Measuring the Value of Rate Segmentation

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Our Challenge

- Enhanced rate segmentation can add significant value

BUT

- Increased segmentation has a cost

- How do we evaluate the value vs. cost?
- How do we make the case to decision makers?

How Some Actuaries Make the Case to Increase Segmentation

We need to enhance our analytics in order to maintain our competitive pricing advantage!

I don't want to lose our pricing advantage. How much will it cost to implement an enhanced pricing strategy?

How Some Actuaries Make the Case to Increase Segmentation

It will take 100,000 IT man-hours costing $10 million to modify our underwriting and agency systems.

That's a lot of money to spend! How much additional revenue will we bring in?

What's wrong with this dialog?

- Focus only on implementation costs
  - In a competitive marketplace, there is a cost to doing nothing
  - Lost business, lost revenue, and increasing cost of remaining policies
- Short-term view of revenue impact
  - "Revenue Neutral" applies only to average premiums on current book
  - There can be long-term revenue impacts

How to make the case better

- Better projections of revenue and profit impacts
  - Look beyond "Revenue Neutral" implementation
- Better consideration of marketplace dynamics
  - Includes customer retention and competitive effects
- Demonstrate the value in monetary terms

The Discounted Cash Flow Trap
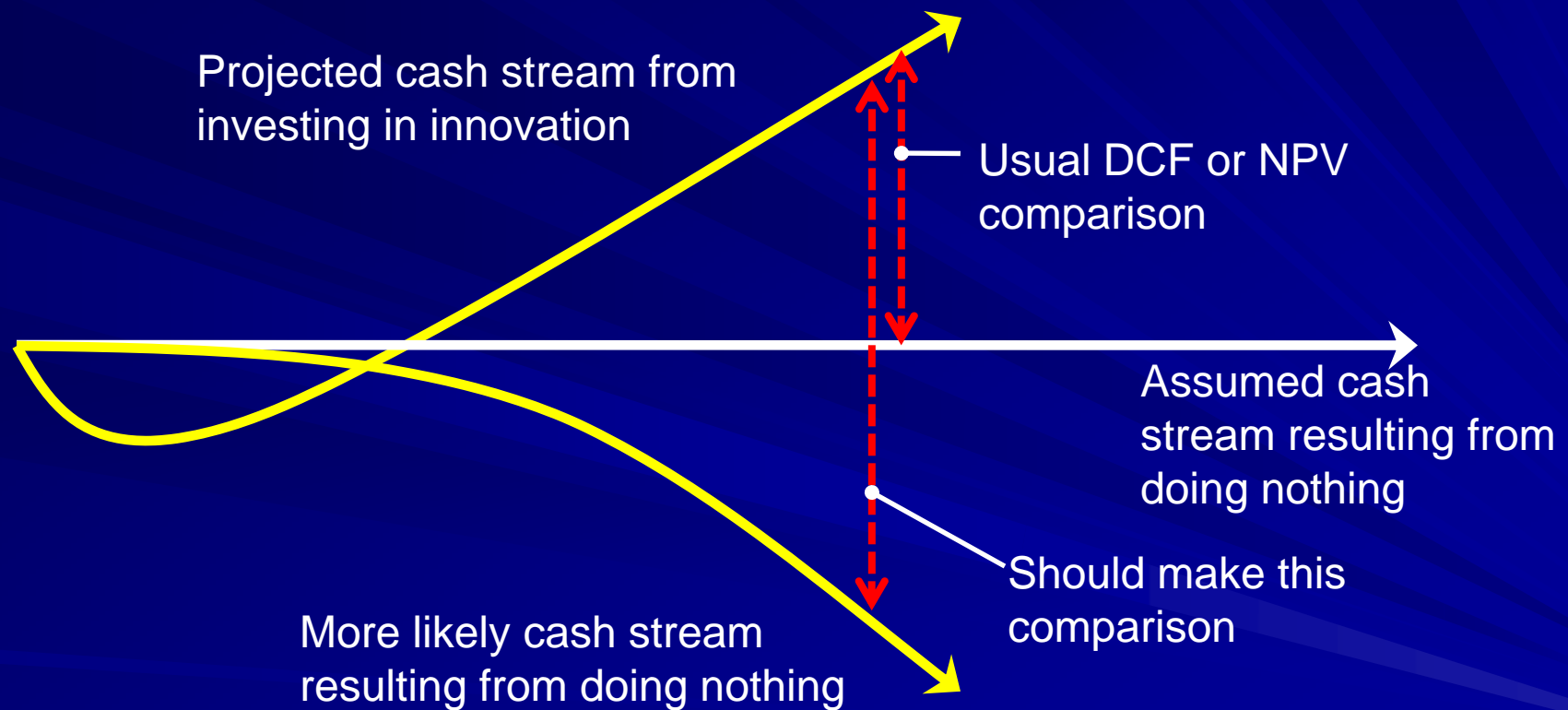
Projected cash stream from investing in innovation

Usual DCF or NPV comparison

Assumed cash stream resulting from doing nothing

Should make this comparison

More likely cash stream resulting from doing nothing

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Illustration

- Insurer writes 3 policies
- All policies priced in the same class
  - Expected Loss Ratio = 50%
  - Profit if Loss Ratio < 60%
- More accurate segmentation is available in the marketplace
  - Used by competitors
  - Places some policies at risk

Illustration – Base Case

Policy #	Premium	Insurer's Expected Loss	Break-Even Loss	Accurate Expected Loss	Insurer's Profit
1	60	30	36	20	16
2	60	30	36	30	6
3	60	30	36	40	-4
Total	180	90	108	90	18
Ratio to Premium		50%	60%	50%	10%

Illustration – Year 1

Policy #	Premium	Insurer's Expected Loss	Break-Even Loss	Accurate Expected Loss	Insurer's Profit	
1	60	30	36	20	~~16~~	0
2	60	30	36	30		6
3	60	30	36	40		-4
Total	180	90	108	90	~~18~~	2
Ratio to Premium		50%	60%	50%	~~10%~~	1%

Lost Profit = 16

Value of Lift (VoL)

- Assume a competitor comes in and takes away the above average risks.
- Because of adverse selection, the new loss ratio will be higher than the current loss ratio.
- *What is the value of avoiding this fate?*
  - $16 in this illustration
  - Insurer could have spent additional $16 for segmentation and been no worse off
- May express the VoL as a $ per car year.
  - $5.33 per policy

Illustration – Year 2

Policy #	Premium	Insurer's Expected Loss	Break-Even Loss	Accurate Expected Loss	Insurer's Profit
2	70	35	42	30	12
3	70	35	42	40	2
Total	140	70	84	90	14
Ratio to Premium		50%	60%	50%	10%

Illustration – Year 2

Policy #	Premium	Insurer's Expected Loss	Break-Even Loss	Accurate Expected Loss	Insurer's Profit	
2	70	35	42	30	~~12~~	0
3	70	35	42	40		2
Total	140	70	84	90	~~14~~	2
Ratio to Premium		50%	60%	50%	~~10%~~	1.4%

Lost Profit = 12

Illustration – Year 3

Policy #	Premium	Insurer's Expected Loss	Break-Even Loss	Accurate Expected Loss	Insurer's Profit
3	80	40	48	40	8
Total	80	80	48	40	8
Ratio to Premium		50%	60%	50%	10%

Illustration – Summary

No Enhanced Segmentation

Year	Premium	Profit
0	180	18
1	120	2
2	70	2
3	80	8

NPV	25

- Declining Revenue
- Declining Profit

- Calculate NPV
  - Using 10% discount rate
- Proper Basis of Comparison

The Discounted Cash Flow Trap
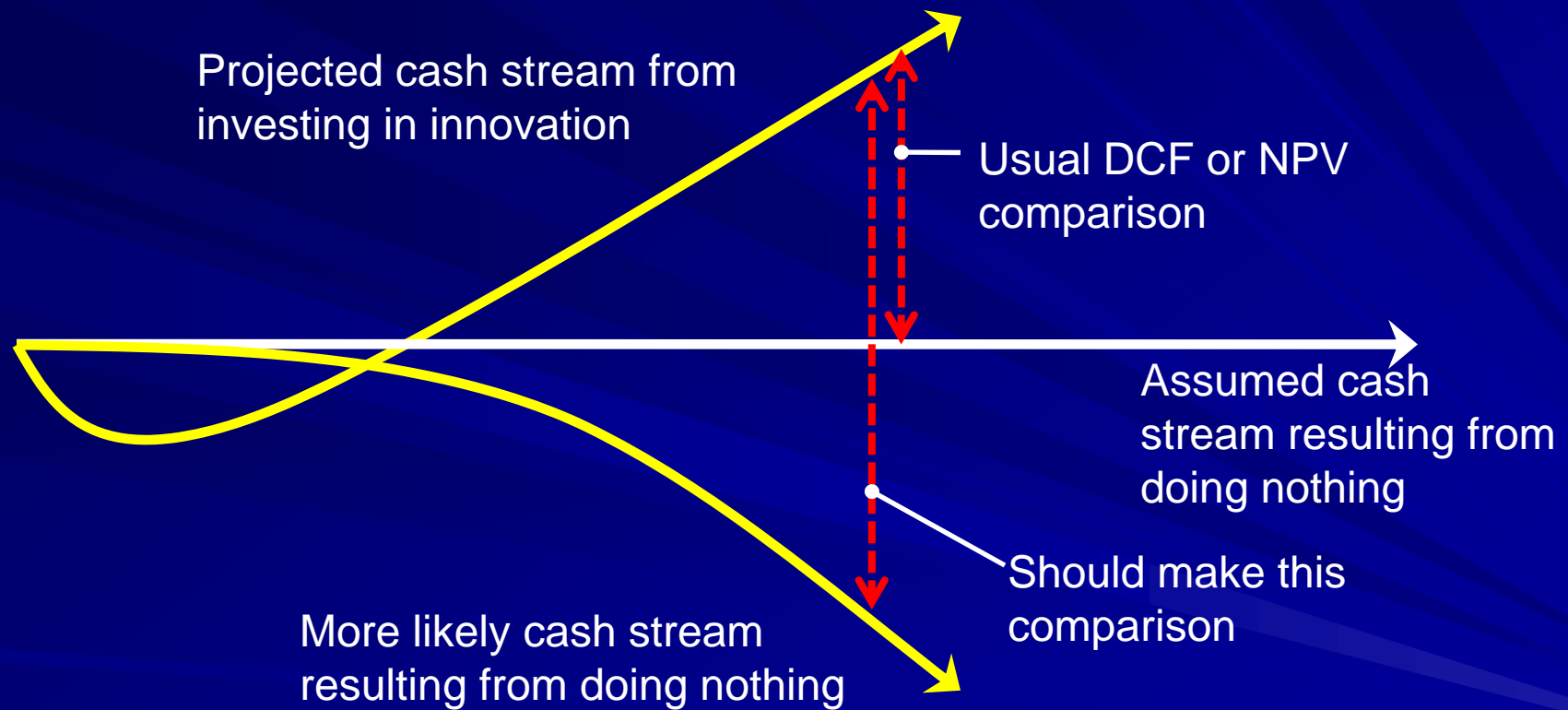
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Alternative Scenario Enhanced Segmentation

Year	Premium	Profit excl Marginal Costs	Marginal Costs	Profit
0	180	18	10	8
1	180	18	3	15
2	180	18	3	15
3	180	18	3	15

NPV	41

- **Assume premium and policies are retained**
- **Directly consider implementation costs**
  - Higher first year expenses

Comparison

No Enhanced Segmentation

Year	Premium	Profit
0	180	18
1	120	2
2	70	2
3	80	8

NPV	25

Enhanced Segmentation

Year	Premium	Profit
0	180	8
1	180	15
2	180	15
3	180	15

NPV	41

■ Greater NPV for Enhanced Segmentation

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References

- Glenn Meyers, "Value of Lift", Actuarial Review, May 2008

- David Cummings, "Value of Lift – A Net Present Value Framework", Actuarial Review, Feb 2009

Summary

- **Assessing the Value of Segmentation**
  - Requires understanding of marketplace dynamics
  - Requires projections of revenue, retention, and conversion effects
- **Basis of comparison is not "status quo"**
  - Project the "do nothing" scenario as well

Extensions of this Approach

- Refined considerations of retention and conversion effects
- Consider different premium scenarios
- Projections are inherently uncertain
  - Use stochastic simulation to project future scenarios under uncertainty
  - Connection with Strategic Risk Management