



LEARNDATA
INSIGHTS

Financial Modelling with UK Banking Industry Data



In this session you will learn how to..

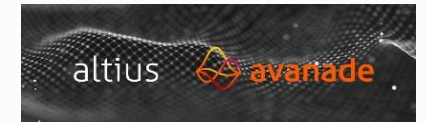
- Take industry Income Statement/Balance Sheet data for 4 Banks (Barclays, Citi, HSBC, Lloyds) and turn it into a financial reporting solution in Power BI
- Create an interactive benchmarking report comparing the financial performance of the Banks on key metrics such as Income Growth, Cost:Income Ratio and Current Ratio
- Create a simple Income Statement and Balance Sheet for each bank
- Link the Income Statement and Balance sheet together through Retained Earnings
- Introduce what-if scenario modelling for key variables such as headcount growth and annual change in loans/deposits

About Me

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Microsoft Most Valuable Professional
Microsoft Certified Trainer
Power BI Fast Track Recognised Solution Architect
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See my past sessions and details of communities at www.rishisapra.com

What we'll build

Banking Industry Financial Ratio Benchmark Analysis

Barclays vs Citi vs Lloyds vs HSBC

Benchmark

Financial Statements

FS Modelling

Bank

Multiple selections



Filters

Current Ratio

Loan to Asset Ratio

Net Income Growth

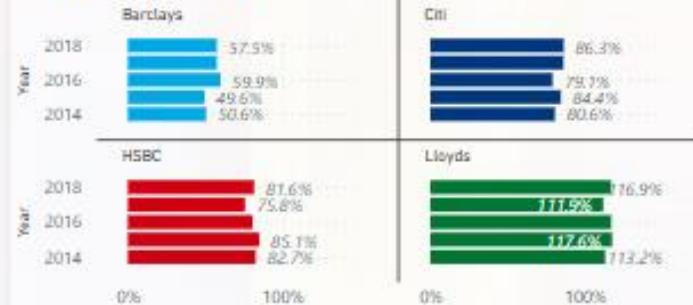
Return on Assets

Current Ratio by Year and Bank

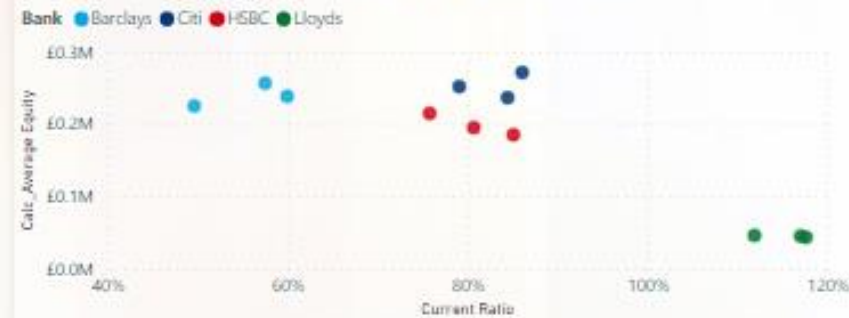
Bank ● Barclays ● Citi ● HSBC ● Lloyds



Current Ratio by Year and Bank



Current Ratio and Calc_Average Equity by Year and Bank

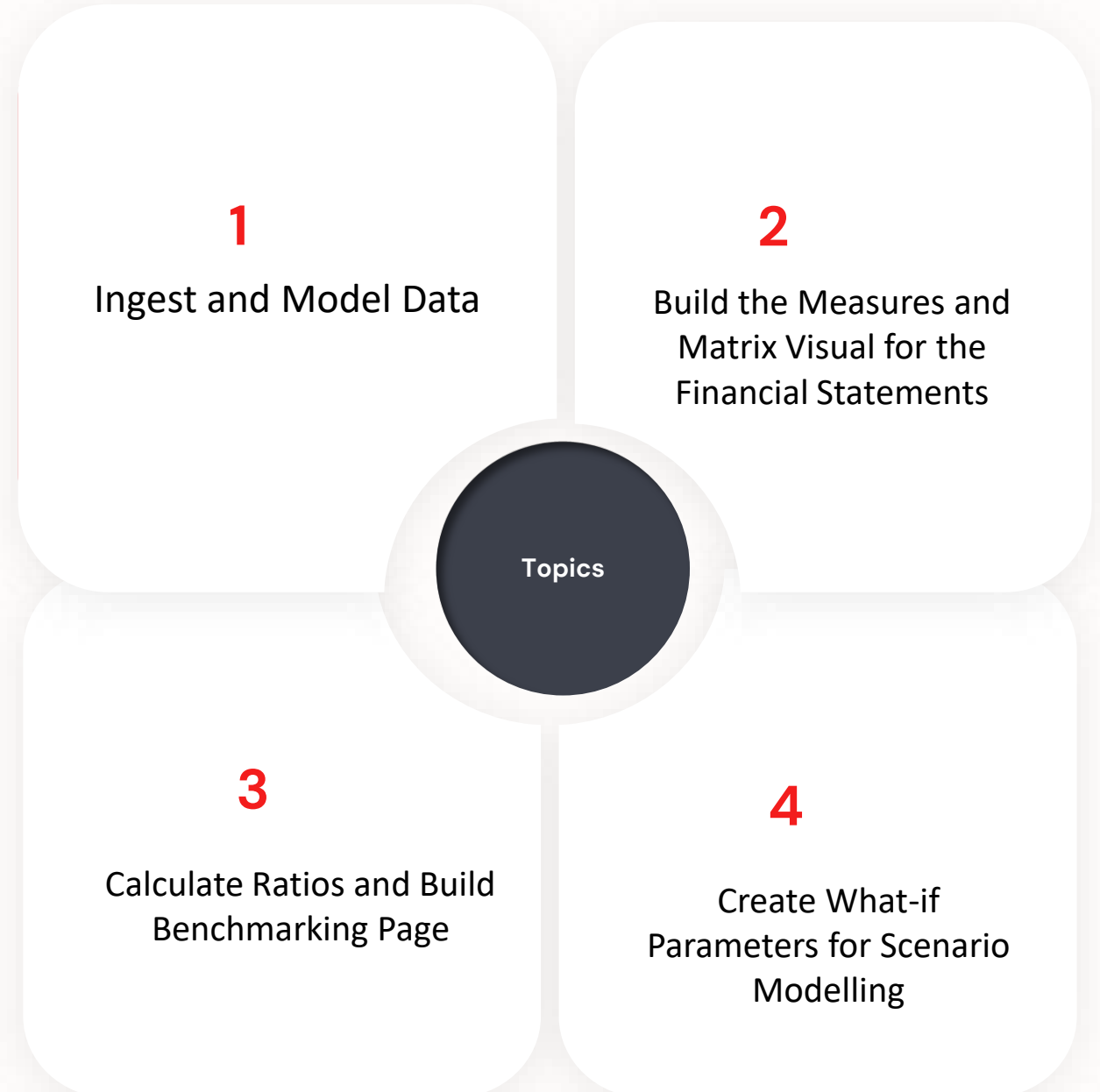


Banking FS Model_Step4, Benchmark

Data updated on 11/12/22, 3:28 PM



How do you build this?






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1: Ingest and Model Data



1. Ingest and Model Data

- Store your files on SharePoint (OneDrive/Teams) rather than a local drive!
- Unpivot the years and join back on all dimensions to return keys
- FS Lines: This is a manually created table that contains the rows we want in our Income Statement/Balance sheet with a corresponding "Calculation Type" (e.g. "Sub-Total (Same Category)", "Calculated", "FS Modelled Line")

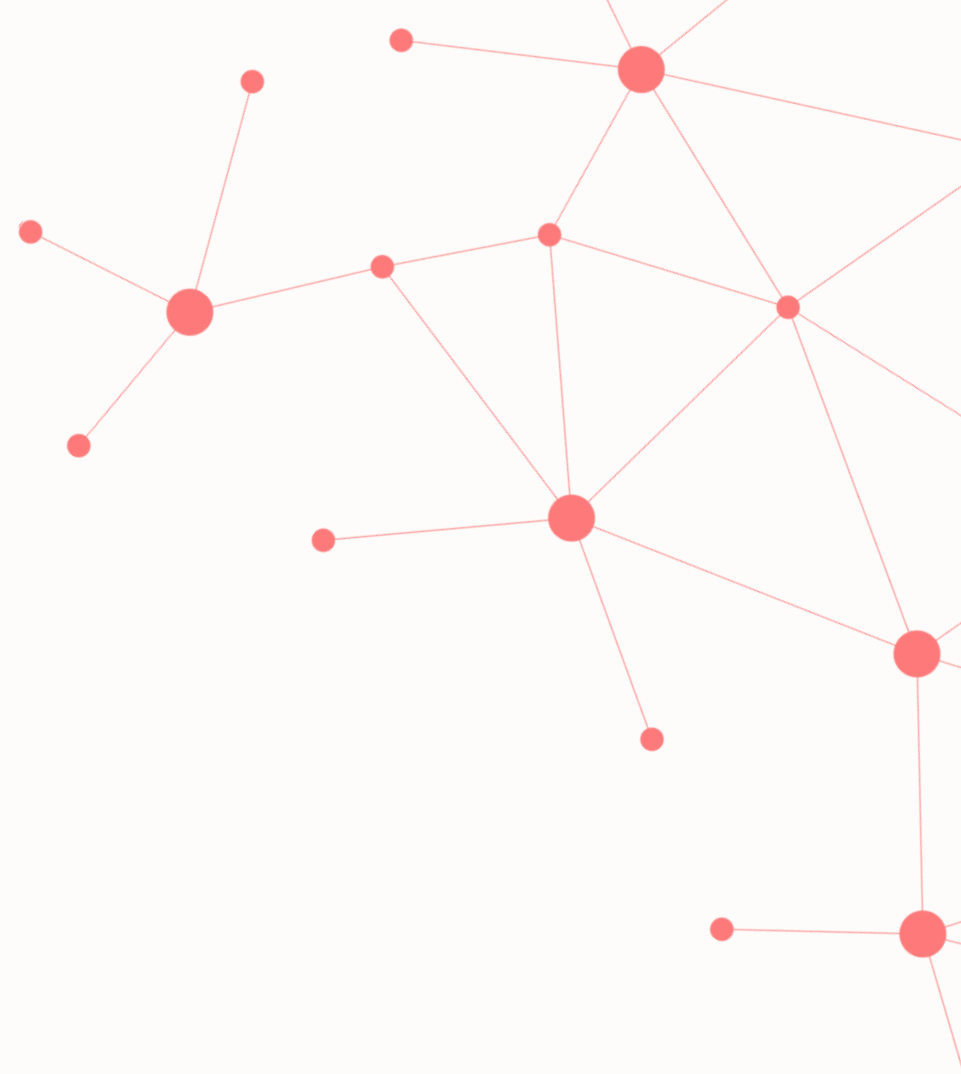
 1 ² ₃ FS Line Number	A ^B _C Financial Statement	A ^B _C FS Line Category	A ^B _C FS Line	1 ² ₃ Calc Type
1	1 BS	Assets	Business & Consumer Loans	5
2	2 BS	Assets	Trading Portfolio Assets	1
3	3 BS	Assets	Derivatives	1
4	4 BS	Assets	Cash & Short Term	1
5	5 BS	Assets	Financial Assets	1
6	6 BS	Assets	Other Assets	1
7	7 BS	Assets	Total Assets	2
8	8 BS	Liabilities	Deposits	5
9	9 BS	Liabilities	Senior Secured Debt	1
10	10 BS	Liabilities	Senior Unsecured Debt	1
11	11 BS	Liabilities	Subord Term Debt	1
12	12 BS	Liabilities	Hybrid Convertibles	1

 1 ² ₃ CalcType	A ^B _C Calc Type Description	A ^B _C Colour
1	1 FS Line	#373F51
2	2 Sub-Total (Same Category)	#657A85
3	3 Sub-Total (Same FS)	#00828C
4	4 Calculated	#666666
5	5 Modelled FS Line	#E6A8BE
6	6 Retained Earnings	#666666



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2: Build the Measures and Matrix Visual for the Financial Statements



2. Build the Measures and Matrix Visual for the Financial Statements

TE3 Measures Script 1

```
/*
Step 1: In this step we create the base measures we need for our Financial Statements
This creates an overall measure called FS Lines total, with a SWITCH Statement based on the Calc Type
For simplicity, the measures underneath are mainly just blank values, but we will recreate these in subsequent steps

*/
//1. Just the Sum of our Value column - for all non-calculated lines (we don't have a chart of accounts here!)
MEASURE '__Measures'[Total Amount] = SUM( '_AccountsData'[Value] )
DisplayFolder = "FS Measures"

//2. Now we create measures for our other calc types, for now just creating these as blank measures
MEASURE '__Measures'[Category Running Total] = BLANK( )
DisplayFolder = "FS Measures"

MEASURE '__Measures'[FS Line Running Total] = BLANK( )
DisplayFolder = "FS Measures"

MEASURE '__Measures'[BS Calculated Value] = BLANK( )
DisplayFolder = "FS Measures"

MEASURE '__Measures'[FS Modelled Value] = [Total Amount]
DisplayFolder = "FS Measures"

MEASURE '__Measures'[Calc_Retained Earnings_Equity] = BLANK( )
DisplayFolder = "FS Measures"

//3. Now we create our main FS Lines Measure which picks the right one depending on the calc type
MEASURE '__Measures'[FS Line Value] =
VAR SelectedFSLineType =
| SELECTEDVALUE( 'FSLines'[Calc Type Description], "FS Line" )
RETURN
```

- **Total Amount = (SUM('_AccountsData'[Value])**
- **Category Running Total, FS Line Running Total, BS Calculated Value, FS Modelled Value, Retained Earnings (Equity): All set to BLANK() for now**
- **FS Line Value: SWITCH Measure based on Calc Type (this is just switching between numerous blank measures for now but we will gradually populate/overwrite the underlying measures in later scripts!)**

TE3 Measures Script 2

```
/*
Step 2: Create the running total measures

*/
//1. Category Running Total (e.g. "Total Assets", "Total Income")
MEASURE '__Measures'[Category Running Total] =

//a. Define this as a cumulative total pattern:
//identify the Current FS Line Number in scope and define the cumu

VAR SelectedFS =
| SELECTEDVALUE( 'FSLines'[Financial Statement] )
VAR SelectedCategory =
| SELECTEDVALUE( 'FSLines'[FS Line Category] )
VAR SelectedFSLineNo =
| SELECTEDVALUE( 'FSLines'[FS Line Number] )
VAR CategoryFilter =
| CALCULATETABLE(
| 'FSLines',
| 'FSLines'[FS Line Category] = SelectedCategory,
| ALL( 'FSLines' )
)
VAR TotalFilter =
| CALCULATETABLE(
| 'FSLines',
| 'FSLines'[FS Line Number] < SelectedFSLineNo,
| ALL( 'FSLines' )
)
VAR CombinedFilter =
| FILTER(
| ALL( 'FSLines' ),
| 'FSLines'[FS Line Category] = SelectedCategory
```

- **Category Running Total, FS Line Running Total:**
 - **Cumulative Total Pattern: CALCULATETABLE function where FS Line Number <= SELECTEDVALUE([FS Line Number])**
 - **Iterate over the result of the CALCULATETABLE with SUMX with the 2nd parameter an IF statement choosing the right measure depending on Calc Type**

TE3 Measures Script 3

```
/*
Step 3: Create the core Balance Sheet Measures and BS Calculated Value

*/
//1. Total Assets =
MEASURE '__Measures'[Total Assets] =
VAR FSLineFilter =
| CALCULATETABLE(
| 'FSLines',
| 'FSLines'[FS Line Category] = "Assets"
)
RETURN
SUMX(
| FSLineFilter,
| SWITCH(
| 'FSLines'[Calc Type Description],
| "FS Line", [Total Amount],
| "Modelled FS Line", [FS Modelled Value],
| BLANK( )
)
)
DisplayFolder = "Core Balance Sheet Measures"

//2. Total Liabilities (Excluding Balancing Figure)
```

- **Total Assets, Total Liabilities, Total Equity:**
 - **CALCULATETABLE function where FS Line Category = [Assets]**
 - **Iterate over the result of the CALCULATETABLE with SUMX with the 2nd parameter an IF statement choosing the right measure depending on Calc Type**
- **Retained Earnings:**
 - **Income Statement Retained Earnings: All IS Lines above the "Retained Earnings" line**
 - **Balance Sheet Retained Earnings: Cumulative Total of IS Retained Earnings**

2. Build the Measures and Matrix Visual for the Financial Statements

Income Statement

FS Line	2014	2015	2016	2017	2018
Returns	£153,938	£166,253	£151,113	£152,526	£141,227
Cost of Funding	(£44,117)	(£46,323)	(£47,669)	(£51,181)	(£46,461)
Total Income	£109,821	£119,930	£103,444	£101,345	£94,766
Credit Impairment and Provisions	(£232)	(£234)	(£243)	(£241)	(£225)
Net Income	£109,589	£119,696	£103,201	£101,104	£94,541
Staff Costs	(£32,042)	(£33,324)	(£32,042)	(£31,734)	(£30,810)
Non-staff Costs	(£37,278)	(£40,633)	(£42,036)	(£42,433)	(£39,657)
Operating Expenses	(£69,320)	(£73,957)	(£74,078)	(£74,167)	(£70,467)
P&L Before Tax	£40,269	£45,739	£29,123	£26,937	£24,074
Tax	(£7,336)	(£7,483)	(£7,700)	(£7,853)	(£7,424)
Profit After Tax	£32,933	£38,256	£21,423	£19,084	£16,650
Dividends	(£5,476)	(£5,586)	(£5,533)	(£5,489)	(£5,188)
Retained Earnings	£27,457	£32,670	£15,890	£13,595	£11,462

Balance Sheet

FS Line Category	2014	2015	2016	2017	2018
Assets					
Business & Consumer Loans	£693,268	£734,864	£787,148	£736,597	£722,154
Trading Portfolio Assets	£495,852	£530,562	£520,158	£490,990	£486,129
Derivatives	£354,003	£371,703	£378,783	£389,403	£354,003
Cash & Short Term	£323,798	£333,512	£370,055	£380,730	£355,822
Financial Assets	£228,267	£237,398	£253,078	£265,484	£248,116
Other Assets	£254,454	£259,543	£254,454	£264,433	£249,465
Total Assets	£2,349,642	£2,467,582	£2,563,676	£2,527,637	£2,415,689
Liabilities					
Deposits	£1,371,035	£1,480,718	£1,313,096	£1,280,975	£1,254,970
Senior Secured Debt	£183,864	£194,896	£195,487	£190,913	£176,549
Senior Unsecured Debt	£268,613	£263,785	£254,805	£263,435	£245,913
Subord Term Debt	£271,884	£288,197	£291,723	£269,115	£261,067
Hybrid Convertibles	£177,105	£182,418	£200,321	£202,981	£182,590
Other Liabilities	£28,690	£28,977	£29,376	£29,776	£27,281
Balancing Figure	(£169,931)	(£219,221)	(£5,614)	(£15,071)	(£43,201)
Total Liabilities	£2,131,260	£2,219,770	£2,279,194	£2,222,124	£2,105,169
Equity					
Share Capital and Share Premium	£81,404	£83,032	£86,388	£90,541	£83,065
Other Equity Instruments and Reserves	£11,492	£11,837	£12,481	£13,469	£12,357
Retained Earnings (Equity)	£125,486	£158,156	£168,833	£199,208	£212,965
Non-controlling Interests	£0	£0	£0	£0	£0
Total Equity	£218,382	£253,025	£267,702	£303,218	£308,387
Balance Sheet Totals					
Average Equity		£225,016	£238,327	£256,508	

Rows

FS Line ✓ ✕

FS Line Number ✓ ✕

Columns

Year ✓ ✕

Values

FS Line Value ✓ ✕

Filters on this visual ...

Financial Statement...

is IS

Rows

FS Line ✓ ✕

FS Line Number ✓ ✕

Columns

Year ✓ ✕

Values

FS Line Value ✓ ✕

Filters on this visual ...

Financial Statement...

is BS



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3: Calculate Ratios and Build Benchmarking Page



3. Calculate Ratios and Build Benchmarking Page

TE3 Measures Script 4

```
/*
Step 4: Creating Key Financial Ratios for benchmarking comparison
*/

//1. Net Income Growth

MEASURE __Measures[Net Income Growth] =
VAR MinYear = CALCULATE( MIN( Years[Year] ), ALL( Years ) )
VAR CurrentYear = SELECTEDVALUE( Years[Year] )
VAR PreviousYearValue = CurrentYear - 1
VAR PriorYearNetIncome = CALCULATE( [FS Line Value], FSLines[FS Line] = "Net Income", Years[
VAR CurrentYearNetIncome = CALCULATE( [FS Line Value], FSLines[FS Line] = "Net Income", Year
RETURN
    IF( CurrentYear = MinYear, 0, DIVIDE( CurrentYearNetIncome - PriorYearNetIncome, PriorYe
DisplayFolder = "Benchmark Analysis"
FormatString = "0.0%"

//2. Loan to Asset Ratio

MEASURE __Measures[Loan to Asset Ratio] =

VAR TotalLoans = CALCULATE( [FS Line Value], FSLines[FS Line] = "Business & Consumer Loans" )
VAR Assets = CALCULATE( [FS Line Value], FSLines[FS Line Category] = "Assets" ) - TotalLoans
RETURN
    DIVIDE(TotalLoans,TotalLoans+Assets)
DisplayFolder = "Benchmark Analysis"
FormatString = "0.0%"
```

- **Net Income Growth, Loan to Asset Ratio, Current Ratio**

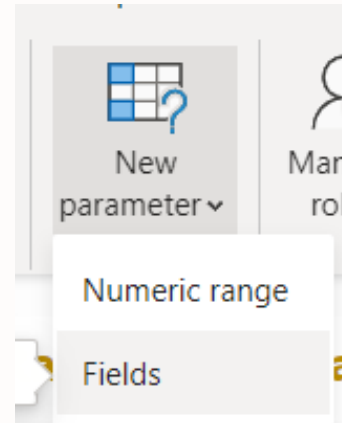
```
MEASURE __Measures[Loan to Asset Ratio] =
```

```
VAR TotalLoans = CALCULATE( [FS Line Value], FSLines[FS Line] =
"Business & Consumer Loans" )
VAR Assets = CALCULATE( [FS Line Value], FSLines[FS Line
Category] = "Assets" ) - TotalLoans
RETURN
    DIVIDE(TotalLoans,TotalLoans+Assets)
```

```
MEASURE __Measures[Current Ratio] =
```

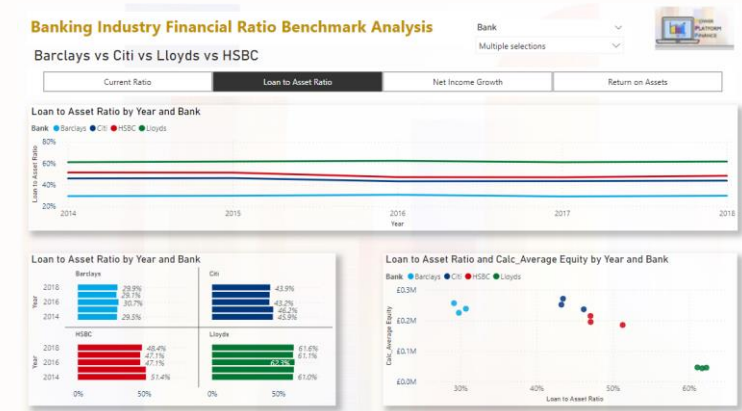
```
VAR Assets = CALCULATE( [FS Line Value], FSLines[FS Line] =
"Business & Consumer Loans" )
VAR Liabilities = CALCULATE( [FS Line Value], FSLines[FS Line]
= "Deposits" )
RETURN
    DIVIDE( Assets, Liabilities )
```

Field Parameters



```
Benchmark Ratio = {
    ("Current Ratio",
NAMEOF('__Measures'[Current Ratio]),
0),
    ("Loan to Asset Ratio",
NAMEOF('__Measures'[Loan to Asset
Ratio]), 1),
    ("Net Income Growth",
NAMEOF('__Measures'[Net Income
Growth]), 2),
    ("Return on
Assets",NAMEOF(__Measures[Return on
Assets]),3)
}
```

Build Visualisations

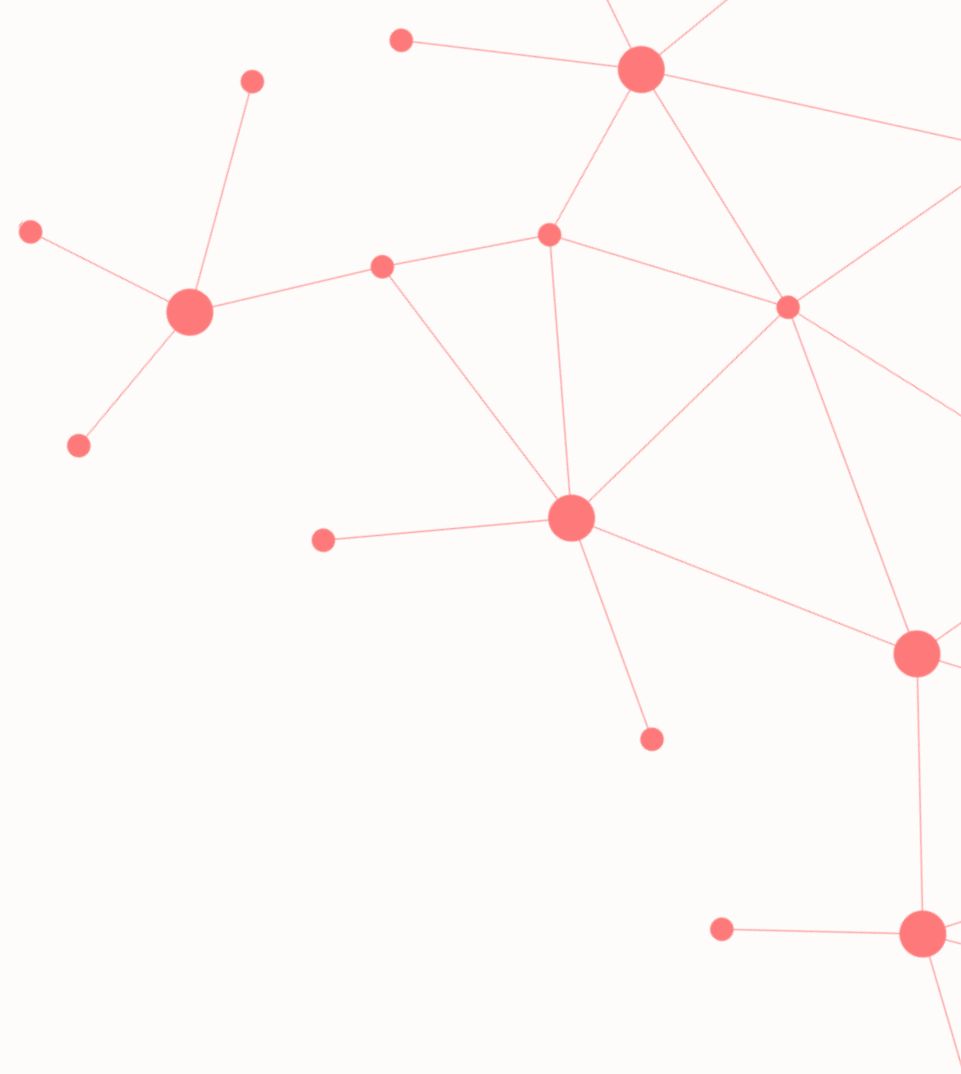


- Use Bank dimension field as a legend/small multiple (with the same colours) consistently on each graph
- Multi-select slicer to select a fewer number of banks to compare if required
- For Growth measures (e.g. Net Income Growth), starting each bank from the same baseline of 0% for the earliest year



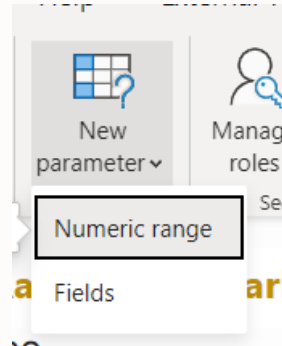
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4: Create What-if Parameters for Scenario Modelling

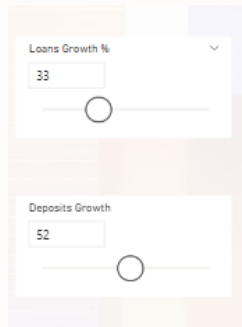


4. Create What-if Parameters for Scenario Modelling

What-if Fields



- **Deposits, Headcounts and Loans:** All numeric range parameters from 1 to 100 representing a % growth number
- These parameters are shown as a slicer on the page



TE3 Measures Script 5

```
/*
Step 5: Create the Modelled values
*/
//1. Modelled Loans
MEASURE '__Measures'[Modelled Loans] =
VAR SelectedScenario = SELECTEDVALUE(tblScenario[Scenario],"Original")
VAR IsModelled = SelectedScenario="Modelled"
VAR DefaultValue = [Total Amount]
VAR LoansGrowthValue = [$WhatIf_Loans Value]
RETURN
IF(IsModelled,DefaultValue * (1+(LoansGrowthValue/100)),DefaultValue)
DisplayFolder = "Scenario Modelling"

//2. Modelled Deposits
MEASURE '__Measures'[Modelled Deposits] =
VAR SelectedScenario = SELECTEDVALUE(tblScenario[Scenario],"Original")
VAR IsModelled = SelectedScenario="Modelled"
VAR DefaultValue = [Total Amount]
VAR DepositsGrowthValue = [$WhatIf_Deposits Value]
RETURN
IF(IsModelled,DefaultValue * (1+(DepositsGrowthValue/100)),DefaultValue)
DisplayFolder = "Scenario Modelling"
```

```
MEASURE '__Measures'[Modelled Loans] =
VAR SelectedScenario =
SELECTEDVALUE(tblScenario[Scenario],"Original")
VAR IsModelled =
SelectedScenario="Modelled"
VAR DefaultValue = [Total Amount]
VAR LoansGrowthValue = [$WhatIf_Loans
Value]
RETURN
IF(IsModelled,DefaultValue *
(1+(LoansGrowthValue/100)),DefaultValue)
DisplayFolder = "Scenario Modelling"
```

Comparison FS– Original vs Modelled

Original						Parameters	Modelled					
FS Line	2014	2015	2016	2017	2018		FS Line	2014	2015	2016	2017	2018
Business & Consumer Loans	£693,288	£734,864	£787,148	£736,597	£722,154	Loans Growth %	Business & Consumer Loans	£922,046	£977,369	£1,048,907	£979,674	£980,465
Trading Portfolio Assets	£495,852	£530,562	£520,158	£490,990	£486,129	33	Trading Portfolio Assets	£495,852	£530,562	£520,158	£490,990	£486,129
Derivatives	£354,003	£371,703	£378,783	£389,403	£354,003		Derivatives	£354,003	£371,703	£378,783	£389,403	£354,003
Cash & Short Term	£323,798	£333,512	£370,055	£380,730	£355,822		Cash & Short Term	£323,798	£333,512	£370,055	£380,730	£355,822
Financial Assets	£228,267	£237,398	£253,078	£265,484	£248,116		Financial Assets	£228,267	£237,398	£253,078	£265,484	£248,116
Other Assets	£254,454	£259,543	£254,454	£264,433	£249,465		Other Assets	£254,454	£259,543	£254,454	£264,433	£249,465
Total Assets	£2,349,842	£2,467,582	£2,563,676	£2,527,637	£2,415,689	Deposits Growth %	Total Assets	£2,578,420	£2,710,087	£2,823,435	£2,770,714	£2,654,000
Deposits	£1,371,035	£1,480,718	£1,313,096	£1,280,975	£1,254,970	52	Deposits	£2,083,973	£2,250,691	£1,995,906	£1,947,082	£1,907,554
Senior Secured Debt	£183,864	£194,896	£195,487	£190,913	£176,549		Senior Secured Debt	£183,864	£194,896	£195,487	£190,913	£176,549
Subordinated Debt	£288,813	£283,785	£284,805	£283,435	£245,913		Subordinated Debt	£288,813	£283,785	£284,805	£283,435	£245,913
Hybrid Convertibles	£177,105	£182,418	£200,321	£202,981	£182,590		Hybrid Convertibles	£177,105	£182,418	£200,321	£202,981	£182,590
Other Liabilities	£78,805	£78,877	£70,374	£70,774	£77,581		Other Liabilities	£78,805	£78,877	£70,374	£70,774	£77,581

- Create new (disconnected) table with a single column and 2 rows: “Original” and “Modelled” which is used as a visual level filter for both Financial Statements
- Update the [FS Modelled] measure to now have a switch statement between Deposits, Headcounts and Loans, returning the correct measure



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Summary



Summary

How do you
build this?

