

## **Guide to the HP Section Pension Modeller** **A potentially useful tool.**

### **Introduction**

This Microsoft Excel modeller has been designed to be a reasonable approximation of pension values over a lifetime. (This Excel file should also be compatible with Apple Numbers and OpenOffice. If you encounter any problems then let the HPPA team know).

It attempts to better understand how the HP SECTION RULES and the FORMULA calculates increases for pre-1997 service and the impact this has for members.

It appears a complex formula and there is no supporting documentation available on the original purpose and policy thinking behind the formula – other than the explanation given within the Deed Rules.

It is worth pointing out also that – at present – members of the HPPA committee and working group are all ex-Digital employees – and therefore have no direct involvement/experience of the HP Section – but have considered it worthwhile to conduct this exercise with the view that it may provide useful understanding, insight and member feedback.

The Digital and HP Sections of the HP Retirement Benefits Plan are managed according to different rules and policies and therefore any member surveys need ideally to take these differences into account.

***Members views on The Formula and the way in which it works is therefore considered an important aspect of evaluating any survey results and feedback from HP members of the HPPA. It is for this reason that the current HPPA survey is taking a differentiated approach between Digital and HP members.***

The Formula is shown in a section below. This modeller is unique to HP Section members.

Any pension is made up of various elements and complex calculations so this model will never be totally accurate – but it should hopefully be a useful and valuable indicator.

You should verify the degree of accuracy of the modeller against your actual personal data and factor in any differences in the results in how you interpret the output and form any conclusions or judgements.

The modeller should hopefully provide indicative values and useful insight.

Refer to the “Calculations Section” for further explanation.

The modeller was originally designed with existing pensioners in mind – however – “late modifications” have been made to enable deferred members to enter future dates and values to get a similar style perspective *(and to repeat, this is just an indicative guide and you must do your own calculations and validations).*

### **Modeller Feedback**

*If you feel there are significant flaws in the logic of the modeller and don't think it appropriate to your circumstances – then discard using it – and send your feedback to the HPPA team.*

*If you have any concerns or questions about the use of the modeller as part of this HPPA 2021 Survey – then please send a message to the team and we will attempt to answer any questions and provide clarification.*

## Overall Approach

Using the input data provided, annual pension increases are calculated according to the HP Section Plan RULES and FORMULA, over a thirty-year horizon.

There is a Section below entitled **“Understanding the Formula”** – that attempts to explain and provide further detail on how the HP Formula has been interpreted and applied within the modeller.

The modeller allows you to assess and validate the Formula for your own circumstances.

For comparison purposes, an RPI-based pension value is also calculated using actual past RPI values and a default future annual average rate (which can be changed enabling you to simulate different permutations).

A basic “Buying Power” value is calculated – which is the value of the actual pension declining in value against the RPI pension.

The modeller calculates these values and displays them in tables and graphs over a thirty-year period, starting from year of retirement.

The idea of “buying power” and the way the modeller calculates it is again a simple straight-forward approach.

It is based on the declining value of a pension against the RPI pension that is growing according to RPI. The complexities of differentiating between RPI and CPI and “personal inflation” rates are ignored at this stage.

The table below gives a view of the calculation model used – that is – a pension growing at a slower rate than a pension growing each year based on RPI, and the “buying power” of the pension declining as a result.

### The basic “Buying Power” calculation the modeller uses

Year	Pension with less than RPI increases	Pension with RPI increases	Pension shortfall against RPI Pension	Buying Power ( Pension less shortfall)	Cumulative Shortfall in income against RPI Pension	Buying Power of Pension as % of current pension
1	£10,000	£10,000	£0		£0	
2	£10,025	£10,200	-£175	£9,850	-£175	98%
3	£10,050	£10,500	-£450	£9,600	-£625	96%
4	£10,075	£10,700	-£625	£9,450	-£1,250	94%
5	£10,100	£10,900	-£800	£9,300	-£2,050	92%
<b>Total Income</b>	<b>£50,250</b>	<b>£52,300</b>				
Difference in Total Incomes	-£2,050					

**12 General rules about pensions**

**12.1 Payment of pensions**

Pensions are payable monthly in advance on such date as the Trustees may from time to time decide, except that the Trustees may pay a small pension less often. No part repayment is necessary on a pensioner's death for the month in which he or she died.

**12.2 Pension increases**

**12.2.1 Service after 1 April 1997**

Subject to Rule 12.2.8 (Member with more than 40 years' Service), any pension payable in respect of Pensionable Service on or after 1 April 1997, except for any GMP which is payable, will increase by 5% each year (or by such greater amount as may be required by law) with effect from 1 April each year. However, no pension will increase under this Rule 12.2.1 in any year by more than the increase in the retail prices index during a 12 month reference period ending on 31 December in each preceding year.

**12.2.2 Pensions in payment on 1 April 1997**

Any pension in payment on 1 April 1997, except for any GMP which is payable, will increase in each year by the lesser of:

- (a) two-thirds of the percentage increase determined under Rule 12.2.1 (Service after 1 April 1997); and
- (b) two-thirds of 5%.

**12.2.3 Service before 1 April 1997**

Subject to Rule 12.2.8 (Member with more than 40 years' Service), any pension payable in respect of Pensionable Service before 1 April 1997, in respect of a Member in Service immediately before that date, except for any GMP, will increase in each year, with effect from 1 April, by an amount calculated in accordance with the following formula:

$$\left( \frac{E + ((B - E) \times (D + C))}{B} \right) \times A$$

**Where:**

- A is the percentage determined under Rule 12.2.2 (pensions in payment on 1 April 1997);
- B is the Member's actual Pensionable Service prior to 1 April 1997;
- C is the Member's prospective Pensionable Service between 1 April 1997 and the earlier of the Member's Normal Pension Date and completion of 40 years' Pensionable Service;
- D is the Member's Pensionable Service from 1 April 1997 to the earliest of the date of leaving Pensionable Service, the Member's Normal Pension Date and completion of 40 years of Pensionable Service; and
- E is either the amount by which B is greater than C or nil if C is greater than or equal to B.

## UNDERSTANDING THE FORMULA

There is a tab within the Modeller entitled “Understanding the Formula” – it allows you to enter specific values and assess and validate how the formula works.

**Note: this application of the formula is based on our current interpretation of how it works – and has not been validated with the company or Trustees.**

**If you have a different interpretation or consider the application within the modeller to be incorrect - then your feedback is required.**

Using the input details – the modeller performs a number of calculations to determine the values to be used within each of the Rules, the values for A, B, C, D, E and then applies the formula to determine the percentage increase to be assigned to pre’97 service and post’97 service.

It then gives an example illustration of a pension being increased based on the formula as well as a pension increasing using RPI. You can adjust the value of the pension and RPI percentage.

It is essentially this calculation that is repeated for a thirty-year horizon within the modeller – using personal data provided on the Master Summary Page and historical and future rates of RPI held within reference tables.

### Assessing and Validating the Formula – Input data includes RPI %, Dates and an example Pension Value

ENTER DETAILS TO ASSESS AND VALIDATE HOW THE HP PENSION FORMULA WORKS FOR PRE-1997 SERVICE																		
<b>RULE 12.2.1 - FOR POST 1997 SERVICE</b>				<b>ONLY ENTER VALUES IN THE YELLOW BOXES WHERE IT SAYS ENTER - do not alter any other values</b>														
MAX OF 5% BUT NO MORE THAN RPI																		
ASSUME RPI IS				2.0%	ENTER													
MAX POSSIBLE IS				5%														
% INCREASE APPLIED FOR THIS RULE IS				2.0%														
<b>RULE 12.2.2 - FOR INCREASING PENSIONS IN PAYMENT AT 1ST APRIL 1997</b>																		
INCREASE EACH YEAR BY BY THE LESSER OF																		
TWO THIRDS OF VALUE DETERMINED BY RULE 12.2.1				1.33%														
TWO THIRDS OF 5% IS				3.33%														
VALUE TO BE APPLIED FOR RULE 12.2.2 and RULE 12.2.3				1.33%	MAXIMUM ALLOWED													
<b>RULE 12.2.3 for Service Before 1997</b>																		
				<p>NOTE: The percentage increase to be applied to pre'1997 service in any specific year will change depending on the value of RPI</p> <p>For those already receiving pensions in 1997 - this rule applies (NOTE: the modeller assumes that retirees before 1997 received full RPI based increases up to 1997 after which this rule applies)</p> <p>A person who retired after 1997 would be granted an increase based on THE FORMULA - which the calculations below attempt to replicate</p>														
<b>CHANGE THESE VALUES TO SIMULATE</b>				<b>CALCULATED</b>														
<b>BASELINE DETAILS FOR INDIVIDUAL</b>				YEAR BORN	DATE JOINED	DATE LEFT	AGE WHEN JOINED	AGE WHEN LEFT	TOTAL YEARS SERVICE	YEARS SERVICE PRE 1997	BASELINE YEAR	YEARS SERVICE AFTER 1997	FROM 1997 TO 40 YEARS SERVICE	FROM 1997 TO NORMAL PENSION DATE	CURRENT YEAR	CURRENT AGE	NORMAL PENSION AGE	NORMAL PENSION YEAR
				ENTER	ENTER	ENTER												
Applying the Formula (the detailed calculations)				1955	1980	1999	25	44	19	17	1997	2	23	24	2021	66	66	2021
				AS % OF TOTAL YEARS SERVICE		89.47%		10.53%										
				<p><b>EXAMPLE</b></p> <p>CURRENT PENSION VALUE: ENTER £15,000</p> <p>Pension Amount Attributable to pre'97 Service: £13,421</p> <p>Pension Amount Attributable to post'97 Service: £1,579</p> <p>% increase applied: 0.12% (pre-97), 2.0% (post-97)</p> <p>AMOUNT OF INCREASE: £15.56 (pre-97), £31.58 (post-97), Total £47.14</p> <p>NEW PENSION VALUE: £15,047.14</p> <p>COMPARED WITH A PENSION THAT INCREASED BY RPI: £300.00 INCREASE, £15,300.00</p>														
YEARS OF SERVICE FROM 1997 TO LEAVING DATE				2														
NUMBER OF YEARS FROM 1997 TO ACHIEVE 40 YEARS SERVICE				23														
NUMBER OF YEARS FROM 1997 TO NORMAL PENSION DATE				24														
<small>(ABOVE CALCULATION CAN RESULT IN 0 under certain circumstances)</small>																		
% TAKEN FROM RULE 12.2.2				A	1.33%													
PENSIONABLE YEARS SERVICE BEFORE 1997				B	17													
PROSPECTIVE PENSIONABLE SERVICE BETWEEN 1997 AND THE EARLIER OF (DATE OF LEAVING, NORMAL PENSION DATE AND COMPLETION 40 YEARS SERVICE)				C	23													
To calculate (D), two tests have to be applied:																		
Test 1 : Which is EARLIER - years to LEAVING DATE or years NORMAL PENSION DATE					2													
Test 2 : OF ABOVE - which is EARLIER against achieving 40 years service					2													
Calculating (E) which is the amount by which years service before 1997 is greater than years to retirement from 1997 or 40 years service. If years to retirement is greater than years worked before 1997 then result is 0					0													
AMOUNT B GREATER THAN C OR ZERO IF C GREATER OR EQUAL TO B				E	0													
% INCREASE TO BE APPLIED TO PRE-97 SERVICE					0.12%													
Which is					8.70%	of the increase available for pre97												

## ***Adjusting Values to determine how the Formula treats differences in age and years of service***

By changing any of the input data you can see how the values change based on years of service, date joined and date left and the resulting change in the % increase to be applied to pre-1997 service.

Each person will have a unique set of circumstances and these determine the output results, for example:

- All years service is before 1997 and age when joined/left is such that it results in 0% increase
- All years service is before 1997 but age is such that an increase is granted
- As the number of years service after 1997 increases, a greater percentage of the maximum allowable increase is granted to the pre-1997 service
- If the number of years service before 1997 is greater than the number of years to normal retirement date then an increase is granted, and the shorter the time remaining to reach normal retirement (and therefore the older the person is) the greater the % that is granted
- And so on...

Multiple permutations can be performed to determine how the formula appears to operate taking into account age and years of service (***and assuming this is a valid and correct interpretation and application of the formula***)

### ***Various Permutations can be assessed***

**EXAMPLE: Same years service but differences in age and RPI set at 2%**

#### **Individual A**

- Years of service from 1980 to 1997
- Joined at age 25 and left at age 42
- The formula calculates **0%** increase

#### **Individual B:**

- Years of service from 1980 to 1997
- Joined at age 35 and left at age 52
- The formula calculates a percentage increase of **0.31%** (which is **23%** of the maximum permissible)

#### **Individual C:**

- Years of service from 1980 to 1997
- Joined at age 45 and left at age 62
- The formula calculates a percentage increase of **1.10%** (which is **82%** of the maximum permissible)

### ***Changing years of service***

If DATE of BIRTH and DATE JOINED remain the same, and the DATE LEFT is altered whereby the years of service after 1997 increase, then the percentage increase granted to pre-1997 service gradually increases for each additional year served after 1997.

## Using the Modeller – the “Master Summary” tab

- Within the Excel spreadsheet there are a number of tabs with titles.
- You input personal data and review the output results on the tab entitled “**Master Summary**”
- You can also view graphs visualising certain data values on the tab entitled “**Summary Graphs**”
- Other tabs contain detailed workings and reference data and are “locked”

Before using the modeller – it is strongly recommended that you review **The Rules** and **The Formula** – and apply these workings to your own circumstances and validate that you believe the way the formula is being used here is an accurate, correct and meaningful interpretation. The Section above explained how best to do this.

### Input data Required

- Year Born
- Year joined company
- Year left company
- If already retired
  - Year retired and started taking pension
  - Gross value of annual pension in first year of retirement (after taking any tax free lumpsum)
- If a Deferred member
  - For Year Retired – enter your anticipated future year of retirement
  - Anticipated Gross value of pension when retiring (after taking any tax free lumpsum)
- Please note – Age When Retired is calculated and will therefore be older than current age if deferred

The section where values are input:

HEWLETT PACKARD SECTION PENSION : IMPACT MODELLER / SIMULATOR - AN INDICATIVE VIEW SPANNING 30 YEARS (REFER TO THE GUIDE BEFORE USING THIS MODELLER)										
ONLY ENTER VALUES IN THE YELLOW BOXES WHERE IT SAYS ENTER AND DOUBLE-CHECK ACCURACY - do not alter any other values										
PERSON 1				ANONYMOUS		Current Year		2021		
YEAR BORN				ENTER	1955					
YEAR JOINED				ENTER	1980	Note 1		YEARS SERVICE BEFORE 1997	17	89%
YEAR LEFT				ENTER	1999	Note 2		YEARS SERVICE AFTER 1997	2	11%
								TOTAL YEARS SERVICE	19	
YEAR RETIRED ( or anticipated year of retirement)				ENTER	2017	Note 3		YEARS RETIRED	4	
AGE WHEN RETIRED					62			CURRENT AGE	66	in current year
PENSION VALUE WHEN RETIRED (whole number - no decimals)				ENTER	£15,000	Enter Gross Annual Pension (after any tax-free lumpsum was taken)				
<b>Notes:</b>		<b>Assumptions</b>								
1	YOUR PENSION CONTRIBUTIONS FOR THESE YEARS INCREASE ACCORDING TO THE FORMULA CALCULATION	£13,421	89%	THE MODELLER ASSUMES YOU RETIRED ON 1ST JANUARY OF						2017
2	YOUR PENSION CONTRIBUTIONS FOR THESE YEARS INCREASE EACH YEAR BY THE VALUE OF THE RETAIL PRICE INDEX (RPI)	£1,579	11%	THEREFORE ANY INCREASE IN YOUR RETIREMENT YEAR IS FACTORED IN AS WELL AS THE CURRENT YEAR						
3	THE MODELLER IS ONLY USEFUL FOR RETIREMENT DATES FROM 1992 ONWARDS			THESE FIGURES SHOULD HOPEFULLY BE A REASONABLE INDICATIVE ESTIMATE - HOWEVER - THEY MAY BE MARGINALLY DIFFERENT THAN ACTUAL DEPENDING ON YEARS SERVICE BEFORE 1997 AND YEAR RETIRED & RPI APPLIED BY THE COMPANY. YOU MUST FACTOR THESE VARIANCES INTO ANY CONCLUSIONS ABOUT PENSION IMPACTS OVER THE TIME HORIZON AND POTENTIAL LIFETIME.						
Your pension is made up of various elements and complex calculations - this modeller therefore cannot be totally accurate. You are asked to verify degree of accuracy against your actual personal data and provide feedback.										

## Summary Assessment Section

**Note:** If using the modeller as a deferred member, the Summary Assessment Section showing the values for “Current Year” represents the anticipated first year of retirement. For existing pensioners, the “Current Year” is obviously 2021.

Using the input values, the modeller runs a number of calculations and provides an “estimated impact assessment”.

### Current Year Estimates and Age 84

- The estimated current value of your pension based on past increases for pre-1997 service and RPI increases for any post 1997 service
- The estimated current value of your pension *had it grown each year with RPI* percentage increases
- Differences between the two pension values
- These same values are projected to age 84 and the same comparisons made
- The value of your current pension is calculated according to the Rule Formula using historical and a default future average value of RPI embedded within the modeller
- The value of the RPI pension is calculated using historical RPI percentages and a default future average value of RPI embedded within the modeller

ESTIMATED PENSION VALUE FOR CURRENT YEAR (Refer to detailed tables below)		
This is an estimate using past increase calculations and any potential increase for the current year		
YOUR CURRENT PENSION WITH INCREASES SINCE RETIREMENT IS ESTIMATED AT BEING APPROXIMATELY	BEFORE TAX	£15,329
If there are significant variances between this figure and actual current pension - this may be due to historical RPI used and other factors in your pension that the model does not/cannot represent.		
ESTIMATED IMPACT ASSESSMENT - FROM YEAR OF RETIREMENT TO CURRENT YEAR		
IF FULL RPI HAD BEEN GIVEN EACH YEAR - YOUR PENSION WOULD BE ESTIMATED TO BE WORTH TODAY		£17,191
*This is calculated using actual historical RPI figures (see detailed view below) and estimate for this year		
THE DIFFERENCE BETWEEN YOUR CURRENT PENSION AND A PENSION INCREASED BY RPI EACH YEAR IS	BOX 1	-£1,862
Your current pension is estimated at being	BOX 2	89%
of the value of your pension had it always risen by RPI to the present time		
THE PRESENT "BUYING POWER" OF YOUR CURRENT PENSION IS ESTIMATED AS		£13,467
Your current pension buying power is estimated at being		88%
of the value of your pension when you retired		
CUMULATIVE AMOUNT OF "LOST" INCOME SINCE RETIREMENT TO THE CURRENT YEAR IS ESTIMATED AT		-£5,809
Total cumulative income from actual pension compared with total cumulative income from an RPI pension		
ESTIMATED IMPACT ASSESSMENT - FROM YEAR OF RETIREMENT TO AGE 84		
AT AGE 84 - THE VALUE OF YOUR PENSION IS ESTIMATED TO BE		£16,219
This is based on continued zero discretionary increases being given over all future years		
AT AGE 84 - IF YOUR PENSION INCREASED EVERY YEAR WITH RPI IT WOULD BE ESTIMATED TO BE		£24,553
This is based on using a DEFAULT VALUE for a forecasted annual rate of inflation over future years		
AT AGE 84 - your pension is estimated at being		66%
of the value of your pension had it always risen by RPI to this age		
AT AGE 84 - THE "BUYING POWER" OF YOUR PENSION IS ESTIMATED TO BE		£7,886
At age 84 - your pension buying power is estimated to be		49%
of the value of your pension when you retired		
AT AGE 84 - CUMULATIVE AMOUNT OF "LOST" INCOME COMPARED TO A PENSION THAT INCREASED WITH RPI		-£96,959
These results are based on using A DEFAULT VALUE forecast rate of inflation % per year		
		2.0
based on the default value used below		
CHANGE VALUE BELOW TO SIMULATE DIFFERENT RATE		

### PLEASE NOTE:

If you choose to use the modeller in conjunction with the survey – the survey gives you the opportunity to submit the output values for BOXES 1-2 above as part of your survey data.

If providing data from the modeller for the survey – you are asked to ensure you use/keep the default future forecast rate of RPI used within the modeller – so that survey data from all those who participate is based on the same baseline assumption.

The survey also gives the opportunity to provide any other feedback on the modeller.

### Simulating alternative rates of RPI

The modeller does allow you to change the rate of RPI for simulation purposes – and therefore the ability to change it has not been “disabled”.

## What the Modeller aims to show

As well as the summary impact assessment tables, the modeller shows the change in pension values over time, the value of increases granted or not granted, and compares this against a pension that always rises with inflation based on RPI.

It compares the difference between pensions in each year as well as cumulative differences and shows the results in various tables, both summary and detailed.

It shows the changing value of “buying power” over time.

The detailed table lists the historical and future forecast values used for calculating increases, the resulting pension values and compares the differences.

*Example Tables: Summary Table in 5-year increments to age 84*

Past and Future Projected Values - from age 55 to 84 (in 5 year increments)									
Comparison of actual pension increases against RPI based increases									
YEAR	AGE	Pension Value	Cumulative Pension Income Received		Pension receiving annual RPI	RPI Pension Cumulative Income		Pension Value Difference with RPI Pension	Cumulative Income Shortfall against RPI
-	55	-	-		-	-		-	-
-	60	-	-		-	-		-	-
2020	65	£15,281	£60,714		£16,854	£64,661		-£1,573	-£3,947
2025	70	£15,522	£137,842		£18,608	£154,122		-£3,085	-£16,281
2030	75	£15,768	£216,188		£20,544	£252,895		-£4,777	-£36,707
2035	80	£16,017	£295,774		£22,683	£361,947		-£6,666	-£66,174
2039	84	£16,219	£360,347		£24,553	£457,307		-£8,333	-£96,959

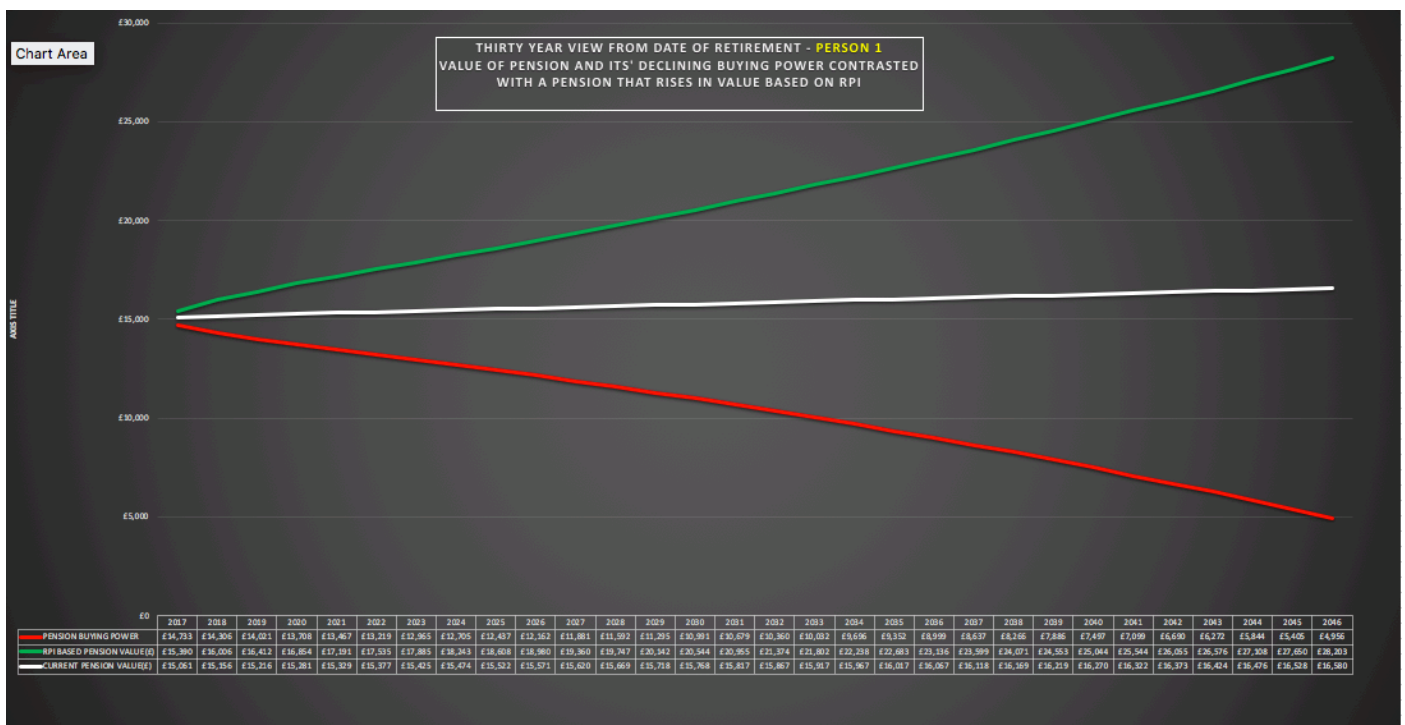
Example Tables: Detailed Table

DETAILED VIEW - COVERING 30 YEAR HORIZON									
Past Actuals and Future Projections									
Year	AGE	Historical RPI and Future Forecast RPI	Increase for Pre'97 Service from FORMULA CALCULATION	Pension Value	Pension with RPI applied	Shortfall Against RPI INCREASES	Your Pension Buying Power	Cumulative Shortfall against RPI Pension	Your Pension Buying Power
			Based on actual past RPI and Future RPI forecast	Grows with FORMULA increases for pre-97 service and Post-97 service using RPI	Growing by RPI increases	Annual difference/reduced income	Declining value due to Inflation	CUMULATIVE "LOSS" OF INCOME	As % of Pension Value
2017	62	2.6%	0.15%	£15,061	£15,390	£-329	£14,733	£-329	98%
2018	63	4.0%	0.23%	£15,156	£16,006	£-850	£14,306	£-1,178	94%
2019	64	2.5%	0.15%	£15,216	£16,412	£-1,196	£14,021	£-2,374	92%
2020	65	2.7%	0.16%	£15,281	£16,854	£-1,573	£13,708	£-3,947	90%
2021	66	2.0%	0.12%	£15,329	£17,191	£-1,862	£13,467	£-5,809	88%
2022	67	2.0%	0.12%	£15,377	£17,535	£-2,158	£13,219	£-7,966	86%
2023	68	2.0%	0.12%	£15,425	£17,885	£-2,460	£12,965	£-10,426	84%
2024	69	2.0%	0.12%	£15,474	£18,243	£-2,769	£12,705	£-13,196	82%
2025	70	2.0%	0.12%	£15,522	£18,608	£-3,085	£12,437	£-16,281	80%
2026	71	2.0%	0.12%	£15,571	£18,980	£-3,409	£12,162	£-19,690	78%
2027	72	2.0%	0.12%	£15,620	£19,360	£-3,739	£11,881	£-23,429	76%
2028	73	2.0%	0.12%	£15,669	£19,747	£-4,078	£11,592	£-27,507	74%
2029	74	2.0%	0.12%	£15,718	£20,142	£-4,423	£11,295	£-31,930	72%
2030	75	2.0%	0.12%	£15,768	£20,544	£-4,777	£10,991	£-36,707	70%
2031	76	2.0%	0.12%	£15,817	£20,955	£-5,138	£10,679	£-41,845	68%
2032	77	2.0%	0.12%	£15,867	£21,374	£-5,507	£10,360	£-47,352	65%
2033	78	2.0%	0.12%	£15,917	£21,802	£-5,885	£10,032	£-53,237	63%
2034	79	2.0%	0.12%	£15,967	£22,238	£-6,271	£9,696	£-59,508	61%
2035	80	2.0%	0.12%	£16,017	£22,683	£-6,666	£9,352	£-66,174	58%
2036	81	2.0%	0.12%	£16,067	£23,136	£-7,069	£8,999	£-73,243	56%
2037	82	2.0%	0.12%	£16,118	£23,599	£-7,481	£8,637	£-80,724	54%
2038	83	2.0%	0.12%	£16,169	£24,071	£-7,903	£8,266	£-88,626	51%
2039	84	2.0%	0.12%	£16,219	£24,553	£-8,333	£7,886	£-96,959	49%
2040	85	2.0%	0.12%	£16,270	£25,044	£-8,773	£7,497	£-105,733	46%
2041	86	2.0%	0.12%	£16,322	£25,544	£-9,223	£7,099	£-114,955	43%
2042	87	2.0%	0.12%	£16,373	£26,055	£-9,683	£6,690	£-124,638	41%
2043	88	2.0%	0.12%	£16,424	£26,576	£-10,152	£6,272	£-134,790	38%
2044	89	2.0%	0.12%	£16,476	£27,108	£-10,632	£5,844	£-145,422	35%
2045	90	2.0%	0.12%	£16,528	£27,650	£-11,122	£5,405	£-156,545	33%
2046	91	2.0%	0.12%	£16,580	£28,203	£-11,624	£4,956	£-168,168	30%

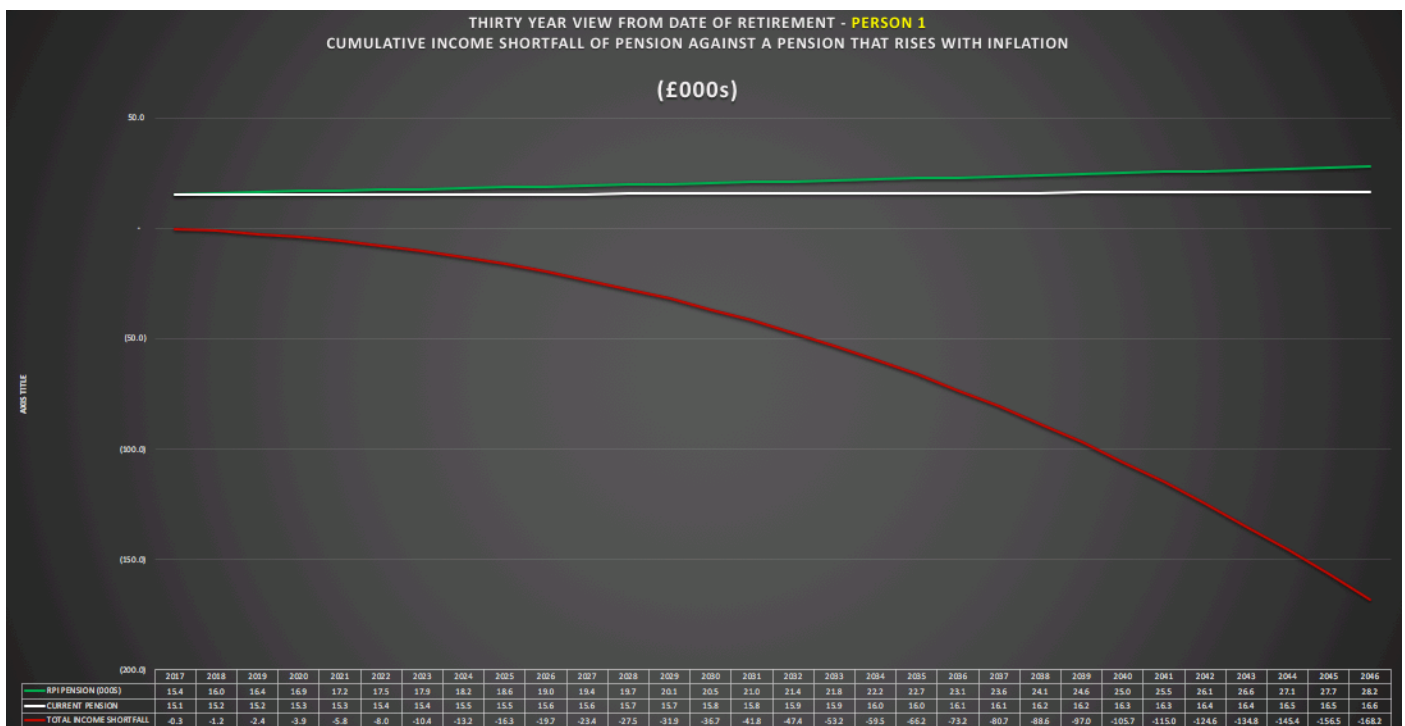
The Modeller also provides a range of visual outputs.

These can be viewed on the “Summary Graphs” tab

Graph 1 Example: Annual Pension, RPI Pension and Buying Power



Graph 2 Example: The Cumulative “lost income”



## Calculations Section and Reference tables

### Notes

Initial basic calculations based on user details

- Years of service before 1997 and as a % of total years of service
- Years of service after 1997 and as a % of total years of service
- The value and percentage of the starting pension that is attributable to pre/post 1997 service
- These values are then used to determine the amount by which the pension increases based on percentages granted by Rules and The Formula

For each year from date of retirement and for the next 30 years, the modeller calculates values as follows:

- Uses the Reference Tables to determine past and future RPI values

#### *Actual Pension*

- Calculates personal percentages to be applied based on age and years of service using the FORMULA calculation
- Calculates the increase to be applied to pre'97 and post'97 pension amounts
- Calculates new pension for the year

#### *RPI-based pension*

- The RPI-based pension is always increased by the value of RPI from the year of retirement onwards using actual historical values and future forecast.
- Calculates the value of the same pension increasing by RPI

Calculates the “*Buying Power*” of the pension

***You are asked to assess the modeller approach and outputs against your own calculations, views and provide feedback.***

**REFERENCE TABLE: Using historical and future RPI values the Modeller determines the rules and values to be applied based on the unique values entered for date of birth, date joined, date left, normal retirement age**

INDIVIDUAL DETAILS SUPPLIED WHEN INITIATING THE MODELLER ON "MASTER SUMMARY" PAGE																	
DATE OF BIRTH	DATE JOINED	DATE LEFT	YEAR RETIRED	AGE WHEN JOINED	AGE WHEN LEFT	CURRENT YEAR	CURRENT AGE	NORMAL PENSION AGE	NORMAL PENSION YEAR	TOTAL YEARS SERVICE	YEARS SERVICE PRE 1997	BASELINE YEAR	YEARS SERVICE AFTER 1997	FROM 1997 TO 40 YEARS SERVICE	FROM 1997 TO NORMAL PENSION DATE		
1955	1980	1999	2017	25	44	2021	66	66	2021	19	17	1997	2	23	24		
THE MODELLER ASSUMES THAT FULL RPI INCREASES WERE APPLIED TO PENSIONS IN PAYMENT BEFORE 1997 AND THE FORMULA APPLIES ONLY FROM 1997 ONWARDS																	
RULE 12.2.1				RULE 12.2.2				RULE 12.2.3						INCREASE GRANTED TO PRE-1997 SERVICE	POST '97 INCREASE		
YEAR	RPI	MAX ALLOWED	APPLIED	2/3RDS OF RULE 2.1			A	B	C	TEST 1	TEST 2	D	E				
							17	23		2	2	2	0				
1989	7.00%	5%	5.0%	4.67%	3.3%	3.33%	3.33%	17	23	2	2	2	0	7.00%			
1990	5.80%	5%	5.0%	3.87%	3.3%	3.33%	3.33%	17	23	2	2	2	0	5.80%			
1991	10.00%	5%	5.0%	6.67%	3.3%	3.33%	3.33%	17	23	2	2	2	0	10.00%			
1992	4.10%	5%	4.1%	2.73%	3.3%	2.73%	2.73%	17	23	2	2	2	0	4.10%			
1993	1.70%	5%	1.7%	1.13%	3.3%	1.13%	1.13%	17	23	2	2	2	0	1.70%			
1994	1.25%	5%	1.3%	0.83%	3.3%	0.83%	0.83%	17	23	2	2	2	0	1.25%			
1995	0.00%	5%	0.0%	0.00%	3.3%	0.00%	0.00%	17	23	2	2	2	0	0.00%			
1996	3.00%	5%	3.0%	2.00%	3.3%	2.00%	2.00%	17	23	2	2	2	0	3.00%			
1997	2.80%	5%	2.8%	1.87%	3.3%	1.87%	1.87%	17	23	2	2	2	0	0.16%	2.8%		
1998	3.30%	5%	3.3%	2.20%	3.3%	2.20%	2.20%	17	23	2	2	2	0	0.19%	3.3%		
1999	2.40%	5%	2.4%	1.60%	3.3%	1.60%	1.60%	17	23	2	2	2	0	0.14%	2.4%		
2000	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2001	2.70%	5%	2.7%	1.80%	3.3%	1.80%	1.80%	17	23	2	2	2	0	0.16%	2.7%		
2002	1.30%	5%	1.3%	0.87%	3.3%	0.87%	0.87%	17	23	2	2	2	0	0.08%	1.3%		
2003	2.90%	5%	2.9%	1.93%	3.3%	1.93%	1.93%	17	23	2	2	2	0	0.17%	2.9%		
2004	2.60%	5%	2.6%	1.73%	3.3%	1.73%	1.73%	17	23	2	2	2	0	0.15%	2.6%		
2005	3.20%	5%	3.2%	2.13%	3.3%	2.13%	2.13%	17	23	2	2	2	0	0.19%	3.2%		
2006	2.40%	5%	2.4%	1.60%	3.3%	1.60%	1.60%	17	23	2	2	2	0	0.14%	2.4%		
2007	4.20%	5%	4.2%	2.80%	3.3%	2.80%	2.80%	17	23	2	2	2	0	0.24%	4.2%		
2008	4.10%	5%	4.1%	2.73%	3.3%	2.73%	2.73%	17	23	2	2	2	0	0.24%	4.1%		
2009	0.10%	5%	0.1%	0.07%	3.3%	0.07%	0.07%	17	23	2	2	2	0	0.01%	0.1%		
2010	3.70%	5%	3.7%	2.47%	3.3%	2.47%	2.47%	17	23	2	2	2	0	0.21%	3.7%		
2011	5.20%	5%	5.0%	3.47%	3.3%	3.33%	3.33%	17	23	2	2	2	0	0.29%	5.0%		
2012	3.90%	5%	3.9%	2.60%	3.3%	2.60%	2.60%	17	23	2	2	2	0	0.23%	3.9%		
2013	3.30%	5%	3.3%	2.20%	3.3%	2.20%	2.20%	17	23	2	2	2	0	0.19%	3.3%		
2014	2.80%	5%	2.8%	1.87%	3.3%	1.87%	1.87%	17	23	2	2	2	0	0.16%	2.8%		
2015	1.10%	5%	1.1%	0.73%	3.3%	0.73%	0.73%	17	23	2	2	2	0	0.06%	1.1%		
2016	1.30%	5%	1.3%	0.87%	3.3%	0.87%	0.87%	17	23	2	2	2	0	0.08%	1.3%		
2017	2.60%	5%	2.6%	1.73%	3.3%	1.73%	1.73%	17	23	2	2	2	0	0.15%	2.6%		
2018	4.00%	5%	4.0%	2.67%	3.3%	2.67%	2.67%	17	23	2	2	2	0	0.23%	4.0%		
2019	2.54%	5%	2.5%	1.69%	3.3%	1.69%	1.69%	17	23	2	2	2	0	0.15%	2.5%		
2020	2.69%	5%	2.7%	1.79%	3.3%	1.79%	1.79%	17	23	2	2	2	0	0.16%	2.7%		
2021	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2022	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2023	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2024	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2025	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2026	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2027	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2028	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2029	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2030	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2031	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2032	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2033	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2034	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2035	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2036	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2037	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2038	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2039	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2040	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2041	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2042	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2043	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2044	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2045	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2046	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2047	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2048	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2049	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2050	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2051	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2052	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2053	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2054	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2055	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2056	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2057	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2058	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2059	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		
2060	2.00%	5%	2.0%	1.33%	3.3%	1.33%	1.33%	17	23	2	2	2	0	0.12%	2.0%		