

Singapore Actuarial Society Enterprise Risk Management Conference 2015  
Creating Value in an Evolving Landscape in Asia  
3<sup>rd</sup> to 4<sup>th</sup> September 2015 @ Equarius Hotel, Sentosa Singapore

# Capital Allocation for Effective Business Steering

Nicholas Yeo Chee Lek FIA FASM FSA  
Founder & Actuary | Nicholas Actuarial Solutions  
Chief | AP College | Actuarial Partners Consulting  
Consulting Actuary | Sunway University Business School

# Disclaimer

My own views.

Not the views of:

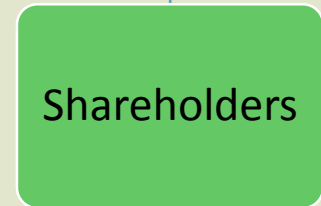
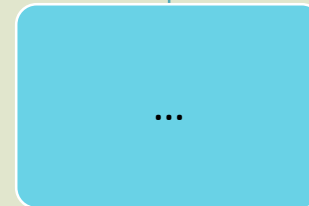
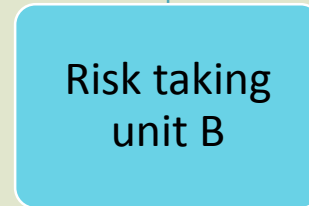
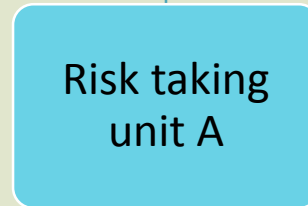
- My company nor any of its affiliations
- Professional bodies which I belong to IFoA, ASM, SOA
- SAS nor its ERM conference organising committee.

# Today's Presentation

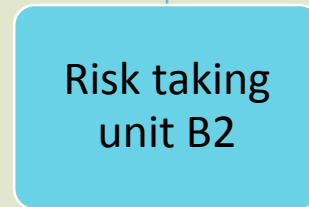
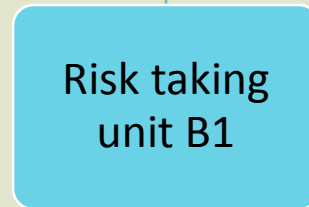
Firms are required to deliver a return on capital to shareholders



How does it allocate capital to amongst risk taking units?

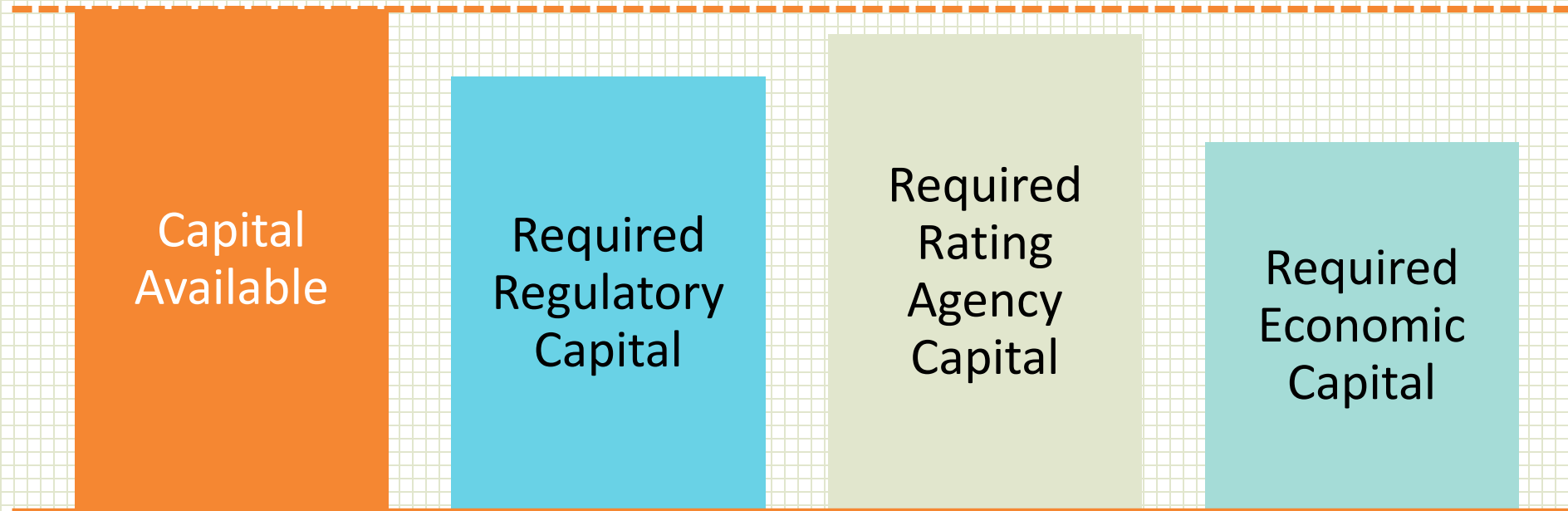


What are the business implications of different allocation methods?



# Capital Allocation

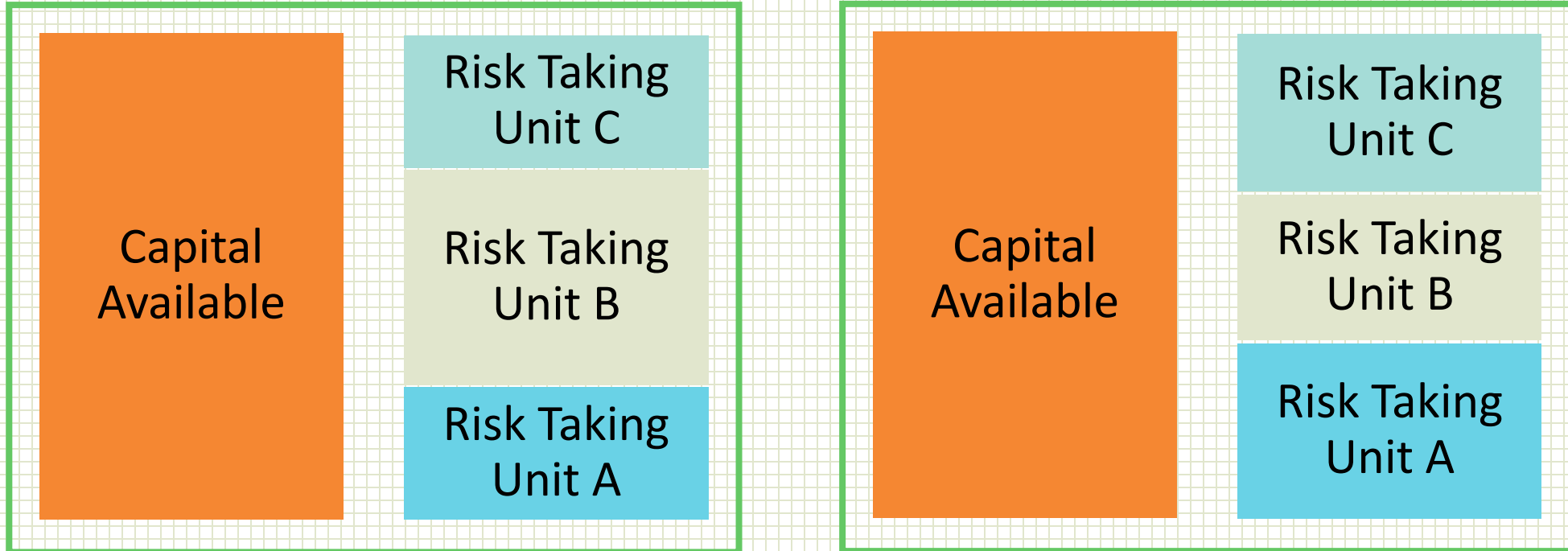
## Capital Available



Level of capital available held ensures sufficient capital resources to support the firm's risk appetite as well as regulatory and rating agency requirements.

# Capital Allocation

## Different Methods Lead to Different Outcomes

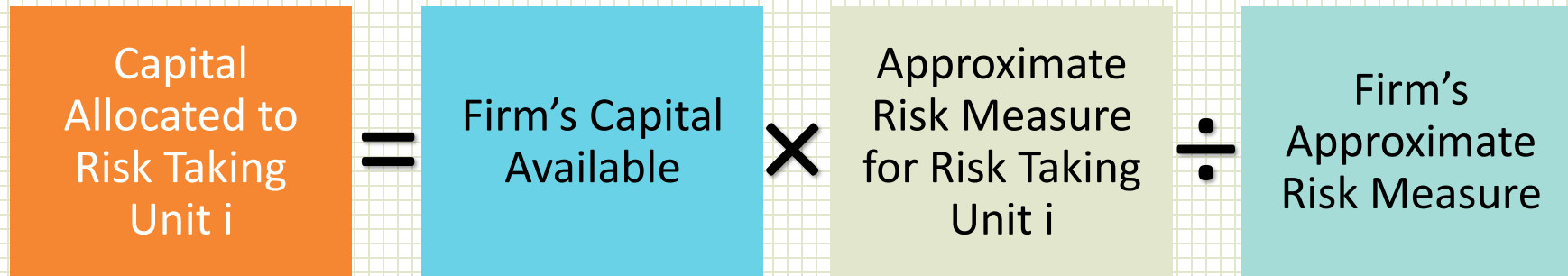


Capital allocation, whilst being a theoretical exercise, is not an exact science. Different capital allocation methods could lead to very different business outcomes.

# Capital Allocation

## Simple Approach

The most simplistic approach of allocating capital to each risk taking unit is by an approximate risk measure.



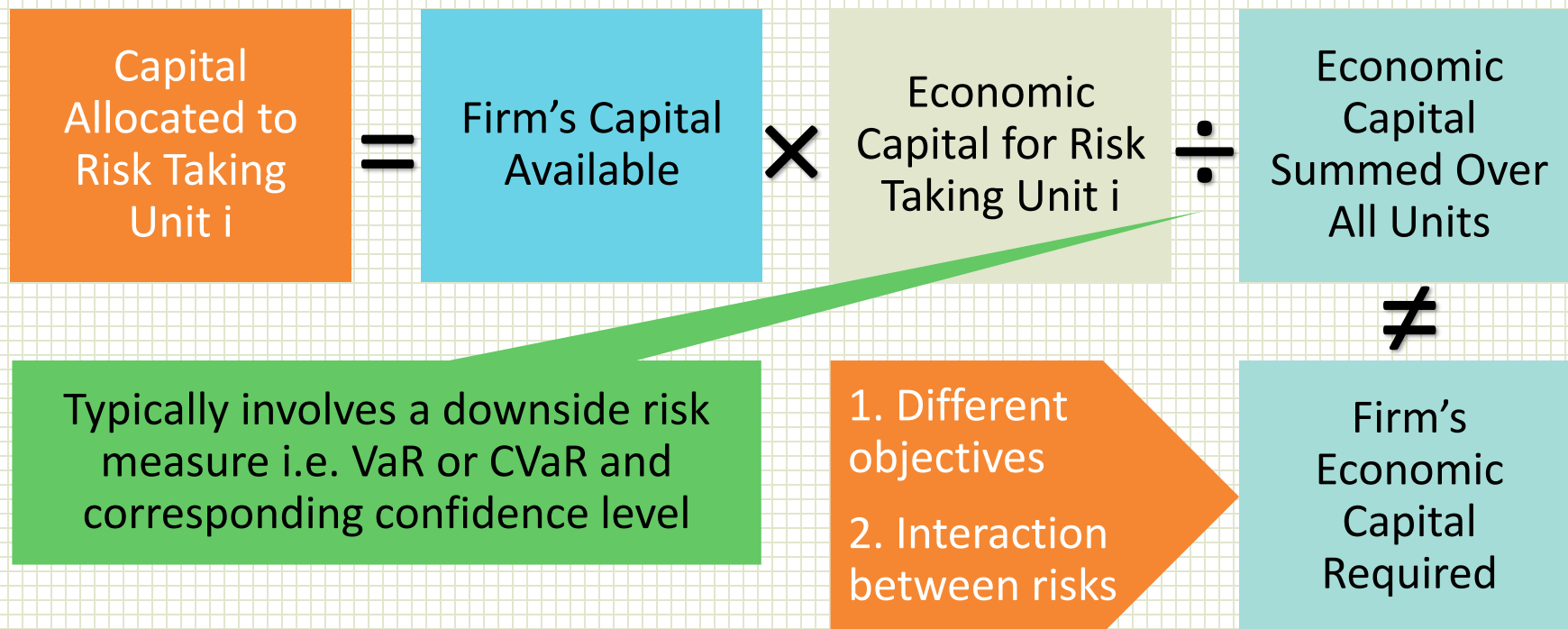
The approximate risk measures can be in the form of the size of profits, premiums, claims, or assets.

Whilst this is a primitive method, it serves as a good starting point, and is often used as a benchmark by non-technical stakeholders.

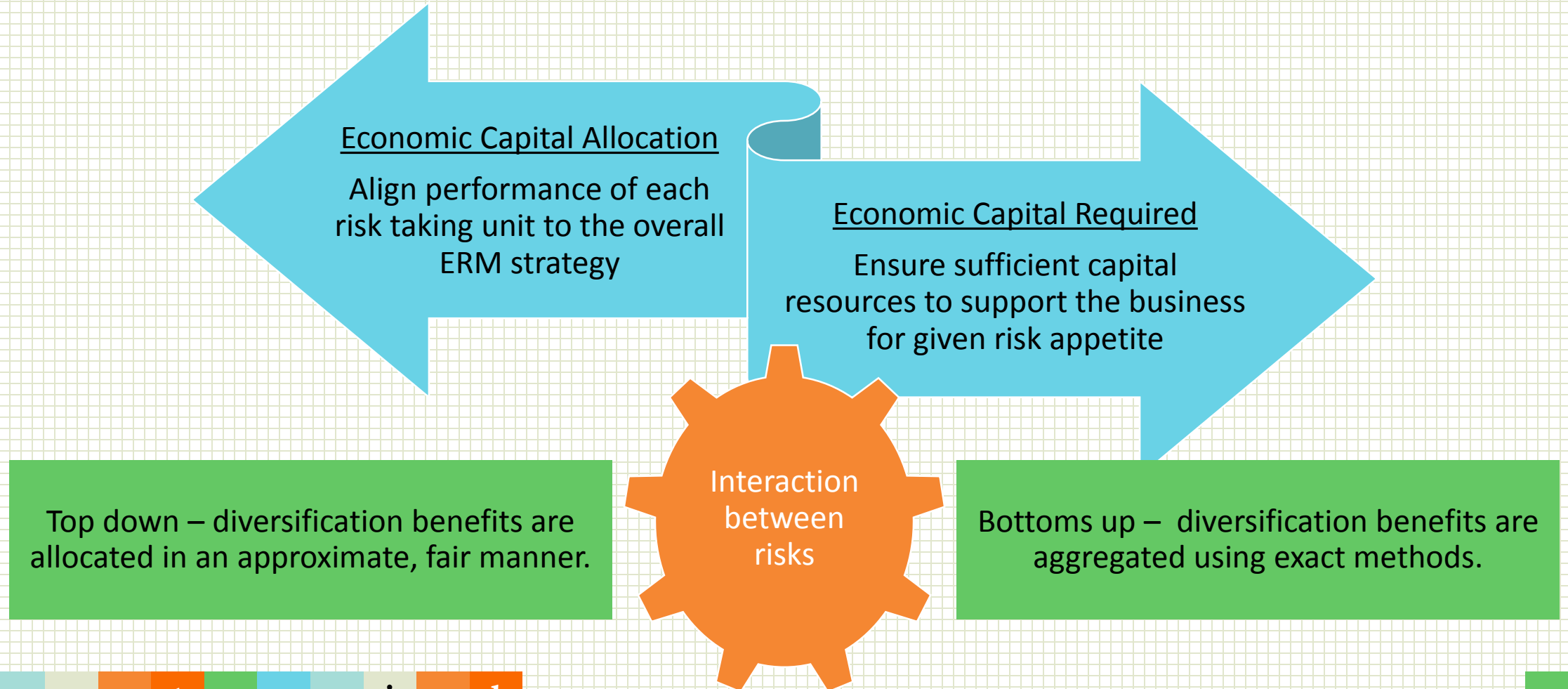
# Capital Allocation

## Economic Capital Approach

A common approach of allocating capital to each risk taking unit is by using the economic capital calculated for the risk taking unit.

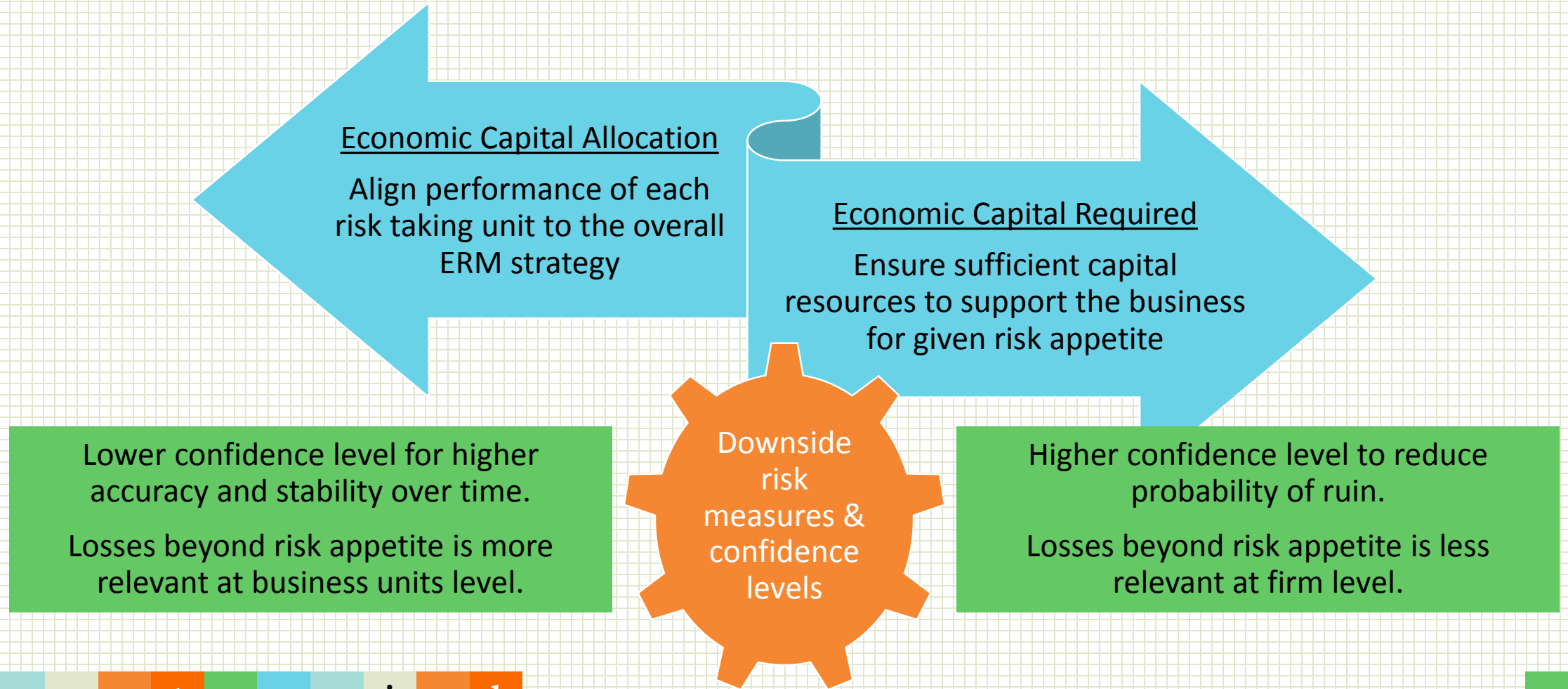


# Economic Capital Allocation Interaction Between Risks





# Economic Capital Allocation Downside Risk Measures & Confidence Levels



# Economic Capital Allocation Downside Risk Measures & Confidence Levels

Downside Risk Measure & Confidence Levels	VaR 99.5%	CVaR 99.5%	VaR 99.97%	CVaR 99.97%
Economic Capital for Unit A	56	67	68	78
Economic Capital for Unit B	42	45	48	49
Total	98	112	116	127
% Firm's Capital Allocated to Unit A	57%	60%	58%	61%
% Firm's Capital Allocated to Unit B	43%	40%	42%	39%

Whilst the results of using different downside risk measures and confidence levels are probably spurious, it is clear that different management units would have different preferences.

# Economic Capital Allocation

## Some Technical Considerations

Effect of financial year and underwriting year. The effect is negligible for stable portfolios but would need to be adjusted should the portfolio shifts.

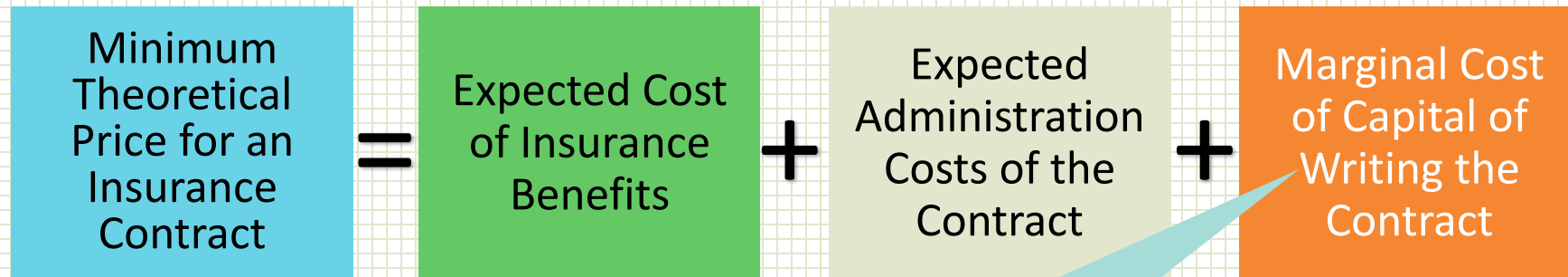
Gross or net or reinsurance. This determines how value creation in reinsurance will be measured. Similarly for exchange rate and other systematic impacts.

Splitting investment risks from underwriting portfolio. Technical liabilities are assumed to be matched in duration and currency, leaving mismatched investment risks.

Forward looking strategic directions from management as model assumptions are calibrated with historical data.

Oversight from independent functions, as well as expert judgment and professionalism during execution to ensure appropriate governance.

# Application of Capital Allocation Pricing



Cost of capital for the entire contract duration and not just the year of underwriting.

The runoff profile of the capital needs to be projected.

# Application of Capital Allocation Pricing

A pragmatic approach would be to allocate capital to new business in a manner proportional to existing business.

$$\begin{array}{ccccccc} \text{Marginal Cost} & = & \text{Firm's Required} & \times & \text{Capital} & \times & \text{Marginal Risk} & \div & \text{Total Risk} \\ \text{of Capital for} & & \text{Return on} & & \text{Allocated to} & & \text{Exposure for} & & \text{Exposure for} \\ \text{Risk Taking} & & \text{Capital} & & \text{Risk Taking} & & \text{Risk Taking} & & \text{Risk Taking} \\ \text{Unit } i & & & & \text{Unit } i & & \text{Unit } i & & \text{Unit } i \end{array}$$

The robustness of this approach depends on:

1. Size of the business being priced
2. Nature of the risk of the business being priced
3. Expertise and professionalism of risk taking unit

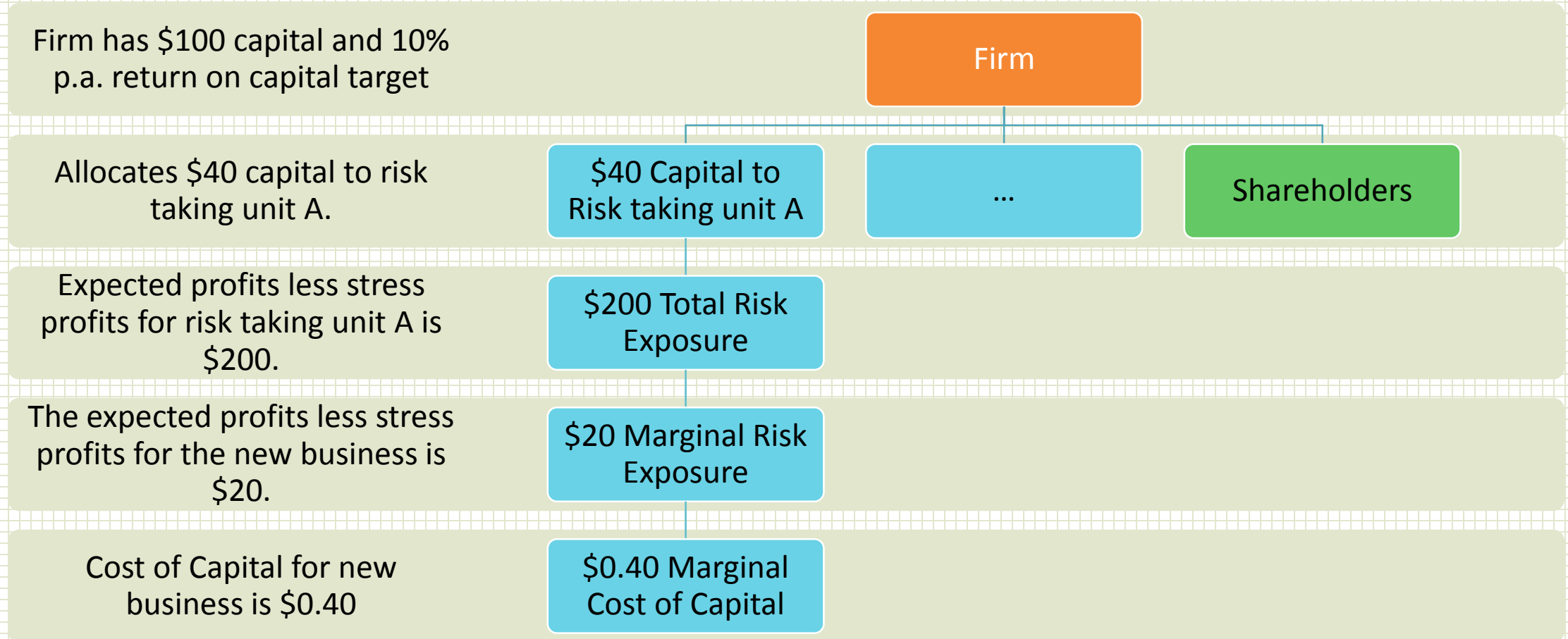
This assumes all risks within the same risk taking unit are homogenous with respect to the risk exposure

# Application of Capital Allocation Pricing

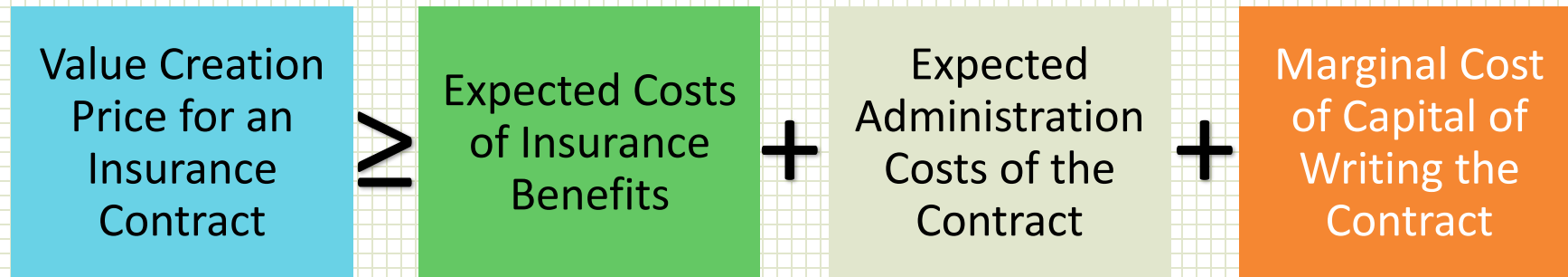
- The risk exposure measure needs to be a risk currency that:
- Reflects the amount and nature of the marginal unit of risk
- Is easy to implement in daily pricing operations

One commonly used risk exposure measure would be the expected profits less stressed profits.

# Application of Capital Allocation Pricing



# Application of Capital Allocation Pricing



Else, decline business and “return” capital.



# Application of Capital Allocation Performance Measurement

$$\text{Performance of Risk Taking Unit } i = \frac{\text{Return Earned by Risk Taking Unit } i}{\text{Capital Allocated to Risk Taking Unit } i}$$

Outperformance possible where:

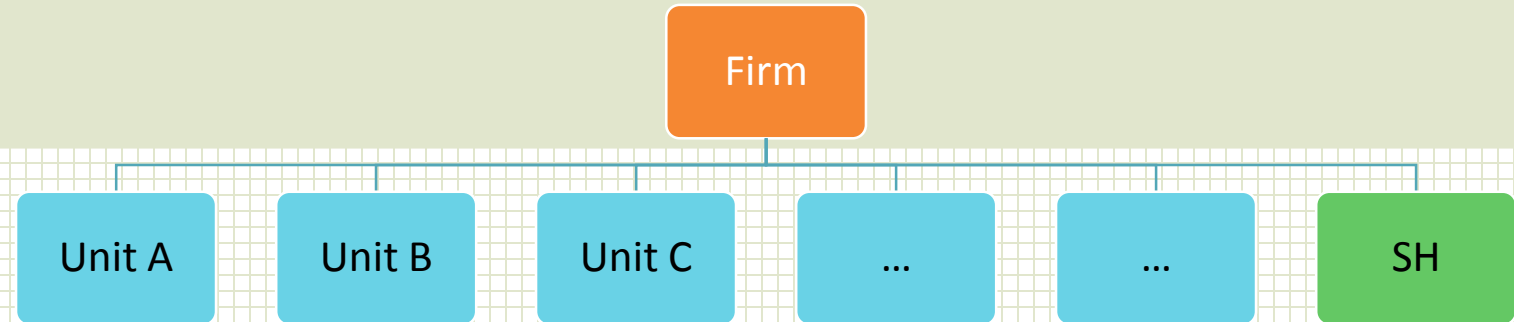
Price charged exceeds expected benefits, expenses and cost of capital

Volume of business higher than expected

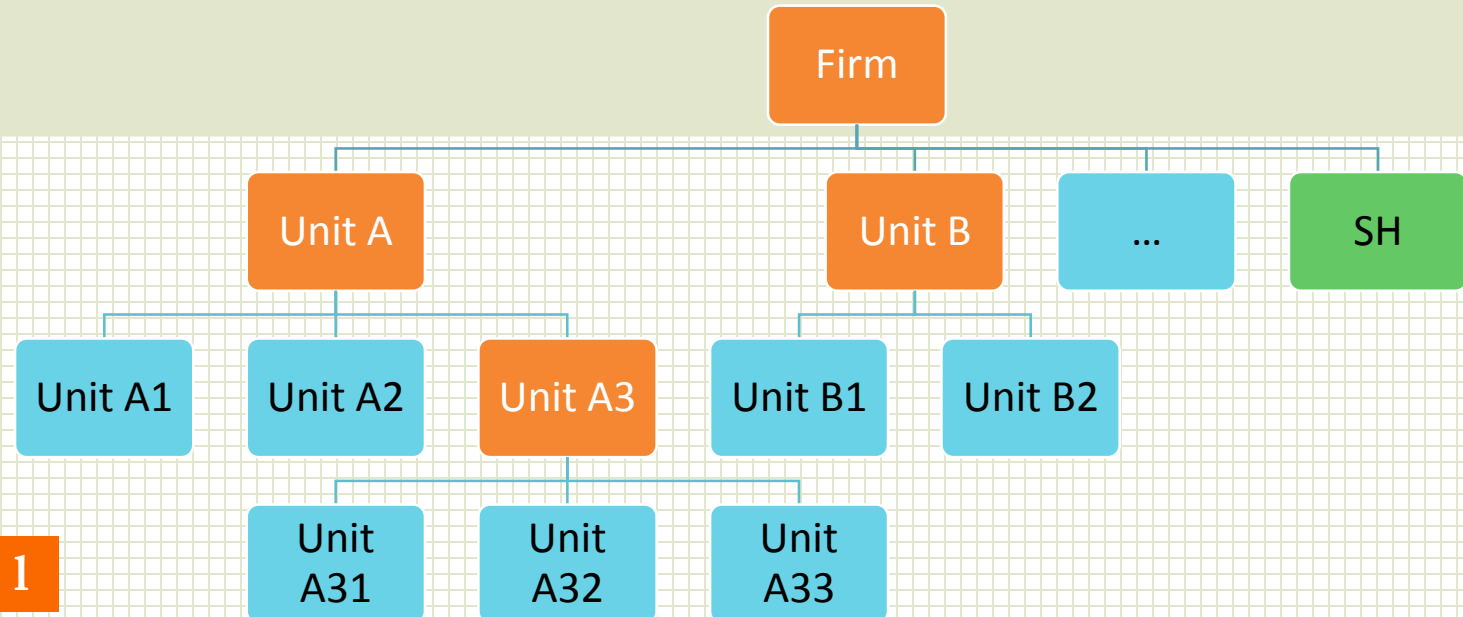
# Application of Capital Allocation

## Cross Subsidy between Business Units

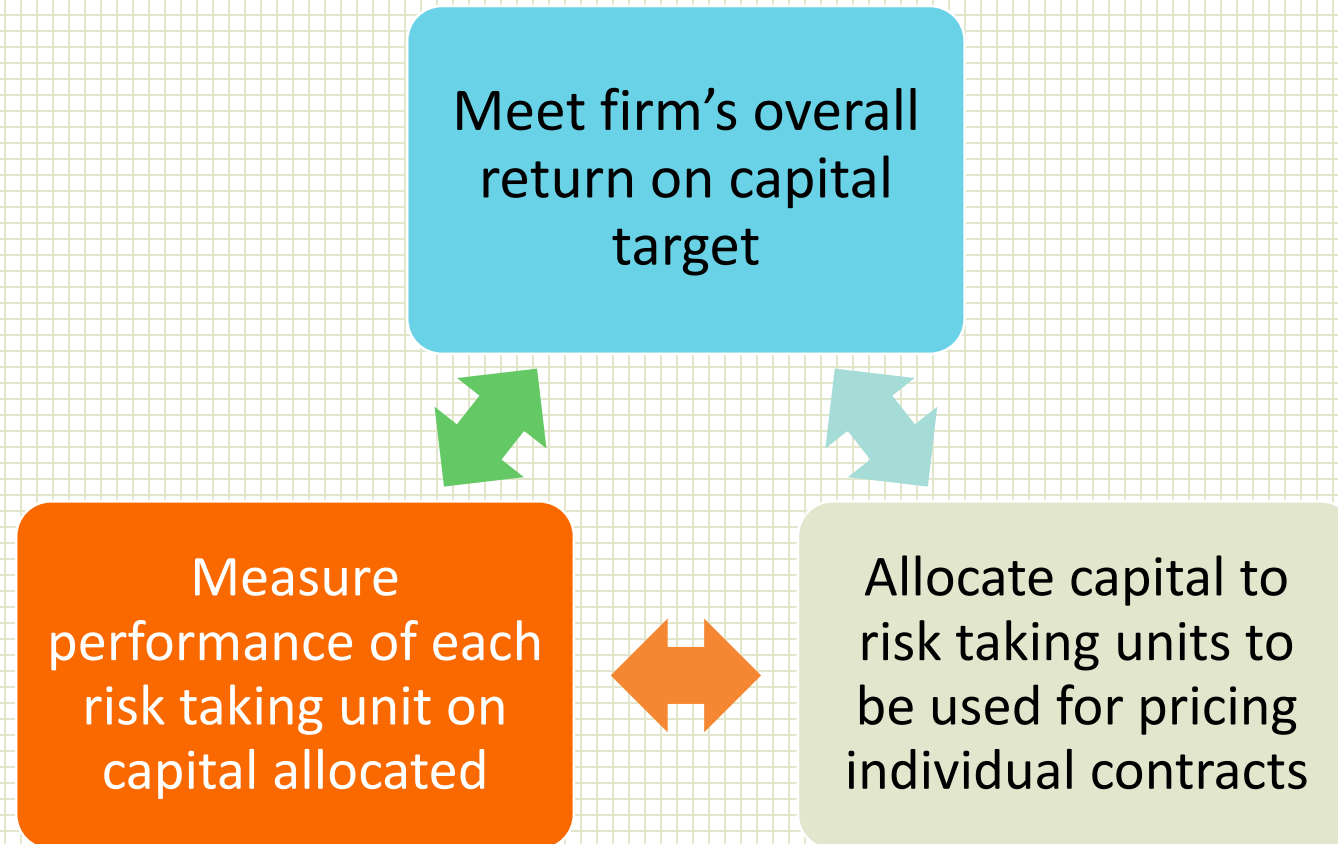
Centralised Model



Decentralised Model



# Recap



Singapore Actuarial Society Enterprise Risk Management Conference 2015  
Creating Value in an Evolving Landscape in Asia  
3<sup>rd</sup> to 4<sup>th</sup> September 2015 @ Equarius Hotel, Sentosa Singapore

Thank you!

Nicholas Yeo Chee Lek FIA FASM FSA  
Founder & Actuary | Nicholas Actuarial Solutions  
Chief | AP College | Actuarial Partners Consulting  
Consulting Actuary | Sunway University Business School

n - a c t u a r i a l