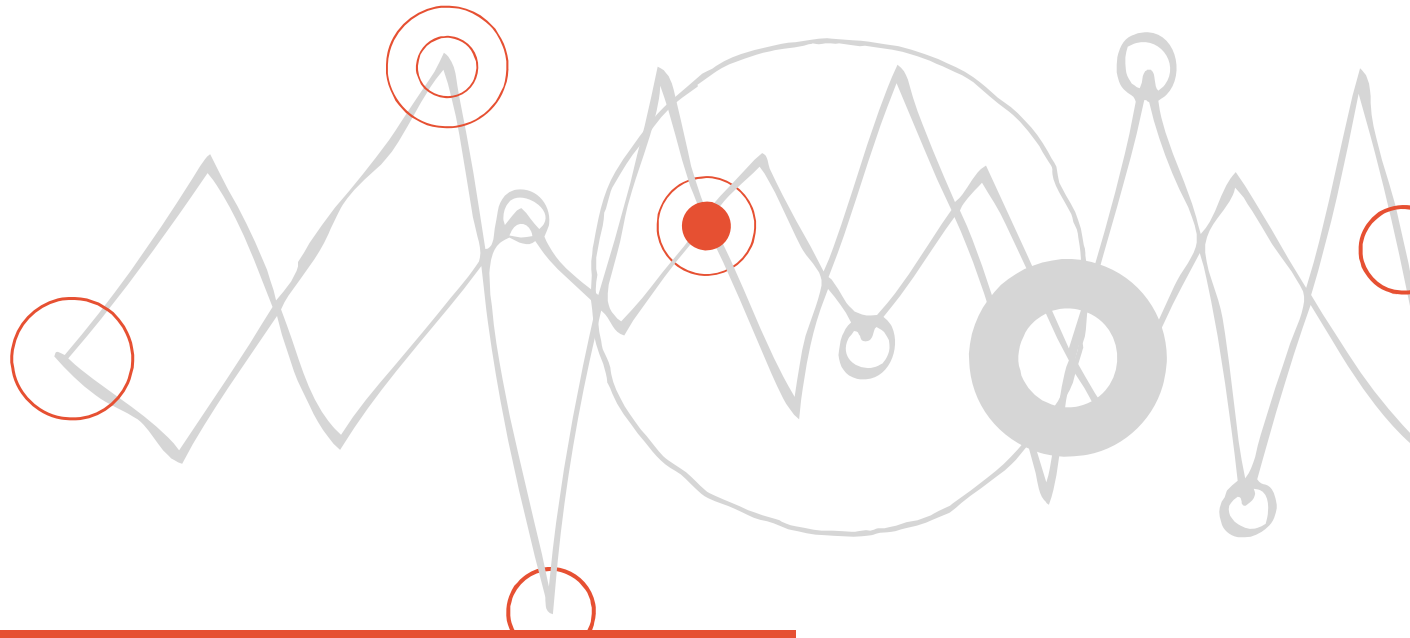

Customer Lifetime Value

Opportunities and Challenges

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Pop quiz!

- A new advertising program would cost $1 million and generate 1,000 new auto policies. Should you spend the money?

- A customer service initiative will improve annual policyholder retention by 0.2% at a cost of $20 per policy per year. Is it worth it?

- A potential auto customer is expected to generate an underwriting loss in the first two years of the relationship. Should you write the policy?

Agenda

- Introducing customer lifetime value (CLV)
  - Current and potential uses
  - The unique complications of CLV in insurance
- Measuring CLV
  - Inventory of CLV metrics
  - The need for different metrics
- The mechanics of calculating CLV

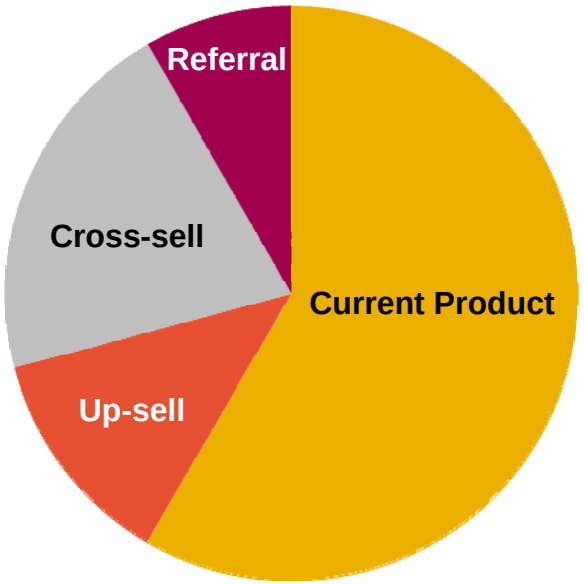
Introducing Customer Lifetime Value

Customer Lifetime Value (CLV)

- *What is the value of a customer?*
- The simplest definition of CLV is the **net present value of the cash flows attributed to the relationship with a customer**

$$CLV = \sum_{t=1}^{T} \frac{(p_t - c_t)}{(1+i)^t} - AC$$

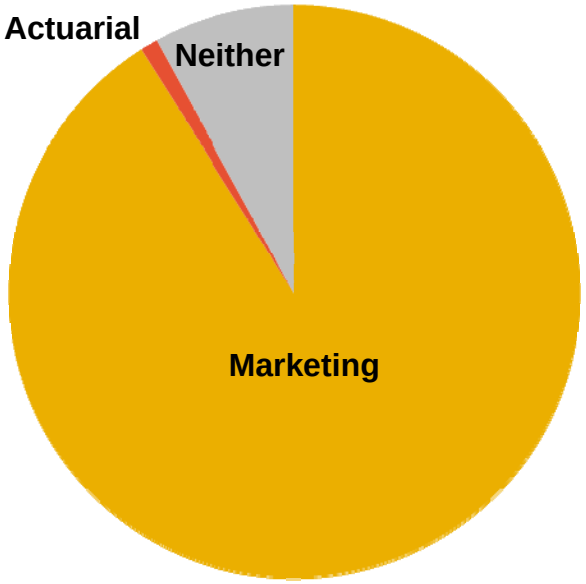
- Ideally, all sources of value should be included
  - This might not always be practical



"All models are wrong, but some are useful."
— George E. P. Box

Background

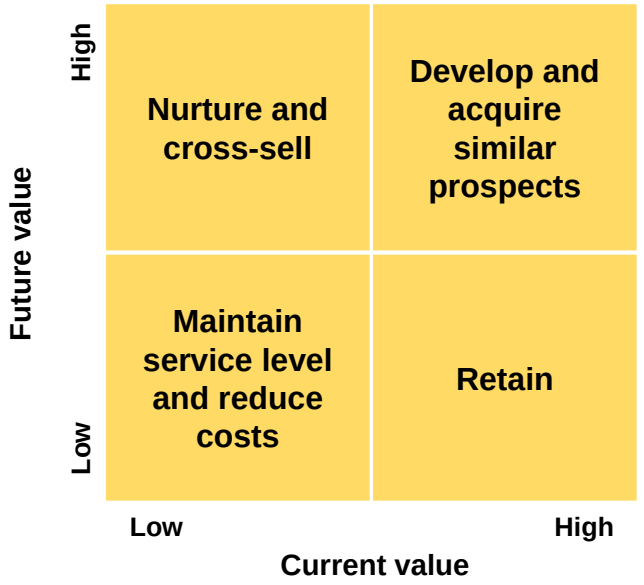
- CLV is widely used in:
  - Banking
  - Retail
  - Airlines
  - Some insurance companies
- Related concepts:
  - Expected lifetime earned premium
  - Policy life expectancy



- CLV helps a firm to rank order its customers on the basis of their contribution to the firm's profits
- Research indicates that the value of a firm is closely related to the sum of the lifetime value of its customers

Current and potential uses of CLV

- Customer Relationship Management (CRM)
  - Provides preferential services to certain customers
    - ICIC Bank
    - Capital One
  - Identifies targets for retention campaigns
  - Offers certain products to specific customers
    - Example: UBI
  - Helps make decisions on which policies to cancel
    - CAT management
- Marketing
- Agents and product managers' compensation



"You can't manage what you can't measure."
— Bill Hewitt

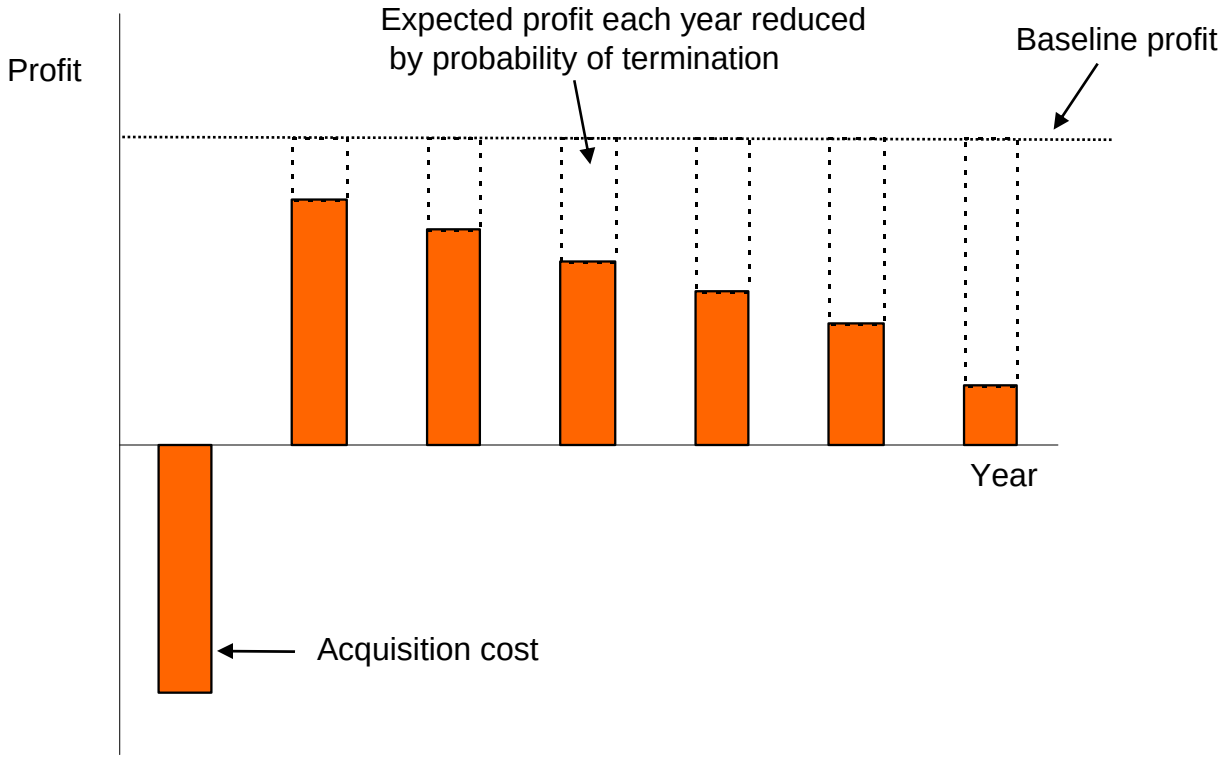
Unique complications of CLV in insurance

- Revenues *and* costs vary by customer and over time for a specific customer; CLV is much more than a function of volume
- Capital/surplus allocation adds further complexity
- Highly variable cost structure yields small contribution to margins, meaning small changes in price can have a dramatic impact on CLV

Measuring CLV

Calculating CLV: Simple example

- Customer with a single policy with high initial acquisition costs and a stream of constant profits in future years. Assuming no chance of cross-sell, up-sell or referrals



Calculating CLV: Simple example

Annual premium: $1,000 (constant overtime)

Profit: 10% accounted for at the end of the policy and fixed over the life of the customer

Retention: 90% with no mid-year termination

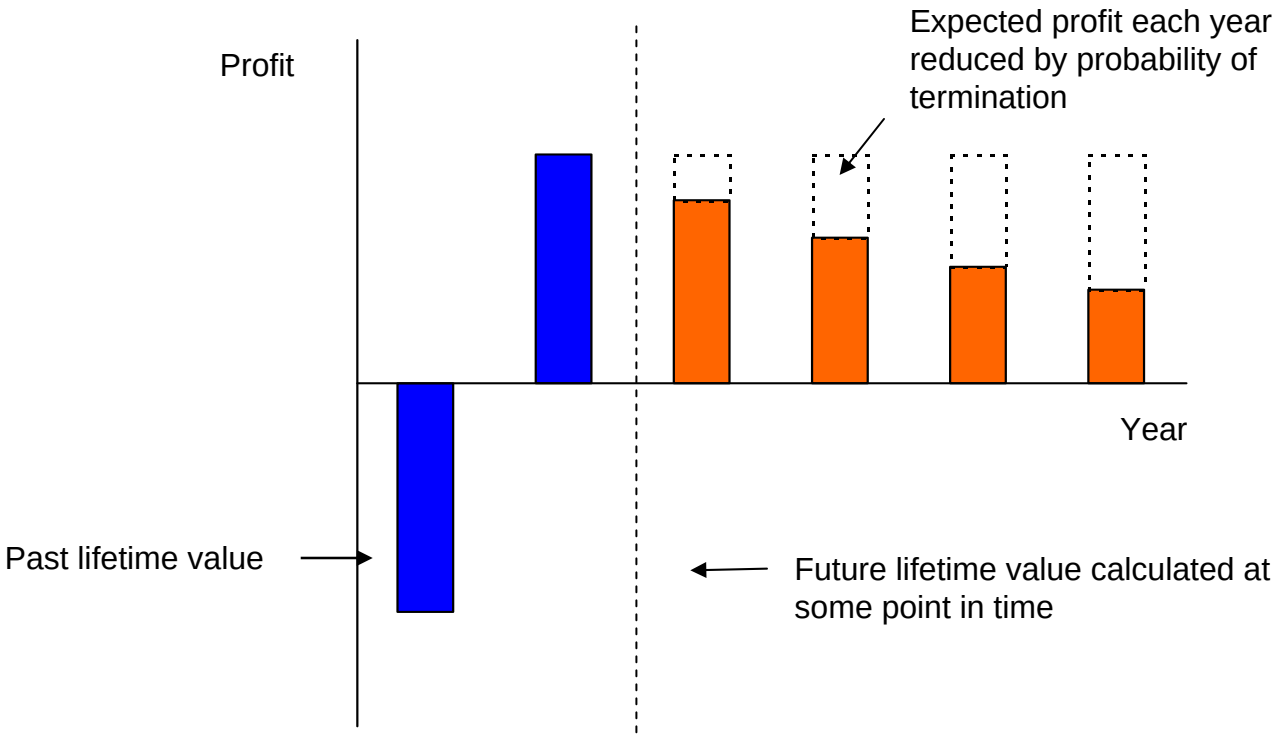
Acquisition cost: $400

Discounting rate: 15%

$$CLV = 100/1.15 + 100 * (.9)/1.15^2 + 100 * (.9)^2/1.15^3 + \ldots. - 400$$

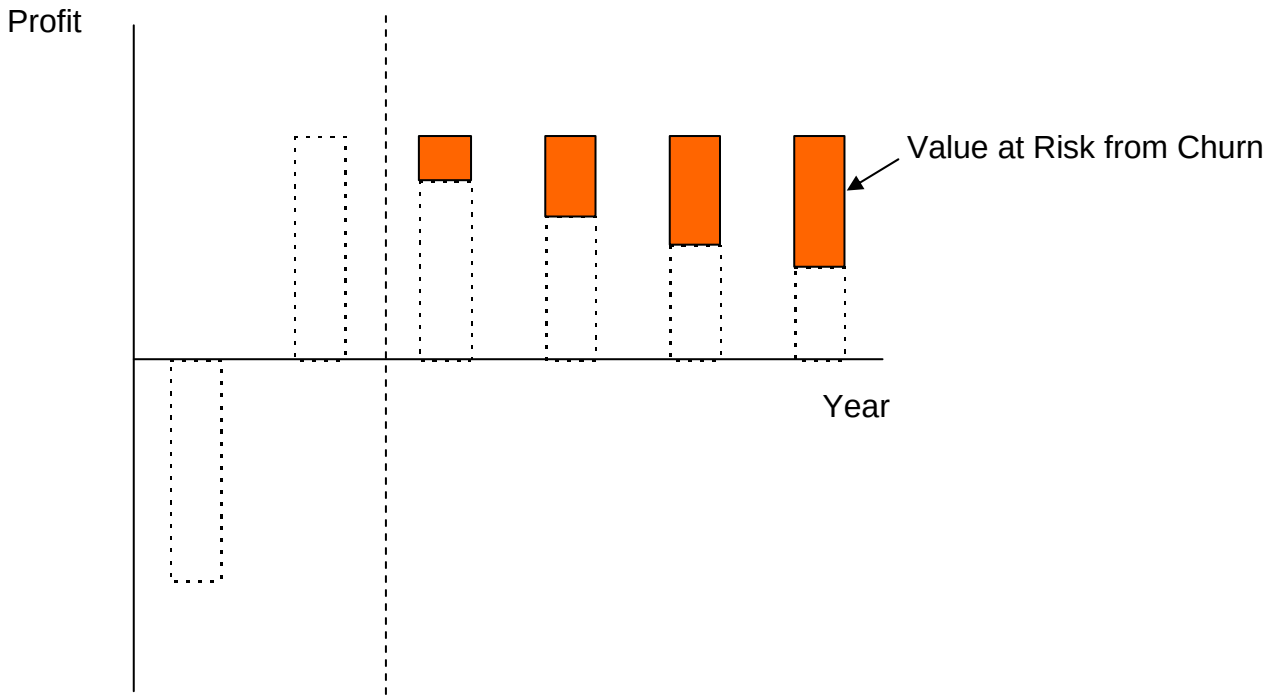
Future and past customer lifetime value

- Future lifetime value represents the NPV of expected *future* profits. Previous profits are treated as “sunk profit”!
- Past lifetime value focuses only on *past* profits; there are still different ways to define it



Value at risk from churn (VaR)

- Value at Risk from churn (VaR) is appropriate measure on which to segment customers for retention purposes
- Knowing VaR does not tell you whether or not you can impact it, but it is a good start



Why do we need different CLV measures?

- Different applications require different definitions
- Example:
  - A high-profit customer with minimum likelihood of termination
    - E.g., a customer with multiple cars and good insurance score
  - Traditional customer value measures such as future lifetime value identify the customer as being very high value
  - From a churn perspective, there is little value in investing retention marketing budget on a customer unlikely to leave
- Future lifetime value should guide decisions regarding acquisition of new customers or service levels of current customers
- VaR should guide decisions regarding retention campaigns
- Neither measures provide any guidance on cross-sell activities

Choosing a definition can be a challenge

"The most important observation is that 'value' is a relative concept and will vary depending upon your business objectives."

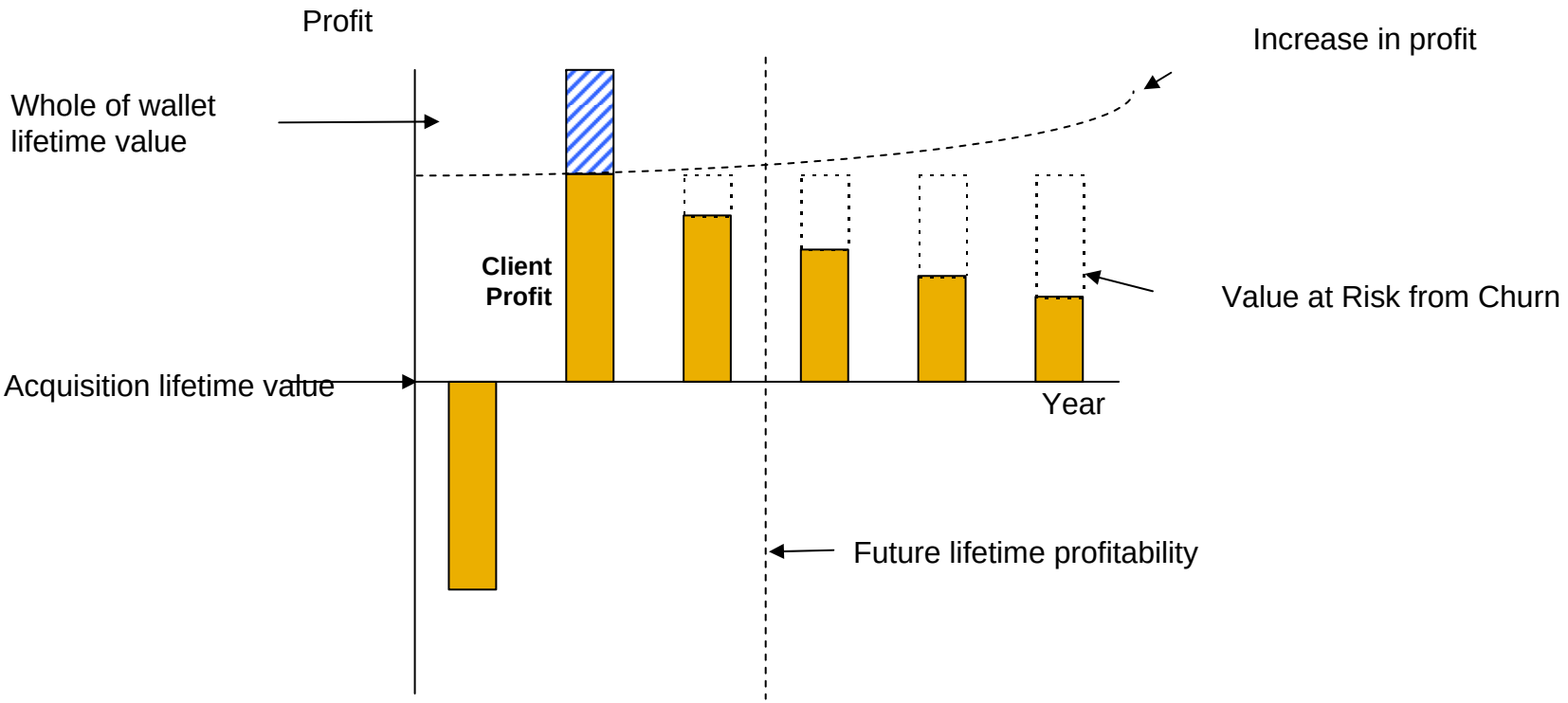
"This ambiguity [of the definition of value] is the cause of most of the difficulties experienced. Without clear framework and set of objectives, every calculation will be wrong for somebody within your organization, and you will remain mired in politics, almost from day one."

— Valoris Abram Hawkes

More customer value definitions

- CLV is a ***framework*** rather than a single metric. There is no single measure of customer value that is suitable for all purposes.
- Potential CLV measures include:
  - **Future lifetime value:** The expected future value of an existing customer at a specific point in time
  - **Past lifetime value:** The past value of an existing customer until this point in time
  - **Value at Risk from churn:** The difference between the value of a customer assuming no churn and the expected value allowing for the probability of churn
  - **Acquisition lifetime value:** The expected value of the customer at the time of acquisition, including acquisition costs specific to the distribution channel
  - **Expected cross-sales lifetime value:** The expected lifetime value resulting from cross-sales
  - **Whole of wallet lifetime value:** The potential lifetime value taking into account all P&C insurance, life insurance and financial products
  - **…and more definitions exist!**

Customer value measures



The mechanics of calculating CLV

Key questions to ask before starting

Strategic questions:

- What is the purpose of the model? Who will use it?
  - Marketing
  - CRM
  - …or something/someone else?
- Is the model meant to inform micro or macro decisions?
  - Models that optimize local decisions often provide suboptimal answers from the broader business prospective and vice versa
  - Decision would impact how to include fixed expenses and/or cost of capital

Tactical questions:

- What lines of business should I include?
- What time horizon should I use?
- Aggregate over households or customers?…or something else?

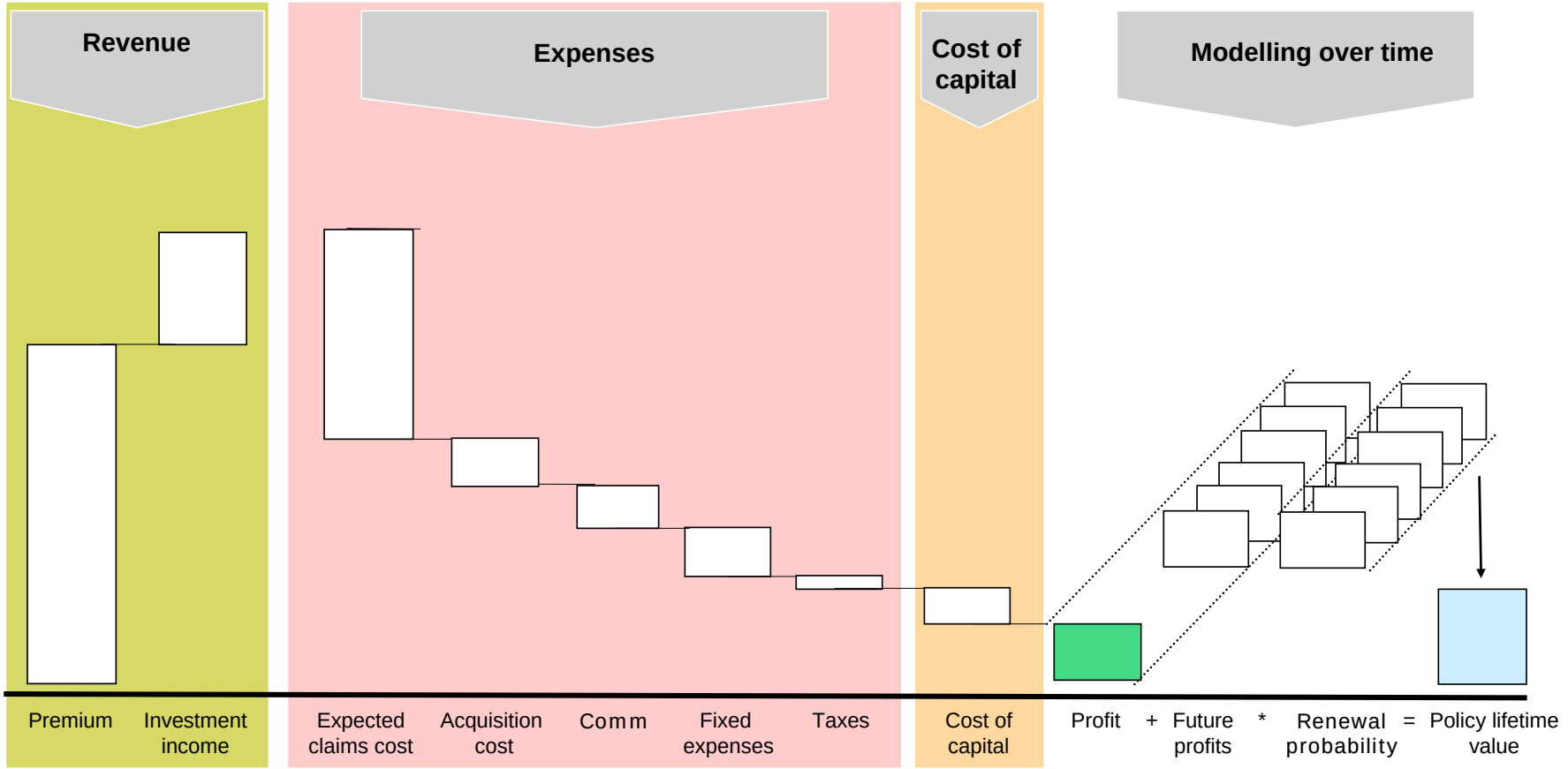
Calculation framework — one possible approach

- Framework for calculating *future* lifetime value of either a newly acquired customer or an existing customer
- Estimate “policy lifetime value” of each existing policy
  - Estimate a one-year expected value of each policy
  - Estimate expected value of each policy for each future year
  - The policy lifetime value is the sum of all future year values, reduced by the probability of churn
- Estimate the potential value of cross-sales
- Add the policy lifetime value of each existing policy and the potential value of cross-sale to estimate the customer lifetime value

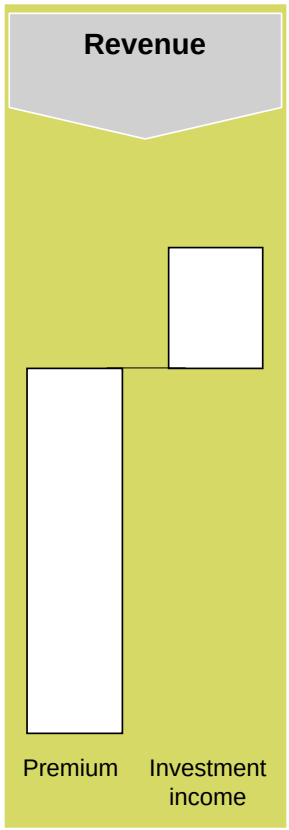
Calculation of a policy lifetime value

- We will use a “simple” definition of value:

Profit = Revenue – Cost

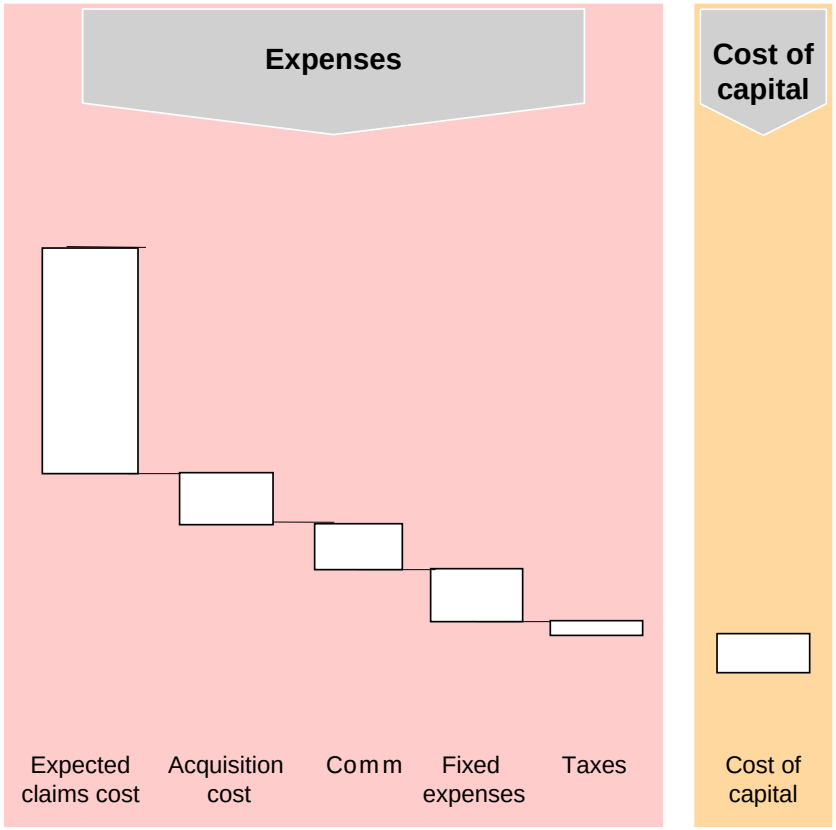


Revenue



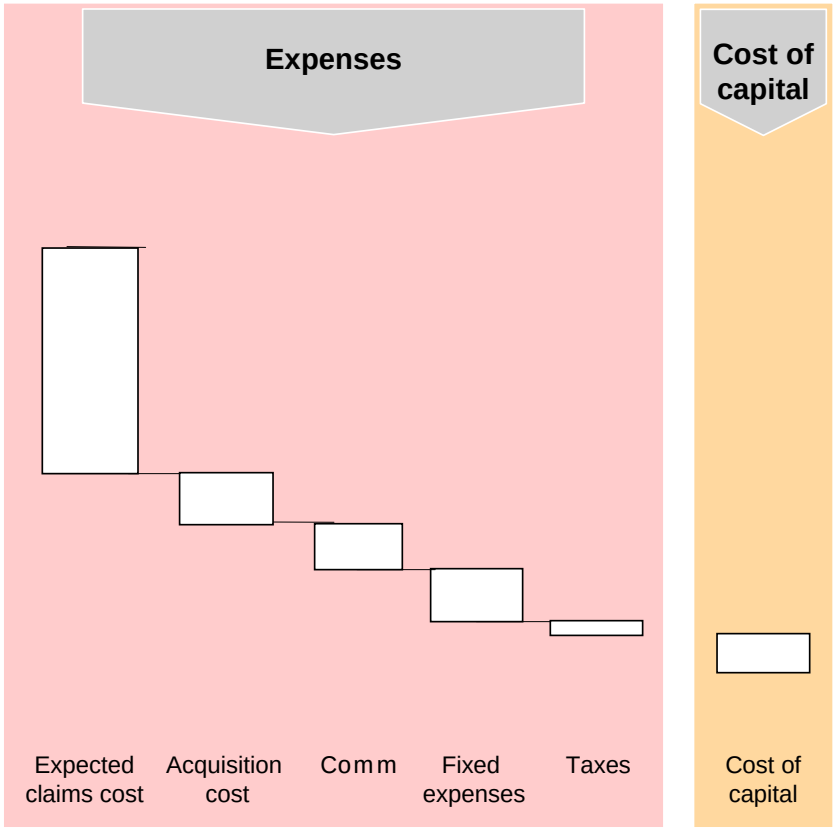
- Estimate the premium that you expect to charge in the future. This involves:
  - Deciding on which rating plan to use
  - Aging each policy
- Alternative approaches:
  - Build a premium multiplier model
    - Use historical view of your current book of business
    - Score it using your current premium model
    - Build a model to calculate a multiplier to apply to this year's premium to estimate future premium
    - Beware of double counting the impact of churn!
  - Assume premium increases at a constant rate
    - Could have large impact on some policies, e.g., a couple adding/dropping a teen driver
- At minimum, investment income should depend on the product type

Expenses



- Expected claim loss is different from losses used to calculate premium
  - New predictors that were not used in the premium model
  - New interactions can be used
  - Different techniques can be used
- Be careful how to treat strategic and conscious subsidies
- Do not forget to add expected excess and CAT losses
- Do not use acquisition cost for current customers; however, add the cost of retention efforts if you can estimate it

Should we include fixed expenses and cost of capital?



- It depends on the application!
- If you decide to include fixed expenses, be consistent
  - Flat cost per policy
  - Flat cost per risk (for example, fixed fee per vehicle)
  - …or something else

Retention

- In contractual products, a common assumption is that customers who do not renew are considered “lost for good”
  - Reasonable assumption, but underestimates the CLV of a customer
- Defining termination could be ambiguous
- Standard techniques to model retention:
  - Logistic regression
  - Survival analysis
- Several different types of variables can be used for retention modeling:
  - Rating variables:
    - Age, insurance score, number of policies, etc.
  - Other variables:
    - Household characteristics
    - Competitive position
    - Distribution channel

Putting it together

Cross-sell modeling:

- Focus on the lines that will have an impact on the CLV
  - The value of a $100 policy that has a 5% probability of being sold in the next five years is a rounding error
  - Focus first on Auto and Home unless you write a large volume of specialty products
  - Modeling a one-line cross-sell becomes easier — logistic regression could be used
  - Calculating the value of the cross-sold product is not straightforward
    - — We only know the customer Auto policy information, but we need to calculate the value of the home policy that will be sold!

Final step:

- CLV is the sum of the policy lifetime value of the policies that the customer has *plus* the value of the cross-sell opportunity
- Difficult to include value of life and annuity policies

Final thoughts

- Is using profit as a measure of value operational?
  - Maybe!
- Using profit is intuitive, however:
  - Profit could be very volatile
    - Assuming a 10% profit load, an increase of 5% on an underpriced segment could double its value
  - Answer will change significantly based on assumptions
    - Cost of capital
    - Expenses

Final thoughts

- Alternative definitions to profit (be warned):
  - Customer lifetime premium
  - Customer lifetime policies (vehicles)
  - Customer life expectancy
- These definitions are easier to calculate, intuitively related to the customer value, but could provide inaccurate answers if pricing deviates too much from the true cost
- Customer lifetime value does not capture all values a customer brings to the firm, but can be a very useful tool to manage your business
- Always start with a simple model

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