Reading: Klann.ReinsComm (Klann - practice 01) a-Question
Model: 2016.Spring #27
Problem Type: mutually beneficial commutation price

Given

gross paid loss	4.1	
gross reserves (case + IBNR)	4.9	
gross discounted reserves (case + IBNR)	3.6	<== *economic discount*
ceded paid loss	0.4	
ceded reserves (case + IBNR)	2.5	
ceded discounted reserves (case + IBNR)	1.8	<== *economic discount*

The following discount factors are for **tax purposes**:

	primary insurer	reinsurer	
average discount factor	0.840	0.860	<== *for statutory discounting*
tax rate	31%	17%	

The reinsurer's assumed losses equal the primary insurer's ceded losses

Calculate range of the mutually beneficial commutation price (if possible)

We need to solve these 2 inequalities for 'price' and HOPE that the solution ranges overlap.
(If the solution ranges do NOT overlap then there is no MUTUALLY beneficial commutation price)

(A)	price	-	$_pR^-_c$	+	$_pT$	>	0	<== *for primary insurer*
(B)	- price	+	$_{re}R^-_g$	+	$_{re}T$	>	0	<== *for reinsurer*

Now:

$_pR^-_c$ = 1.8 <== *use company discounted reserves (economic value)*

$_{re}R^-_g$ = 1.8 <== *use company discounted reserves (economic value)*

For the primary insurer:

$_pT$ = tax rate x (decrease in taxable income for primary insurer)

= tax rate x (reserves commuted - price)

= 31% x (2.100 - price)

where: reserves commuted

= undiscounted ceded reserves x discount factor <== *tax discounting*

= 2.5 x 0.840

= 2.100

Using these values to solve inequality **(A)** gives: price > 1.665 <== for *insurer's benefit*

And a similar calculation for the reinsurer is as follows:

$_{re}T$ = tax rate x (decrease in taxable income for primary insurer)

= tax rate x (-reserves commuted + price)

= 17% x (-2.150 + price)

where: -reserves commuted

= - undiscounted ceded reserves x discount factor <== *tax discounting*

= -2.5 x 0.860

= -2.150

Using these values to solve inequality **(B)** gives: price < 1.728 <== for re*insurer's benefit*

Final price range: (1.665 , 1.728)

Reading: Klann.ReinsComm (Klann - practice 02) a-Question
Model: 2016.Spring #27
Problem Type: mutually beneficial commutation price

Given

gross paid loss	3.9	
gross reserves (case + IBNR)	4.9	
gross discounted reserves (case + IBNR)	3.4	<== *economic discount*
ceded paid loss	0.4	
ceded reserves (case + IBNR)	2.8	
ceded discounted reserves (case + IBNR)	2.5	<== *economic discount*

The following discount factors are for **tax purposes**:

	primary insurer	reinsurer	
average discount factor	0.850	0.890	<== *for statutory discounting*
tax rate	35%	18%	

The reinsurer's assumed losses equal the primary insurer's ceded losses

Calculate range of the mutually beneficial commutation price (if possible)

We need to solve these 2 inequalities for 'price' and HOPE that the solution ranges overlap.
(If the solution ranges do NOT overlap then there is no MUTUALLY beneficial commutation price)

(A)	price	-	$_pR^-_c$	+	$_pT$	>	0	<== *for primary insurer*
(B)	- price	+	$_{re}R^-_g$	+	$_{re}T$	>	0	<== *for reinsurer*

Now:

$_pR^-_c$ = 2.5 <== *use company discounted reserves (economic value)*

$_{re}R^-_g$ = 2.5 <== *use company discounted reserves (economic value)*

For the primary insurer:

$_pT$ = tax rate x (decrease in taxable income for primary insurer)

= tax rate x (reserves commuted - price)

= 35% x (2.380 - price)

where: reserves commuted

= undiscounted ceded reserves x discount factor <== *tax discounting*

= 2.8 x 0.850

= 2.380

Using these values to solve inequality **(A)** gives: price > 2.565 <== for *insurer's benefit*

And a similar calculation for the reinsurer is as follows:

$_{re}T$ = tax rate x (decrease in taxable income for primary insurer)

= tax rate x (-reserves commuted + price)

= 18% x (-2.492 + price)

where: -reserves commuted

= - undiscounted ceded reserves x discount factor <== *tax discounting*

= -2.8 x 0.890

= -2.492

Using these values to solve inequality **(B)** gives: price < 2.502 <== for re*insurer's benefit*

Final price range: (no overlap , no overlap)

Reading: Klann.ReinsComm (Klann - practice 03) a-Question
Model: 2016.Spring #27
Problem Type: mutually beneficial commutation price

Given

gross paid loss	4.2
gross reserves (case + IBNR)	5.4
gross discounted reserves (case + IBNR)	3.3
ceded paid loss	0.5
ceded reserves (case + IBNR)	2.9
ceded discounted reserves (case + IBNR)	1.8

<== *economic discount*

<== *economic discount*

The following discount factors are for **tax purposes**:

	primary insurer	reinsurer
average discount factor	0.880	0.870
tax rate	34%	18%

<== *for statutory discounting*

The reinsurer's assumed losses equal the primary insurer's ceded losses

Calculate range of the mutually beneficial commutation price (if possible)

We need to solve these 2 inequalities for 'price' and HOPE that the solution ranges overlap.
(If the solution ranges do NOT overlap then there is no MUTUALLY beneficial commutation price)

(A)	price	-	${}_{p}\bar{R}_{c}$	+	${}_{p}T$	>	0	<== *for primary insurer*
(B)	- price	+	${}_{re}\bar{R}_{g}$	+	${}_{re}T$	>	0	<== *for reinsurer*

Now:

${}_{p}\bar{R}_{c}$	=	1.8	<== *use company discounted reserves (economic value)*
${}_{re}\bar{R}_{g}$	=	1.8	<== *use company discounted reserves (economic value)*

For the primary insurer:

${}_{p}T$	=	tax rate	x	(decrease in taxable income for primary insurer					)
	=	tax rate	x	(	reserves commuted	-	price		)
	=	34%	x	(	2.552	-	price		)

where: reserves commuted

=	undiscounted ceded reserves	x	discount factor	<== *tax discounting*
=	2.9	x	0.880	
=	2.552			

Using these values to solve inequality **(A)** gives: price > 1.413 <== for *insurer's benefit*

And a similar calculation for the reinsurer is as follows:

${}_{re}T$	=	tax rate	x	(decrease in taxable income for primary insurer					)
	=	tax rate	x	(	-reserves commuted	+	price		)
	=	18%	x	(	-2.523	+	price		)

where: -reserves commuted

=	- undiscounted ceded reserves	x	discount factor	<== *tax discounting*
=	-2.9	x	0.870	
=	-2.523			

Using these values to solve inequality **(B)** gives: price < 1.641 <== for re*insurer's benefit*

Final price range: (1.413 , 1.641)

Reading: Klann.ReinsComm (Klann - practice 04) a-Question
Model: 2016.Spring #27
Problem Type: mutually beneficial commutation price

Given

gross paid loss	3.7	
gross reserves (case + IBNR)	4.6	
gross discounted reserves (case + IBNR)	3.6	<== *economic discount*
ceded paid loss	0.7	
ceded reserves (case + IBNR)	2.9	
ceded discounted reserves (case + IBNR)	2.1	<== *economic discount*

The following discount factors are for **tax purposes**:

	primary insurer	reinsurer	
average discount factor	0.860	0.810	<== *for statutory discounting*
tax rate	32%	18%	

The reinsurer's assumed losses equal the primary insurer's ceded losses

Calculate range of the mutually beneficial commutation price (if possible)

We need to solve these 2 inequalities for 'price' and HOPE that the solution ranges overlap.
(If the solution ranges do NOT overlap then there is no MUTUALLY beneficial commutation price)

(A)	price	-	$_pR^-_c$	+	$_pT$	>	0	<== *for primary insurer*
(B)	- price	+	$_{re}R^-_g$	+	$_{re}T$	>	0	<== *for reinsurer*

Now:

$_pR^-_c$ = 2.1 <== *use company discounted reserves (economic value)*

$_{re}R^-_g$ = 2.1 <== *use company discounted reserves (economic value)*

For the primary insurer:

$_pT$ = tax rate x (decrease in taxable income for primary insurer)

= tax rate x (reserves commuted - price)

= 32% x (2.494 - price)

where: reserves commuted

= undiscounted ceded reserves x discount factor <== *tax discounting*

= 2.9 x 0.860

= 2.494

Using these values to solve inequality **(A)** gives: price > 1.915 <== for *insurer's benefit*

And a similar calculation for the reinsurer is as follows:

$_{re}T$ = tax rate x (decrease in taxable income for primary insurer)

= tax rate x (-reserves commuted + price)

= 18% x (-2.349 + price)

where: -reserves commuted

= - undiscounted ceded reserves x discount factor <== *tax discounting*

= -2.9 x 0.810

= -2.349

Using these values to solve inequality **(B)** gives: price < 2.045 <== for re*insurer's benefit*

Final price range: (1.915 , 2.045)