Policy Data

Ratemaking Tasks:

1. Define and describe exposure bases as used in the ratemaking process
2. Evaluate and select an exposure base in a given scenario for use in the ratemaking process (e.g., line of business, use cases)
3. Aggregate and/or organize ratemaking data in the following ways: calendar year, policy year, in-force

Since most ratemaking and reserving approaches rely on using historical information to predict the future, obtaining historical data is of vital importance to actuaries. This section will focus on data that is captured from the policy purchasing process and from policy changes/cancellations, with a particular focus on measuring exposures and premium.

Transaction Level Data

When it comes to data, most data is first captured and stored at the transaction level. For the policy purchasing process, some types of transactions include:

- A quote being completed
- A policy being issued
- A customer making a premium payment
- A customer making a mid-term coverage change
- A customer making a mid-term risk characteristic change
- A policy renewal being processed
- A policy being canceled
- A premium audit being completed

Each of these transactions might exist in the policy database in different tables, with different levels of granularity. For example, a policy being issued might require premium being calculated and stored first at the coverage level, and then in a separate table with the information at the policy level. The level of granularity needed by actuaries for an analysis will vary on what is being analyzed. To continue the example, measuring profitability for a coverage will require coverage level data, while measuring profitability for a policy in total just requires policy level data.

Policy Data Elements

The following data elements are generally the most relevant to actuaries when using data from the policy database:

- **Policy identifier:** This is a unique number or set of characters that identifies a particular policy.
- **Risk identifier:** This is a number or set of characters that uniquely identifies a risk on a policy. This becomes relevant when there are multiple risks per policy. For example, a single personal auto policy might cover 2 vehicles, so a separate risk id will be needed for each vehicle.
- **Transaction effective date:** This is the calendar date on which the current transaction will go into effect. For example, for a new policy being issued, this will be the start date of the policy term.
- **Transaction processed date:** This is the calendar date on which the transaction was processed in the policy database. For example, for a new policy being issued that was purchased in advance of the policy term start date, this will be the date of purchase.
- **Policy term start date:** The calendar date on which the policy term begins.
- **Policy term end date:** The calendar date on which the policy term ends.
- **Transaction Premium:** This will be the amount of premium associated with this transaction. For a new policy being issued, it will be the full-term premium for the policy. For a policy cancellation, it will be the amount of premium to be refunded to the policyholder.
- **Risk characteristic elements:** There are usually many data elements related to the risk characteristics of policies. These would include values of rating variables, underwriting criteria, or other information about the risk.
- **Coverage related elements:** This includes data elements related to deductibles, coverage limits, and which coverages are on the particular policy.
- **Transaction Exposure:** This will be the amount of **exposure** associated with this transaction. An exposure is the basic unit of risk underlying the insurance premium, and the base rates used in rating a policy are expressed in units of dollars per exposure.

  The definition of what an exposure represents varies by line of business and is called an **exposure base**. For example, for homeowners insurance the standard exposure base is house-years, so 1 house insured for 1 year would count as 1 exposure (i.e., 1 house-year). One house insured for 2 years would count as 2 exposures. Three houses insured for 6 months each would be 1.5 exposures.

  Exposure bases are used as a simplified way to measure the true underlying exposure to loss of any particular risk. For example, a house's exposure to loss at any given moment is constantly changing, and varies based on things like weather conditions, whether the house is being occupied, and how well the house is being maintained. Using a generic and simple exposure base like house-years allows insurers to quantify their exposure to loss from the risk without having to deal with the complexity of the true exposure to loss at any given moment.

Exposure Bases

The exposure base for a line of business could be chosen from a number of risk characteristics, however, there are 3 criteria for a good exposure base:

1. **Proportional to expected loss:** The exposure base chosen for a line of business should be the risk characteristic that exhibits the most directly proportional relationship to expected losses. For example, house-years seems to be a good exposure base for homeowners insurance, as you would expect the losses for 2 houses to be double the expected losses for 1 house.
2. **Practical:** The exposure base should be objective, and easy & inexpensive to obtain and verify.
3. **Considerate of historical precedence:** It is very costly for the industry to change an existing exposure base because:
    - It can result in large premium swings for individual insureds.
    - It requires changing the rating algorithm, which can be costly from an IT standpoint.
    - It will require significant adjustments for future ratemaking analyses.

The exposure bases currently used for different lines of business are:

Line of Business	**Exposure Base(s)**
Personal Automobile	Car-Years
Homeowners	House-Years
Workers Compensation	Total Payroll
Commercial General Liability	Sales Revenue, Payroll, Square Footage, Number of Units
Commercial Property	Amount of Insurance Coverage
Professional Liability	Number of Professionals
Physician's Professional Liability	Number of Physician-Years
Personal Articles Floater	Value of Item

Some possible alternative exposure bases and why they aren't used:

Line of Business	**Possible Exposure Base**	**Why Not Used (partial list)**
Personal Automobile	Annual miles driven	Too hard to verify.
Homeowners	Amount of Dwelling Coverage	Not directly proportional to loss.
Workers Compensation	Hours worked	Too costly to change, harder to verify.
Workers Compensation	Limited Payroll	Too costly to change, harder to verify.
Products Liability	Products in use	Too hard to verify.

For some commercial policies, rather than using a different exposure base for each coverage, all coverages are rated using a single composite exposure base. This will be discussed further in a later section covering Individual Risk Rating.

Measuring Exposures and Premium

There are 4 common ways to measure exposures or premium:

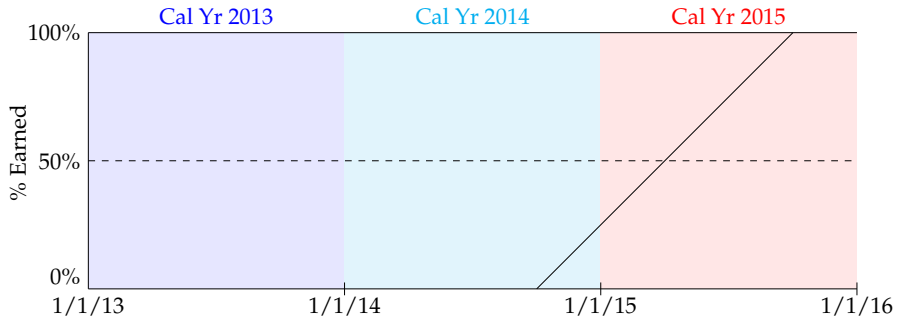
1. **Written Exposures/Premium:** The total exposures/premium coming from policies issued during a given time period as of a certain point in time.
2. **Earned Exposures/Premium:** The portion of written exposures/premium for which coverage has been provided as of a certain point in time. The insurer keeps this if the policy is canceled.
3. **Unearned Exposures/Premium:** The portion of written exposures/premium for which coverage has NOT been provided as of a certain point in time.
4. **In-force Exposures/Premium:** The number of insured units/the amount of full-term premium, for all policies exposed to loss at a given point in time.

There are 2 common ways to aggregate the first 3 metrics above over time:

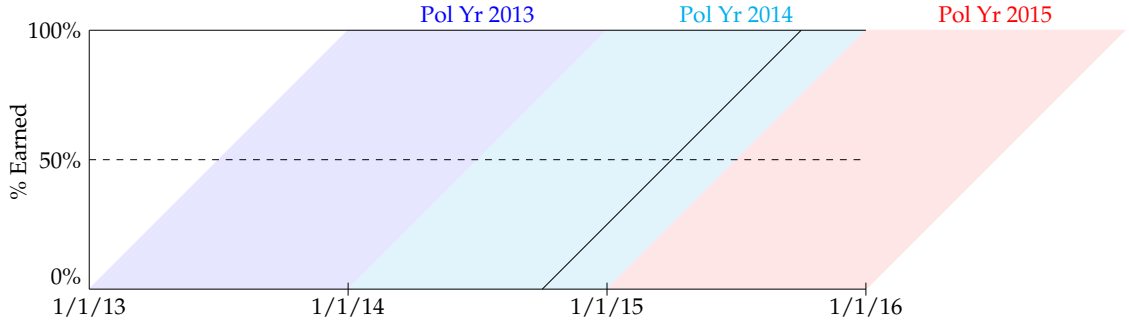
- **Calendar year (CY)**: This considers all transactions or coverage provided during the year. CY metrics are fixed once the year is over.
- **Policy year (PY)**: This considers all transactions or coverage provided on policies with policy effective dates during the year. PY metrics can still change after the year is over.

Representing Policy Periods Graphically

Suppose a 12-month homeowners policy is effective 10/1/2014. A common assumption that we will make is that premium is earned evenly throughout the policy term. We can represent this graphically as:



The slanted line above represents the policy, and you can see that this policy has coverage provided in calendar year 2014 and calendar year 2015. In contrast, we could also show this policy relative to the policy year definition, where you can see that coverage is only provided in policy year 2014:

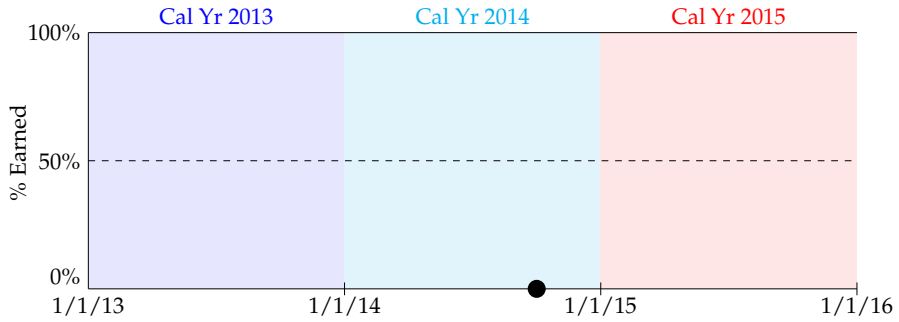


Calendar Year Written Exposures/Premium

Continuing with the 12-month homeowners policy effective 10/1/2014, since it is 1 home insured for 1 year, it represents 1 exposure (i.e., 1 house-year). Suppose the full-term policy premium = $1,200. The transaction data for the policy issuance transaction might look like:

Policy #	Eff Date	Trans Date	Term Start	Term End	Premium	Exposures
1	10/1/2014	9/25/2014	10/1/2014	9/30/2015	$1,200	1

The relevant date for recording written exposures/premium on a **calendar year basis** from the data is the later of the transaction effective date and the transaction processed date, which in this case is 10/1/2014.



The dot above shows when the policy is written on a calendar year basis. For this policy, the calendar year 2014 written premium will be $1,200 and the calendar year 2014 written exposures will be 1. There is no written premium nor written exposure in any other calendar years.

Calendar Year Earned Exposures/Premium

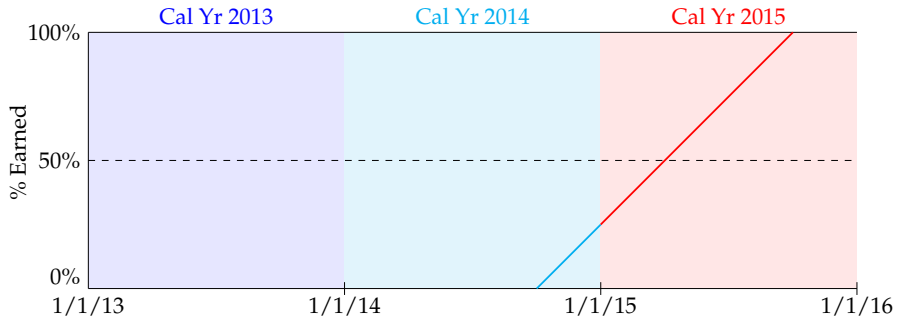
Coverage is provided for this policy in calendar years 2014 and 2015. In this case, the amount earned for this policy in each calendar year (as of 10/1/2015 and later) is:

$$\text{CY 2014 earned exposure} = \frac{\text{3 months of coverage provided in CY 2014}}{\text{12-month policy term}} \times 1 \text{ house-year} = 0.25 \text{ house-years}$$

$$\text{CY 2014 earned premium} = \frac{\text{3 months of coverage provided in CY 2014}}{\text{12-month policy term}} \times \$1{,}200 = \$300$$

$$\text{CY 2015 earned exposure} = \frac{\text{9 months of coverage provided in CY 2015}}{\text{12-month policy term}} \times 1 \text{ house-year} = 0.75 \text{ house-years}$$

$$\text{CY 2015 earned premium} = \frac{\text{9 months of coverage provided in CY 2015}}{\text{12-month policy term}} \times \$1{,}200 = \$900.$$



Calendar Year Unearned Exposures/Premium

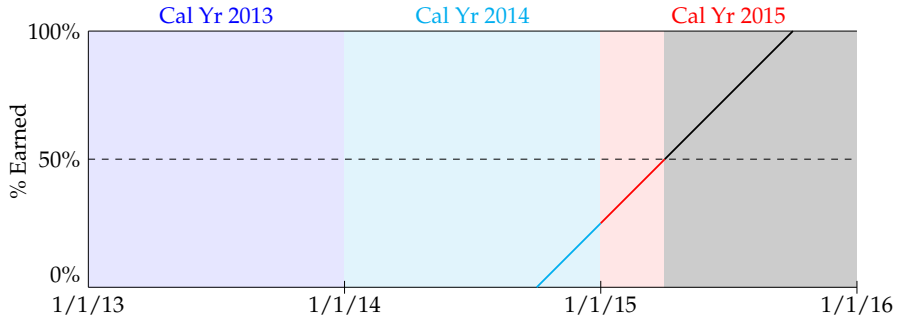
Since exposures and premium are earned over time, the amount of earned exposures/premium depends on the date of measurement, known as the **valuation date**. Any coverage provided prior to the valuation date will have been earned, while any coverage expected to be provided after the valuation date will be unearned.

Continuing our example of the 12-month homeowners policy written on 10/1/2014 with a premium of $1,200, the earned and unearned premium amounts as of 3/31/2015 are calculated as:

$$\text{CY 2014 earned premium} = \frac{\text{3 months of coverage provided in CY 2014}}{\text{12-month policy term}} \times \$1{,}200 = \$300$$

$$\text{CY 2015 earned premium} = \frac{\text{3 months of coverage provided in CY 2015 as of 3/31/15}}{\text{12-month policy term}} \times \$1{,}200 = \$300.$$

$$\text{CY 2015 unearned premium} = \frac{\text{6 months of coverage not yet provided in CY 2015 as of 3/31/15}}{\text{12-month policy term}} \times \$1{,}200 = \$600.$$



Relation Between Written, Earned, and Unearned

Written Premium = Earned Premium + Change in Unearned Premium Written Exposures = Earned Exposures + Change in Unearned Exposures

As an example with the policy we've been using:

	CY 2014	CY 2015 as of 3/31/2015
Written Premium	$1,200	$0
Earned Premium	(3/12) × $1,200 = $300	(3/12) × $1,200 = $300
Starting Unearned Premium	$0	(9/12) × $1,200 = $900
Ending Unearned Premium	(9/12) × $1,200 = $900	(6/12) × $1,200 = $600
Relation	$1,200 = $300 + ($900 - $0)	$0 = $300 + ($600 - $900)

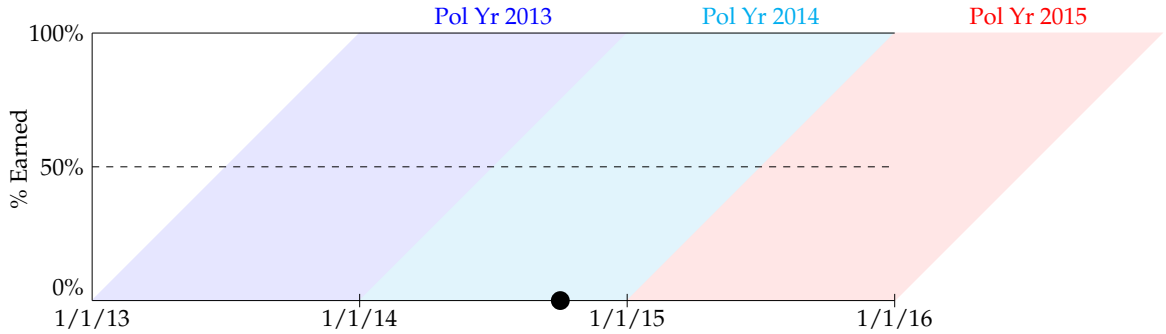
This relation will hold for both premiums and exposures on both a calendar year basis and a policy year basis, so long as all the terms in the formula are on the same basis and time frame. It will also hold for blocks of policies.

Note that the starting unearned amounts will always be 0 on a policy year basis since no policies will have been written yet in the PY at its start, so on a policy year basis the formula simplifies to:

PY Written Premium = PY Earned Premium + PY Unearned Premium
PY Written Exposures = PY Earned Exposures + PY Unearned Exposures

Policy Year Written Exposures/Premium

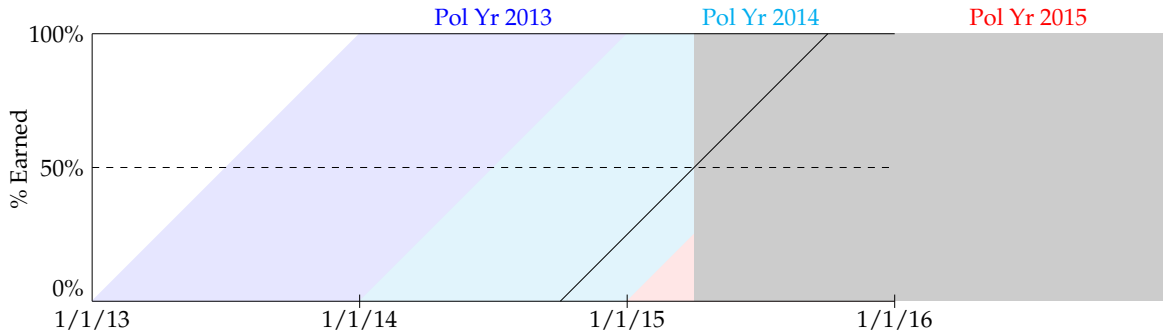
The relevant date for recording written exposures/premium on a **policy year basis** from the data is always the policy effective date, which in this case is 10/1/2014.



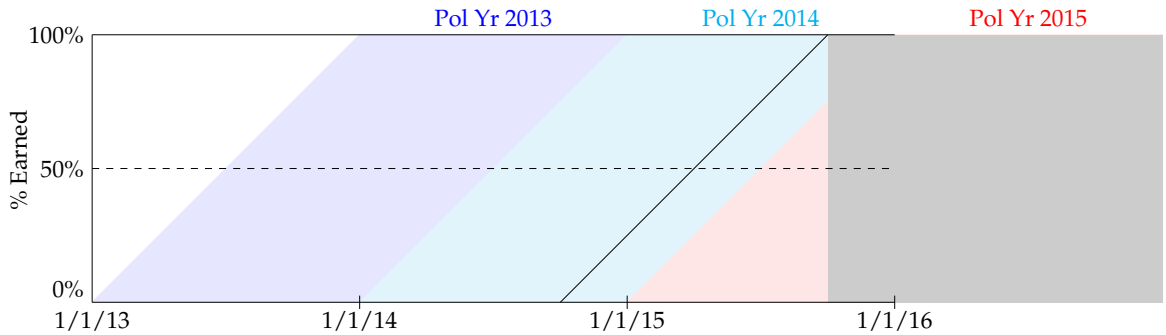
The dot above shows when the policy is written on a policy year basis. For this policy, the policy year 2014 written premium will be $1,200 and the policy year 2014 written exposures will be 1. There is no written premium nor written exposure in any other policy years.

Policy Year Earned Exposures/Premium

Coverage is provided for this policy in policy year 2014 only. As of 3/31/2015, the PY 2014 earned premium would be 50% × $1,200 = $600 and the PY earned exposure would be 50% × 1 = 0.50.

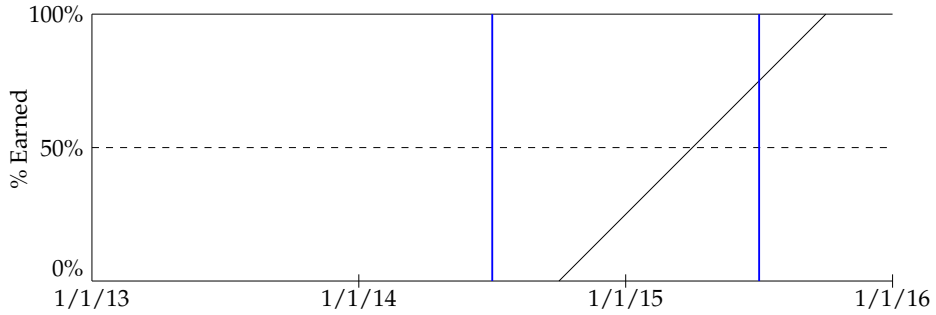


As of 9/30/2015 and later, the PY 2014 earned premium would be the full $1,200 and the PY 2014 earned exposure would be the full 1.



In-force Exposures/Premium

In-force exposures and premiums are measured as of a single point in time, so they don't require the calendar year or policy year concepts. They are visualized by vertical lines in the diagrams. Any policy that intersects a vertical line is considered in-force as of that date.



The first vertical line above is on 7/1/2014. This policy is not in-force on that date. The second vertical line is on 7/1/2015. On 7/1/2015, the policy is in-force, so the in-force premium is $1,200 and the in-force exposure is 1.

Note that different companies might count insured units differently. For example, a single auto policy might insure 3 cars on a 6-month policy. Insurers might refer to "vehicles in-force", "policies in-force", or "written exposures in-force". The in-force exposure under each definition would be:

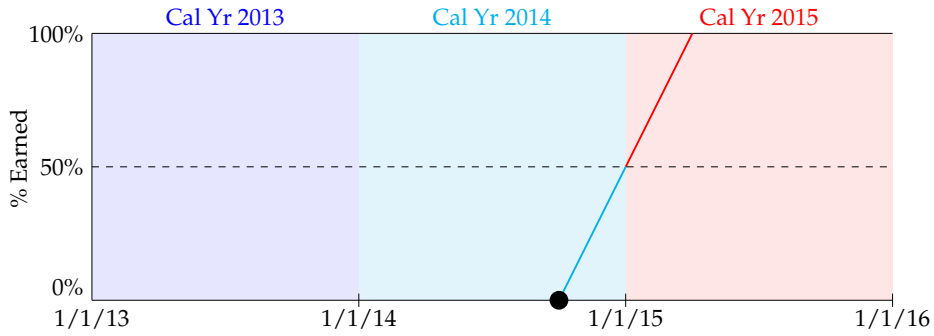
Vehicles in-force: 3 cars
Policies in-force: 1 policy
Written exposures in-force: 1.5 car-years (0.5 for each car)

Finally, a reminder about in-force premium is that it is based on the full-term premium amount (on the valuation date), regardless of policy term. This becomes important when comparing insurers that write policies with different terms. Two insurers can have the same written premium in a year, but if one insurer writes only 6-month policies and the other insurer writes only 12-month policies, then all else being equal, the insurer writing 12-month policies will have double the in-force premium of the insurer writing 6-month policies.

For a simple example, suppose insurer A only writes 6-month policies that cost $500 for 6-months, and insurer B only writes 12-month policies that cost $1,000 for 12 months. Suppose each insurer issues policies to 10 identical insureds on 1/1/2015. On 4/1/2015, insurer A will have $500 $\times$ 10 = $5,000 in in-force premium, while insurer B will have $1,000 $\times$ 10 = $10,000 in in-force premium, so it can appear that insurer B is larger than insurer A. However, both insurers will have $10,000 in annual written premium assuming insurer A's policies renew and have 2 policy terms during the year.

Different Policy Terms

When policy terms are different than 1 year, you need to adjust the slope of the policy line, and the slope of the policy year parallelograms. For example, if the policy was a 6-month auto policy, the CY diagram would be:

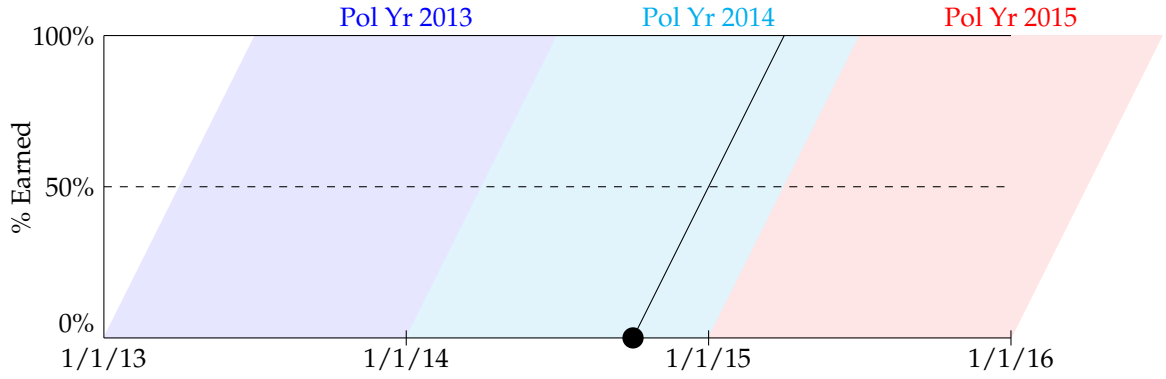


If the policy insured a single car, the policy exposures would be 0.5 car-years, and the earned exposures by calendar year would be:

$$\text{CY 2014 earned exposure} = \frac{\text{3 months of coverage provided in CY 2014}}{\text{6-month policy term}} \times 0.5 \text{ car-years} = 0.25 \text{ car-years}$$

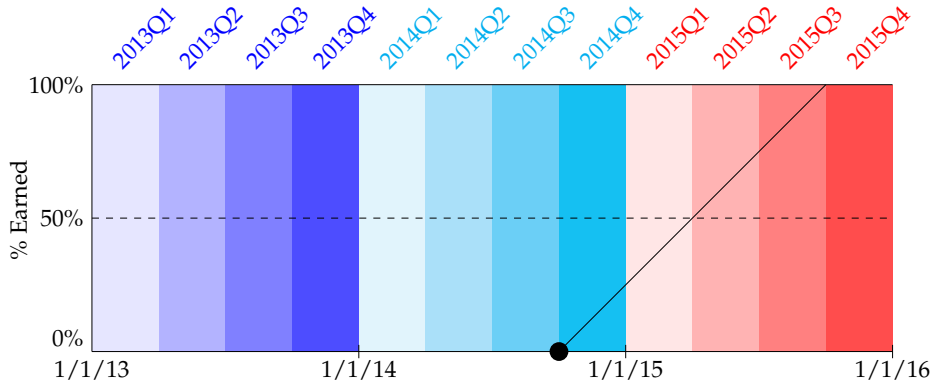
$$\text{CY 2015 earned exposure} = \frac{\text{3 months of coverage provided in CY 2015}}{\text{6-month policy term}} \times 0.5 \text{ car-years} = 0.25 \text{ car-years}$$

The policy year diagram is below. Note the change in slant of the parallelograms:

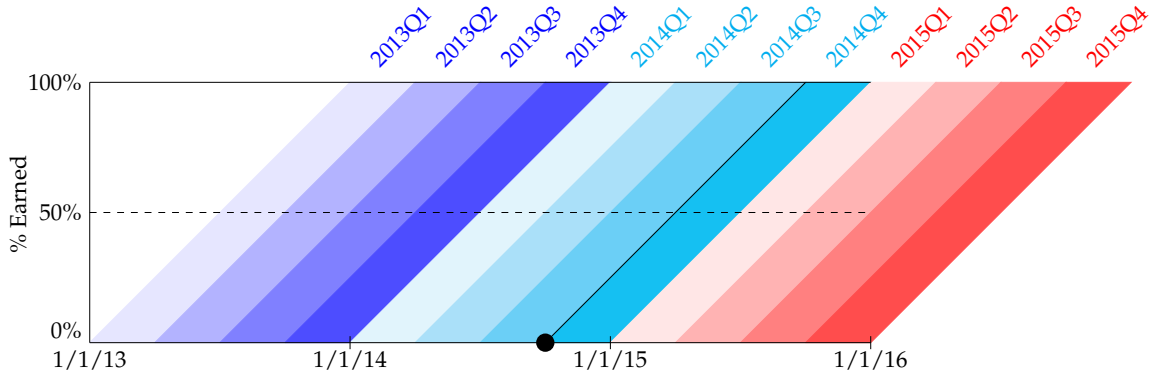


Different Time Periods

If you were to use calendar or policy quarters instead of years, the diagrams with annual policies and a sample policy effective 10/1/2014 would look like:



The policy above would have written amounts in calendar quarter 2014Q4 only, and would have earned amounts in 2014Q4 through 2015Q3.



The policy above would only have written and earned amounts in policy quarter 2014Q4.

Different Earning Patterns

Thus far we have been making the assumption that premium is earned evenly throughout the policy term (aka, “pro-rata”), however, this assumption is not appropriate for policies where the chance of losses varies significantly during the policy term. Examples of this include policies covering seasonal losses (i.e., due to hurricanes, snowmobiles, etc.) or warranty policies (a loss is more likely as the product ages). If premium was earned pro-rata on these policies, the amount refunded in the case of a mid-term policy cancellation would likely be unfair to either the insured or the insurer.

On a diagram, this would be reflected by changing the shape of the line for individual policies into a shape reflective of the earning pattern. In the case of seasonal losses, the shape of the policy curve will vary depending on when the policy is written.

Other Transaction Types

Thus far we have only talked about policy issuance, but other transactions can also impact the metrics discussed.

Quotes: These have no impact on these metrics since no policy is actually issued.

Premium Payments: These have no impact on these metrics since they don't impact the amount of premium. However, the timing of payments is of interest to an insurer as it impacts their cash flow and investment income.

Cancellations: Policy cancellations result in negative written exposures/premium in the amount of the unearned exposures/premium as of the later of the effective date of cancellation or the cancellation transaction processed date.

For example, a 12-month policy with a premium of $1,200 is written on 10/1/2014 and is canceled on 2/25/2015 effective 3/1/2015. Assuming pro-rata earning of premium, the transactions might look like:

Policy #	Eff Date	Trans Date	Term Start	Term End	Premium	Exposures
1	10/1/2014	9/25/2014	10/1/2014	9/30/2015	$1,200	1
1	3/1/2015	2/25/2015	10/1/2014	9/30/2015	-$700	-0.583

- The CY 2014 written and earned amounts will not be impacted by the cancellation, since the cancellation occurs in CY 2015.
- The CY 2015 written amounts will be the amounts shown in the cancellation transaction above.
- The CY 2015 earned premium = $\frac{\text{2 months of coverage provided in CY 2015}}{\text{12-month policy term}} \times \$1,200 = \$200$.
- Since the policy year metrics only depend on the policy term start date and the valuation date, all data will show in PY 2014.

	As of 1/1/2015	As of 3/1/2015 or later
PY 2014 Written Premium	$1,200	$1,200 - $700 = $500
PY 2014 Earned Premium	$300	$500

Mid-Term Recalculations of Premium: If a mid-term change results in an immediate recalculation of premium for the remainder of the policy term, the difference between the new unearned exposures/premium and the previous unearned exposures/premium will result in written exposures/premium as of the later of the change effective date or the change transaction processed date.

For example, a 12-month policy with a premium of $800 is written on 7/1/2014 and has a mid-term change on 10/1/2014 resulting in a new full-term premium of $400. Assuming pro-rata earning of premium, the transactions might look like:

Policy #	Eff Date	Trans Date	Term Start	Term End	Premium	Exposures
2	7/1/2014	7/1/2014	7/1/2014	6/30/2015	$800	1
2	10/1/2014	10/1/2014	7/1/2014	6/30/2015	-$600	-0.75
2	10/1/2014	10/1/2014	7/1/2014	6/30/2015	$300	0.75

- There will be a written premium amount of $800 on 7/1/2014.
- The unearned premium as of 9/30/2014 = $\frac{\text{9 months remaining on policy}}{\text{12 month policy term}} \times \$800 = \$600$.
- The new unearned premium as of 10/1/2014 would be $(9/12) \times \$400 = \$300$.
- There will be a written premium amount of $300 - $600 = -$300 on 10/1/2014.
- The premium will earn at a rate of $(3/12) \times \$800 = \$200$ per quarter between 7/1/2014 and 10/1/2014.
- The premium will earn at a rate of $(3/12) \times \$400 = \$100$ per quarter between 10/1/2014 and 7/1/2015.

Premium Audits: Premium audits that result in a new calculation of full-term exposures/premium are written and earned immediately after the audit is performed, and the exposures/premium amount will be the difference between the new full-term exposures/premium and the prior full-term exposures/premium.

For example, a 12-month Workers Compensation policy was written on 1/1/2014 with an estimated payroll of $1,000,000 and a premium of $3,000. A premium audit was performed on 7/1/2015, resulting in payroll of $1,200,000 and a premium of $3,500. Assuming pro-rata earning of premium, the transactions might look like:

Policy #	Eff Date	Trans Date	Term Start	Term End	Premium	Exposures
3	1/1/2014	1/1/2014	1/1/2014	12/31/2014	$3,000	$1,000,000
3	1/1/2014	7/1/2015	1/1/2014	12/31/2014	$500	$200,000

- The CY 2014 written exposures = $1,000,000 and WP = $3,000.
- The CY 2015 written exposures = $200,000 and WP = $500.
- The CY 2014 earned exposures = $1,000,000 and EP = $3,000.
- The CY 2015 earned exposures = $200,000 and EP = $500.
- As of 1/1/2015, the PY 2014 written exposures = $1,000,000 and WP = $3,000.
- As of 7/1/2015, the PY 2014 written exposures = $1,200,000 and WP = $3,500.

Metrics for Groups of Policies

When you are calculating the metrics for a group of policies, generally you are given summarized data by month, quarter, or year, and you won't be given the individual effective dates for each policy. If you are given written data by time period, the general assumption is that all policies were written in the middle of the time period. This will generally be a good assumption if policies are written uniformly throughout each time period.

The most common scenario is to be given written exposures/premium by month. In that case, the assumption is that all policies are written on the 15th of the month. When calculating earned exposures/premium, you then would sum the earned amounts in 24 half-months.

For example, you may be given that 1,200 exposures were written in March 2014. We will assume they were all written effective March 15, 2014. Assuming they are 12-month policies and are earned pro-rata throughout the policy term, the earned exposures will be:

- For calendar month March 2014, exposures are earned for the last half of the month, so earned exposures will be $1/24 \times 1{,}200 = 50$.
- For calendar months of April 2014 through February 2015, earned exposures for each month will be $2/24 \times 1{,}200 = 100$.
- For the calendar month March 2015, exposures are earned for the first half of the month, so earned exposures will be $1/24 \times 1{,}200 = 50$.
- CY 2014 earned exposures = 50 (for Mar 2014) + 100×9 (for Apr-Dec 2014) = 950
- CY 2015 earned exposures = 100×2 (for Jan-Feb 2015) + 50 (for Mar 2015) = 250

If the assumption of uniform writings within the written time period did not hold, then we could potentially overestimate or underestimate the earned exposures for a given time period. For example, if the 1,200 exposures in the above example were all actually written on March 1, 2014, then the CY 2014 earned exposures would be 1,000 and the CY 2015 earned exposures would be 200, and by assuming they were all written on March 15 we would have incorrectly estimated them as 950 and 250, respectively.

Average Coverage Duration for Groups of Policies

Using the assumption that a group of policies were all written in the middle of a time period can lead to inaccurate calculations of earned exposures/premium in certain cases. This error occurs when the coverage duration of the average policy in the group (i.e., the one written at the midpoint) during the measurement period is not equal to the average coverage duration of the group of policies during the measurement period. In general, we can address this by splitting the data into subgroups when the rate of earning in the measurement period changes. For example, consider these scenarios:

Scenario 1: 100 exposures from 6-month policies written in CY 2020. We want CY 2020 earned exposures.

WRONG: CY 2020 earned exposures = $100 \times \frac{\text{6 months of coverage in CY 2020 for policies written on 7/1/2020}}{\text{6 month policy term}} = 100$

6-month policies written prior to 7/1/2020 will be fully earned in CY 2020, and policies written after 7/1/2020 will earn between 6 months and 0 months. So we can create 2 subgroups to get:

Written Date Range	% of CY 2020 written exposures	Average months of coverage provided in CY 2020
1/1/2020 - 6/30/2020	50% *(since written uniformly throughout year)*	6 months
7/1/2020 - 12/31/2020	50% *(since written uniformly throughout year)*	3 months
Weighted Average		4.5 months

Now we can calculate the CY 2020 earned exposures correctly as:

CORRECT: CY 2020 earned exposures = $100 \times \frac{\text{4.5 avg months of coverage provided in CY 2020}}{\text{6 month policy term}} = 75$

Scenario 2: 60 exposures from annual policies written between Oct 2019 - Mar 2020. We want CY 2020 earned exposures.

Written Date Range	% of 60 written exposures	Average months of coverage provided in CY 2020
10/1/2019 - 12/31/2019	50%	10.5 months
1/1/2020 - 3/31/2020	50%	10.5 months
Weighted Average		10.5 months

CY 2020 earned exposures = $60 \times \frac{\text{10.5 avg months of coverage provided in CY 2020}}{\text{12 month policy term}} = 52.5$

Scenario 3: 100 exposures from annual policies are written in CY 2020. We want earned exposures in CY 2020 through 6/30/2020.

Written Date Range	% of 100 written exposures	Average months of coverage provided in CY 2020 through 6/30/2020
1/1/2020 - 6/30/2020	50%	3 months
7/1/2020 - 12/31/2020	50%	0 months
Weighted Average		1.5 months

CY 2020 earned exposures through 6/30/2020 = $100 \times \frac{\text{1.5 avg months of coverage provided}}{\text{12 month policy term}} = 12.5$

Problem Knowledge Checklist

1. Exposure bases
    - Be able to define the purpose of exposures and exposure bases.
    - Be able to list the 3 criteria for a good exposure base.
    - Be able to evaluate potential exposure bases against the 3 criteria.
2. Measuring Exposures and Premium
    - Be able to define the calendar year and policy year concepts.
    - Be able to calculate written exposures and premium on a CY or PY basis at different valuation dates given a set of policies or transactions.
    - Be able to calculate earned exposures and premium on a CY or PY basis at different valuation dates given a set of policies or transactions.
    - Be able to calculate unearned exposures and premium on a CY or PY basis at different valuation dates given a set of policies or transactions.
    - Be able to use the relation formula between written, earned, and unearned premiums and exposures (written = earned + change in unearned).
    - Be able to calculate in-force exposures and premium at different valuation dates given a set of policies.
    - Be able to calculate written, earned, unearned, and in-force exposures and premium for policies with different policy terms.
    - Be able to calculate all the metrics for time periods of quarters or months instead of years.
    - Be able to calculate all the above metrics for policies with mid-term changes, audits, or cancellations.
3. Metrics for Groups of Policies
    - Know the assumption that policies were written on the 15th of the month if you only know the written month.
    - Know whether the above assumption is likely to be reasonable.
    - Know how to calculate earned exposures and premium in 24 half-months.
    - Recognize when you need to split groups of policies into subgroups in order to calculate earned exposures and premium correctly.
    - In general, be able to calculate earned exposures and premium for grouped policies.

