

PERFORMANCE MANAGEMENT DATA RETURN

RENEWAL SCENARIO EXAMPLES

2017

V1.0

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These illustrative examples are provided to demonstrate how to report pricing data in the PMDR format. In all cases the data to assess the price changes is given and the examples show how to report the price changes to Lloyd's. The examples cover different classes of business to demonstrate the principles of identifying the underlying components of price change. Although the details may differ by class of business, the same concept applies to all lines.

Basics of mapping data to PMDR renewal fields

Example 1

Expiring Terms 1 hotel, Fire and flood cover @ £100 Gross Written Premium per hotel.								
Change of Terms Flood cover removed worth -£20 Gross Written Premium on expiring premium terms.								
Current Terms 1 hotel, Fire cover only @ £90 Gross Written Premium per hotel.								
Acq Costs Acquisition costs are 30% of Gross Written Premium on expiry and renewal								
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
100	-30	+0	-20	+0	+10	90	-27	-24
						Net RARC =		12.5%
						Gross RARC =		12.5%

The -£20 change per hotel for the removal of flood cover, which on expiring terms (one hotel) is worth -£20, relates to an adjustment of peril and is recorded in the change due to change in breadth of cover (field 190).

So the expected premium this year on last year's pricing basis is £80 (£100 + £0 + -£20 + £0). Since £90 is received, the change due to pure rate change is +£10 (£90 - £80).

Example 2

Expiring Terms 1 hotel, Fire and flood cover @ £100 Gross Written Premium per hotel.								
Change of Terms Flood removed worth -£40 Gross Written Premium. Deductible change of +£50 Gross Written Premium on expiring premium terms.								
Current Terms 1 hotel, Fire cover only and adjusted Deductible @ £90 Gross Written Premium per hotel.								
Acq Costs Acquisition costs are 30% of Gross Written Premium on expiry and renewal								
Expiring 100% Gross Written Premium Written	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Written Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Written Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Written Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
100	-30	+50	-40	+0	-20	90	-27	-33
						Net RARC =		-18.2%
						Gross RARC =		-18.2%

The change due to change in deductible is worth +£50 per hotel, which on expiring terms (one hotel) is worth +£50. The change due to change in breadth of cover is worth -£40 per hotel, which on expiring terms (one hotel) is worth -£40.

So the expected premium this year on last year's pricing basis is £110 (£100 + £50 + -£40 + £0). Since £90 is received, the change due to pure rate change is -£20 (£90 - £110).

Example 3

Expiring Terms	1 hotel, Fire and flood cover @ £100 Gross Written Premium per hotel.							
Change of Terms	9 more identical hotels added.							
Current Terms	10 hotels, Fire and flood cover @ £100 Gross Written Premium per hotel.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
100	-30	+0	+0	+900	+0	1,000	-300	-300
						Net RARC =		0.0%
						Gross RARC =		0.0%

There are no changes in deductible or in perils covered.

Last year £100 (£100 + £0 + £0) would have been charged for one hotel on this year's terms. Nine hotels are added at last year's price; hence there is a change due to other factors worth $9 * £100 = +£900$.

So the expected premium this year on last year's pricing basis is £1000 (£100 + £0 + £0 + £900). Since £1000 is received, the change due to pure rate change is +£0 (£1000 – £1000).

Change of brokerage

Example 1

Expiring Terms	£100 Gross Written Premium Charged with £20 brokerage.							
Change of Terms	No changes in terms in conditions other than increase in brokerage to £25.							
Current Terms	£100 Gross Written Premium Charged with £25 brokerage.							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
100	-20	+0	+0	+0	+0	100	-25	-20
						Net RARC =		-6.3%
						Gross RARC =		0.0%

The 'change' fields in PMDR are captured as Gross Written Premium (GWP) amounts, i.e. premium including acquisition costs and brokerage. Since the contract is renewed with no changes in GWP, or in terms and conditions, but with an increase in brokerage, gross RARC is zero. However, gross net RARC is negative due to the increase in brokerage.

Example 2

Expiring Terms	£100 Gross Written Premium Charged with £20 brokerage.							
Change of Terms	No changes in terms in conditions other than increase in brokerage to £25.							
Current Terms	£105 Gross Written Premium Charged with £25 brokerage.							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
100	-20	+0	+0	+0	+5	105	-25	-20
						Net RARC =		0.0%
						Gross RARC =		5.0%

There are no changes in terms and conditions so; the expected premium on last year's pricing basis is £100. Since £105 is received, the change due to pure rate change is +£5 (£105-£100) and this would lead a positive gross RARC. However, gross net RARC is zero as gross net premium received and gross net premium expected on last year's pricing basis are the same (£105-£25=£100-£20).

Example 3

Expiring Terms	£100 Gross Written Premium Charged with £20 brokerage.							
Change of Terms	No changes in terms in conditions other than increase in brokerage to £25.							
Current Terms	£120 Gross Written Premium Charged with £25 brokerage.							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
100	-20	+0	+0	+0	+20	120	-25	-20
						Net RARC =		18.8%
						Gross RARC =		20.0%

There are no changes in terms and conditions. The change due to pure rate change is +£20 (£120-£100) which gives a positive gross RARC. Since gross net premium received is higher than gross net premium expected on last year's pricing basis, gross net RARC is positive.

Expiring premium basis for fields 180 to 200

Example 1

Expiring Terms	1 hotel, fire and flood cover @ £100 Gross Written Premium per hotel.							
Change of Terms	9 new hotels added. Deductible change worth +£15 Gross Written Premium per hotel, fire cover removed worth -£20 Gross Written Premium per hotel (on expiring risk).							
Current Terms	10 hotels, flood cover only @ £100 Gross Written Premium per hotel.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
100	-30	+15	-20	+855	+50	1,000	-300	-285
						Net RARC =		5.3%
						Gross RARC =		5.3%

The change due to change in deductible is worth +£15 per hotel, which on expiring terms (one hotel) is worth +£15. The fire cover removed (change due to change in breadth of cover) is worth –£20 per hotel, which on expiring terms (one hotel) is worth –£20.

Last year £95 (£100 + £15 + –£20) would have been charged for one hotel on this year's terms. Nine hotels are added on this year's terms on last year's pricing basis; hence there is a change due to other factors worth $9 * £95 = +£855$.

So the expected premium this year on last year's pricing basis is £950 (£100 + £15 + –£20 + £855). Since £1000 is received, the change due to pure rate change is +£50 (£1000 – £950) (which is also $(£100 – £95) * 10$).

Note that fields 180 and 190 are completed based on the expiring coverage of the policy. One hotel only was covered last year and so the changes recorded in 180 and 190 relate only to one hotel.

Example 2

Expiring Terms	10 hotels, fire and flood cover @ £100 Gross Written Premium per hotel.							
Change of Terms	9 new hotels removed. Deductible change worth +£15 Gross Written Premium per hotel, fire cover removed worth –£20 Gross Written Premium per hotel (on expiring risk).							
Current Terms	1 hotel, flood cover only @ £100 Gross Written Premium per hotel.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
1,000	-300	+150	-200	-855	+5	100	-30	-29
						Net RARC =		5.3%
						Gross RARC =		5.3%

The change due to change in deductible is worth £15 per hotel, which on expiring terms (ten hotels) is worth $10 * £15 = +£150$. The flood cover removed (change due to change in breadth of cover) is worth –£20 per hotel, which on expiring terms (ten hotels) is worth $10 * –£20 = –£200$.

Last year £95 (£100 + £15 + –£20) would have been charged for one hotel on this year's terms. Nine hotels are removed on this year's terms on last year's pricing basis; hence there is a change due to other factors worth $9 * –£95 = –£855$.

So the expected premium this year on last year's pricing basis is £95 (£1000 + £150 + –£200 + –£855). Since £100 is received, the change due to pure rate change is +£5 (£100 – £95).

No claims discount and profit commission

Example 1

Expiring Terms	A Gross Written Premium of £550 was charged for an E&O policy for a large law firm.							
Change of Terms	The terms, conditions and turnover associated with the policy remain the same but a profit commission is introduced. Between 0% to 15% of premium will be rebated depending on claims experience. The expected average rebate is 10%.							
Current Terms	A Gross Written Premium of £600 is charged (before rebate) for an E&O policy for a large law firm with a profit commission.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
550	-165	+0	+0	+0	-10	540	-162	-165
							Net RARC =	-1.8%
							Gross RARC =	-1.8%

A profit commission is introduced whereby up to 15% of the premium for the risk is rebated depending on the claims experience. When the risk is written, the claims outcome for the policy is unknown and so the actual premium net of the profit commission will be unknown. The best estimate that can be made is to take a view on the probability of a claim and estimate the average premium that would be received based on the expected claims. In this case, last year's expiring £550 gross written premium is expected to renew at £600 with an expected profit rebate of 10% making the expected renewed premium equal to £540. This corresponds to a change due to pure rate change of -£10 (£540 - £550).

Example 2

Expiring Terms	A motor policy charges £150 Gross Written Premium							
Change of Terms	Following a long period with a benign claims history, a 'no claims' discount is introduced. The premium is reduced by £20 Gross Written Premium. The policy terms, conditions, exposure and claims rates remain unchanged.							
Current Terms	A motor policy charges £130 Gross Written Premium.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
150	-45	+0	+0	+0	-20	130	-39	-45
							Net RARC =	-13.3%
							Gross RARC =	-13.3%

A 'no claims' discount is introduced where the loss ratio is below a given threshold. The introduction of the no claims discount reduces the premium for the same amount of claims. This corresponds to a change due to pure rate change of -£20 (£130 - £150).

Adjustment premiums

Example 1

Expiring Terms	£100 Gross Written Premium charged.							
Change of Terms	No changes in coverage terms or conditions. There was a claim last year and so a £10 additional Gross Written Premium is charged. This claim last year did not increase the likelihood of future claims on the contract.							
Current Terms	£110 Gross Written Premium charged.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
100	-30	+0	+0	+0	+10	110	-33	-30
						Net RARC =		10.0%
						Gross RARC =		10.0%

The poor claims experience from last year does not affect the expected claims for next year and hence the exposure fields 180 – 200 are all zero. So the expected premium this year on last year's pricing basis is £100 (£100 + £0 + £0 + £0). The additional £10 of premium is included within field 220 and there is a positive change due to pure rate change of +£10 (£110 – £100).

Example 2

Expiring Terms	£110 Gross Written Premium charged.							
Change of Terms	No changes in coverage terms or conditions. There were no claims last year and so the £10 additional Gross Written Premium was removed. No change in the likelihood of future claims on the contract compared to last year.							
Current Terms	£100 Gross Written Premium charged.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
110	-33	+0	+0	+0	-10	100	-30	-33
						Net RARC =		-9.1%
						Gross RARC =		-9.1%

This scenario is a year further on from the scenario in Example 1. The policy has been renewed again but as the claims experience has been benign, the adjustment premium has been dropped from the renewed premium. There is once again no change in the exposure fields 180 – 200 and the expected premium this year on last year's pricing basis is £110 (£110 + £0 + £0 + £0). The additional £10 of premium has been removed from field 220 and there is a negative change due to pure rate change of – £10 (£100 – £110).

Claims inflation

Example 1

Expiring Terms	A policy with a sum insured of £25,000 charges a Gross Written Premium of £175.							
Change of Terms	The sum insured remains at £25,000 and policy terms and conditions are unchanged. However, inflation data suggests costs of repairs have increased 15%.							
Current Terms	A policy with a sum insured of £25,000 charges a premium of £175 with 15% claims inflation.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in	Change in Expiring 100% Gross Written Premium Due to Change in	Change in Expiring 100% Gross Written Premium Due to Change in	Change in Expiring 100% Gross Written Premium Due to Pure Rate	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
175	-52.50	+0	+0	+26.25	-26.25	175	-52.50	-60
							Net RARC =	-13.0%
							Gross RARC =	-13.0%

The sum insured remains the same but for the same insured value the costs of repairs have increased 15%. This is equivalent to a change in underlying exposure of 15% of last year's premium which is a change due to other factors of +£26.25. So the expected premium this year on last year's pricing basis is £201.25 (£175 + £0 + £0 + £26.25). Since the price has not increased and £175 is received, there is a negative change due to pure rate change of -£26.25 (£175 - £201.25).

Example 2

Expiring Terms	A policy with a sum insured of £25,000 charges a gross premium of £175.							
Change of Terms	The sum insured remains at £25,000 and policy terms and conditions are unchanged. Claims inflation data suggests costs of repairs have increased 15% and so the premium is increased by £25.							
Current Terms	A policy with a sum insured of £25,000 charges a premium of £200. 15% claims inflation.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
175	-52.50	+0	+0	+26.25	-1.25	200	-60.00	-60
							Net RARC =	-0.6%
							Gross RARC =	-0.6%

The inflation and exposure are the same but in this case, the premium is increased to £200 and so the negative change due to pure rate change is smaller at -£1.25 (£200 - £201.25)

This illustrates that while the inflationary effect produces the same change due to other factors in both cases, the actual premium charged for the increased exposure determines the change due to pure rate change.

Example 3

Expiring Terms	A policy with a sum insured of £25,000 charges a premium of £175.							
Change of Terms	The sum insured decreases to £10,000 and policy terms and conditions are unchanged. Claims inflation data suggests costs of repairs have increased 15%. Premium is changed to £125.							
Current Terms	A policy with a sum insured of £10,000 charges a premium of £100. 15% claims inflation.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
175	-52.50	+0	+0	-94.50	+19.50	100	-30.00	-24
						Net RARC =	24.2%	
						Gross RARC =	24.2%	

The exposure is reduced (change due to other factors = $-\text{£}105 ((100-250)/250 * 175)$), while there is claims inflation on the remaining exposure (change due to other factors = $+\text{£}10.50 (0.15 * 70)$), giving a change due to other factors of $-\text{£}94.50 (-\text{£}105 + \text{£}10.50)$. So the expected premium this year on last year's pricing basis is $\text{£}80.50 (\text{£}175 + \text{£}0 + \text{£}0 + -\text{£}94.50)$. Since the premium is increased and $\text{£}100$ is received, there is a positive change due to pure rate change of $+\text{£}19.50 (\text{£}100 - \text{£}80.50)$.

Modelling changes

Example 1

Expiring Terms	A casualty policy charges a Gross Written Premium of £500.							
Change of Terms	Pricing model parameters are changed and the new model estimates that to maintain the same loss ratio, an additional £150 of premium should be charged. Market conditions will not support the increase and so the premium remains the same at £500.							
Current Terms	A casualty policy charges a premium of £500 with a revised pricing model.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
500	-150	+0	+0	+150	-150	500	-150	-195
						Net RARC =	-23.1%	
						Gross RARC =	-23.1%	

There has been a change in the calculation basis in the profit model so that to maintain the expected loss ratio from the expiring policy, the gross written premium needs to increase by £150. The premium charged did not increase and so the shortfall is reflected in the change due to pure rate change.

Example 2

Expiring Terms	A property portfolio's long term average earthquake claims are modelled at £100. Gross Written Premium charged is £230.							
Change of Terms	A new geological fault is discovered in the area. The revised model estimates an increase in expected claim costs from £100 to £120. Gross Written Premium charged is increased by £20.							
Current Terms	Gross Written Premium charged increased to £250 for £120 long term average modelled claims.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
230	-69	+0	+0	+46	-26	250	-75	-83
						Net RARC =	-9.4%	
						Gross RARC =	-9.4%	

There has been a change in the profit model's view on expected claims on renewal because new information on the risk has come to light. For the expiring contract, £230 was charged for £100 of expected claims giving a loss ratio of 43.5%. The expected claims exposure has increased by 20% from £100 to £120 and so the gross written premium equivalent change in exposure recorded in the change due to other factors is $£20 / £100 * £230 = £46$. The actual premium charged has increased by £20 so there is a $-£26$ change in the change due to pure rate change. Note that the change in claims is not directly reported in the change due to other factors as this would rate the new exposure with a 100% loss ratio when last year's loss ratio was 43.5%.

Limit and exposure changes

Example 1

Expiring Terms	A treaty with an excess of £5,000 and limit of £2,000 charges a Gross Written Premium of £200.							
Change of Terms	The limit of the treaty is changed from £2,000 to £4,000. The pricing model values this change as an additional £70 Gross Written Premium.							
Current Terms	A treaty with an excess of £5,000 and limit of £4,000 charges a Gross Written Premium of £400.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
200	-60	+70	+0	+0	+130	400	-120	-81
						Net RARC =	48.1%	
						Gross RARC =	48.1%	

There is a change in limit. The PMDR specification requires changes in limit, deductible and attachment point to be reported in change due to change in deductible. The change in limit could also be regarded as a change in exposure but it should not be reported in change due to other factors in addition to change due to change in deductible. It should be accounted for only once. The overall change in premium is significantly larger than the change due to the limit adjustment and so there is a positive change due to pure rate change.

Example 2

Expiring Terms	A treaty with an excess of £5,000 and limit of £2,000 charges a Gross Written Premium of £200.							
Change of Terms	A new peril is added to the treaty. The pricing model values this change as an additional £50 Gross Written Premium.							
Current Terms	A treaty with additional perils and excess of £50 and limit of £20 charges a Gross Written Premium of £210.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
200	-60	+0	+50	+0	-40	210	-63	-75
						Net RARC =		-16.0%
						Gross RARC =		-16.0%

A new peril has been added to the contract. The £50 change has therefore been reported in change due to change in breadth of cover. The overall premium increase is smaller than the change due to the additional peril and so the change due to pure rate change is negative.

Example 3

Expiring Terms	A treaty with an excess of £5,000 and limit of £2,000 charges a Gross Written Premium of £200.							
Change of Terms	The terms and conditions of the policy remain the same but underlying frequency of claims has increased. The model values the change as an additional £20 of Gross Written Premium.							
Current Terms	A treaty with an excess of £5,000 and limit of £2,000 charges a Gross Written Premium of £200. Claims frequency has increased.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
200	-60	+0	+0	+20	-20	200	-60	-66
						Net RARC =		-9.1%
						Gross RARC =		-9.1%

The change to the contract can not be related to either change due to change in deductible or change due to change in breadth of cover and so the £20 adjustment is reported in change due to other factors. The premium remains flat and so the +£20 change in exposure results in a negative change due to pure rate change.

Discount for volume

Example 1

Expiring Terms	A casualty policy on a payroll of £10,000 charges a Gross Written Premium rate of 0.5%							
Change of Terms	An additional £20,000 of payroll is added. A discount for volume of business is applied so the combined portfolio is charged at 0.45% of payroll.							
Current Terms	£30,000 payroll charged at a Gross Written Premium rate of 0.45%							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
50	-15	0	0	100	-15	135	-41	-45
							Net RARC =	-10.0%
							Gross RARC =	-10.0%

The claims should increase in proportion to the increase in payroll. If a discount on the rate is given when more business is written, this increases the expected loss ratio for the book. This corresponds to a negative change due to pure rate change. Note that the overall profit may well increase with the higher payroll and loss ratio but the profit margin is reduced, resulting in a negative change due to pure rate change.

Example 2

Expiring Terms	A casualty policy on a payroll of £10,000 charges a Gross Written Premium rate of 0.5%							
Change of Terms	An additional £20,000 of payroll is added. The increase in the portfolio significantly reduces volatility so that less capital is required per £ insured. The cost of capital reduction is estimated at 0.001% of sum insured.							
Current Terms	£30,000 payroll charged at a Gross Written Premium rate of 0.5% Reduced cost of capital.							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Due to Pure Rate Change	Current 100% Gross Written Premium	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
50	-15	+0	+0	+99.70	+0.30	150	-45	-45
							Net RARC =	0.2%
							Gross RARC =	0.2%

The rate on payroll is maintained after a significant increase in total payroll. The loss ratio for the combined book would be expected to be the same. However, the increase in diversification reduces the volatility of total claims and so less capital is needed to support the business. The reduction in interest charge has been calculated as 0.001% of the payroll and so maintaining the rate leads to a small positive change due to pure rate change. The effect of diversification is likely to be small unless the change in exposure is very large and managing agents would need to conduct a very careful study to quantify this effect.

Additive and multiplicative price changes

In many cases, the pricing data recorded on underwriting systems is expressed in terms of percentage change figures rather than the monetary amounts format of PMDR.

Percentage changes figures can themselves be calculated on an additive or multiplicative basis as follows:

Additive

Current 100% GWP (220) = expiring 100% GWP (170) * (1 + deductible / attachment point change % + breadth of cover change %) * (1 + other factors change %) * (1+ pure rate change %)

Multiplicative

Current 100% GWP (220) = expiring 100% GWP (170) * (1 + deductible / attachment point change %) * (1 + breadth of cover change %) * (1 + other factors change %) * (1 + pure rate change %)

If data is recorded on an additive basis, then the percentage change figures for deductible / attachment point change (180) and breadth of cover change (190) can be multiplied by the expiring 100% GWP to calculate the numerical amount that needs to be recorded in the PMDR return. When the percentages are based on a multiplicative method, applying this approach will not give a precise mapping to the format required for PMDR.

The following four examples demonstrate the translation of price changes stored as multiplicative percentages into the PMDR format.

Example 1 - Multiplicative

Expiring Premium	£750,000							
Change % Ded/Limits/Attach	40%							
Change % Breadth Cover	60%							
Change % Exposure/Other	40%							
Current Premium	£2,116,800							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium Written	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Written Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Written Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Written Due to Pure Rate Change	Current 100% Gross Written Premium Written	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
750,000	-225,000	+372,000	+558,000	+672,000	-235,200	2,116,800	-635,040	-705,600
							Net RARC =	-10.0%
							Gross RARC =	-10.0%

In this case, the percentage change values recorded corresponding to deductible / attachment point and breadth of cover are both positive, i.e. +40% and +60% respectively.

Expiring 100% GWP adjusted for deductible / attachment point and breadth of cover in the multiplicative method is

$$= 750,000 * (1 + 40%) * (1 + 60%) = 1,680,000.$$

Therefore, the sum of change for fields 180 and 190

$$= 1,680,000 - 750,000 = 930,000.$$

This premium amount needs to be split between the two fields. The multiplicative approach in effect mixes components of fields 180 and 190 and this must be resolved into separate components for PMDR. The suggested approach is to apportion based on the ratio of the percentage changes, i.e.

Field 180

$$= 40% / (40% + 60%) * 930,000 = 372,000$$

Field 190

$$= 60% / (40% + 60%) * 930,000 = 558,000.$$

Applying the other factors change % to the total for fields 170, 180 and 190 gives:

Field 200

$$= 40% * 930,000 = 672,000.$$

The expiring 100% GWP is given so the pure rate change can be calculated as a difference:

Field 210

$$= 2,116,800 - 672,000 - 558,000 - 372,000 - 750,000$$

$$= -235,000.$$

Field 220

$$= 2,116,800.$$

Example 2 - Multiplicative

Expiring Premium	£750,000							
Change % Ded/Limits/Attach	-50%							
Change % Breadth Cover	-20%							
Change % Exposure/Other	40%							
Current Premium	£378,000							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium Written	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Written Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Written Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Written Due to Pure Rate Change	Current 100% Gross Written Premium Written	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
750,000	-225,000	-321,429	-128,571	+120,000	-42,000	378,000	-113,400	-126,000
							Net RARC =	-10.0%
							Gross RARC =	-10.0%

In this case, the percentage change values recorded corresponding to deductible / attachment point and breadth of cover are both negative, i.e. -50% and -20% respectively.

Expiring 100% GWP adjusted for deductible / attachment point and breadth of cover in the multiplicative method is

$$= 750,000 * (1 - 50%) * (1 - 20%) = 300,000.$$

Therefore, the sum of change for fields 180 and 190

$$= 300,000 - 750,000 = -450,000.$$

As before, this premium amount needs to be split between the two fields, i.e.

Field 180

$$= -50% / (-50% - 20%) * -450,000 = -321,429$$

Field 190

$$= -20% / (-50% - 20%) * -450,000 = -128,571.$$

Applying the other factors change % to the total for fields 170, 180 and 190 gives:

Field 200

$$= 40% * 300,000 = 120,000.$$

The expiring 100% GWP is given so the pure rate change can be calculated as a difference:

Field 210

$$= 378,000 - 120,000 + 128,571 + 321,429 - 750,000$$

$$= -42,000.$$

Field 220

$$= 378,000.$$

Example 3 - Multiplicative

Expiring Premium	£750,000							
Change % Ded/Limits/Attach	-30%							
Change % Breadth Cover	30%							
Change % Exposure/Other	40%							
Current Premium	£859,950							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium Written	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Written Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Written Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Written Due to Pure Rate Change	Current 100% Gross Written Premium Written	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
750,000	-225,000	-225,000	+157,500	+273,000	-95,550	859,950	-257,985	-286,650
							Net RARC =	-10.0%
							Gross RARC =	-10.0%

In this case, the percentage change value recorded corresponding to deductible / attachment point change is negative and the percentage change value recorded corresponding to breadth of cover is positive, i.e. -30% and +30% respectively

Expiring 100% GWP adjusted for deductible / attachment point and breadth of cover in the multiplicative method is

$$= 750,000 * (1 - 30%) * (1 + 30%) = 682,500.$$

Note that the -30% and +30% changes reduced the overall premium total because the calculation is multiplicative, not additive.

Therefore, the sum of change for fields 180 and 190

$$= 682,500 - 750,000 = -67,500.$$

As before, this premium amount needs to be split between the two fields. In this case because the signs of the changes are different, the negative change is applied first and then the positive change to calculate the totals for the fields. The negative change reduces the original premium total which is then acted upon by the positive change for breadth of cover. Therefore:

Field 180

$$= -30% * 750,000 = -225,000$$

Field 190

$$= +30% * (750,000 - 225,000) = +157,500.$$

Applying the other factors change % to the total for fields 170, 180 and 190 gives:

Field 200

$$= 40% * (750,000 - 225,000 + 157,500) = 273,000.$$

The expiring 100% GWP is given so the pure rate change can be calculated as a difference:

Field 210

$$= (859,950 - 273,000 - 157,500 + 225,000 - 750,000)$$

$$= -95,550.$$

Field 220

$$= 859,950.$$

Example 4 - Multiplicative

Expiring Premium	£750,000							
Change % Ded/Limits/Attach	30%							
Change % Breadth Cover	-30%							
Change % Exposure/Other	40%							
Current Premium	£859,950							
Acq Costs	Acquisition costs are 30% of Gross Written Premium on expiry and renewal							
Expiring 100% Gross Written Premium Written	Expiring 100% Acquisition Costs	Change in Expiring 100% Gross Written Premium Written Due to Change in Deductible / Attachment	Change in Expiring 100% Gross Written Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Written Premium Written Due to Change in Other Factors	Change in Expiring 100% Gross Written Premium Written Due to Pure Rate Change	Current 100% Gross Written Premium Written	Current 100% Acquisition Costs	Expiring Renewed 100% Acquisition Costs
170	170a	180	190	200	210	220	220a	240
750,000	-225,000	+157,500	-225,000	+273,000	-95,550	859,950	-257,985	-286,650
							Net RARC =	-10.0%
							Gross RARC =	-10.0%

In this case, the percentage change value recorded corresponding to deductible / attachment point change is positive and the percentage change value recorded corresponding to breadth of cover is negative, i.e. +30% and -30% respectively

Expiring 100% GWP adjusted for deductible / attachment point and breadth of cover in the multiplicative method is

$$= 750,000 * (1 + 30%) * (1 - 30%) = 682,500.$$

Note that the -30% and +30% changes reduced the overall premium total because the calculation is multiplicative, not additive.

Therefore, the sum of change for fields 180 and 190

$$= 682,500 - 750,000 = -67,500.$$

As before, the premium amount needs to be split between the two fields. In this case because the signs of the changes are different, the negative change is applied first and then the positive change to calculate the totals for the fields. The negative change reduces the original premium total which is then acted upon by the positive change for deductible / attachment point. Therefore:

Field 190

$$= -30% * 750,000 = -225,000$$

Field 180

$$= +30% * (750,000 - 225,000) = +157,500.$$

Applying the other factors change % to the total for fields 170, 180 and 190 gives:

Field 200

$$= 40% * (750,000 - 225,000 + 157,500) = 273,000.$$

The expiring 100% GWP is given so the pure rate change can be calculated as a difference:

Field 210

$$= (859,950 - 273,000 - 157,500 + 225,000 - 750,000)$$

$$= -95,550.$$

Field 220

$$= 859,950.$$

