What are CY statutory incurred losses equal to?
PL + ∆ in undiscounted loss reserves

What are Tax Basis incurred losses equal to?
PL + ∆ in discounted loss & LAE reserves

What are the IRS reserve discount factors ratios of?
Ratios of discounted to undiscounted loss reserves.

Do the actual loss payment patterns for a block of business impact the IRS reserve discount factors?
No. The IRS discount factors are by Schedule P line of business. The actual loss payment pattern for the block of business is not relevant.

What might statutory accounting show for long-tailed lines of business?
Underwriting loss during policy term when losses occur and positive investment income on the assets backing the reserves until losses are settled.

What does statutory accounting for long-tailed lines of business force insurers to do? What does this ensure?
Forces insurers to hold additional capital supporting full value loss reserves. Ensures the company can meet its claim obligations in adverse scenarios.

What does statutory accounting NOT reflect?
It does not reflect the economics of the business.

What is the economic income during the policy term equal to?
Present value of future profits
= Present value of net premium – Present value of loss payments

**What is used as the offset to taxable income?**
Discounted losses

**What does the IRS tax: underwriting profit or economic profit?**

By using discounted losses as the offset to taxable income, the IRS taxes economic profit, not underwriting profit. As the losses are settled, the investment income on the assets backing the loss reserves offsets the amortization of the interest discount in the reserves. The full gain or loss is realized during the policy term, with no expected gain or loss in subsequent years.

**What 3 components are the discounted loss reserves determined from?**

1) The undiscounted loss reserves
2) The discount rate promulgated each year by the Treasury
3) The loss payment pattern by line of business

**Where does these components come from?**

1) Schedule P, Part 1
2) BLAH
3) Schedule P

**What does the Treasury assume about the loss reserves in Schedule P, Part 1?**

Assumes they are undiscounted values.

**If the loss reserves in Schedule P, Part 1 are discounted and the amount of the discount is disclosed in (or with) the Annual Statement, what should you do?**

Gross up the losses before application of the IRS loss reserve discounting procedure. Schedule P, Part 1 is gross of non-tabular discount and net of tabular discount, so the adjustment is normally for tabular discounts.
What does the discount rate vary by?
Accident year

For each accident year, what is the discount rate equal to?
60-month moving average of the federal mid-term rates ending December 1 of the preceding AY. This rate is vintaged (frozen) and applies to that accident year’s losses in all future calendar years.

What is the federal mid-term rate?
The average rate on Treasury securities with 3 to 9 years remaining maturity. The federal mid-term rate is promulgated by the Treasury each month.

When can the 60-month moving average for an AY be determined?
Once the last federal mid-term rate has been announced

What are the market values of future cash flows based on?
The current term structure of interest rates – the date that the liability was incurred is no relevant.

What are the IRS discount rates based on? What is the rationale for this?
The year the loss occurred.
The rationale is that the insurer uses the premiums to buy fixed-income securities to fund the future loss payments. The yield on the fixed-income securities is set at purchase date. If the duration of the assets backing the reserves matches the duration of the loss liabilities, the losses will be paid from the coupon income and the principal repayment from these securities. The yield during the AY is the relevant investment yield throughout the life of the policies.

What does the IRS procedure apply a CY payment pattern to?
Applies CY payment pattern to AY loss reserves
What kind of payment patterns do pricing actuaries use? What about the IRS?

Pricing actuaries often use quarterly payment patterns; the IRS uses annual periods since only annual data are shown in Schedule P.

What does the IRS payment pattern assume?

1) Assumes a payment date of 7/1 each year, as a proxy for an even distribution of payments during the year.
2) Assumes all losses are paid by the 16th year
   a. Assumes all the losses in the “prior years” row of Schedule P are 10 to 15 years old

What is “\( p_i \)”? What are the \( p_i \)’s estimated from?

\( p_i \) is the percentage of the reserves paid in each future calendar year \( i \).

These are estimated from historical data (from Schedule P). For example, if you wanted to calculate percentage of AY 2011 losses paid in 2012, you would use the percentage of AY 2008 losses paid in 2009 (use 2009 Schedule P since the 2009 Schedule P would be available by year end 2010).

What is “\( r_f \)?

\( r_f \) is the risk-free interest rate

Assuming a payment date in the middle of each year and a risk-free interest rate \( r_f \), what are the discounted loss reserves equal to?

Discounted LR = Undiscounted LR * \( (p_1/(1+r_f)^{0.5} + p_2/(1+r_f)^{1.5} + p_3/(1+r_f)^{2.5} + ... ) \)

What is a constraint of the IRS method?

Actuaries use payment patterns of 30 or 40 years for the long-tailed lines of business. Since Schedule P shows 10 year loss triangles, the IRS is constrained by the available data; it uses a ten year loss payment pattern plus a five year extension for long-tailed lines of business.
What part of Schedule P do actuarial estimates of loss payment patterns use?

Paid loss triangles from Schedule P, Part 3

What part of Schedule P does IRS use to estimate loss payment patterns?

Schedule P, Part 1

What are the reasons the IRS uses Part 1 instead of Part 3?

1) Part 3 contains only D&CC expenses, not Adjusting and other expenses; Part 1 contains all LAE
2) Part 1 is an audited exhibit; Part 3 is not
3) Some actuarial methods rely on judgment to select paid LDF’s. The IRS method eliminates any judgment.

If the actual loss payments are not distorted by random fluctuations, the ratio of cumulative paid losses to incurred losses by AY are equal to what?

The cumulative percentage of losses expected to be paid at each valuation date

What are the differences in the cumulative percentages of paid to incurred equal to?

Incremental percentage of losses expected to be paid in a given interval

What ratio is the loss reserve discount factor equal to?

\[ = \frac{(\text{Discounted unpaid losses/IL})}{(\text{Undiscounted paid losses/IL})} \]

\[ = \frac{(i_j/(1+R)^{0.5} + i_{j+1}/(1+R)^{1.5} + \ldots)}{(1-p_j)} \quad \text{note: numerator incomplete due to lack of payment extension beyond 10 years} \]

Where \( p_j \) is the cumulative percentage of losses paid by year \( j \) (or 12\( j \) months)

Where \( i_j \) is the incremental percentage of losses paid between year \( j \) and year \( j+1 \)

**This formula might be total crap – double check with the notes/group.**
What ratio is the loss reserve discount factor equal to if you multiply by a AY XXXX IL?

= (AY XXXX discounted loss reserves @ 12 months maturity) / (AY XXXX undiscounted reserves @ 12 months maturity)

The loss reserve discount at other maturities is similarly calculated.

How often does the company get to elect the type of discount factors they use?

Once every five years (determination years). The election is made with the company’s tax filing for the determination year, and it applies to that year and the next four years.

What 2 choices of discount factors does the company choose from during determination years?

1) Discount factors developed by the Treasury, based on industry aggregate data from Best’s Aggregates & Averages
2) Discount factors derived from the company’s own Schedule P

If the company elects to use its own payment patterns, what year’s Schedule P data would it use when estimating payment patterns for accident year 200X?

For AY 200X, it uses Schedule P data in its 200X – 2 Annual Statement

If the company uses its own data to determine the loss payment pattern, how often are the patterns updated? Compare/Contrast with aggregate (industry) loss payment pattern updating.

The patterns are updated each year if the company uses its own data to determine the loss payment pattern.

The aggregate (industry) loss payment patterns are vintaged and updated only in determination years.

What digits do determination years end in? What do the statement dates end in for aggregate industry data used?

2 or 7; 0 or 5
What do you assume about losses that are unpaid at the end of 10 years (if the amount unpaid is less than the amount assumed to be paid in the tenth year)?

You assume that these unpaid losses will be paid in the 11th year.

What do you do with losses that are unpaid at the end of 10 years (if the amount unpaid is greater than the amount assumed to be paid in the tenth year)?

You need to use the IRS extension of payments when the amount unpaid after 10 years is larger than the amount assumed to be paid in the 10th year.

What are the 2 methods you can use to calculate the “Discounted Percentage Unpaid”?

1) Iterative method, working backwards from oldest AY
   a. Begin with computation of the discounted percentages unpaid at the year end preceding the final loss payment
   b. The loss payment pattern here extends through 16 years, so one begins with the end of the 15th year

2) Formula method

What does “going backwards in accident years” correspond to?

Going forward in calendar years.

What are the amounts unpaid at the end of 10 years assumed to be paid in the 11th year capped by? What about the 12th, 13th, etc?

The amount assumed to be paid in the 10th year is used to cap the unpaid amount assumed to be paid in the 11th year. The excess is assumed to be paid in the 12th year, capped at the same limit. The excess is assumed to be paid in the 13th year, and so forth. Continue in this fashion through the 15th year. The remaining excess is assumed to be paid in the 16th year, with no limit.

What are the discount factors for years 11 through 15 combined into?

A composite discount factor for the “prior years” row

How many year payment pattern does a line of business with 2 accident years in Schedule P use?
Lines of business with 2 AY’s in Schedule P use a 3 year payment pattern

- The percentage of losses paid from 12 to 24 months is the difference in the cumulative paid to incurred ratios from 12 to 24 months
- The percentage of losses paid in each of the next 2 12 month intervals is half the unpaid losses at 24 months

Does extension of payments apply to 2-year lines?

No