

Agenda

1 **Setting the Context**

- Meaning of Reserves – CAs & Insurer
- Premium to Profit – Typical P&L elements
- Different Types of Reserves

2 **Methods of Estimating Reserves**

- Flow of Reserves
- Premium Reserves
- Claims Reserves

3 **How it affects Financials**

- Effects of Reserving
- Examples of Reserving and Financials
- Final Word

Meaning of Reserves – CAs & Insurer

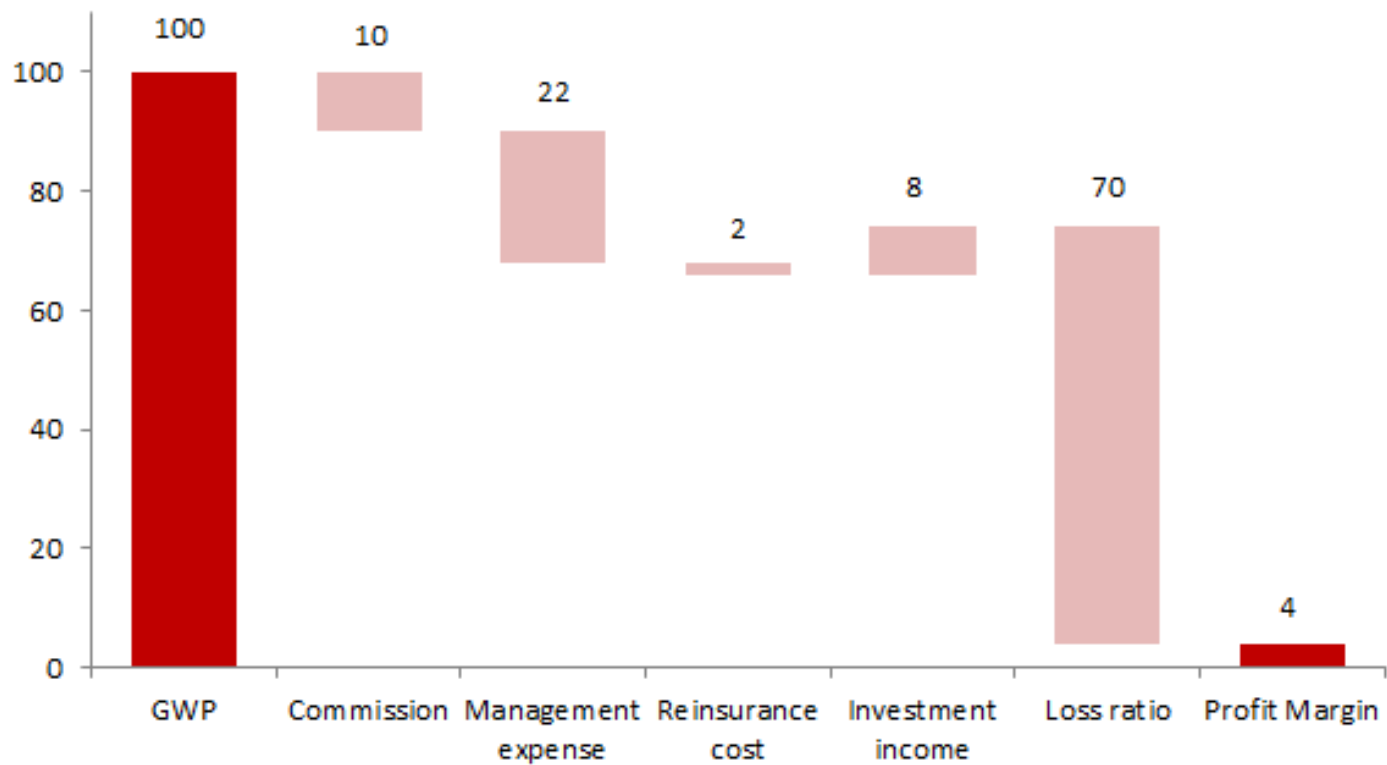
Chartered Accountant's Understanding of Reserve

- Appropriation of Profit

General Insurer / Actuary's Understanding of Reserve

- Charge to Profit

Premium to Profit – Typical P&L Elements



Different Types of Reserves

- Unearned Premium Reserve – UPR
- Premium Deficiency Reserve – PDR
- Incurred but not reported – IBNR
- Incurred but not enough reported – IBNER
- Case Estimates / Reserve
- Catastrophe Reserve – Cat Reserve

Agenda

1 Setting the Context

- Meaning of Reserves – CAs & Insurer
- Premium to Profit – Typical P&L elements
- Different Types of Reserves

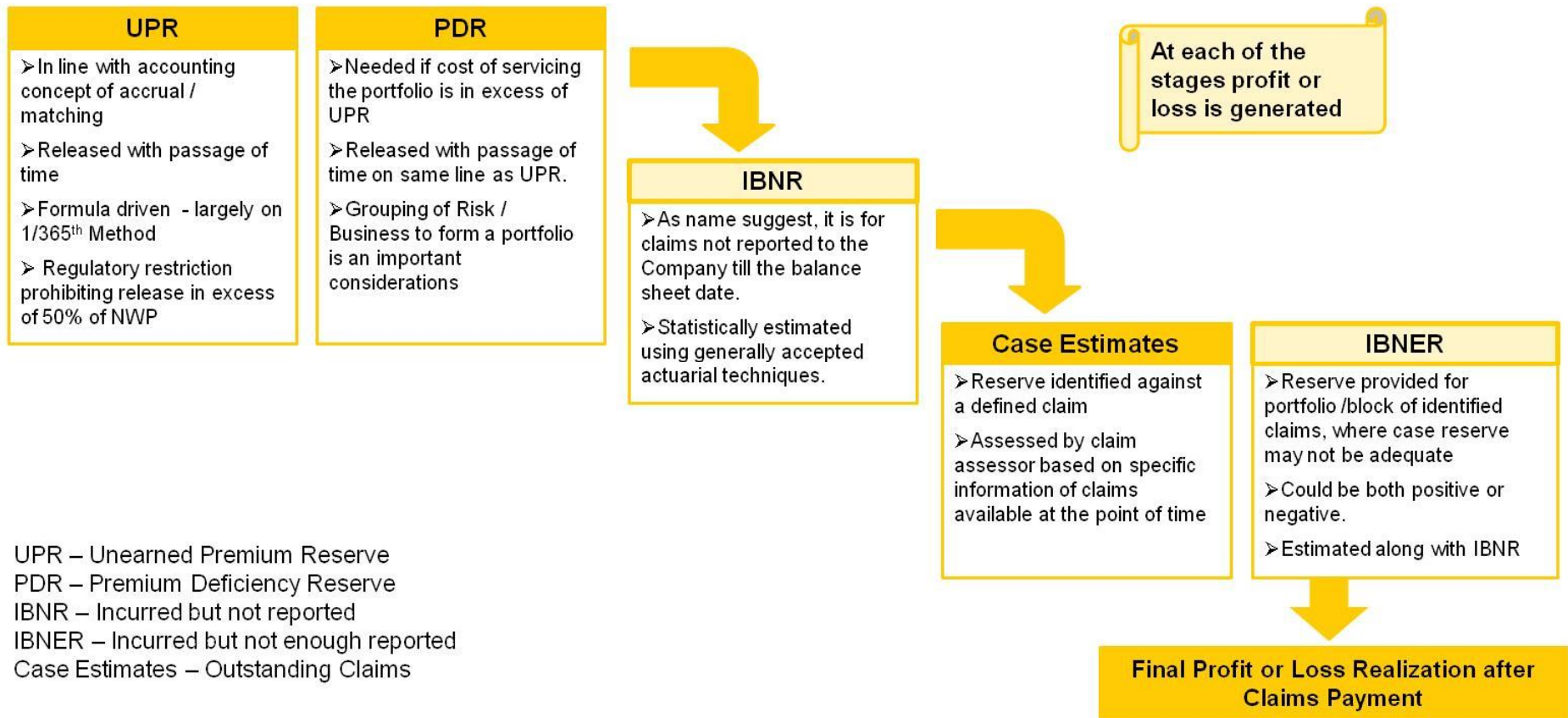
2 Methods of Estimating Reserves

- Flow of Reserves
- Premium Reserves
- Claims Reserves

3 How it affects Financials

- Effects of Reserving
- Examples of Reserving and Financials
- Final Word

Flow of Reserves



UPR – Unearned Premium Reserve
 PDR – Premium Deficiency Reserve
 IBNR – Incurred but not reported
 IBNER – Incurred but not enough reported
 Case Estimates – Outstanding Claims

Premium Reserves – UPR



Uniform Earning Pattern

- 1/365th Method
- 1/24th Method
- 1/8th Method

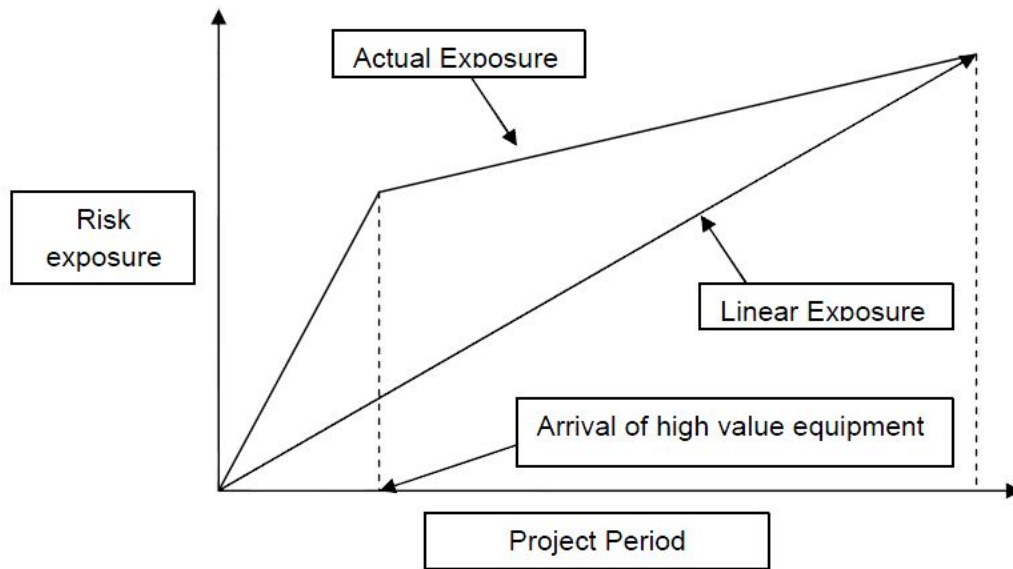
Marine Insurance

- Specific Cargo Policies
- Open policies & Open Covers

Uneven Earning Pattern

- Extended Warranty
- EAR / CAR

UPR Calculations for EAR / CAR

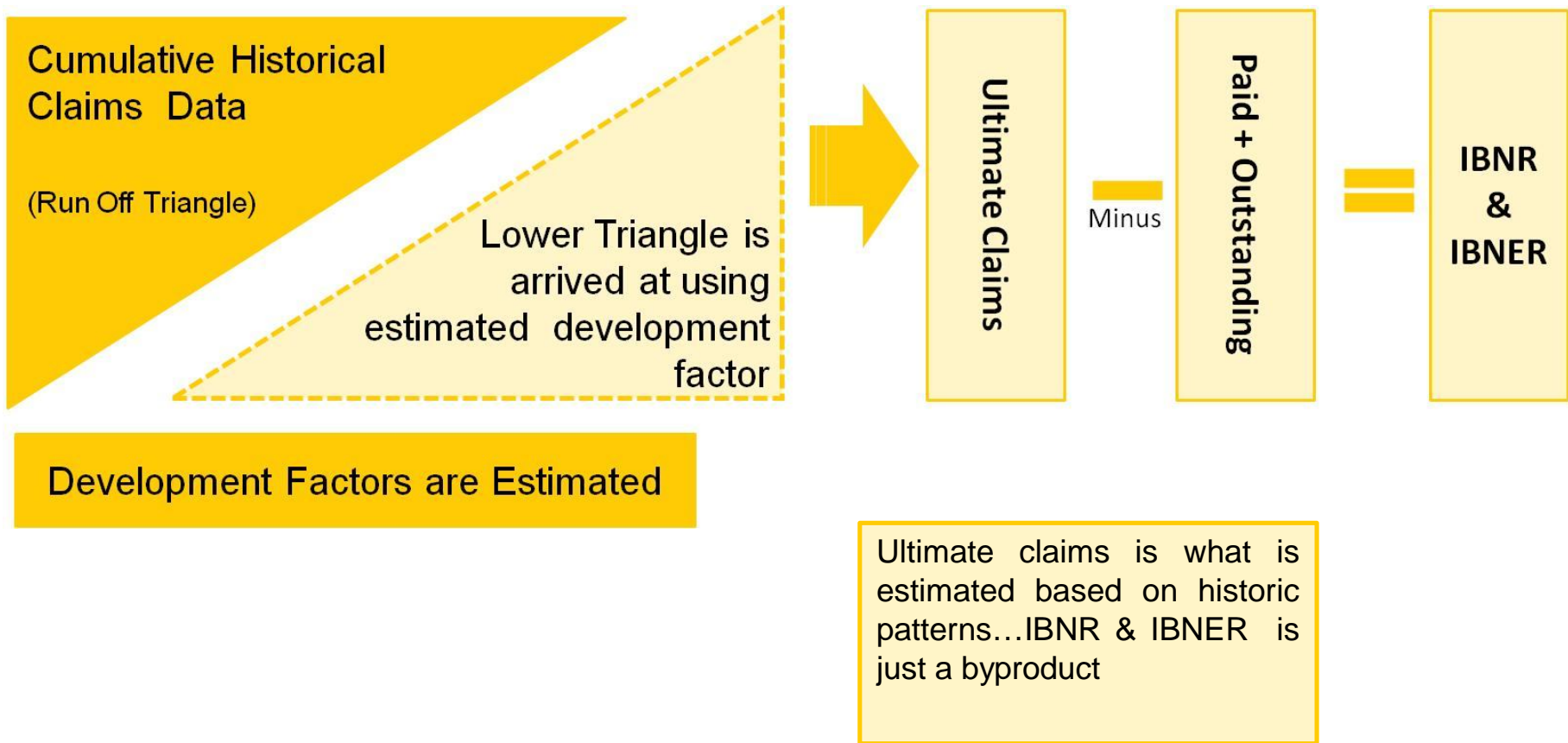


Important to Understand the risk Exposure

Policy Characteristics

- Generally more than One year Policy Term
- Exposure is steadily increasing
- More commonly used = 1/365th Method

IBNR Estimation – Overall Process



Chain Ladder Method – Primary Reserving Tool for IBNR/ IBNER



Historical Cumulative Claims Paid Data from Transaction System							
		Financial Year					
		2008	2009	2010	2011	2012	2013
Accident Cohort	2008	100	225	394	650	975	1,218
	2009		400	920	1,610	2,657	5,313
	2010			600	1,410	2,468	5,305
	2011				750	1,800	4,050
	2012					900	2,610
	2013						1,500
	2013						

Chain Ladder Δ of Cumulative Claims Paid							
		Development Period					
		0	1	2	3	4	5
Accident Cohort	2008	100	225	394	650	975	1,218
	2009	400	920	1,610	2,657	5,313	
	2010	600	1,410	2,468	5,305		
	2011	750	1,800	4,050			
	2012	900	2,610				
	2013	1,500					
	2013	1,500					

Development Factors (DF) from run off Δ							
		Development Factors					
		0-1	1-2	2-3	3-4	4-5	
Accident Cohort	2008		2.250	1.750	1.650	1.500	1.250
	2009		2.300	1.750	1.650	2.000	
	2010		2.350	1.750	2.150		
	2011		2.400	2.250			
	2012		2.900				
	2013						
	2013						

Development Factors						
Individual DF		2.440	1.875	1.817	1.750	1.250
Cumulative DF		18.181	7.451	3.974	2.188	1.250

- ### Different Matrices
- Claims paid (Gross / Net)
 - Claims Incurred (Gross/ Net)
 - Claims Number
 - Avg Claim Cost
 -

- ### Different Cohort
- Underwriting Period
 - Accident occurrence
 - Reporting date

- ### Different Time Elements
- Development as time elapses (Horizontally)
 - Emerging Trend for every new accident cohort (Vertically)
 - Any financial year impact (Diagonally)

- ### Different Method
- Basic Chain ladder
 - BF Method (Bayesian)
 - Bootstrapping
 -

- Simple Average
- Weighted Average
- Geometric Mean
- Curve fitting

Other Elements of Reserving and Methodology

- Premium Deficiency Reserve (PDR)
- Unexpired Risk Reserve (URR) – UPR + PDR
- Case Estimates

Flow of Reserves →

	1. UPR	2. PDR	3. IBNR & IBNER	4. Outstanding
Purpose	<ol style="list-style-type: none"> UPR is the reserve for unexpired portion of risk UPR is created immediately after premium is received 	<ol style="list-style-type: none"> PDR is created if the estimated ultimate claims is greater than the UPR as at the Reserving date PDR , <i>if required</i>, is created after estimating the Ultimate Claims & IBNR 	<ol style="list-style-type: none"> Estimated for the losses that have not yet been reported as at the Reserving date. When claims get reported this moves to Outstanding Reserve and eventually gets paid. 	<ol style="list-style-type: none"> Outstanding reserve is created when a claim is reported Is an estimate since the actual losses are most likely not known when a loss is intimated.
Approach	<ol style="list-style-type: none"> Is calculated by apportioning the written premium to the actual number of unexpired days as at the Reserving date Generally this approach is termed as 1/365ths method 	<ol style="list-style-type: none"> Ultimate claims is first estimated and the ULR is known (ULR = Ultimate Claims / Earned Premium) PDR is calculated by multiplying the Expected ULR above 100% by the UPR 	<ol style="list-style-type: none"> Is estimated on a historic aggregate claims basis Generally accepted methods include Basic Chain Ladder, BF, Cape Cod; stochastic modeling can also be performed 	<ol style="list-style-type: none"> Is estimated on a individual claims basis No standardised formula/approach for estimating this; requires professional judgment
Estimated by	Actuaries	Actuaries	Actuaries	Claims/Loss Assessors

Agenda

1 Setting the Context

- Meaning of Reserves – CAs & Insurer
- Premium to Profit – Typical P&L elements
- Different Types of Reserves

2 Methods of Estimating Reserves

- Flow of Reserves
- Premium Reserves
- Claims Reserves

3 How it affects Financials

- Effects of Reserving
- Examples of Reserving and Financials
- Final Word

Effects of Reserving

Over Reserving

First Order Impact

1. Worsen apparent profitability; cause lack of SH confidence
2. Reduce solvency margin
3. Possibly causing problems regulatory / rating agencies
4. Reduce overall returns to SH

Second Order Impact

1. Increase in Premium rates
2. Lack competitiveness in product pricing
3. Delay payment of taxes

Comments

1. Over reserving happens when the actual claims paid are less than the estimated reserves (outstanding + IBNR)
2. Mostly because of a conservative outlook of the future
3. Prudent reserving is desirable to withstand seasonal swings and catastrophes

Under Reserving

First Order Impact

1. Could lead to shortfall of funds and inability to meet liabilities as they become due
2. Speed up the payment of taxes and dividends
3. Lower solvency capital; higher solvency margin

Second Order Impact

1. Reduction in premium rates
2. Untimely capital requirement
3. Serious regulatory implications

Comments

1. Under reserving happens when the actual claims paid are more than the estimated reserves (outstanding + IBNR)

Examples of Reserving...

- Indian Third Party Motor Pool – needed additional INR 100 Billion of Capital Infusion

Examples of Reserving...Disclosure by a US insurer



	Calendar year							
	2007	2008	2009	2010	2011	2012	2013	2014
Provision for losses and loss adjustment expenses	14,843.2	14,467.2	14,504.8	16,049.3	17,232.2	19,648.8	19,212.8	17,749.1
Less: CTR Life ⁽¹⁾	21.5	34.9	27.6	25.3	24.2	20.6	17.9	15.2
	14,821.7	14,432.3	14,477.2	16,024.0	17,208.0	19,628.2	19,194.9	17,733.9
Cumulative payments as of:								
One year later	3,167.8	3,136.0	3,126.6	3,355.9	3,627.6	4,323.5	4,081.1	
Two years later	5,130.8	5,336.4	5,307.6	5,441.4	6,076.7	7,153.1		
Three years later	6,784.9	7,070.7	6,846.3	7,063.1	7,920.3			
Four years later	8,124.6	8,318.7	7,932.7	8,333.3				
Five years later	9,079.0	9,189.1	8,936.9					
Six years later	9,730.6	10,039.4						
Seven years later	10,458.1							
Reserves re-estimated as of:								
One year later	14,420.4	14,746.0	14,616.0	15,893.8	17,316.4	19,021.2	18,375.6	
Two years later	14,493.8	14,844.4	14,726.6	15,959.7	17,013.6	18,529.4		
Three years later	14,579.9	14,912.4	14,921.6	15,705.6	16,721.0			
Four years later	14,679.5	15,127.5	14,828.9	15,430.4				
Five years later	14,908.6	15,091.0	14,663.1					
Six years later	14,947.2	15,011.7						
Seven years later	14,964.2							
Favourable (unfavourable) development	(142.5)	(579.4)	(185.9)	593.6	487.0	1,098.8	819.3	
Comprised of – favourable (unfavourable):								

Examples of Reserving...

➤ Audit Practices in other Jurisdictions

Final Word....

To Under-reserve it to Under-Price

- By Warren Buffet



$$E[T^*(V=0)] = \begin{cases} \frac{V_0}{|\alpha|} & \text{if } \alpha < 0 \\ \infty & \text{if } \alpha \geq 0 \end{cases}$$

$$E[T^*(V=0)] = \begin{cases} \frac{V_0}{|\alpha|} & \text{if } \alpha < 0 \\ \infty & \text{if } \alpha \geq 0 \end{cases}$$

$$\begin{aligned} Cov(\hat{\beta}_1, \hat{\beta}_2) &= \text{plim}_{N \rightarrow \infty} \left[\left(\frac{\sum_{i=1}^N X_{1i}^2}{N} \right)^{-1} \left(\frac{\sum_{i=1}^N X_{1i} X_{2i}}{N} \right) \right. \\ &\quad \left. \times \left(\frac{\sum_{i=1}^N X_{2i}^2}{N} \right)^{-1} \right] \\ &= (\sigma_X^2)^{-2} \text{plim}_{N \rightarrow \infty} \left[\left(\frac{\sum_{i=1}^N X_{1i} X_{2i}}{N} \right) \left(\frac{\sum_{i=1}^N X_{2i}^2}{N} \right)^{-1} \right] \\ &= (\sigma_X^2)^{-2} \frac{N \rho_X \sigma_X^2 \rho_X \sigma_X^2}{N^2} \\ &= \frac{\rho_X \rho_X \sigma_X^2}{N \sigma_X^2} \end{aligned}$$

Any Questions...