cover
- Replace lost wages during recovery time
- Disability and rehabilitation benefits
- Death and funeral benefits

Employer benefits for providing WC

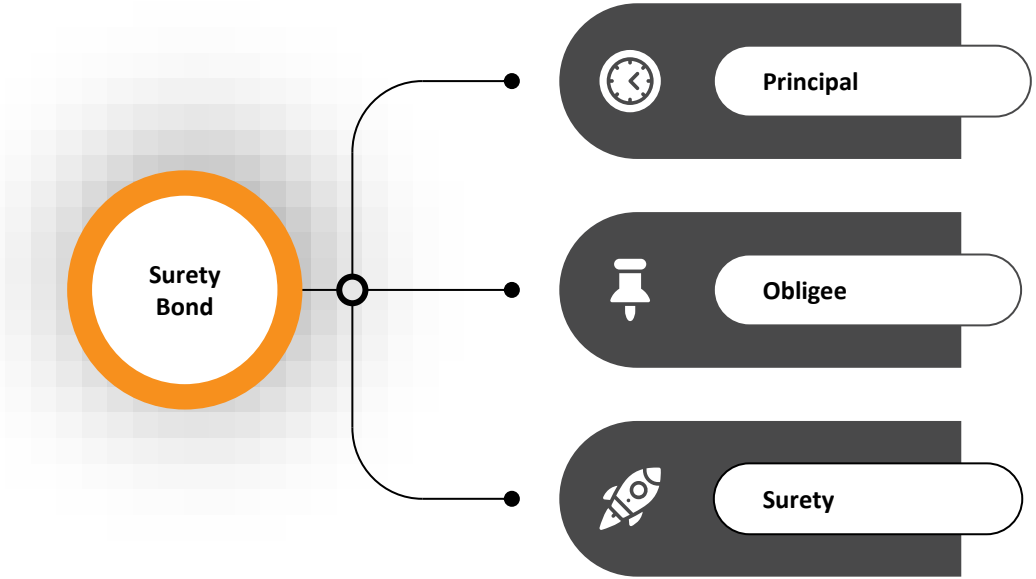
It **protects businesses from lawsuits** (for work related injuries) and **keeps business compliant with state regulations**.

- General damages for pain and suffering, and punitive damages for employer negligence, are generally not available under workers compensation.
- It is a trade off where an employee **gives away the right to sue** his employee for the tort of negligence and in return gets an assured 'no-fault' insurance where employee **will be covered for work related injuries caused by his own negligence**.

Surety Bonds

A surety bond is a promise to be liable for the debt, default, or failure of another. It is a three-party contract by which one party (the surety) guarantees the performance or obligations of a second party (the principal) to a third party (the obligee).

There are three parties involved in a surety bond: the principal, the obligee, and the surety:



The principal purchases the surety bond to guarantee quality and completion of contracted work

The obligee is the entity who requires the principal to purchase the bond

The surety is the entity that issues the bond and financially guarantees the principal's ability to complete the contracted work

If the principal does not complete the work as contracted, the obligee can make a claim for payment from the bond up to but not exceeding the bond amount. The principal is then obligated to pay back the claimed amount to the surety entity.

Surety Bonds - Types

Surety bonds can be required for different types of contracts. The two most common types of surety bonds are contract surety bonds and commercial surety bonds.

Contract Surety Bonds

1. These bonds are required for construction projects
2. A project owner (the obligee) seeks a contractor (the principal) to fulfill a contract. The contractor, through a surety bond producer, obtains a surety bond from a surety company. If the contractor defaults, the surety company is obligated to find another contractor to complete the contract or compensate the project owner for the financial loss incurred

There are three types of contract surety bonds:

- Bid bond
- Performance bond
- Payment bond
- Warranty Bond

Commercial Surety Bonds

1. Commercial surety bonds cover a very broad range of surety bonds that guarantee performance by the principal of the obligation or undertaking described in the bond.
2.They are required of individuals and businesses by the federal, state, and local governments; various statutes, regulations, ordinances; or by other entities.

Following are the types of commercial surety bonds:

- License and permit bonds
- Court bonds
- Public official bonds
- Fiduciary bonds
- Miscellaneous bonds

Reinsurance

What is Reinsurance?

- Known as insurance for insurers or stop-loss insurance.
- Practice where **insurers transfer portions of their risk portfolios to other parties** to avoid paying a large obligation resulting from an insurance claim.

I. Ceding party (Primary insurer): Party that transfers its risk to others
II. Reinsurer: Party that accepts the risk.

Benefits of reinsurance

- Gives the insurer more security for its equity and solvency.
- Helps insurer **withstand the financial burden** when unusual and major events occur.
- **Increases underwriting capacity** of ceding company in terms of the number and size of risks.
- Avail reinsurers **expertise to set appropriate premium** for a specific risk and use it to write own policies.

Types of reinsurance

- **Facultative:** Protects an insurer for an individual or a specified risk or contract.
- **Proportional:** Reinsurer receives a prorated share of all policy premiums sold by the insurer. For a claim, the reinsurer bears a portion of the losses based on a pre-negotiated percentage.
- **Non-proportional:** Reinsurer is liable if the insurer's losses exceed a specified amount, known as priority or retention limit. It is applied for a specific risk or entire risk category.

US P&C Insurance Market

- Financial Results
- Top P&C insurance companies by Direct Premium Written and market share by line of business
- Challenges faced by the Industry
- Innovation*
- Insurtechs*
- Recent acquisitions

* Innovation and Insurtech sections may include trends that are global and not just US focused

U.S. P&C Insurance Market Overview : P&C Industry financial results

U.S. Property and Casualty Insurance Industry Results

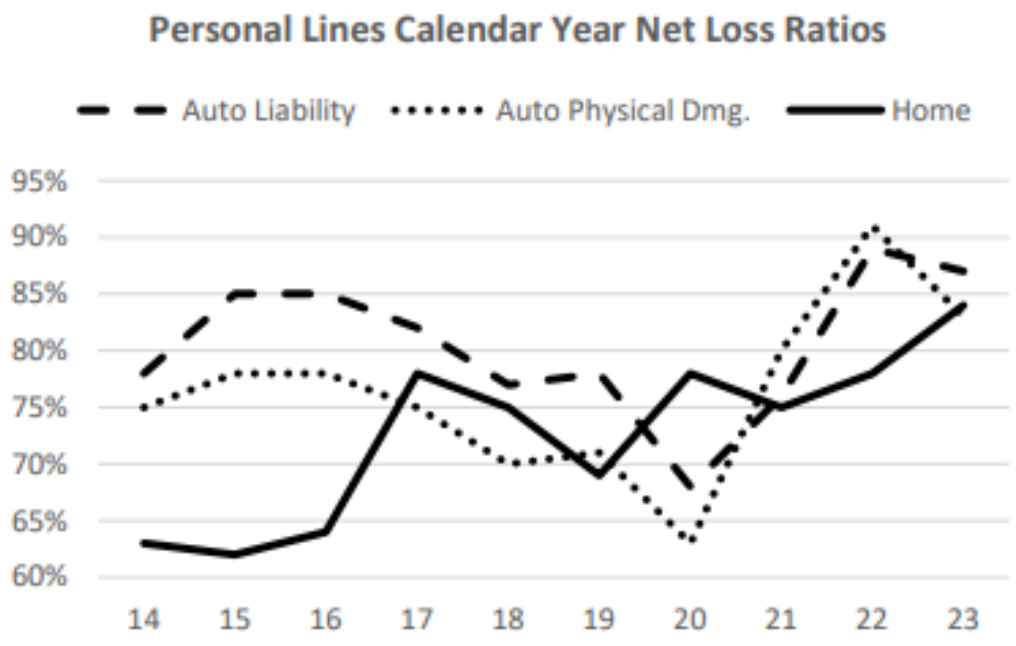
(in millions, except for percent)

For the year ended December 31,	YoY Chg	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Net Premiums Written	10.0%	859,850	781,750	719,927	658,910	642,980	621,786	561,952	537,926	524,006	506,657
Net Premiums Earned	9.4%	823,435	752,690	693,776	646,010	630,772	603,188	549,958	533,236	515,835	497,931
Net Losses Incurred	9.3%	546,228	499,631	432,600	383,305	378,581	366,258	353,954	323,195	296,749	284,934
Loss Expenses Incurred	7.7%	81,253	75,464	70,653	69,885	69,242	64,658	65,218	61,829	60,932	58,706
Underwriting Expenses	6.5%	213,792	200,677	189,526	179,963	173,054	168,228	151,672	148,692	145,753	139,846
Underwrting Gain (Loss)	25.5%	(18,443)	(24,746)	(111)	12,104	8,374	2,907	(22,459)	(1,700)	11,453	14,658
Net Loss Ratio	(0.2) pts	76.2%	76.4%	72.5%	70.2%	71.0%	71.4%	76.2%	72.2%	69.3%	69.0%
Expense Ratio	(0.8) pts	24.9%	25.7%	26.3%	27.3%	26.9%	27.1%	27.0%	27.6%	27.8%	27.6%
Combined Ratio	(1.0) pts	101.5%	102.5%	99.6%	98.7%	98.7%	99.1%	103.9%	100.5%	97.8%	97.3%
1yr Rsrv Devlp/PY PHS	0.5 pts	-	(0.5%)	(0.7%)	(0.8%)	(0.8%)	(1.6%)	(1.4%)	(0.7%)	(1.2%)	(1.4%)
Net Invmnt. Inc. Earned	0.9%	70,076	69,467	52,935	51,596	55,132	53,287	48,978	45,539	47,228	46,401
Net Realized Gains (Loss)	3,054.6%	50,404	1,598	18,204	11,064	11,259	10,885	19,833	8,747	10,285	12,006
Net Invmnt. Gain (Loss)	69.5%	120,479	71,064	71,139	62,660	66,391	64,172	68,812	54,286	57,513	58,407
Investment Yield	(0.03) pts	3.20%	3.23%	2.58%	2.75%	3.02%	3.06%	3.08%	3.01%	3.18%	3.17%
Total Other Income	(99.8%)	5	1,979	3,514	1,034	1,284	1,530	(4,687)	950	1,475	(2,908)
Net Income[1]	126.0%	87,567	38,745	60,453	59,198	62,233	57,565	38,717	42,860	56,884	56,439
Return on Revenue	4.6 pts	9.3%	4.7%	7.9%	8.4%	8.9%	8.6%	6.3%	7.3%	9.9%	10.1%
December 31,	YoY Chg	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Policyholders' Surplus[2]	6.2%	1,062,988	1,000,893	1,077,866	955,136	891,214	779,921	786,016	734,026	705,948	706,740
Return on Surplus	4.8 pts	8.5%	3.7%	5.9%	6.4%	7.4%	7.4%	5.1%	6.0%	8.1%	8.1%

1. Excludes investment income from affiliates. 2. Adjusted to eliminate stacking

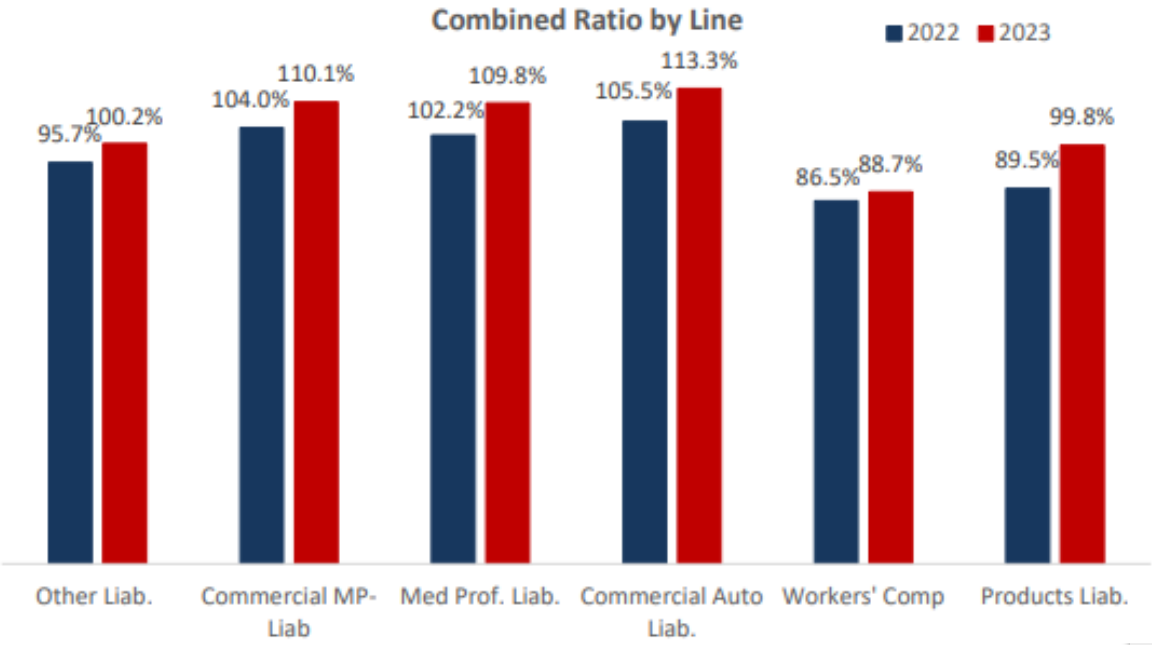
- Net Written Premiums NWP) grew 10% in 2023 vs prior year
- Despite the challenges faced by the industry, such as increased losses and expenses, the overall growth in net premiums written and policyholders' surplus indicates a resilient market
- The improvement in the combined ratio, despite still being above 100%, indicates efforts to enhance operational efficiency

U.S. P&C Insurance Market Overview : Personal Lines Overview



- The combined ratio for personal lines improved to 104.7% compared to 110.1% last year.
- After a historically bad year, underwriting performance for personal auto improved largely due to premium increases and expense reductions to offset inflation.
- While 2023 was a mild year for hurricanes, severe convective storms and rapidly rising replacement costs took their toll on homeowner insurers.
- With less capacity available for property reinsurance, most of the smaller convective storms did not reach reinsurance limits, leaving primary homeowner insurers to bear the brunt of the natural catastrophe claims in 2023.
- The net loss ratio worsened 6.0-points to 84.2%. The combined ratio for homeowners was the worst in at least a decade at 110.5%.

U.S. P&C Insurance Market Overview : Commercial Lines Overview



- While the overall combined ratio remained below 100%, there has been a slight YoY deterioration in most major commercial lines.
- The commercial auto liability line had the highest combined ratio at 113.3%.
- The deterioration in commercial lines can be attributed largely to adverse prior year reserve development. While overall development was favorable, that trend is diminishing.
- For the current year, there was unfavorable development across several commercial lines, most notably the other liability-occurrence at $4.7 billion and commercial auto liability at $3.1 billion.

Top 25 Property and Casualty Insurers – All Lines (NAIC, 2023)

Rank	Group/ Company Code	Group/ Company Name	Direct Premiums Written (000)	Direct Premiums Earned (000)	Loss Ratio	Loss & Cost Containment Ratio	Market Share	Cumulative Market Share
1	176	STATE FARM GRP	93,788,131	88,679,560	82.85 %	85.79 %	9.66 %	9.66 %
2	155	PROGRESSIVE GRP	62,711,707	59,870,842	68.41 %	70.45 %	6.46 %	16.12 %
3	31	BERKSHIRE HATHAWAY GRP	59,668,420	58,144,354	66.50 %	69.78 %	6.14 %	22.26 %
4	8	ALLSTATE INS GRP	50,041,693	48,197,230	73.12 %	75.16 %	5.15 %	27.41 %
5	111	LIBERTY MUT GRP	45,794,528	45,264,053	64.89 %	68.89 %	4.72 %	32.13 %
6	3548	TRAVELERS GRP	38,596,540	36,532,033	58.95 %	63.26 %	3.97 %	36.11 %
7	200	UNITED SERV AUTOMOBILE ASSN GRP	32,002,400	30,046,229	76.56 %	77.64 %	3.30 %	39.40 %
8	626	CHUBB LTD GRP	31,873,268	31,047,192	58.39 %	62.99 %	3.28 %	42.68 %
9	69	FARMERS INS GRP	27,220,677	26,575,266	64.77 %	66.02 %	2.80 %	45.49 %
10	140	NATIONWIDE CORP GRP	19,766,499	20,322,814	69.92 %	74.08 %	2.04 %	47.52 %
11	212	ZURICH INS GRP	18,563,083	18,049,970	61.34 %	68.71 %	1.91 %	49.43 %
12	473	AMERICAN FAMILY INS GRP	16,628,159	15,490,889	73.73 %	75.44 %	1.71 %	51.15 %
13	12	AMERICAN INTL GRP	16,077,448	15,945,476	51.91 %	55.94 %	1.66 %	52.80 %
14	91	HARTFORD FIRE & CAS GRP	15,953,591	15,336,033	57.23 %	63.59 %	1.64 %	54.44 %
15	218	CNA INS GRP	13,741,405	13,245,107	58.30 %	63.97 %	1.42 %	55.86 %
16	280	AUTO OWNERS GRP	13,108,452	11,981,803	78.20 %	84.51 %	1.35 %	57.21 %
17	3098	TOKIO MARINE HOLDINGS INC GRP	12,051,113	11,761,142	63.62 %	67.66 %	1.24 %	58.45 %
18	158	FAIRFAX FIN GRP	11,346,544	11,199,076	65.83 %	71.88 %	1.17 %	59.62 %
19	213	ERIE INS GRP	10,056,484	9,276,793	82.94 %	85.02 %	1.04 %	60.65 %
20	98	WR BERKLEY CORP GRP	10,049,014	9,554,864	52.91 %	59.59 %	1.03 %	61.69 %
21	84	AMERICAN FINANCIAL GRP	9,174,481	8,992,694	56.80 %	61.92 %	0.94 %	62.63 %
22	785	MARKEL CORP GRP	8,789,378	8,404,642	61.70 %	73.73 %	0.91 %	63.54 %
23	968	AXA INS GRP	7,721,689	7,643,863	62.63 %	66.91 %	0.80 %	64.33 %
24	796	QBE INS GRP	7,559,558	7,515,818	80.12 %	82.96 %	0.78 %	65.11 %
25	244	CINCINNATI FIN GRP	7,455,996	7,093,753	56.16 %	61.19 %	0.77 %	65.88 %

Top 25 Property and Casualty Insurers – Personal Auto (NAIC, 2023)

Rank	Group/ Company Code	Group/ Company Name	Direct Premiums Written (000)	Direct Premiums Earned (000)	Loss Ratio	Loss & Cost Containment Ratio	Market Share	Cumulative Market Share
1	176	STATE FARM GRP	57,974,270	54,812,500	84.34 %	87.63 %	18.21 %	18.21 %
2	155	PROGRESSIVE GRP	48,255,875	45,888,459	69.15 %	70.83 %	15.16 %	33.36 %
3	31	BERKSHIRE HATHAWAY GRP	38,965,762	38,383,696	74.24 %	75.58 %	12.24 %	45.60 %
4	8	ALLSTATE INS GRP	32,848,169	31,863,542	74.76 %	76.84 %	10.32 %	55.92 %
5	200	UNITED SERV AUTOMOBILE ASSN GRP	19,847,916	18,829,721	77.30 %	78.71 %	6.23 %	62.15 %
6	111	LIBERTY MUT GRP	13,312,836	13,397,700	71.25 %	74.61 %	4.18 %	66.33 %
7	69	FARMERS INS GRP	13,221,687	13,012,950	66.54 %	67.48 %	4.15 %	70.49 %
8	473	AMERICAN FAMILY INS GRP	6,790,423	6,472,156	75.29 %	77.62 %	2.13 %	72.62 %
9	3548	TRAVELERS GRP	6,578,946	6,224,211	70.15 %	73.37 %	2.07 %	74.68 %
10	140	NATIONWIDE CORP GRP	5,413,758	5,476,445	74.52 %	76.61 %	1.70 %	76.38 %
11	1318	AUTO CLUB ENTERPRISES INS GRP	4,829,408	4,418,150	78.16 %	79.86 %	1.52 %	77.90 %
12	280	AUTO OWNERS GRP	4,250,283	3,844,453	82.95 %	88.22 %	1.33 %	79.24 %
13	213	ERIE INS GRP	4,240,246	3,894,226	89.23 %	90.77 %	1.33 %	80.57 %
14	1278	CSAA INS GRP	3,817,543	3,394,493	80.72 %	82.19 %	1.20 %	81.77 %
15	215	KEMPER CORP GRP	2,950,213	3,179,248	88.06 %	92.15 %	0.93 %	82.69 %
16	660	MERCURY GEN GRP	2,819,069	2,777,230	71.46 %	74.67 %	0.89 %	83.58 %
17	55	AUTOMOBILE CLUB MI GRP	2,256,739	2,150,771	67.96 %	71.68 %	0.71 %	84.29 %
18	91	HARTFORD FIRE & CAS GRP	2,126,385	2,060,827	80.65 %	84.22 %	0.67 %	84.96 %
19	169	SENTRY INS GRP	1,561,955	1,493,411	61.84 %	62.71 %	0.49 %	85.45 %
20	411	MAPFRE INS GRP	1,446,905	1,385,050	69.07 %	70.22 %	0.45 %	85.90 %
21	88	THE HANOVER INS GRP	1,443,149	1,403,303	75.47 %	78.05 %	0.45 %	86.35 %
22	5	ALFA INS GRP	1,387,691	1,304,874	70.63 %	71.96 %	0.44 %	86.79 %
23	28	AMICA MUT GRP	1,383,042	1,325,196	75.71 %	79.60 %	0.43 %	87.22 %
24	50	COUNTRY INS & FIN SERV GRP	1,369,040	1,319,947	71.50 %	72.45 %	0.43 %	87.65 %
25	483	SOUTHERN FARM BUREAU CAS GRP	1,338,550	1,279,120	79.62 %	80.69 %	0.42 %	88.07 %

Top 25 Property and Casualty Insurers – Homeowners (NAIC, 2023)

Rank	Group/ Company Code	Group/ Company Name	Direct Premiums Written (000)	Direct Premiums Earned (000)	Loss Ratio	Loss & Cost Containment Ratio	Market Share	Cumulative Market Share
1	176	STATE FARM GRP	27,037,940	25,705,654	77.08 %	78.89 %	17.71 %	17.71 %
2	8	ALLSTATE INS GRP	13,551,256	12,722,771	70.42 %	72.12 %	8.88 %	26.59 %
3	111	LIBERTY MUT GRP	10,476,330	10,140,532	68.56 %	70.17 %	6.86 %	33.46 %
4	200	UNITED SERV AUTOMOBILE ASSN GRP	10,346,045	9,515,309	78.22 %	78.72 %	6.78 %	40.24 %
5	69	FARMERS INS GRP	8,981,110	8,517,213	67.58 %	68.43 %	5.88 %	46.12 %
6	3548	TRAVELERS GRP	7,569,914	7,014,931	69.57 %	70.70 %	4.96 %	51.08 %
7	473	AMERICAN FAMILY INS GRP	7,010,000	6,334,715	75.28 %	75.78 %	4.59 %	55.67 %
8	140	NATIONWIDE CORP GRP	4,077,262	4,003,910	80.88 %	83.57 %	2.67 %	58.34 %
9	626	CHUBB LTD GRP	3,891,676	3,649,700	49.49 %	50.69 %	2.55 %	60.89 %
10	10064	CITIZENS PROP INS CORP	3,208,945	2,770,287	39.39 %	45.66 %	2.10 %	63.00 %
11	155	PROGRESSIVE GRP	2,952,598	2,685,978	51.87 %	52.13 %	1.93 %	64.93 %
12	213	ERIE INS GRP	2,659,423	2,415,582	88.73 %	90.16 %	1.74 %	66.67 %
13	280	AUTO OWNERS GRP	2,564,100	2,326,325	88.27 %	90.02 %	1.68 %	68.35 %
14	4663	UNIVERSAL INS HOLDING GRP	1,819,043	1,777,151	53.80 %	54.32 %	1.19 %	69.54 %
15	3098	TOKIO MARINE HOLDINGS INC GRP	1,405,037	1,306,343	81.87 %	82.00 %	0.92 %	70.47 %
16	1278	CSAA INS GRP	1,323,341	1,248,095	68.80 %	69.76 %	0.87 %	71.33 %
17	1318	AUTO CLUB ENTERPRISES INS GRP	1,197,117	1,095,514	76.21 %	78.96 %	0.78 %	72.12 %
18	244	CINCINNATI FIN GRP	1,196,666	1,054,892	62.56 %	65.19 %	0.78 %	72.90 %
19	660	MERCURY GEN GRP	1,143,868	1,039,222	62.98 %	65.58 %	0.75 %	73.65 %
20	28	AMICA MUT GRP	1,134,059	1,064,671	58.76 %	60.25 %	0.74 %	74.39 %
21	50	COUNTRY INS & FIN SERV GRP	1,000,969	934,604	96.51 %	96.87 %	0.66 %	75.05 %
22	91	HARTFORD FIRE & CAS GRP	990,862	959,281	55.96 %	57.17 %	0.65 %	75.70 %
23	55	AUTOMOBILE CLUB MI GRP	964,554	911,945	76.30 %	76.85 %	0.63 %	76.33 %
24	88	THE HANOVER INS GRP	944,623	887,536	95.11 %	96.53 %	0.62 %	76.95 %
25	4861	HERITAGE INS HOLDINGS GRP	943,983	961,934	64.73 %	69.68 %	0.62 %	77.57 %

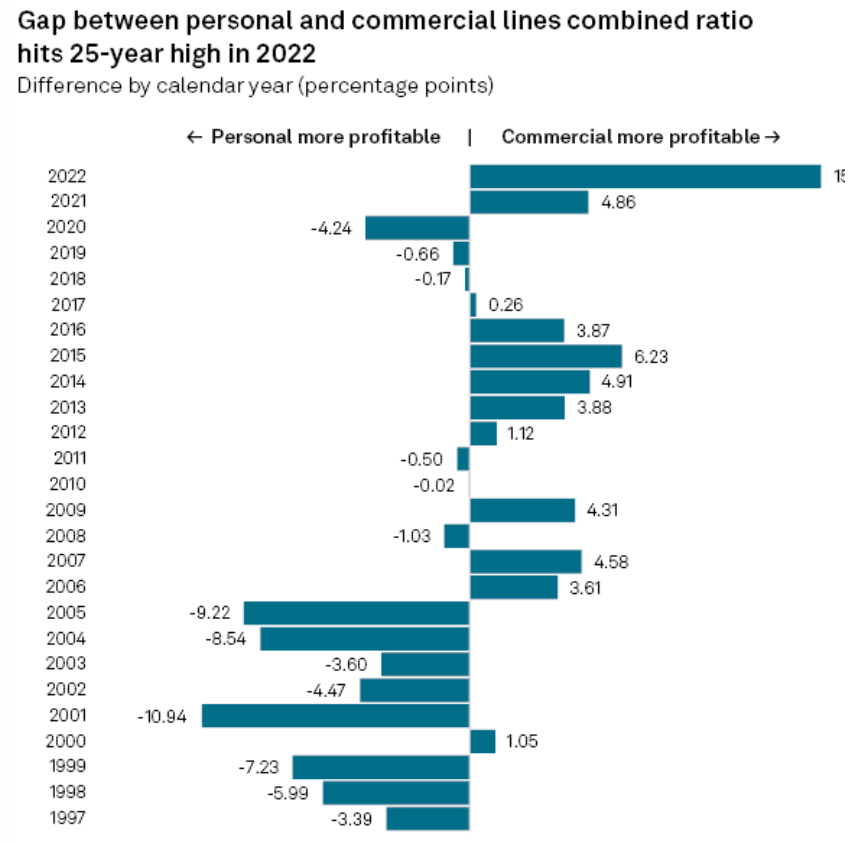
Top 25 Property and Casualty Insurers – Commercial Auto (NAIC, 2023)

Rank	Group/ Company Code	Group/ Company Name	Direct Premiums Written (000)	Direct Premiums Earned (000)	Loss Ratio	Loss & Cost Containment Ratio	Market Share	Cumulative Market Share
1	155	PROGRESSIVE GRP	9,716,927	9,554,318	74.21 %	78.50 %	15.09 %	15.09 %
2	3548	TRAVELERS GRP	3,441,405	3,305,589	68.80 %	75.22 %	5.34 %	20.44 %
3	111	LIBERTY MUT GRP	2,716,060	2,552,749	78.43 %	83.53 %	4.22 %	24.65 %
4	150	OLD REPUBLIC GRP	2,502,163	2,347,319	79.44 %	85.89 %	3.89 %	28.54 %
5	212	ZURICH INS GRP	2,099,053	1,995,925	89.31 %	96.42 %	3.26 %	31.80 %
6	31	BERKSHIRE HATHAWAY GRP	1,951,535	1,804,053	68.19 %	78.12 %	3.03 %	34.83 %
7	280	AUTO OWNERS GRP	1,843,847	1,716,764	88.47 %	98.58 %	2.86 %	37.69 %
8	176	STATE FARM GRP	1,674,411	1,415,340	101.02 %	109.48 %	2.60 %	40.29 %
9	98	WR BERKLEY CORP GRP	1,362,619	1,292,129	65.89 %	72.78 %	2.12 %	42.41 %
10	140	NATIONWIDE CORP GRP	1,241,900	1,490,308	72.98 %	77.69 %	1.93 %	44.34 %
11	626	CHUBB LTD GRP	1,240,871	1,217,760	94.30 %	100.49 %	1.93 %	46.27 %
12	91	HARTFORD FIRE & CAS GRP	1,203,622	1,131,537	69.73 %	75.78 %	1.87 %	48.14 %
13	12	AMERICAN INTL GRP	1,150,149	1,073,587	67.14 %	72.59 %	1.79 %	49.92 %
14	84	AMERICAN FINANCIAL GRP	1,045,676	1,029,336	69.70 %	73.34 %	1.62 %	51.55 %
15	242	SELECTIVE INS GRP	1,010,639	947,400	65.11 %	68.91 %	1.57 %	53.12 %
16	158	FAIRFAX FIN GRP	1,009,722	955,609	72.24 %	78.62 %	1.57 %	54.68 %
17	3098	TOKIO MARINE HOLDINGS INC GRP	976,674	936,602	66.99 %	71.26 %	1.52 %	56.20 %
18	169	SENTRY INS GRP	931,455	900,939	72.16 %	77.67 %	1.45 %	57.65 %
19	213	ERIE INS GRP	891,288	839,341	85.64 %	89.50 %	1.38 %	59.03 %
20	244	CINCINNATI FIN GRP	877,528	860,425	58.17 %	61.99 %	1.36 %	60.39 %
21	218	CNA INS GRP	874,464	794,929	75.92 %	80.17 %	1.36 %	61.75 %
22	8	ALLSTATE INS GRP	842,197	909,239	95.57 %	98.76 %	1.31 %	63.06 %
23	14184	ACUITY A MUT INS CO	810,564	769,757	56.74 %	61.81 %	1.26 %	64.32 %
24	7	FEDERATED MUT GRP	733,644	700,129	63.85 %	69.38 %	1.14 %	65.46 %
25	1279	ARCH INS GRP	705,248	651,287	73.28 %	78.35 %	1.10 %	66.55 %

Top 25 Property and Casualty Insurers – Workers Comp (NAIC, 2023)

Rank	Group/ Company Code	Group/ Company Name	Direct Premiums Written (000)	Direct Premiums Earned (000)	Loss Ratio	Loss & Cost Containment Ratio	Market Share	Cumulative Market Share
1	3548	TRAVELERS GRP	3,866,767	3,849,947	43.01 %	47.86 %	6.23 %	6.23 %
2	91	HARTFORD FIRE & CAS GRP	3,771,504	3,711,059	43.82 %	49.87 %	6.08 %	12.31 %
3	2538	AMTRUST FINANCIAL SERV GRP	3,425,170	3,344,213	45.59 %	51.55 %	5.52 %	17.83 %
4	212	ZURICH INS GRP	2,932,999	2,906,800	36.25 %	58.60 %	4.73 %	22.56 %
5	626	CHUBB LTD GRP	2,379,022	2,443,829	32.03 %	35.17 %	3.83 %	26.39 %
6	31	BERKSHIRE HATHAWAY GRP	2,125,793	2,113,200	50.21 %	58.07 %	3.43 %	29.82 %
7	111	LIBERTY MUT GRP	2,093,981	2,175,890	49.86 %	57.89 %	3.37 %	33.19 %
8		WASHINGTON STATE FUND	1,950,901	1,950,901	114.34 %	125.13 %	3.14 %	36.34 %
9	36102	STATE INS FUND WORKERS COMPENSATION	1,709,193	1,728,657	64.55 %	70.60 %	2.75 %	39.09 %
10	572	BCBS OF MI GRP	1,670,454	1,699,990	48.85 %	54.26 %	2.69 %	41.78 %
11	150	OLD REPUBLIC GRP	1,471,615	1,456,701	46.57 %	54.36 %	2.37 %	44.16 %
12	84	AMERICAN FINANCIAL GRP	1,418,133	1,408,176	42.87 %	49.06 %	2.29 %	46.44 %
13	12	AMERICAN INTL GRP	1,230,785	1,210,465	33.06 %	45.10 %	1.98 %	48.43 %
14	98	WR BERKLEY CORP GRP	1,219,710	1,202,527	47.83 %	54.28 %	1.97 %	50.39 %
15		OHIO BUREAU OF WORKERS' COMPENSATION	1,198,066	1,198,066	29.04 %	43.93 %	1.93 %	52.32 %
16	35076	STATE COMPENSATION INS FUND	1,140,751	1,139,004	37.47 %	43.46 %	1.84 %	54.16 %
17	922	ICW GRP ASSETS INC GRP	1,108,761	1,040,814	53.58 %	60.11 %	1.79 %	55.95 %
18	22945	TEXAS MUT INS CO	1,090,472	1,067,490	36.48 %	39.58 %	1.76 %	57.71 %
19	218	CNA INS GRP	1,070,154	1,001,634	28.67 %	36.86 %	1.72 %	59.43 %
20	1279	ARCH INS GRP	860,901	822,774	43.02 %	52.35 %	1.39 %	60.82 %
21	3363	EMPLOYERS HOLDINGS GRP	758,599	719,896	45.46 %	52.05 %	1.22 %	62.04 %
22	158	FAIRFAX FIN GRP	757,824	761,509	33.27 %	36.26 %	1.22 %	63.26 %
23	4670	STARR GRP	667,542	675,417	45.10 %	55.24 %	1.08 %	64.34 %
24	36196	SAIF CORP	582,018	564,115	71.73 %	75.15 %	0.94 %	65.28 %
25	291	ENCOVA MUT INS GRP	572,310	561,527	45.09 %	53.93 %	0.92 %	66.20 %

Gap between Personal and Commercial Lines profitability



- From 2015 to 2022, commercial lines have generally shown increasing profitability compared to personal lines, with notable peaks in 2015 (+6.23) and 2022 (+6.23)
- The significant shifts in profitability between personal and commercial lines indicate changing market dynamics, possibly influenced by factors such as economic conditions, regulatory changes, and shifts in consumer behavior.

Insurance industry challenges & priorities (Part 1)

1 Rising Catastrophic Events and Climate Risks

- Increased frequency and severity of natural disasters (hurricanes, wildfires, floods) lead to larger claim volumes and higher losses.
- Insurers need to adjust underwriting models and premiums to account for these risks.

3 Financial illiteracy and innumeracy

- To make right insurance purchase decision, consumers should understand the losses they may sustain, their frequency and severity.
- Financial illiteracy and Innumeracy is observed to be low.

2 The Protection Gap

- With advent of new technologies and business models, traditional insurance is unable to provide complete coverage of consumer needs.
- There is need to shrink the protection gap with new and innovative products - People will have a better perception of insurance while insurer's income would rise.

4 Behavioral economic biases

- Decision-making is generally poor when dealing with problems that are unfamiliar, complex and in the future.
- People often use instinct than reason when buying insurance.

Insurance industry challenges & priorities (Part 2)

5 Digital Transformation and Automation

- Insurers are prioritizing investments in technology to automate claims processing, underwriting, & policy admin. This includes implementing AI, machine learning, & robotic process automation (RPA) to improve efficiency & reduce manual effort.
- Customers now expect digital-first experiences with faster, more transparent, and personalized interactions.

6 Attracting top and diverse talent

- With the advent of digital technologies, the nature of job for insurance workers has changed.
- Routine tasks are being automated while core work relies more on judgment and experience.
- Workers need to be more tech savvy and data savvy.

7 Social Inflation

- Social inflation is a term used to describe the potential for rising insurance claim costs resulting from increased litigation, broader definitions of liability, more plaintiff-friendly legal decisions, and larger compensatory jury awards.
- Legal costs and lawsuits in the industry continue to grow in both personal and commercial lines

8 Economic Inflation

- The U.S. economy has shown signs of rising inflation, with various measures spiking to their highest levels in over forty years.
- Rising economic inflation in recent months has had impact on loss costs, which could impact reserve adequacy and underwriting profitability for many lines of business.

Innovation in P&C insurance industry… 1

Cloud computing, the Internet of Things (IoT), advanced analytics, telematics, the global positioning system (GPS), RPA, Chatbots, drones, blockchain, smart contracts, and artificial intelligence (AI)

- All these technologies are providing new ways to measure and price risk, engage with customers, reduce cost, improve efficiency, and expand insurability.
- They also lead to the creation of new insurance products, services, and business models.

On-Demand insurance

New digital platforms support micro-duration and atomization of insurance by item.

IoT & property insurance

Sensors and monitoring systems give property owners and insurers data on, and control over major risks.

Telematics and Driverless car insurance

Telematics monitors customer driving habits for accurate risk profiles and pricing. Driverless cars redefine the kind of insurance required.

Drones as aerial assessors

The technology allows easy access to isolated and dangerous areas after disasters occur to collect aerial data and assess loss through cutting-edge imagery analytics.

Blockchain-enabled smart contracts

Eliminate error, negligence, and detect fraud by providing a decentralized digital repository to independently verify the veracity of customers, policies, and claims.

AI and Cognitive agents

Software-client interactions help insurers collect enormous real-time data to gain deep insights into each of their client's unique needs and provide customized products and services.

Innovation in P&C insurance industry… 2

Blockchain-enabled smart contracts

Eliminate error, negligence, and detect fraud by providing a decentralized digital repository to independently verify the veracity of customers, policies, and claims.

Generative AI

Generative AI is revolutionizing the P&C insurance industry by automating claims processing and enhancing underwriting accuracy through advanced data analysis. It also improves customer interactions with personalized responses and recommendations.

Use of External Data

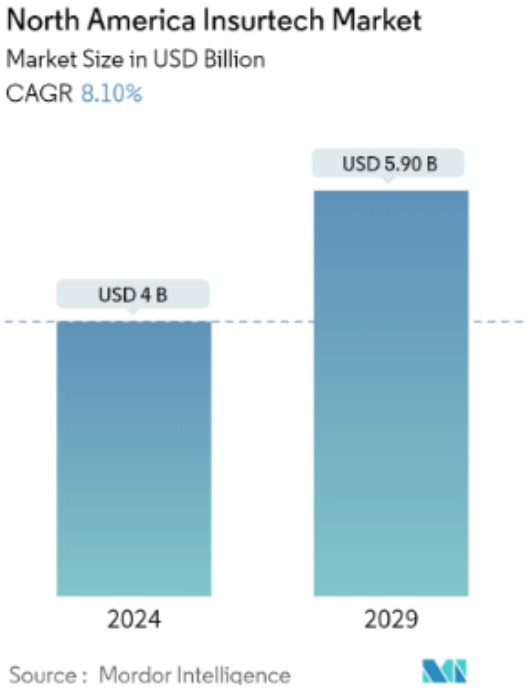
Insurers are leveraging external data to complement already available internal data to develop a deep understanding of customers. Insurers are reaping good benefits executing some critical use cases such as Underwriting application pre-fill and Fraud detection using external data (such as social media data)

Computer Vision

Insurers are applying computer vision to positively impact various processes in various areas of insurance, specifically underwriting and claims. Some examples (1) Underwriting: virtual inspection of properties for underwriting purposes on obtained drone imagery and (2) Claims: damage assessment of a car involved in accident based on photos submitted by the customer

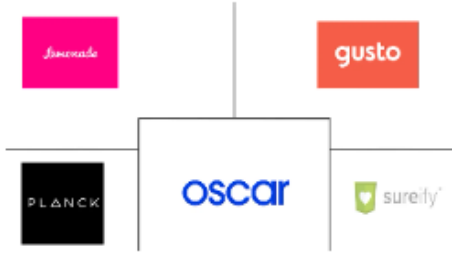
InsurTech - Overview

- Insurtech refers to the ecosystem of companies that use new technologies and / or new business models aided by technology to innovate across one or more parts of insurance value chain.
- Insurtechs adopt new technology and concepts, especially within big data, machine learning and usage-based insurance.



Study Period	2020 - 2029
Base Year For Estimation	2023
Market Size (2024)	USD 4 Billion
Market Size (2029)	USD 5.90 Billion
CAGR (2024 - 2029)	8.10 %
Market Concentration	Medium

Major Players



*Disclaimer: Major Players sorted in no particular order

How do insurtechs differ from incumbents?

Increased connectivity

- AI bots are able to provide robo-advice to customers through a digital customer interface; Example- digital brokers Knip (Germany) and Clark (Switzerland)

Full automation

- Automation helps reduce costs and accelerates processes to meet customer expectations
- Example, SnapSheet offers end-to-end automated claims management settling “simpler” claims faster than usual

Data-driven decision making and insights

- Insurtechs apply ML techniques to diverse data and utilize the intelligence from the models built to develop sophisticated and personalized products and services for customers
- Example, Metromile offers pay-per-mile auto insurance.

Targeted product concepts

- Insurtechs are able to offer personalized small ticket products based on usage or value-added services
- Cuvva offers- hourly car insurance on demand to customers using their mobile phone

More frequent interactions

- On-demand insurers like Trov offer consumers a mobile-enabled on-off switch for coverage.
- These innovations promote customer relationships and raise awareness of insurance by making it more relevant.

Social engagement

- Peer-to-peer insurers, such as Friendsurance, Lemonade, Guevara, and Inspeer, use policyholder pooling to lower rates as well as also create a social contract with customers
- ERSTE Digital, sells through social media channels, including YouTube, Instagram, and Facebook.

Digitizing “moments of truth.”

- Customer pain points, whether arising in advice or claims, can make or break customer relationships
- Advisory solutions to these “moments of truth,” such as PolicyGenius and HeyBrolly, tackle customer concerns about being over- or underinsured.
- Bauxy allows its customers instantly to initiate straight-through claims processing by taking a photo of an invoice and submitting it electronically.

Insurtechs- product focus and distinction from Custom Built Solution Providers

1. Insurtechs build novel solutions and a few also sell insurance directly

    a. An overwhelming majority of insurtechs are building solutions that support the P&C insurance companies and don't sell their own insurance products to customers. However, there are a few insurtechs that do sell their own insurance products in the market such as Lemonade (Auto/Renters), Hippo Insurance (Property) and Metromile (Auto)

2. Insurtech Product Solutions vs Custom Built Solutions

    b. Insurtech Product solutions are very different from Custom Built AI/Data Science solutions built by Tiger Analytics and other similar companies. For instance, OCR, driver assistance systems, algorithms predicting diagnosis from scans, image recognition, are perfect for product companies to address as they are dependent on fewer types of data sources, that are very consistent in format. Also, these solutions have wide applicability that makes it a great use case for product companies to invest given the scale

    b. A good example for custom built solution is using Computer Vision to answer a variety of UW risk scenarios using several sources / types of images. Developing such a solution requires significant customization downstream workflow due to either evolving nature of risk or changes in data source formats, that may be best addressed through a custom solution that is white-box and customizable at their end. Custom built solutions are
        i. flexible and can be customized more easily
        ii. not limited to data sources
        iii. easily upgradable with no dependencies (unlike vendor’s product upgrade schedules)
        iv. lower total cost of ownership that typically decreases with scale

Major Insurtech fundings, M&A activities in US in recent years

Insurtech Fundings

Company	Sector	Amount Raised	Lead Investor	Details
Vitesse	Payments	$93 million	KKR	Enhancing its platform for real-time management and safeguarding of capital
Jensten	Broker and Underwriting	$211 million	LGT Private Debt and Bridgepoint Credit	Pursuing strategic acquisitions and organic growth initiatives
ICEYE	Disaster Management	$93 million	Solidium Oy	Expanding satellite-powered disaster management solutions

Insurtech M&A

Acquirer	Target	Date	Details
Verisk	Rocket Enterprise S olutions GmbH	Jan 2024	Expands Verisk's footprint in Germany, enhancing p roperty claims solutions
Majesco	Decision Research C orporation (DRC)	Jan 2024	Enhances Majesco's SaaS-based insurance software offerings
American Financial Group	Crop Risk Services	May 2023	Expanding crop insurance operations

2a. P&C Insurance Distribution and Marketing

P&C Insurance Distribution

- Types of P&C Insurance writers
- US P&C Distribution

P&C Insurance Distribution overview - Direct vs Indirect writers

Direct Writers

Direct writers, who sell their own products through captive agents by mail, telephone, or via the internet. It includes distributing through the internet, exclusive/captive agents, direct response, and affinity groups.

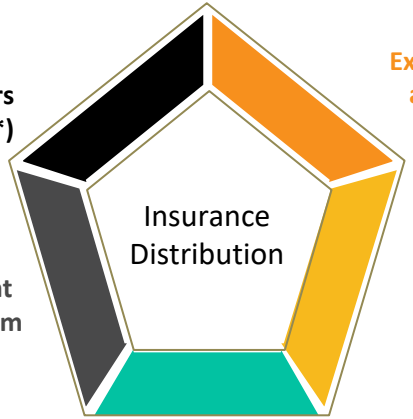
Indirect Writers (Agency Writers)

Agency writers or Insurance companies whose products are sold by independent agents or brokers representing several companies. It includes independent agencies, brokers, general agents, and managing general agents (MGAs).

There is a degree of overlap as many insurers use multiple channels. We will see in the next slide with examples how different insurers use the distribution systems to market their insurance offerings.

P&C Insurance Distribution overview - further breakdown of Direct & Indirect insurance writers

Most insurance companies have multiple channels for distribution and available channels may vary by line of business; Below is further breakdown of how the Direct and Indirect writers distribute their products with some examples of companies using the specific channel (quite likely the companies cited as an example for a channel may use other channels to distribute too)



Brokers (IW*)

Represent the insured. Client contacts broker, who in turn contacts several insurance companies to find best insurance for client. E.g. Liberty Mutual, Travelers
Note brokers are not authorized to sell the insurance product and ultimately the chosen insurance company or its agent will complete the sales process

Exclusive/ captive agency system (DW)**

Independent businesses (agents) contract exclusively with one insurance company to represent and sell insurance on a commission basis.
E.g. Farmers, State Farm

Sales Reps (DW)**

These are employees of the insurance company. They receive a salary and commission.
E.g. Liberty Mutual

Independent agency system (IW*)

Multiple companies authorize an agent to sell insurance for them, but the agent remains independent (not an employee of any of these companies). The agent collects commissions on the policies sold.
E.g. Hanover, Liberty Mutual, Progressive

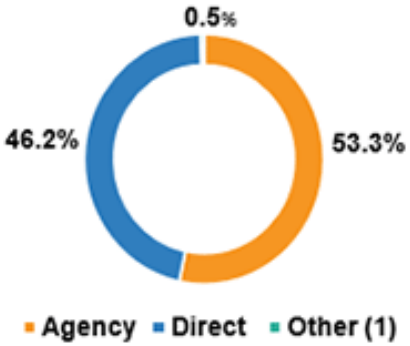
Direct response system (DW)**

Insurance company sells through direct mail, phone, or internet.
E.g. Lemonade and Metromile are new generation insurance companies selling policies online

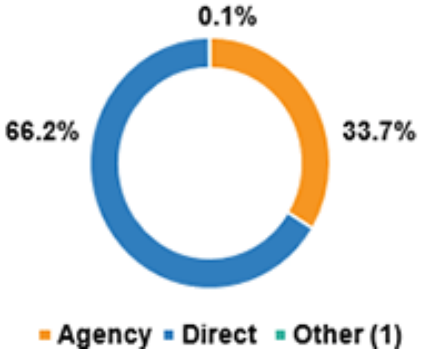
* IW - Indirect Writers
** DW - Direct Writers

US P&C Insurance Distribution Market

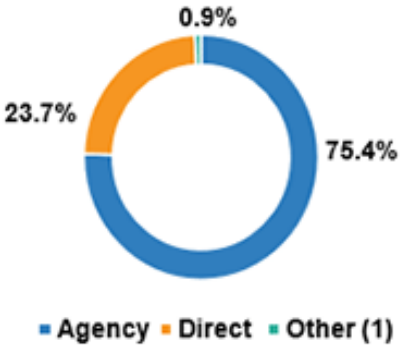
All Property/Casualty Lines - Distribution Channels by Net Premiums Written, 2022



Personal Lines - Distribution Channels by Net Premiums Written, 2022

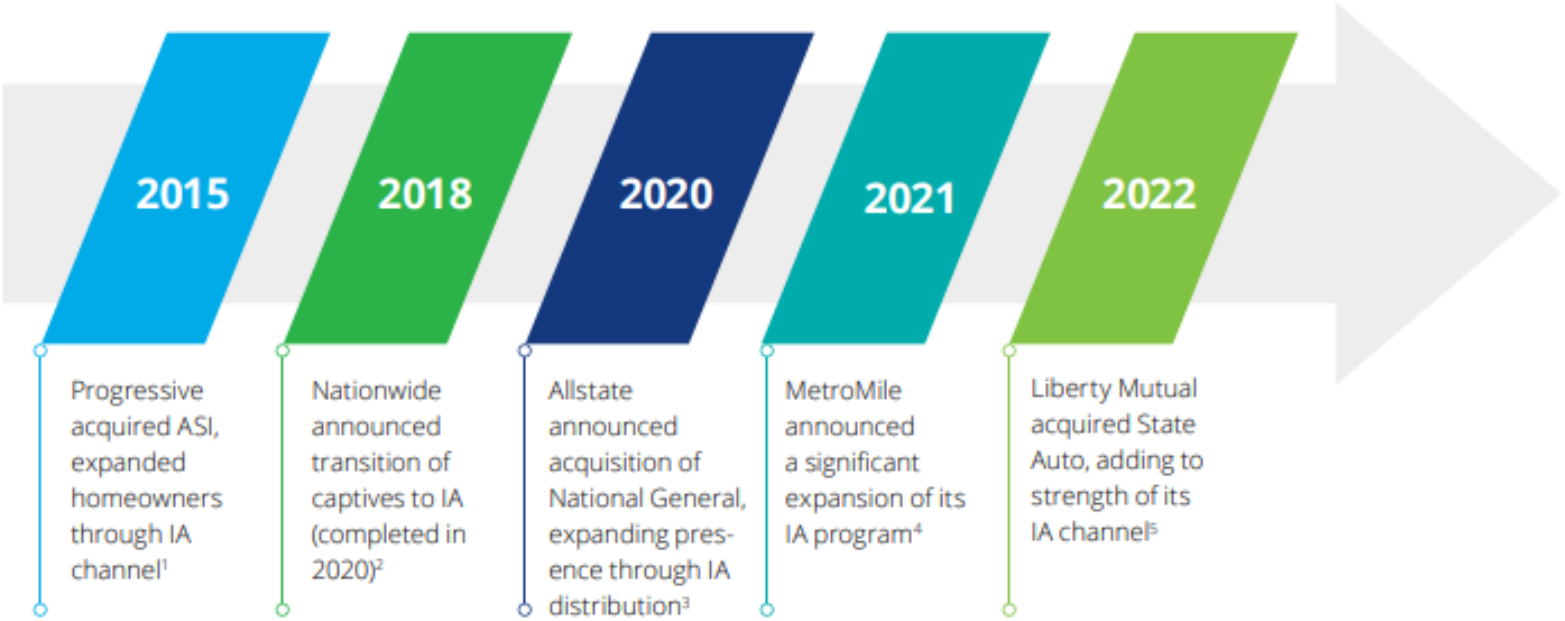


Commercial Lines - Distribution Channels by Net Premiums Written, 2022



US P&C Insurance Distribution Market – Personal Lines

Insurers are strengthening their independent agent force, resulting in stability and growth in personal lines sales



P&C Carriers expand into new distribution channels to meet customers in the preferred channel - Carrier Management

Increasing Investment in Independent Agencies	• Allstate and Liberty Mutual acquired independent agent carriers National General and State Auto respectively • Insuretechs like Metromile and Root which employs digital first and Direct to Consumer model also invested in Independent agents channel. • ~10% agencies in the study* were involved in acquisitions of independent agencies, this signaled a desire among captive carriers to expand their reach with shoppers who work with independent agents. This is also indicative of personalized guidance in the marketplace.
Convergence towards multichannel P&C Distribution	• Insurers are also investing in the channels where they're weak and developing the ability to meet each potential customer everywhere they shop. • Insurers unable to serve consumers in any of the distribution channels will be missing out on a significant market share (as the P&C market is heavily fragmented and highly digital). • Legacy carriers have strengthened their Digital and Direct to Consumer capabilities
Multichannel P&C distribution requires Data Science	• In a fragmented, increasingly digital marketplace, carriers need to be able to deliver a great customer experience at every touchpoint . Carriers will want to deliver personalized, seamless customer experience across multiple channels • Collecting data across channels and using granular insights to serve consumers will become even more important

P&C Distribution - Sample Analytics use cases

Use Case	Why?
Channel optimization : What's the contribution of the direct and indirect distribution channels in sales?	Build / enhance channel capabilities or invest in the most effective channels
Digital Analytics: What %of customers that start the insurance quote process online abandon the process and call 1800 number to buy the policy?	Online quoting forms on the company website / app may require streamlining to boost the sales in the channel
Independent Agency Channel Segmentation : What are the high/low performing independent agencies?	Insurance companies should aim to focus on high performing agencies that help them grow business profitably

P&C Insurance Marketing

P&C Marketing

Traditional Marketing concepts apply for P&C Insurance as well. That said, the Marketing strategies are heavily dependent on the key distribution channel(s) for a P&C company.

Direct Writers	• Advertising is critical for the direct writers: primarily online insurance providers since it lacks the storefront presence of the brick-and-mortar model • Companies like Geico and Progressive market their products through TV ads, Social Media and Google ads.
Indirect Writers	• Indirect writers who sell their product via independent agents/brokers institute programs to incentivize the top performing agents and brokers based on growth and profitability. The marketing spend is less on advertising and more on agent / broker appointments and relationship building

P&C Marketing and Advertising Spend trends

Increased Digital Advertising

•**Shift to Digital**: There has been a significant shift towards digital advertising, with insurers investing heavily in online channels such as social media, search engines, and display ads.
•**Personalization**: Insurers are leveraging data analytics to create personalized advertising campaigns that target specific customer segments.

Ad Spend Growth

•**Overall Increase**: The P&C insurance industry has seen a steady increase in advertising spend, driven by the need to attract new customers and retain existing ones.
•**Seasonal Peaks**: Advertising spend tends to peak during certain times of the year, such as the holiday season and major sporting events.

Emerging Technologies

•**AI and Automation**: The use of artificial intelligence and automation in advertising is on the rise, helping insurers optimize their ad spend and improve campaign performance.
•**Augmented Reality (AR)**: Some insurers are experimenting with AR to create interactive and engaging advertising experiences.

Cross-Channel Marketing

•**Integrated Campaigns**: Insurers are increasingly adopting cross-channel marketing strategies, integrating their campaigns across digital, TV, radio, and print media to maximize reach and impact.
•**Omnichannel Presence**: Maintaining an omnichannel presence is crucial for insurers to engage with customers at multiple touchpoints.

P&C Marketing - Sample Analytics use cases

Use Case	Why?
Build Independent Agent / Broker Segmentation models	As P&C insurance companies work with different agents, the segmentation helps them prioritize and focus on top agencies
Build marketing optimization models	Many P&C insurance companies have multiple channels of distribution. Optimization models help solve the problem of marketing spend allocation by channel of distribution (example, tv ad spend vs marketing spend to incentivize independent agents for profitable growth)

2c. P&C Underwriting

- Basics of Underwriting – introduction, process and risk selection
- Measuring Underwriting results
- Modern-age Underwriting

Underwriting in Insurance- Introduction

Underwriting: the art and science of assuming risk

What is Underwriting?

Primary role: To determine loss exposures that will be insured, amount of coverage, price, under specific conditions.

Purpose of underwriting:

- To develop and maintain a **profitable** book of business.
- **minimize adverse selection** and protect insurer's capacity

Primary activities of underwriter

- **Selecting insureds** based on the criteria set by the insurer.
- **Pricing coverage** – Premium is determined by estimating the probability that a loss will occur, the probable severity of a loss if it occurs, and the value of what the insured wants to protect from loss.
- **Determining policy terms and conditions** – Insurers can leverage standard forms or their own forms.
- **Monitoring underwriting decisions** – Risk can change over time, and monitoring underwriting decisions is an ongoing activity.

Underwriting expenses

- Costs required to acquire and maintain a book of business.
- Underwriting expenses may include **direct costs** such as business acquisition, actuarial reviews, and inspections, as well as **indirect costs** such as commissions paid, accounting, legal and customer service expenses.

The Underwriting Process

Steps involved in Underwriting process

Agents and Underwriter gather the necessary information

-Agent collects applications from applicant and provides it to the insurance company that underwriter accesses

-Underwriter may also collect information from **other sources** such as credit reports, prior loss history and driving history etc.

Underwriter makes the decision on application

-Underwriter matches applicant data against underwriting guidelines (proprietary to each insurer) to perform three functions: risk selection (accepts/declines the application), risk classification and rating, and policy selection

- After determining the acceptability of an applicant and assigning the proper classification and rating, the underwriter is ready to issue an insurance policy

Insurer communicates the decision to agent/applicant

-Insurer communicates the decision to applicant's agent (indirect writer) or directly to the applicant (direct writer)

-Underwriters typically do not have one-to-one contact with applicants (sales team/agent may communicate this decision) unless insurance company is a Direct Writer

Underwriters continue to monitor the issued policy (continuous underwriting)

--Underwriting is an Ongoing process and does not end with the issuance or renewal of policy

- Underwriters continuously monitor policies for losses as well as conformance to underwriting guidelines as those guidelines may change over time as well

Risk Selection in Decision Process

Successful underwriting encompasses rigorous risk selection

Insurers, whether life or non-life, must assess the risk and gauge the likelihood of claims and the value of those claims. Underwriters' job is to evaluate whether given risks can be covered and, if so, under what terms. Underwriting departments often have the authority to accept or reject risks.

Underwriting guidelines must follow insurance laws

- Underwriting involves **risk selection,** which should not discriminate against individuals on the basis of **age, gender, origin, and religious beliefs**
- Underwriting guidelines are developed by insurance companies
  and are **proprietary** to each insurer. The Law department can subject these guidelines for inspection, and if the guidelines are unfairly discriminating, then the insurer is penalized. If insurance companies treat similarly situated individuals differently, then they are violating the Unfair Practices Act
- Insurance companies are very cautious and **consent to state laws** by incorporating them in their underwriting guidelines.

Prudent underwriting minimizes poor risk selection

- Underwriters have to focus on profitability as higher losses mean poor risk selection and paying out more money than taken in via premiums. **Good underwriting minimizes poor risk selection** to maintain a profitable business.
- **Adverse selection:** refers to situations in which an insurance company extends insurance coverage to an applicant whose actual risk is substantially higher than the risk known by the insurance company. E.g. An applicant obtains auto insurance based on providing a residence address in an area with a very low crime rate, whereas the applicant lives in an area with a very high crime rate. Obviously, the risk of the applicant's vehicle being stolen is higher.
- Insurers can protect themselves against adverse selection by- accurately identifying and quantifying risk factors, scrutinizing an applicant's information, placing limits (ceilings) on coverage and raising premiums.

Underwriter - key factors for consideration

Factors that influence Underwriting decision:

- **Nature of the risk**
  - Insurance risk can be defined simply as the possibility of an insured suffering a financial loss that's covered in a policy issued by an insurance company or other insurer
  - Example, A vehicle residing in a high crime area, for example, presents a higher risk to you, the insurer, that will have to be taken into account during the underwriting process.

- **Hazards that are present**
  - A hazard is a condition that increases the possibility of loss.
  - For example, fire is a risk because it causes losses, while a fireplace is a hazard because it increases the probability of loss from fire.

- **Claims History**
  - Claims history provides the underwriter a view of prior loss history associated with the risk being insured and helps build an expectation around future losses

- **Other factors** that depend upon the type of risk being insured
  - There may be specific factors associated with the type of risk
  - Example, for homeowner's insurance, certain dog breeds are considered dangerous and may be a key consideration for certain insurance companies (based on their underwriting guidelines)

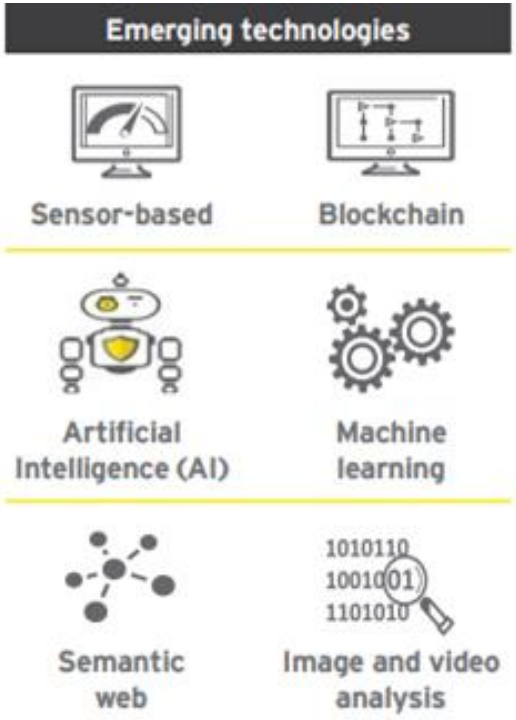
Measuring Underwriting Results

Financial indicators	• **Loss Ratio:** a measure of the portion of each premium dollar used to pay losses and is calculated as: Loss ratio = **Losses** / **Premium**. Typically, the ratio uses total reported losses and total earned premium; however, other variations are common. For example, companies may include Loss Adjustment Expenses (LAE) in the calculation of loss ratios • **Underwriting (UW) Expense Ratio:** a measure of the portion of each premium dollar used to pay for underwriting expenses, and it is calculated as: **UW expenses** / **Premium**. Often the company will subdivide the major underwriting expense categories into expenses that are generally incurred at the onset of the policy (e.g., commissions, other acquisition, taxes, licenses, and fees) and expenses that are incurred throughout the policy (e.g., general expenses). For the purpose of calculating the underwriting expense ratio, the former expenses are measured as a ratio to written premium and the latter expenses are measured as a ratio to earned premium. • **Combined Ratio:** is the combination of the loss and expense ratios and is calculated as: **Loss Ratio + (LAE / Earned Premium) + (Underwriting Expenses / Written Premium)**. In calculating the combined ratio, the loss ratio should not include LAE or it will be double counted. Some companies may compare underwriting expenses incurred throughout the policy to earned premium rather than to written premium. Here LAE (Loss Adjustment Expenses) refers to amount of expenses incurred to adjust claims • **Expense Ratio or Operating Expense Ratio:** a measure of the portion of each premium dollar used to pay for loss adjustment and underwriting expenses and is calculated as: UW Expense Ratio + LAE / Earned Premium • **Net underwriting income:** the difference between net premiums earned and the sum of losses incurred (inclusive of loss adjustment expenses), underwriting expenses and policyholder dividends. • **Indicators related to concentration of insurance:** Different lines of insurance business entail different sorts of risks and some business lines may require more careful monitoring than others. The share of business in specific lines – at the level of a particular company or market more generally or in comparison to a prior period – provides key information on changes in product mix and any concentration in specific lines of business • **Indicators related to premium growth in certain classes of insurance:** Another indicator of potential risk related to concentration certain lines of business is the growth in premiums by line of business (or class of insurance).
Non-Financial indicators	• **Relationship with agents** • **Customer Satisfaction:** How pleased customers are with insurance services • **Retention ratio:** measure of the rate at which the existing insureds renew their policies upon expiration and calculated as : # of policies renewed/ Total number of potential renewal policies • **Underwriting Speed:** Sum of time taken for underwriting/ Total number of policies per month

Modern-age Underwriting / Underwriting Innovation

(note that this section focuses on global innovation not just US specific)

01	Digital data sources with ML and AI	• By applying ML and AI techniques, insurers can gain a precise view of their risk exposure. • Build advanced capabilities in underwriting such as real-time quoting and issuance.
02	Sensor-based underwriting	• Leverage data from on-vehicle telematics sensors, and drivers' wearable devices to calculate risk • Leverage data from drones, sensors and satellites and strengthen risk selection.
03	No-touch Underwriting	• Small commercial insurers can straight-through process applications fueled by data pre-fills from external data sources and AI models / sophisticated business rules.
04	Insurance-as-a-Service	• Partnering with digital platforms offering IaaS E.g. Insurance Companies partners with Planck to create full digital underwriting for their commercial lines.
05	Dynamic Underwriting	• Insurers pivoting from traditional risk snapshot of one time frame to real time using IoT, Telematics, fitness, mobility, Drone data.



P&C Underwriting - Sample Analytics use cases

Use Case	Why?
Automate underwriting decision making / straight through processing using AI	1. Improves underwriting efficiency 2. Standardization of underwriting process
Build underwriting fraud models	Eliminate any premium / loss leakage by detecting fraudulent elements in the insurance application (example, incorrect vehicle garaging address in the application, misstating driving violations in the auto insurance application)

2c. Pricing (Ratemaking) and Reserving

- Principles of Pricing/Ratemaking
- Pricing Considerations
- Loss Development & Loss Development Triangle
- Reserving

Principles of Pricing/Ratemaking

Pricing/Ratemaking is the process by which an insurance company sets the premium that needs to be charged to a policyholder by considering various risk factors.

Principle 1: A rate is an estimate of the expected value of future costs

Ratemaking is prospective because the property and casualty insurance rate must be developed prior to the transfer of risk.

Principle 2: A rate provides for all costs associated with the transfer of risk

Ratemaking should provide for all costs so that the insurance system is financially sound.

Principle 3: A rate provides for the costs associated with an individual risk transfer

- Ratemaking should provide for the costs of an individual risk transfer so that equity among insureds is maintained.
- When the experience of an individual risk does not provide a credible basis for estimating these costs, it is appropriate to consider the aggregate experience of similar risks.

Principle 4 : A rate is reasonable and not excessive, inadequate, or unfairly discriminatory

- Ratemaking produces cost estimates that are actuarially sound if the estimation is based on Principles 1, 2, and 3
- Such rates comply with four criteria commonly used by actuaries: reasonable, not excessive, not inadequate, and not unfairly discriminatory.

Considerations for Ratemaking (Part 1)

Exposure Unit

The determination of an appropriate exposure unit or premium basis is essential. It is desirable that the exposure unit vary with the hazard and be practical and verifiable.

Homogeneity

Ratemaking accuracy often is improved by subdividing experience into similar groups. For a heterogeneous product, consideration should be given to segregating the experience into more homogeneous groupings

Data

Historical premium, exposure, loss and expense experience is usually the starting point of ratemaking. This experience is relevant if it provides a basis for developing a reasonable indication of the future.

Credibility

Credibility is a measure of the predictive value that the actuary attaches to a particular body of data. Credibility is increased by making groupings more homogeneous or by increasing the size of the group analyzed.

Organization of Data

There are several acceptable methods of organizing data including **calendar year, accident year, report year** and policy year. Each presents certain pros and cons; but, if handled properly, each may be used to produce rates. Data availability, clarity, simplicity, and the nature of the insurance coverage affect the choice.

Loss Development

When incurred losses and loss adjustment expenses are estimated, the development of each of the components (losses, expenses)should be considered.

Considerations for Ratemaking (Part 2)

Trends

Consideration should be given to past and prospective changes in claim costs, claim frequencies, exposures, expenses and premiums.

Mix of Business

Consideration should be given to distributional **changes in deductibles, coverage limitations** or type of risks that may affect the frequency or severity of claims.

Catastrophes

Consideration should be given to the impact of catastrophes on the experience and procedures should be developed to include an allowance for the catastrophe exposure in the rate.

Reinsurance

Consideration should be given to the effect of reinsurance arrangements.

Policy Provisions

Consideration should be given to the effect of salvage and subrogation, coinsurance, coverage limits, deductibles, coordination of benefits, second injury fund recoveries and other policy provisions.

Operational Changes

Consideration should be given to operational changes such as changes in the underwriting process, claim handling, case reserving and marketing practices that affect the continuity of the experience.

Considerations for Ratemaking (Part 3)

Other Influences

The impact of external influences on the expected future experience should be considered. Considerations include the **judicial environment, regulatory and legislative changes, guaranty funds, economic variable, and residual market** mechanisms including subsidies of residual market rate deficiencies.

Risk

The rate should include a charge for the risk of random variation from the expected costs. This risk charge should be reflected in the determination of the appropriate total return consistent with the cost of capital

Classification Plans

A properly defined classification plan enables the development of actuarially sound rates.

Investment & Other Income

The contribution of net investment and other income should be considered.

Individual Risk Rating

When an individual risk experience is sufficiently credible, the premium for that risk should be modified to reflect the individual experience. Consideration should be given to the impact of individual risk rating plans on the overall experience.

Actuarial Judgment

Informed actuarial judgments can be used effectively in ratemaking. Such judgments may be applied throughout the ratemaking process and should be documented and available for disclosure.

Loss Development- Some Old Claims Never Die, They Just Get Adjusted

The process of adjusting immature losses to an estimated ultimate value is known as loss development.

Why does Loss Develop?

- Sometimes losses that belong to a certain accident year are not known or reported until a later date. Claims not currently known by the insurer are referred to as unreported claims or incurred but not reported (IBNR) claims.
- As a claim matures, payments are made and claim adjusters gather more information about the value of the loss until the final payment is made and the ultimate amount is known. These are also known as incurred but not enough reported (IBNER) claims.

Short-tailed lines: Examples of which include automobile physical damage and homeowners, the ultimate amount is known rather quickly.
Long-tailed lines: Examples of which include automobile bodily injury, commercial general liability, workers compensation, or personal umbrella, may take many years for the ultimate amount to be known.

Example of loss development with claim maturity

Think about an accident involving two cars (A and B) where A's driver hit car B and injured car B's driver (say the accident happened in January 2022)

- Car B's driver has an injury claim that A's insurance company will have to pay for. The treatment received by B's driver is worth $2000 in Feb 2022 and $4000 in Apr 2022 and finally $8000 in Jan 2023. Overall, the injury claim developed between Feb and Sep from $2000 to $14000 in Sep 2022
- When the pricing actuaries are looking at the claim in Mar 2022, they will have to estimate what this claim will ultimately cost expecting the loss development based on historical trends associated with similar accidents.

Note that this is a simple example to explain the concept of loss development. In reality, actuaries estimate thousands of claims in aggregate rather than one claims at a time

Loss Development- an important consideration

- As explained in previous slides, losses develop over time and the development depends on the line of business (short tailed vs long tailed)

- Loss development is an important consideration for ratemaking as it helps the insurance company understand the amount of losses that will be ultimately paid for the claims (reported or incurred but not reported) for a given accident year

    - **Pricing** actuaries make an informed decision on whether insurance rates for a particular type of customer/region etc. should be increased based on the loss development analysis (and many other considerations as discussed in previous slides)

- Loss development is also an important consideration for reserving actuaries as ultimate paid losses also help establish **adequate reserve** levels for an insurance company

- Loss development triangle / chain ladder method is one of the many tools used to estimate ultimate losses and the future slides explain it with some examples

Loss Development Triangle

- The chain ladder method is based upon the assumption that aggregate losses will move from unpaid to paid in a pattern that is generally consistent over time.
- Loss data for this method is usually organised in a triangle format (as shown below), which makes it a "Loss Development Triangle".
- By arranging the data in this way, it is easy to see the change in estimated losses or development over time.

Exhibit 1: Loss (in Million $) by accident year from the Claims system

Accident Year	Development(in months)								
	12	24	36	48	60	72	84	96	108
2013	$ 404.00	$ 986.00	$1,342.00	$1,582.00	$1,736.00	$1,833.00	$1,907.00	$1,967.00	$2,006.00
2014	$ 387.00	$ 964.00	$1,336.00	$1,580.00	$1,957.00	$1,813.00	$1,903.00	$1,949.00	
2015	$ 421.00	$1,037.00	$1,401.00	$1,604.00	$1,729.00	$1,821.00	$1,878.00		
2016	$ 336.00	$ 753.00	$1,029.00	$1,195.00	$1,326.00	$1,395.00			
2017	$ 257.00	$ 569.00	$ 754.00	$ 802.00	$ 958.00				
2018	$ 193.00	$ 423.00	$ 589.00	$ 661.00					
2019	$ 142.00	$ 361.00	$ 463.00						
2020	$ 160.00	$ 312.00							
2021	$ 122.00								

Applications of Loss Development Triangle:

Actuaries produce triangles for:

- Paid losses
- Incurred losses
- IBNR losses

All of these triangles allow the actuary and the captive's board members to get a picture of trends in claims.

Loss Development Factor:

- A loss development factor (LDF) is a number applied to current losses to estimate ultimate losses.
- For example, an LDF of 2.0 means that for every $1 in claims, the ultimate payout will be $2. If an insurer had $100,000 in current claims, the ultimate payout would be $200,000 with an LDF of 2.0.

$$\text{Loss Development}_{\text{at projected period}} = \text{Loss}_{\text{at current evaluation period}} * \text{LDF}$$

Simple example to understand LDF and ultimate loss projections

Problem statement: How to project year 2021's ultimate losses?

Exhibit 2: Loss development factor calculation on Exhibit 1 data

	12 to 24	24 to 36	36 to 48	48 to 60	60 to 72	72 to 84	84 to 96	96 to 108	108
2013	2.44	1.36	1.18	1.10	1.06	1.04	1.03	1.02	
2014	2.49	1.39	1.18	1.24	0.93	1.05	1.02		
2015	2.46	1.35	1.14	1.08	1.05	1.03			
2016	2.24	1.37	1.16	1.11	1.05				
2017	2.21	1.33	1.06	1.19					
2018	2.19	1.39	1.12						
2019	2.54	1.28							
2020	1.95								
2021									
LDF	2.32	1.35	1.14	1.14	1.02	1.00	1.00	1.00	

Avg

Avg

Product

Ultimate LDF of 2021 = 4.1814142

Step 1: Calculating Loss Development

This is the loss development occurred from 96 to 108 months.
It is calculated as (From Exhibit 1):
$ 2,006.00 / $ 1,967.00
Similarly, all the other Loss developments are calculated

Step 2: Calculating LDF for each period (Average of each column)

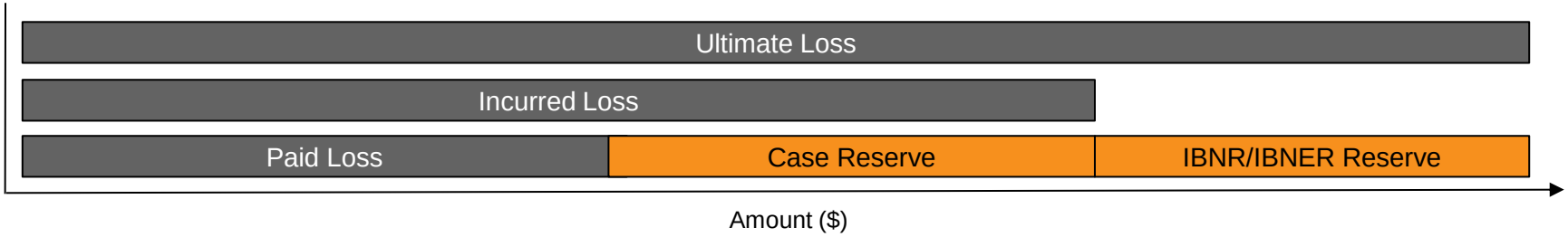
Step 3: Calculating Ultimate LDF for 2016 (Product of all LDFs)

Step 4: Calculating Ultimate Loss

Ultimate loss $_{2021}$ = Loss $_{\text{in 2021}}$ * Ultimate LDF $_{2021}$ = 122.00 (Million $) * 4.1814142 = ~ $ 510 (Million $)

P&C Reserving

Reserving is the process of evaluating, reviewing, and estimating unpaid claims within insurance, reinsurance and self-insurance.



Accuracy in estimating unpaid claims is critical to insurers

- Unlike manufacturers, insurers may not know the true cost of goods sold during a financial reporting period until several years later.
- An insurer sells its promise to pay the policyholder or an injured party on behalf of the policyholder in the event of an occurrence covered by the insurance policy.
- For some insured events, the insurer is able to quantify the exact costs of settlement quickly and with great precision. For other insured events, the insurer may not know the ultimate cost for years, and possibly decades. Nevertheless, the insurer must report its financial results on a regular basis.
- Claim reserves (also known as technical provisions in some parts of the world) represent the insurer's estimate of its current liabilities for claims that occurred on or prior to the financial statement reporting date but that have not yet been paid.
- Actuaries around the world work with insurers and self-insurers to quantify, evaluate, and monitor estimates of unpaid claims.

P&C Pricing - Sample Analytics use case

Use Case	Why?
Build models to understand loss trends (understand if and why claims frequency and severity is going up/down?) by region	- Helps refine pricing sophistication so that insurance companies are able to lower (low frequency/severity) or increase rates (higher frequency / severity) by specific regions / zip code. - Lowering rates, wherever applicable, may help the company acquire more customers - Increasing rates, wherever applicable, may help the company maintain profitability

2d. Claims

- Basics of Claims
- Insurance claims life-cycle
- Type of claims

Claims Introduction

What is a claim?

An insurance policy involves the insured paying money (i.e., premium) to an insurer in exchange for a promise to **indemnify the insured** for the financial consequences of an event covered by the policy. If the event is covered by the policy, the insured (or other individual as provided in the insurance policy) makes a demand to the insurer for **indemnification** under the policy. The demand is called a **claim,** and the individual making the demand is called a **claimant**. The claimant can be an insured or a third party alleging injuries or damages that are covered by the policy.

Concept of Indemnity

Insurance is meant to indemnify (i.e. compensate for losses). Insurance should place the insured in the same financial position after the loss, as they enjoyed before it**; neither better nor worse**– no profit, no loss.

Goals of the claim function:

1) Keep the insurer promise: the first goal of the claims function is to satisfy the insurer's obligations to the policyholder as set forth in the insurance contract. the **insurer's promise is to pay for direct physical loss to covered property by a covered cause of loss**.
2) Supporting the insurer's **profit goals**: the second goal of the claims function is to support the insurer's profit goal. Achieving this goal is generally the responsibility of the marketing and underwriting departments; however the claims function serves a role in generating underwriting profit by **managing expenses and paying only what insurer companies owe** on the claim.

Claims Introduction (contd.)

The typical claim status values:

1. **Reported** Claim - refers to the claims that get reported by the customer, third party or by some other parties (agents, lawyers etc...). A reported claim typically gets an "Open" status
2. **Open** Claim - Claim remains open till it gets settled / closed
3. **Closed** Claim - Once the claim gets settled, the claim adjuster marks it closed
4. **Reopened** Claim - In some cases, the claim gets reopened. Example, an injury claim was settled after the treatment was completed but a recurrence of pain resulted in "Reopening" of claim

Key Dates associated with Claim

Accident date	The date of the event that caused the loss is called the date of loss or accident date (or occurrence date).	• For most business lines accident is a sudden event • Some business lines have **repeated exposure** to same hazards, in such cases accident date is when damage, or loss is apparent.
Report date	The date on which claimant reports the claim to the insurer.	• Until the claimant reports the claim to the insurer the insurer is unaware of the claim. • Claims not known currently to the insurer are referred to as unreported claims or incurred but not reported (IBNR) claims.

Insurance Claims life-cycle

Claims goes through different steps as it gets settled. During the process various Claims employees adjust/touch/estimate the claim or components related to the claim

1 Claims Reporting / First notice of loss

1. Reporting claim through phone call, email, fax agent and electronically
2. Claim, when first reported to the insurance company is commonly referred to as First notice of loss (FNOL)

2 Claim Assignment to Claims Adjuster(s)

1. One or more adjusters get assigned to handle claims. Example, Adjuster 1 to handle Property Damage, Adjuster 2 to handle Injury Claims

3 Information Gathering and Coverage Determination

1. Assigned adjusters gather information on the claim (example, name of the people involved, police report, details of the loss, injured parties, injury details)
2. Adjusters determine if the loss is covered and deny entire claim (or portions of the claim), if not covered

4 Estimation / Injury Evaluation

1. Claims Appraisers estimate damage (example, damage to the car / damage to the machinery)
2. Injury adjusters determine the nature of injury and estimated cost of treatment / pain & suffering for injured parties involved

5 Claim Negotiation / Settlement

1. Adjusters settle the claims issuing payments to providers (example, body shops, medical providers, third party claimants or their lawyers etc.)
2. Some claims like injury liability claims may require negotiation with third party and even have to be litigated before a settlement is arrived at.

6 Recovery

1. After the settlement, Salvage and Subrogation teams work on recovering applicable losses/expenses paid on claims. This may require negotiation with the third party insurance carrier as well

Claims payment/losses

Actual claims costs are unknown at the time of projection. Despite the skill of insurance actuaries, actual losses can differ significantly from projected claims costs.

1	What affects claim costs?	• Affected by events that occur during a particular calendar year • Affected if reserves set aside to pay claims that occurred in the past turn out to be inadequate • Include expenses derived from “loss adjustment”; these are items such as claim investigation
2	Why do claim costs fluctuate significantly?	• Insurance involves uncertainty. E.g. an insurer might insure the value of 100 homes, it does not collect premiums for an amount equal to the cost of replacing 100 homes. It bases premiums on the number of homes that sophisticated statistical models determine are likely to face losses. • Should a highly unpredictable and severe catastrophe strike, all of the insurer’s capital (surplus assets) could potentially be used to pay the claims.
3	What happens if an insurer becomes insolvent?	• There are additional costs for the remaining solvent insurers in that same market. • The state insurance guaranty fund system—which is unique to insurance—requires that financially healthy insurers assume responsibility for the claims of failed companies’ policyholders.

Types of claims

When a claim is made, how it is handled depends on the type of loss involved

Property Claim- *policyholder makes a claim*

- The claims representative (usually known as an “adjuster”) will investigate the loss, including verifying coverage for the particular risk; they also will determine whether a policy is in force, and prepare a repair estimate.

Casualty/Liability Claim- *third party makes a claim*

- If a third party makes a claim alleging that the policyholder is responsible for damage to/losses by the claimant (e.g., a guest falls down the policyholder’s stairs and injures their back), the claim adjuster would assess the claim, verify insurance coverage, review records and interview the policyholder, claimant, and in cases of bodily injury, perhaps the claimant’s health care provider to determine the extent of injuries and negligence.
- Liability claim costs generally are broken down into two categories: 1) economic damages - which include the claimant’s out-of-pocket expenses and lost wages
  2) non-economic - which includes compensation for pain and suffering
- The claim representative/adjuster has the responsibility to offer a fair settlement to the injured party.

Measuring claims Results

Average Cost per Claim	The average cost per claim is the total costs associated with processing a claim, including legal costs, manpower hours, processing costs, and overhead. It doesn't include the claims losses paid to policyholders.
Average Time to Settlement	Average time to settlement is the length of time that elapses between report date and final claims payout. It has a significant effect on overall customer satisfaction, loyalty, and cost-effectiveness.
Severity	Severity is a measure of the average cost of claims and is calculated as: Severity=Losses/Number of claims Thus, if the total loss dollars are $300,000,000 and the number of claims is 100,000, then the average severity is $3,000
Salvage Recovery	Insurance companies are able to recoup some payments made to the insured. If a company replaces property, the company has the ownership of the damaged property. The damaged property may then be sold to offset part of the payments made for the loss; these recoveries are called salvage. The amounts recouped are known as salvage recovery. E.g. Insurer makes a payment of $15,000 to compensate insured and receives a $900 salvage recovery by selling damaged property.
Subrogation Recovery	When a company pays for an insured's loss, the company receives the rights to subrogate (i.e., to recover any damages from a third party who was at fault or contributed fault to the loss event). The amounts recouped are known as subrogation recovery.
Customer Satisfaction	Measure of customer satisfaction on the claim service delivered. Many insurance companies use a KPI called Net Promoter Score (NPS) for this
Fraud Referrals	Claims adjusters refer the suspicious claims to Special Investigation Unit that does further research on potential Fraud. Fraud Referrals (SIU referrals) is a KPI tracked closely to monitor the fraud trends

P&C Claims- Sample Analytics use cases

Use Case	Why?
Build Claims Fraud Models	Helps protect the insurance companies from loss leakage by detecting potentially fraudulent claims that require further investigation by Claims team
Build Claims triage models	Detects complexity of the new claims and assign to adjusters based on their skill level/tenure Complex claims are handled by more seasoned adjusters that results in more favorable claims management. Complex claims handling may lead to litigation or excess costs (beyond what insurers “owe”) and assigning such claims to a seasoned adjuster may help avoidance of litigation / loss leakage

3. Additional topics in P&C Insurance

- Insurance Product management
- Role of Actuaries in Insurance
- P&C Reserving

The Concept of Product management

The Product

- One of the most fundamental aspects of the product management system is its focus on individual products.
- The product is identified as having strategic meaning worthy of significant resources, widespread corporate attention, and dedicated management personnel.
- In the case of the insurance industry, the product can be defined as a service, such as risk financing and third party administration

Product Management

- Product management describes a system in which all aspects of a single product are managed centrally, usually by an individual manager.
- This product manager leads a product management team which coordinates a comprehensive set of development and lifecycle issues for the product.
- These product activities include design and implementation, pricing, sales and distribution, market research, product positioning and advertising, budgeting and financial analysis, planning and strategy, innovation, and customer service.

Coordination of Effort

- The product management system's focus on the individual product simplifies the coordination of a wide range of product-based activities.
- It allows management to concentrate on long-term product issues in order to manage the product's lifespan.
- This perspective is necessary if, over time, the same management team is to coordinate a variety of product activities: developing the new product, bringing it to market, maintaining it as a mature product, and managing the rollout of product upgrades or enhancements.

Applying Product Management to P&C Insurance

Insurance Products

- Applying product management to insurance explicitly recognizes that insurance products are consumer products.
- It is no secret that consumer expectations and sophistication have grown over time, honed by the wide range of other products which are marketed to them.
- In order to survive in the competitive market, these consumer products have had to keep prices low while maintaining or improving quality and service.

Fringe Benefits

- The product management environment also breeds a set of attitudes which are essential for superior business management, such as entrepreneurship, empowerment, cross-training, market niching, and aggressive competitive practices.
- Properly applied, paradigms such as these are designed to improve the company's quality, efficiency, self-awareness, and technology integration, in addition to furthering profitability, competitiveness, and strategic focus.
- In addition to these general benefits, product management can address a variety of issues challenging the P&C insurance industry.

A representative Product Management Org in P&C

Chief Product Officer

Pricing Teams

Goal: To build countrywide pricing models that are customized by state management teams for individual states

Team composition: Data analysts and Actuaries

Product Research

Goal: Building predictive models

- Pricing models that may compete or supplement actuarial models (subject to DOI approval)
- Telematics
- Fraud models
- Customer lifetime value models

Team Composition: Data Analysts, and Data Scientists

Product Strategy

Goal: Develop new P&C products – pay per use; bundling auto and motorcycle insurance etc., accident forgiveness program

Team Composition: Insurance Product Managers, and Data Analysts

State Management

Goal: Grow profitably in states making use of models from pricing and research teams as well selling new products

Team Composition: Insurance Product Managers, and Data Analysts

Catastrophic Risk Management

Goal: Plan for CAT utilizing CAT models

Team composition: Mainly Actuaries and Data Analysts

Catastrophe risk management

Catastrophe risk management

- Catastrophes result in sudden and mass destruction of property, lives, environment, and/or the economy.
- Include both natural (earthquakes, hailstorms, etc.) and man-made disasters (terrorism, nuclear reactor explosion, etc.).
- Due to their infrequent nature, analysis of past losses can't sufficiently measure catastrophe risk.
- Many insurers use catastrophe models to estimate potential losses.

What are Catastrophe models?

- Models that combine historical disaster information with current demographic, building (age, type and usage), scientific and financial data to determine the potential cost of catastrophes for a specified geographic area.
- 3 major CAT modeling companies – AIR, RMS and EQECAT.

- The annual average of $1 billion dollar events from 1980 to 2021 is 7.7 events.
- The annual average for the most recent 5 years is 17.8 events (CPI-adjusted).
- Since 1980 the U.S. has sustained a total of 323 events where overall costs reached or exceeded $1 billion.

Table shows the distribution of damage from U.S. billion-dollar disasters by time period.

Time Period	Billion Dollar Disasters	Events per Year	Overall Cost
1980-1989	31	3.1	$195.2B
1990-1999	55	5.5	$298.4B
2000-2009	67	6.7	$558.0B
2010-2019	128	12.8	$891.5B
Last 5 yrs. (2017-2021)	89	17.8	$764.9B
Last 3 yrs. (2019-2021)	56	18.7	$306.6B
2021	20	20.0	$148.0B

Role of Actuaries in Insurance

- The actuarial and statistical department is the "numbers" department.
- Actuarial function uses statistical calculations to determine insurance rates and premiums, based on projections of probability and costs for a defined risk.

What actuaries do?

- Analyzing insurance rates, such as for cars, homes, liability etc.
- Calculating a fair price for insurance product- **Pricing**
- Estimating the money to be set aside for claims that have not yet been paid – **Reserving**
- Participating in corporate planning, such as mergers and acquisitions
- Forecasting the potential impact of catastrophes.
- Analyzing investment programs

Why reserving?

- It is very important to accurately estimate the amount and the payout for a claim so that if the indemnity is to be paid later, that money should not lie idle but be invested to grow.
- When it is the time for payout, the insurance company has appropriate liquidity and does not has to compromise with its investment strategy.

4. Appendix

4a. Glossary

Glossary

- **Accrue:** an accrual, or something that accrues, accumulates over time.
- **Actuary:** a person who calculates risk and probability on behalf of an insurer.
- **Adjuster*:*** a person who, on behalf of an insurer, investigates the circumstances around a claim and advises how much should be paid out.
- **Adverse selection:** refers to situations in which an insurance company extends insurance coverage to an applicant whose actual risk is substantially higher than the risk known by the insurance company.
- **Appraisal:** the process where insured property is assessed for its value, or the value of any damage, at the time of loss.
- **Asset:** any item you own which can be insured, like vehicles or properties
- **Assurance:** cover for an event that will definitely happen, like death. This is different to insurance, which is cover for something that may or may not happen.
- **Bodily injury liability (BI):** liability insurance term that includes bodily harm, sickness, or disease, including resulting death.
- **Boiler & Machinery Insurance:** also called equipment breakdown insurance, covers the cost of repairing or replacing the damaged equipment and business losses incurred from the equipment not functioning. It covers a wide range of equipment, including HVAC systems, ovens, boilers and furnaces, refrigeration units, elevators, and office equipment.
- **Brokers:** a type of financial adviser who recommends insurance products to clients and arranges cover with an insurer.

Glossary

- **Business Interruption Insurance:** Business interruption insurance covers lost income and expenses resulting from property damage or loss. For example, if a fire forces business to close for few months, it would reimburse for salaries, taxes, rents, and net profits that would have been earned during the downtime.
- **Captive Agency (Exclusive Agency): I**ndependent businesses contract exclusively with one insurance company to represent and sell insurance on a commission basis.
- **Ceding party:** Party that transfers its risk to others
- **Claim**: a request for compensation made by a policyholder to their insurer when they have suffered loss or damage.
- **Closed Claim:** Once the claim is settled, it is categorized as a closed claim
- **Commercial General Liability:** A standard insurance policy issued to business organizations to protect them against liability claims for bodily injury (BI) and property damage (PD) arising out of premises, operations, products, and completed operations; and advertising and personal injury (PI) liability.
- **Commercial Line of Insurance:** A line of insurance where policyowner/Policyholder is a business establishment. These policies are usually designed for business entities e.g. general liability, workers compensation.
- **Condo insurance:** is coverage that helps protect against losses and repair costs for a condominium unit. Condo insurance often provides protection for theft, vandalism, fire damage, water damage, and more.
- **Contribution:** If there is more than one insurer for the same asset, the insured cannot recover loss from all insurers and make profit by making separate claims. Each insurer pays a proportionate share of the loss. This is known as contribution. E.g. A person bought two insurance policies on a used Lamborghini. The person have a policy with Allstate that covers $30,000 in property damage and a policy with State Farm that cover $50,000 in property damage. If the person ends up in a wreck that causes $50,000 worth of damage to vehicle. Then about $19,000 will be covered by Allstate and $31,000 by State Farm.

Glossary

- **Coverage:** the amount that is protected by the insurer
- **Crime Insurance:** covers theft, burglary, and robbery of money, securities, stock, and fixtures from employees and outsiders.
- **Deductible:** a fee that a policyholder agrees to pay before the insurer pays out for a claim.
- **Direct Response System:** No agents exist. Insurance company sells through direct mail, phone, or internet.
- **Direct Writers**: Direct writers, who sell their own products through captive agents by mail, telephone, or via the internet. It includes distributing through the internet, exclusive/captive agents, direct response, and affinity groups.
- **Direct Written Premium(DWP) or Direct Premium Written(DPW)**: Total amount of an insurance company's written premiums during a given year without accounting for the amount ceded to reinsurance
- **Endorsement**: an amendment to an insurance policy that extends, removes or changes the nature of the insurance coverage.
- **Excess:** the portion of a claim that a policyholder agrees to pay; the insurer will pay the rest of the claim above the value of the excess.
- **Exposure:** The state of being subject to loss because of some hazard or contingency. Also used as a measure of the rating units or the premium base of a risk, e.g. area of the property, no. of vehicles etc.
- **First notice of loss (FNOL):** the moment at which a policyholder informs their insurer that they have cause to make a claim.

Glossary

- **Flood Insurance:** A type of property insurance that covers a dwelling for losses sustained by water damage specifically due to flooding. Coverage for the peril of flood is excluded by homeowners policy. However flood damage is covered under most auto policies; Federal government provides flood insurance through private insurers.
- **Hazard:** a factor that increases the chance of loss arising. For example, a staircase without a handrail may increase the risk of a personal injury claim, so the lack of a handrail would be a hazard for an insurer.
- **Homeowners insurance:** A form of property insurance that covers losses and damages to an individual's residence and assets in the home
- **Inception:** the date insurance cover begins
- **Indemnify:** Insurance is meant to indemnify (i.e. compensate for losses). Insurance should place the insured in the same financial position after the loss, as they enjoyed before it**;** neither better nor worse– no profit, no loss.
- **Independent Agency:** Multiple companies authorize an agent to sell insurance for them, but the agent remains independent. The agent collects commissions on the policies sold.
- **Indirect Writers(Agency Writers):** Agency writers or Insurance companies whose products are sold by independent agents or brokers representing several companies. It includes independent agencies, brokers, general agents, and managing general agents (MGAs).
- **Inland Marine Insurance:** Provides insurance to property in transit over land, property in the custody of a bailee, property deemed to be an instrumentality of transportation/ communication, such as bridges and radio towers, mobile medical equipment, contractors equipment.
- **Insurtech:** a company that provides a technological innovation for the insurance industry

Glossary

- **Law of large numbers:** theorizes that the average of a large number of results closely mirrors the expected value, and that difference narrows as more results are introduced. In other words the credibility of data increases with the size of the data pool under consideration.
- **Landlord's insurance:** A landlord Insurance is a coverage that offers financial protection to landlords renting out their property. It is designed keeping in mind the interests of the landlords so that their property and contents of the property are insured against untoward incidents.
- **Loss development triangle:** The chain ladder method which is based upon the assumption that aggregate losses will move from unpaid to paid in a pattern that is generally consistent over time. Loss data for this method is usually organised in a triangle format (as shown below), which makes it a "Loss Development Triangle".
- **Liability**: a line of insurance that covers a policyholder for the cost of compensation arising from their own negligence or error.
- **Lines:** different categorisations, or types, of insurance. E.g. Commercial Line, Personal Line
- **Loss:** The basis of a claim for damages under the terms of a policy
- **Malpractice Insurance:** A type of professional liability insurance that pays for losses resulting from injuries to third parties when a professional's conduct falls below the profession's standard of care. It is available for doctors, dentists, accountants, real estate agents, architects, and other professionals.
- **Managing General Agents:** a specialized type of insurance agent/broker that, unlike traditional agents/brokers, is vested with underwriting authority from an insurer. Accordingly, MGAs perform certain functions ordinarily handled only by insurers, such as binding coverage, underwriting and pricing, appointing retail agents within a particular area, and settling claims.
- **Medical payment(MP)/ Personal injury protection (PIP):** Covers for the treatment of injuries to the driver and passengers of the policyholder's car. It can cover medical payments, lost wages and the cost of replacing services and funeral costs for someone injured in the accident.

Glossary

- **Mutual:** an insurance company that is fully owned by its customers. E.g. Liberty Mutual
- **Open Claim:** Until the claim is settled, the reported claim is considered an open claim.
- **Peril**: a cause of damage or injury such as fire, flood or storm
- **Personal Lines: A** line of insurance business where Policyowner/Policyholder is an individual. These policies are designed to be sold in large quantities to individuals e.g. auto insurance, homeowners insurance
- **Pricing/Ratemaking:** is the process by which an insurance company sets the premium that needs to be charged to a policyholder by considering various risk factors:
- **Reinsurance:** the process where insurers buy insurance for themselves, from reinsurance companies, to cover against the possibility of large losses.
- **Renter's Insurance: This** type of property insurance is exclusively meant to cover a tenant's personal belongings stored inside his/her rented house. It may include clothes, jewelry, furniture, electronic appliances etc. Some policies also cover additional liabilities a tenant may incur towards his/her landlord.
- **Reopened Claim:** A closed claim may be reopened in some instances and further activity may occur after the claim is closed, these claims are known as reopened claims.
- **Reported Claim:** Once a claim gets notified to the insurance company, it is called reported claim. The event of first notification of claim to the insurance company is also commonly referred to as First Notice of Loss (FNOL)
- **Reserves**: an amount of money set aside by insurers for unexpected expenses.

Glossary

- **Risk Pooling:** People exposed to similar risks are brought together and contribute premium to the common pool. When a member suffers a loss, compensation is paid from this common pool. The risk is thus spread among the members **-** big loss on one is reduced to smaller, manageable impacts on all.
- **Salvage:** Companies may be able to recoup some payments made to the insured. If a company replaces property, the company assumes ownership of the damaged property. The damaged property may then be reconditioned and sold to offset part of the payments made for the loss; these recoveries are called salvage.
- **Subrogation**: a process where the insurer, acting on behalf of a policyholder who has suffered loss, pursues a third-party (typically another insurer) who has caused that loss for compensation.
- **Surety**: someone that takes responsibility for another person's debt or obligations
- **Surplus:** the amount by which an insurer's assets exceed its liabilities
- **Third party**: in relation to auto insurance in particular, a person involved in a claim who is neither the policyholder nor the insurer.
- **Umbrella Insurance:** Broad liability policy intended to provide high liability limits in excess of basic liability policy coverage. E.g. A catastrophic auto accident occurs and the damage caused by it exceed an insured's auto liability limit, the insured's umbrella policy would pay the excess of the loss up to its limit of liability.
- **Underwriter**: a person who assesses risk on behalf of an insurer and assumes that risk in return for a fee.
- **Underwriting guidelines**: a set of rules and requirements an insurer provides for its agents and underwriters. The underwriter uses these guidelines to make decisions regarding the acceptance, modification, or rejection of a prospective insured.

Glossary

- **Uninsurable**: an event or situation which is not covered by any insurance policy because it is either inevitable, unstoppable or unlawful.
- **Vis major:** otherwise known as an ‘act of God’ or ‘force majeure’, an event which could not have been foreseen or prevented such as an earthquake or volcanic eruption.
- **Workers Compensation Insurance:** A type of business insurance that provides benefits to employees who suffer work-related injuries or illnesses.

4b. Key Financial Terms

Key Financial Terms

- **Accident Severity**: Sums up the financial worth of the loss incurred in an accident and is used to indicate the premium amount payable for accident insurance.
- **Actual Cash Value**: The repayment value for indemnification due to loss or damage of property; in most cases it is replacement cost minus depreciation.
- **Advance Premiums**: They occur when a policy has been processed, and the premium has been paid prior to the effective date. These are a liability to the company and not included in written premium or the unearned premium reserve.
- **Ceded Premium**: Amount of premium (fees) used to purchase reinsurance.
- **Claims Adjustment Expenses**: Costs expected to be incurred in connection with the adjustment and recording of accident and health, auto medical and workers' compensation claims.
- **Combined Ratio:** The combined ratio is the combination of the loss and expense ratios and is calculated as: Combined Ratio = Loss Ratio + (LAE / Earned Premium) + (Underwriting Expenses / Written Premium). In calculating the combined ratio, the loss ratio should not include LAE or it will be double counted. Some companies may compare underwriting expenses incurred throughout the policy to earned premium rather than to written premium.
- **Commission:** A percentage of premium paid to agents by insurance companies for the sale of policies.
- **Direct Incurred Loss**: Loss whereby the proximate cause is equivalent to the insured peril.
- **Direct Loss**: Loss whereby the proximate cause is equivalent to the insured peril.

Key Financial Terms

- **Direct Premium Written (DPW):** Total amount of an insurance company's written premiums during a given year without accounting for the amount ceded to reinsurance.
- **Dividend**: A refund of a portion of the premium paid by the insured from insurer surplus.
- **Earned Premium:** Represents the portion of the written premium for which coverage has already been provided as of a certain point in time
- **Expense:** All the expenditure associated with acquiring, underwriting, and servicing premiums (claims) . It also includes advertising, salaries, and commissions paid.
- **Expense Ratio:** A measure of the portion of each premium dollar used to pay for loss adjustment and underwriting expenses and is calculated as: UW Expense Ratio + LAE / Earned Premium
- **Frequency**: Frequency is a measure of the rate at which claims occur.
- **Gross Premium:** The net premium for insurance plus commissions, operating and miscellaneous commissions. For life insurance, this is the premium including dividends.
- **Gross Written Premium:** The total premium (direct and assumed) written by an insurer before deductions for reinsurance and ceding commissions.
- **Incurred Claims:** Paid claims plus amounts held in reserve for those that have been incurred but not yet paid.
- **Incurred Losses:** Sustained losses, paid or not, during a specified time period. Incurred losses are typically found by combining losses paid during the period plus unpaid losses sustained during the time period minus outstanding losses at the beginning of the period incurred in the previous period.

Key Financial Terms

- **Investment expenses**: Investment expenses are your allowed deductions, other than interest expense, directly connected with the production of investment income. For example, depreciation or depletion allowed on assets that produce investment income is an investment expense
- **Loss:** The basis of a claim for damages under the terms of a policy.
- **Loss Adjustment Expense (LAE)**: Expected payments for costs to be incurred in connection with the adjustment and recording of losses. Can be classified into two broad categories: Defense and Cost Containment (DCC) and Adjusting and Other (AO). Can also be separated into (Allocated Loss Adjustment Expense) and (Unallocated Loss Adjustment Expense for ratemaking purposes.
- **Loss Frequency**: Incidence of claims on a policy during a premium period.
- **Loss Ratio**: A measure of the portion of each premium dollar used to pay losses and is calculated as: Loss ratio = Losses / Premium. Typically, the ratio uses total reported losses and total earned premium; however, other variations are common. For example, companies may include Loss Adjustment Expenses (LAE) in the calculation of loss ratios.
- **Loss Reserve:** An insurance company’s best estimate of what it will pay in the future for claims.
- **Net Income**: Total revenues from an insurer's operations less total expenses and income taxes
- **Net Premiums Earned**: Premiums on property/casualty or health policies that will not have to be returned to the policyholder if the policy is cancelled.

Key Financial Terms

- **Net underwriting income:** Calculated as the difference between net premiums earned and the sum of claims or benefits incurred (inclusive of adjustment expenses or surrenders), underwriting expenses and policyholder dividends.
- **Net Written Premium:** Premiums the company gets to keep after removing all costs (brokerages, commissions re-insurance, etc.) from gross written premium.
- **Other Underwriting Expenses:** Allocable expenses other than loss adjustment expenses and investment expenses.
- **Policy Dividend:** A refund of part of the premium on a participating life insurance policy. Amount of payment is determined by subtracting the actual premium expense from the premium charged. The payment can be taken as cash, applied to a purchase an increment of paid-up insurance, left on deposit with the insurance company or applied to purchase term insurance for one year.
- **Policy Fee**: Fee added to the periodic premium payments to cover undefined policy costs.
- **Premium:** The amount of money paid by a policyholder to an insurer in return for cover.
- **Premium Discount:** A discount allowed on premiums paid in advance of one year based on projected interest to be earned; discount allowed on certain workers compensation and comprehensive liability policies to allow for the fact that larger premium policies do not require the same percentage of the premium for basic insurer expenses such as policy writing. The discount percentage increases with the size of the premium

Key Financial Terms

- **Premiums Net:** It is the amount calculated on the basis of the interest and mortality table used to calculate the reporting entity's statutory policy reserves.
- **Pure Premium:** That portion of the premium equal to expected losses void of insurance company expenses, premium taxes, contingencies, or profit margin.
- **Rate**: Value of insured losses expressed as a cost per unit of insurance.
- **Replacement Cost**: The cost of replacing property without a reduction for depreciation due to normal wear and tear.
- **Reported Losses:** Includes both expected payments for losses relating to insured events that have occurred and have been reported to the insurance company, but not yet paid.
- **Reserve**: Reserves are liabilities. They reflect an insurer's financial obligations with respect to the insurance policies it has issued. An insurer's two major liabilities are loss reserves and unearned premium reserves. Loss reserves are an insurance company's best estimate of what it will pay in the future for claims. Unearned premium reserves represent the premiums paid for coverage that has not yet been used because the policy has not expired. If the policy was cancelled by the policyholder, for example, the insurer would have to return the dollar amount of unused coverage.
- **Retention rate**: No of Renewals/ Total policies expired
- **Salvage Recovery:** The ratio of amount recouped through salvaging and payments made to the insured. Companies are able to recoup some payments made to the insured. If a company replaces property, the company has the ownership of the damaged property. The damaged property may then be sold to offset part of the payments made for the loss; these recoveries are called salvage. E.g. Insurer makes a payment of $15,000 to compensate insured and receives a $900 salvage recovery by selling damaged property.

Key Financial Terms

- **Stop Loss/Excess Loss**: Individual or group policies providing coverage to a health plan, a self-insured employer plan, or a medical provider providing coverage to insure against the risk that any one claim or an entire plan's losses will exceed a specified dollar amount.
- **Subrogation Recovery**: The amount of $s recovered from the third party subrogation
- **Surplus:** Insurance term referring to retained earnings.
- **Total Revenue**: Premiums, revenue, investment income, and income from other sources.
- **Unallocated Loss Adjustment Expense (ULAE)**: Loss adjustment expenses that cannot be specifically tied to a claim.
- **Underwriting Expense Ratio:** A measure of the portion of each premium dollar used to pay for underwriting expenses, and it is calculated as: UW expenses / Premium. Often the company will subdivide the major underwriting expense categories into expenses that are generally incurred at the onset of the policy (e.g., commissions, other acquisition, taxes, licenses, and fees) and expenses that are incurred throughout the policy (e.g., general expenses). For the purpose of calculating the underwriting expense ratio, the former expenses are measured as a ratio to written premium and the latter expenses are measured as a ratio to earned premium.
- **Unearned Premium**: Represents the portion of the written premium for which coverage is yet to be provided as of a certain point in time
- **Unearned Premium Reserve:** All premiums (fees) received for coverage extending beyond the statement date; appears as a liability on the balance sheet.
- **Unpaid Losses**: Claims that are in the course of settlement. The term may also include claims that have been incurred but not reported.
- **Written Premium**: is the total premium associated with policies that were issued during a specified period.

4c. Acronyms

Acronyms and abbreviations

P&C	Property and Casualty Insurance
DPW	Direct Premiums Written
NWP	Net Written Premiums
MGA	Managing General Agent
PL	Personal Insurance Line
CL	Commercial Insurance Line
PIP	Personal Injury Protection
WC	Workers Compensation Insurance
CGL	Commercial General Liability
FNOL	First Notice Of Loss

4d. Sources

Sources

1. Property & Casualty Basics : https://www.aig.com/content/dam/aig/america-canada/us/documents/careers/property-casualty-basics.pdf
2. Basic Ratemaking https://www.casact.org/sites/default/files/old/studynotes_werner_modlin_ratemaking.pdf
3. Insurance Information Institute https://www.iii.org/
4. Actuary as a Product Manager https://www.casact.org/sites/default/files/2021-02/pubs_dpp_dpp98_stein.pdf
5. NAIC https://content.naic.org/sites/default/files/research-actuarial-property-casualty-market-share.pdf
6. Mckinsey article: Insurtech - the threat that inspires https://www.mckinsey.com/industries/financial-services/our-insights/insurtech-the-threat-that-inspires
7. S&P Global
8. Investopedia
9. Final session of PAMIC's first Virtual Insurance School-https://www.youtube.com/watch?v=2_QEkuzM6fQ
10. Swiss Re website
11. EY's website
12. Carrier Management, https://www.carriermanagement.com/
13. Progressive.com
14. S&P Global Market Intelligence
15. AMBEST.com