

PAYSLIP TO PAYBACK

From earning on the job to paying yourself your retirement pension

Product Requirements & Technical Specification

Version 1.4 · March 2026 · Polyglyph Analytica

1. Product Overview

Payslip to Payback is a self-contained UK lifetime financial planning calculator delivered as a Microsoft Excel workbook with VBA automation. It guides a user from their current earning life through retirement drawdown, surfacing tax efficiency, pension adequacy, and wealth projection in a single integrated tool.

Attribute	Value
Product name	Payslip to Payback
Tagline	From earning on the job to paying yourself your retirement pension
Format	Excel .xlsx (user saves as .xlsm to enable VBA)
VBA module	PayslipToPayback_VBA_Module.bas — imported separately
Current version	v1.4 (March 2026)
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Distribution	Public domain — no warranty. Not financial advice.
Target user	UK-resident individual or couple, any age, any wealth stage

2. Workbook Architecture

The workbook contains 21 sheets organised into four functional zones, plus one hidden validation helper.

2.1 Sheet Inventory

#	Tab ID	Sheet Name	Purpose	Tab Colour
1	S0	Start Here	Onboarding wizard — 4 sections, dropdowns, couple-aware, protected	Cyan
2	S1	Dashboard	KPI tiles, life chapter, competing goals, Next Action, alerts	Navy
3	S17	Charts & Visuals	6 live charts pulling from all sheets	Teal
4	S2	Life Events	50-row financial biography, 32 event categories	Steel
5	—	_val_temp	Hidden validation helper (do not delete)	Hidden

#	Tab ID	Sheet Name	Purpose	Tab Colour
6	S3	Wrappers	All tax wrappers, carry forward, AA taper + earnings cap	Steel
7	S4	Allocation	Risk profile targets, drift analysis, rebalancing alerts	Steel
8	S5	State Pension	NI record, gap fill ROI, deferral, career break impact	Steel
9	S6	Income Streams	13 income source types, drawdown sequencing priority	Steel
10	S7	Monthly Tracker	Portfolio log + one-off income/expense columns J–M	Steel
11	S8	Projection	65-year year-by-year modelling engine	Purple
12	S9	Monte Carlo	1,000 simulation model	Purple
13	S10	Scenarios	Base / Optimistic / Conservative / Stress Test	Purple
14	S11	Care Costs	Later-life liability, PV reserve calculator	Purple
15	S12	Market Data	Live data refresh, manual inputs, FX registry, Gemini AI	Slate
16	S13	Assumptions	82 named ranges, 2025/26 HMRC values, user override column	Slate
17	S14	Disclaimer	6 regulatory sections, copyright, version log	Slate
18	S15	Children & Education	Cost benchmarks, govt support, opportunity cost	Green
19	S16	Home & Property	Deposit planner, LISA tracker, equity-as-retirement-asset	Green
20	S18	Insurance & Protection	Cover requirements, register, gap analysis	Green
21	S20	Asset Register	50-asset register, CGT calculator, breakdown by type/wrapper	Navy

3. Market Data Sheet (S12)

The Market Data sheet is the live data hub of the workbook. It is divided into four functional sections. Sheet protection is active; only designated yellow input cells are unlocked.

3.1 Row Map

Rows	Section	Content
1–2	Banner	Sheet title and subtitle
3–4	Refresh button	Form Control button → fires RefreshAllData macro
5		Button note (amber)
6		Spacer
7–13	Gemini key setup	Step-by-step instructions + yellow input cell C13 for API key

Rows	Section	Content
14		Green info bar (free tier confirmation)
15		Spacer
16	UK Macro Data	Section header
17		Column headers: Indicator / Current Value / As of Date / API Source / Signal
18		BoE Base Rate (%) — API auto, grey, VBA writes
19		UK CPI annual (%) — YELLOW INPUT CELL, user enters manually
20		10yr Gilt Yield (%) — API auto, grey, VBA writes
21		FTSE All-World 1yr (%) — YELLOW INPUT CELL, user enters manually
22		ONS Earnings Growth (%) — YELLOW INPUT CELL, user enters manually
23		ONS House Price Index — YELLOW INPUT CELL, user enters manually
24		Spacer
25	AI Tax Refresh	Section header
26–28		Last query timestamp / Active status / Model in use
29		Spacer
30	Currency Registry	Section header
31		Column headers: ISO Code / Description / GBP Rate / As of Date / Source
32–39		8 currency slots — ISO code and description are yellow input cells; rate and date written by VBA
40		Spacer
41	FX Log	Section header
42		Log column headers

3.2 Data Sources

Indicator	Source	Method	Key required?
BoE Base Rate (%)	Bank of England IADB (IUDBEDR)	VBA HTTP GET → CSV parse	No
10yr Gilt Yield (%)	Bank of England IADB (IUDMNZC)	VBA HTTP GET → CSV parse	No
FX spot rates	ECB Statistical Data Warehouse	VBA HTTP GET → JSON parse	No
UK CPI annual (%)	Manual entry	User types into yellow cell	N/A
FTSE All-World 1yr (%)	Manual entry	User types into yellow cell	N/A
ONS Earnings Growth (%)	Manual entry	User types into yellow cell	N/A

Indicator	Source	Method	Key required?
ONS House Price Index	Manual entry	User types into yellow cell	N/A
AI Tax Parameters	Google Gemini 1.5 Flash	VBA HTTP POST	Yes — free (Alza...)

3.3 Manual Input Cell Specification

The four indicators that cannot be fetched automatically (CPI, FTSE, Earnings Growth, HPI) are presented as unlocked yellow input cells following the workbook's standard input cell convention.

Cell	Indicator	Format	Notes
C19	UK CPI annual (%)	0.00%	Enter as decimal, e.g. 0.0327 for 3.27%. Source: ONS CPI H or CPIH.
C21	FTSE All-World 1yr (%)	0.00%	Enter 12-month total return as decimal. Source: vanguard.co.uk or similar.
C22	ONS Earnings Growth (%)	0.00%	Annual whole economy earnings growth. Source: ONS EARN01 release.
C23	ONS House Price Index	0.00%	UK HPI annual change. Source: ONS UK HPI or Nationwide/Halifax.
D19	As of Date (CPI)	DD/MM/YYYY	Date of the data used — enter when updating value in C19.
D21	As of Date (FTSE)	DD/MM/YYYY	Date of the data used — enter when updating value in C21.
D22	As of Date (Earnings)	DD/MM/YYYY	Date of the data used — enter when updating value in C22.
D23	As of Date (HPI)	DD/MM/YYYY	Date of the data used — enter when updating value in C23.

4. VBA Module Specification

The VBA module is distributed as a separate .bas file and must be imported after the workbook is saved as .xlsm.

4.1 Function Reference

Function / Sub	Trigger	Purpose
RefreshAllData()	Form Control button	Orchestrates full refresh: BoE rates, ECB FX, signals, summary dialog
FetchBoECSV(code, date)	Called by RefreshAllData	GETs BoE IADB CSV, parses last data row, returns rate as Double
ConvertBoEDate(str)	Called by FetchBoECSV	Converts "DD Mon YYYY" → "DD/MM/YYYY"
FetchECBFXRates(ws)	Called by RefreshAllData	Loops currency registry; GETs ECB SDW JSON per currency; parses observation array
GenerateSignals()	Called by RefreshAllData	Writes BUY/HOLD/SELL signals to col F based on BoE rate and gilt yield

Function / Sub	Trigger	Purpose
QueryTaxParameters()	Macros menu (manual)	Validates Gemini key, calls Gemini 1.5 Flash, shows preview, logs to AuditLog
CallGeminiAPI(key, prompt)	Called by QueryTaxParameters	POSTs to Gemini generateContent endpoint; parses candidates[0].content.parts[0].text
BuildTaxQueryPrompt()	Called by QueryTaxParameters	Returns structured JSON-only prompt for UK tax parameter extraction
WriteAuditLog(action...)	Called by QueryTaxParameters	Appends timestamp, prompt, response to auto-created AuditLog sheet
TogglePartnerFields()	Worksheet_Change on C12	Locks/unlocks and clears partner input cells on Start Here
ProtectSheet(ws)	Shared helper	Applies standard sheet protection (no password, sort/filter locked)

4.2 API Endpoints

Service	URL Pattern	Auth	Cost
BoE Base Rate	bankofengland.co.uk/boeapps/database/_iadb-fromshowcolumns.asp?csv.x=yes&SeriesCodes=IUDBEDR&CSVF=TN&UsingCodes=Y&Datefrom=...	None	Free
BoE Gilt Yield	Same URL with SeriesCodes=IU DMNZC	None	Free
ECB FX (per CCY)	data-api.ecb.europa.eu/service/data/EXR/D.{CCY}.GBP.SP00.A?format=jsondata&lastNObservations=1	None	Free
Gemini AI	generativelanguage.googleapis.com/v1beta/models/gemini-1.5-flash:generateContent?key={KEY}	API key (Alza...)	Free tier: 1,500 req/day

4.3 Sheet Constants (VBA row/col references)

All cell references use Excel 1-based row/column numbering. These constants must stay in sync with the build script if the sheet layout is modified.

Constant	Value	Cell	Purpose
MD_KEY_ROW	13	Row 13	Gemini API key row
MD_KEY_COL	3	Col C	Gemini API key column
MD_BOE_ROW	18	Row 18	BoE base rate value cell
MD_GILT_ROW	20	Row 20	Gilt yield value cell
MD_DATE_COL	4	Col D	As-of date column
MD_SIG_COL	6	Col F	Signal output column

Constant	Value	Cell	Purpose
MD_CCY_START	32	Row 32	First currency registry row
MD_AI_LAST	26	Row 26	Last AI query timestamp cell
MD_AI_ACTIVE	27	Row 27	AI parameters active flag

5. Setup Instructions

5.1 One-Time Setup (approx. 5 minutes)

1. Open Payslip_to_Payback_v1.4.xlsx in Microsoft Excel.
2. File → Save As → Excel Macro-Enabled Workbook (.xlsm). Keep the same file name.
3. Alt+F11 to open the VBA editor.
4. File → Import File → select PayslipToPayback_VBA_Module.bas.
5. Close the VBA editor.
6. Right-click the "Refresh All Market Data" button on the Market Data sheet → Assign Macro → select RefreshAllData → OK.
7. In the VBA editor, open the Start Here sheet module (expand Microsoft Excel Objects in the left panel) and paste the Worksheet_Change event code (see §5.2).
8. Save the .xlsm file.

5.2 Start Here Sheet Event Code

Paste this into the Start Here sheet module (not the standard module) via Alt+F11:

```
Private Sub Worksheet_Change(ByVal Target As Range)
    If Not Intersect(Target, Me.Range("C12")) Is Nothing Then
        Call TogglePartnerFields
    End If
End Sub
```

5.3 Getting a Free Gemini API Key

The Gemini key is required only for the AI Tax Refresh feature. The key is entirely free; usage at normal scale will not be charged and no credit card is required.

9. Go to: <https://aistudio.google.com/app/apikey>
10. Sign in with any Google / Gmail account.
11. Click "Create API key" → "Create API key in new project".
12. Copy the key (it starts with Alza...).
13. Paste it into Market Data cell C13 (the yellow input cell).

Free tier limits: 1,500 requests/day · 15 req/min · No credit card required · No charge at this usage level.

6. Input Conventions

Convention	Meaning
Yellow background	Unlocked input cell — user enters data here
Grey background, italic text	Locked cell — populated by VBA or formula
Blue text	Hardcoded input value
Black text	Formula-derived value
Green text	Cross-sheet formula reference
Light green background	On-track status indicator
Light red background	Alert or warning status indicator

7. Key Assumptions (S13 Named Ranges)

All 82 named ranges are defined on the Assumptions sheet. Values reflect 2025/26 HMRC rates. Users can override in the override column without editing formulas.

7.1 Tax & NI (England 2025/26)

Named Range	Value	Description
PA	12,570	Personal Allowance (£)
BRL	50,270	Basic Rate Limit (£)
HRL	125,140	Higher Rate Limit / PA taper threshold (£)
BR_PCT	20%	Basic Rate
HR_PCT	40%	Higher Rate
AR_PCT	45%	Additional Rate
NI_PT	12,570	NI Primary Threshold (£)
NI_UEL	50,270	NI Upper Earnings Limit (£)
NI_MAIN	8%	NI Main Rate
NI_UPPER	2%	NI Upper Rate
NI_CLASS3	17.45	Class 3 NI weekly rate (£)
NI_QUAL_YRS	35	Qualifying years for full State Pension

7.2 Pension

Named Range	Value	Description
PENSION_AA	60,000	Annual Allowance (£)
MPAA	10,000	Money Purchase Annual Allowance (£)
PENSION_MIN_AGE	57	Minimum pension access age (NPA 57 from 2028)
TFC_FRAC	25%	Tax-free cash fraction

Named Range	Value	Description
PENSION_IHT_2027	1	Flag: pension in scope of IHT from 2027

7.3 Modelling

Named Range	Value	Description
CPI	2.5%	Base inflation assumption
EQ_RET_ACC	6.5%	Equity return (accumulation)
EQ_RET_DEC	4.5%	Equity return (decumulation)
BOND_RET	3.0%	Bond return assumption
CASH_RET	4.0%	Cash return assumption
HPI	3.0%	House Price Inflation
CARE_ANNUAL	50,400	Annual care cost (£, today's money)
MC_EQ_SD	15%	Monte Carlo equity standard deviation
MC_BOND_SD	6%	Monte Carlo bond standard deviation
MC_INF_SD	1.5%	Monte Carlo inflation standard deviation
SP_WEEKLY	230.25	State Pension weekly rate (£)
SP_ANNUAL	11,973	State Pension annual rate (£)
SPA	66	State Pension Age
SP_DEFER	5.8%	State Pension deferral rate (per year)

8. Pension Annual Allowance Logic (Wrappers Sheet)

The effective Annual Allowance is calculated in three stages on the Wrappers sheet:

Stage	Formula / Logic	Cell
1. Tapered AA	=MAX(10000, MIN(60000, 60000 - MAX(0, AdjustedIncome - 260000) / 2))	C24
2. Earnings-based cap	=MAX(3600, RelevantUKEarnings)	C26
3. Effective AA	=IF(MPAA_triggered, MIN(10000, MIN(TaperedAA, EarningsCap)), MIN(TaperedAA, EarningsCap))	C30

9. Known Limitations & Exclusions

Item	Status in v1.4
Defined Benefit (DB) pension modelling	Not included — DC/SIPP only
Scottish income tax rates	Not included — England/Wales/NI only

Item	Status in v1.4
Inheritance planning in base case	Excluded — Optimistic scenario only
Automatic ONS CPI / FTSE data pull	Not automated — manual yellow input cells provided
Power Query setup for ONS feeds	Not bundled — user configures via Data > Get Data
Multi-property portfolio	Single primary residence + one investment property
Trust structures	Not included
Non-UK domicile / remittance basis	Not included
Pension IHT (post-2027)	Flag only — detailed modelling deferred to v2

10. Version History

Version	Date	Changes
v1.0	Jan 2026	Initial build — 17 core sheets, VBA foundation
v1.1	Jan 2026	Phase 14: Pension AA taper + earnings cap; Phase 15: Charts & Visuals tab
v1.2	Feb 2026	Phase 16–20: Dropdowns, cell protection, couple-aware fields, partner locking, chart repositioning
v1.3	Feb 2026	Amendments H–J: Insurance & Protection, Asset Register, Market Data refresh button + VBA
v1.4a	Mar 2026	CF consolidation fix: Monthly Tracker 650 → 2 conditional format rules
v1.4b	Mar 2026	Copyright + disclaimer expansion; Polyglyph Analytica branding
v1.4c	Mar 2026	Real BoE/ECB API calls replacing placeholders; Form Control button; Gemini AI integration
v1.4d	Mar 2026	Bug fixes: Chr(10003)→ChrW; MD_BOE_ROW/GILT_ROW constants corrected; value col corrected
v1.4e	Mar 2026	ECB JSON parser rewritten to target observation array value (not key); INR added to FX registry
v1.4f	Mar 2026	Gemini key instructions: explicit free/no-charge messaging added to sheet and VBA dialog
v1.4g	Mar 2026	Manual input yellow cells for CPI, FTSE, Earnings, HPI; VBA no longer overwrites manual rows; this document

11. Legal & Disclaimer

Important: This workbook is released into the public domain without warranty. Calculations may contain errors. Nothing in this tool constitutes financial advice. Always consult an FCA-regulated financial adviser before making investment, pension, or tax decisions. Past modelled returns are not indicative of future results.

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