



**WELCOME
TO
BANK LOAN
PROJECT**

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Project Title

Bank Loan performance Analysis

Problem Statement:

In today's data-driven world, understanding how borrower details and loan characteristics impact loan performance is very important for banking institutions. This project seeks to delve deep into a lending loan dataset to uncover the relationship between borrower behavior (such as employment length, income, and debt-to-income ratio) and loan characteristics (including amount, term, and interest rate) to unearth critical insights into loan performance metrics. By examining patterns in loan statuses such as fully paid, charged off, or late payments, this analysis aims to empower banking institutions with actionable insights to optimize loan lending strategies, mitigate credit risk, and enhance overall portfolio performance.

bank loan - Excel

This screenshot shows the 'LoanDetails' sheet from the 'bank loan.xlsx' file. The table has 13 columns: id, loan_amnt, funded_amnt, term, int_rate, installment, grade, sub_grade, issue_d, loan_status, and purpose. The data consists of 23 rows of loan information.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	id	loan_amnt	funded_amnt	term	int_rate	installment	grade	sub_grade	issue_d	loan_status	purpose						
2	1077501	5000	4975	36 months	10.65	162.87	B	B2	Dec-18	Fully Paid	credit_card						
3	1077430	2500	2500	60 months	15.27	59.83	C	C4	Dec-18	Charged Off	car						
4	1077175	2400	2400	36 months	15.96	84.33	C	C5	Dec-18	Fully Paid	small_business						
5	1076663	10000	10000	36 months	13.49	339.31	C	C1	Dec-18	Fully Paid	other						
6	1075358	3000	3000	60 months	12.69	67.79	B	B5	Dec-18	Current	other						
7	1075269	5000	5000	36 months	7.9	156.46	A	A4	Dec-18	Fully Paid	wedding						
8	1069639	7000	7000	60 months	15.96	170.08	C	C5	Dec-18	Current	debt_consolidation						
9	1072053	3000	3000	36 months	18.64	109.43	E	E1	Dec-18	Fully Paid	car						
10	1071795	5600	5600	60 months	21.28	152.39	F	F2	Dec-18	Charged Off	small_business						
11	1071570	5375	5350	60 months	12.69	121.45	B	B5	Dec-18	Charged Off	other						
12	1070078	6500	6500	60 months	14.65	153.45	C	C3	Dec-18	Fully Paid	debt_consolidation						
13	1069908	12000	12000	36 months	12.69	402.54	B	B5	Dec-18	Fully Paid	debt_consolidation						
14	1064687	9000	9000	36 months	13.49	305.38	C	C1	Dec-18	Charged Off	debt_consolidation						
15	1069866	3000	3000	36 months	9.91	96.68	B	B1	Dec-18	Fully Paid	credit_card						
16	1069057	10000	10000	36 months	10.65	325.74	B	B2	Dec-18	Charged Off	other						
17	1069759	1000	1000	36 months	16.29	35.31	D	D1	Dec-18	Fully Paid	debt_consolidation						
18	1065775	10000	10000	36 months	15.27	347.98	C	C4	Dec-18	Fully Paid	home_improvement						
19	1069971	3600	3600	36 months	6.03	109.57	A	A1	Dec-18	Fully Paid	major_purchase						
20	1062474	6000	6000	36 months	11.71	198.46	B	B3	Dec-18	Fully Paid	medical						
21	1069742	9200	9200	36 months	6.03	280.01	A	A1	Dec-18	Fully Paid	debt_consolidation						
22	1069740	20250	19142.16108	60 months	15.27	484.63	C	C4	Dec-18	Fully Paid	debt_consolidation						
23	1039153	21000	21000	36 months	12.42	701.73	B	B4	Dec-18	Charged Off	debt_consolidation						

bank loan - Excel

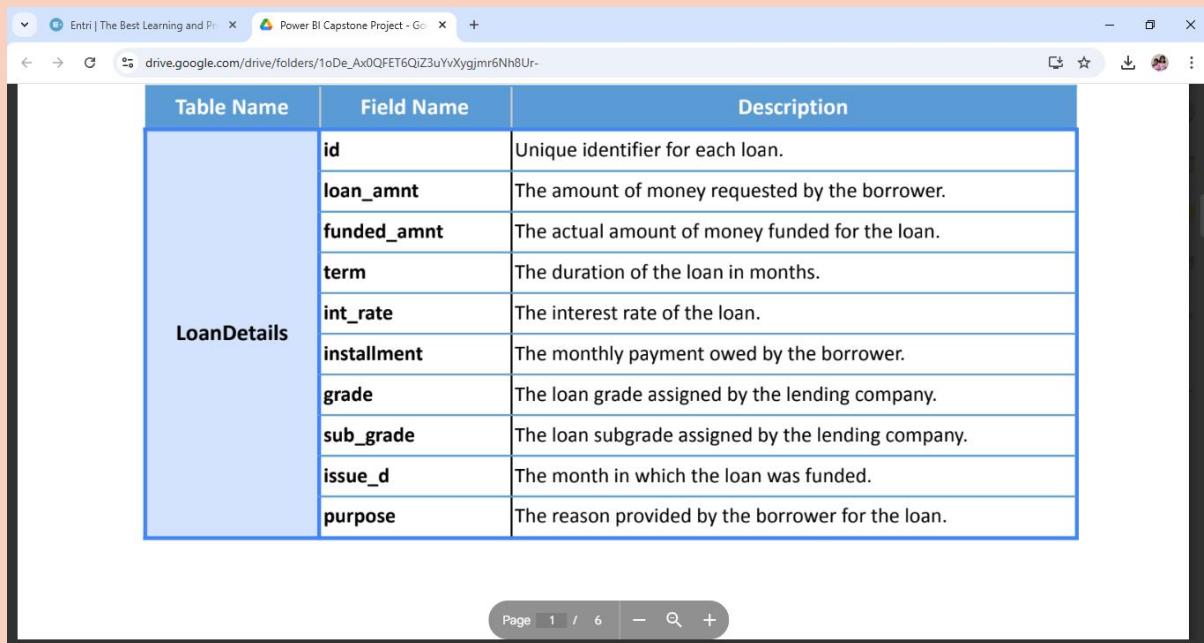
This screenshot shows the 'BorrowerDetails' sheet from the 'bank loan.xlsx' file. The table has 15 columns: member_id, loan_id, emp_length, home_ownership, annual_inc, verification_status, dti, delinq_2yrs, last_pymnt_d, total_pymnt, and out_prncp. The data consists of 23 rows of borrower information.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	
1	member_id	loan_id	emp_length	home_ownership	annual_inc	verification_status	dti	delinq_2yrs	last_pymnt_d	total_pymnt	out_prncp						
2	1296599	1077501	10+ years	RENT	24000	Verified	27.65	0	Jan-15	5861.071414	0						
3	1314167	1077430	<1 year	RENT	30000	Source Verified	1	0	Apr-20	1008.71	0						
4	1313524	1077175	10+ years	RENT	12252	Not Verified	8.72	0	Jun-21	3003.653644	0						
5	1277178	1076663	10+ years	RENT	49200	Source Verified	20	0	Jan-15	12226.30221	0						
6	1311748	1075350	1 year	RENT	80000	Source Verified	17.94	0	Jan-16	3242.17	766.9						
7	1311441	1075269	3 years	RENT	36000	Source Verified	11.2	0	Jan-15	5631.377753	0						
8	1304742	1069639	8 years	RENT	47000	Not Verified	23.51	0	Jan-16	8136.84	1889.15						
9	1288686	1072053	9 years	RENT	48000	Source Verified	5.35	0	Jan-15	3938.144334	0						
10	1306957	1071795	4 years	OWN	40000	Source Verified	5.55	0	Apr-19	646.02	0						
11	1306721	1071570	<1 year	RENT	15000	Verified	18.08	0	Nov-19	1476.19	0						
12	1305201	1070078	5 years	OWN	72000	Not Verified	16.12	0	Jun-20	7677.52	0						
13	1305008	1069908	10+ years	OWN	75000	Source Verified	10.78	0	Sep-20	13943.08	0						
14	1298717	1064687	<1 year	RENT	30000	Source Verified	10.08	0	Jul-19	2270.7	0						
15	1304956	1069866	3 years	RENT	15000	Source Verified	12.56	0	Jan-15	3478.981915	0						
16	1303503	1069057	3 years	RENT	100000	Source Verified	7.06	0	Oct-20	7471.99	0						
17	1304871	1069750	<1 year	RENT	28000	Not Verified	20.31	0	Jan-15	1270.171106	0						
18	1299699	1065775	4 years	RENT	42000	Not Verified	18.6	0	Jan-15	12519.26045	0						
19	1304884	1069971	10+ years	MORTGAGE	110000	Not Verified	10.52	0	May-20	3785.02	0						
20	1294539	1062474	1 year	MORTGAGE	84000	Verified	18.44	2	Feb-15	7164.499852	0						
21	1304853	1069742	6 years	RENT	77385.19	Not Verified	9.86	0	Jul-19	9459.96	0						
22	1284848	1069740	3 years	RENT	43370	Verified	26.53	0	Aug-15	27663.04267	0						
23	1269083	1039153	10+ years	RENT	105000	Verified	13.22	0	Sep-20	14025.4	0						

The dataset "bank loan.xlsx" contains two sheets:

1. **Loan Details** : This sheet contains information about each loan.
2. **Borrower Details** : This sheet provides details about the borrowers.

Data Dictionary



The screenshot shows a Google Sheets document titled "Power BI Capstone Project - Go". The sheet displays a data dictionary for a table named "LoanDetails". The table has three columns: "Table Name", "Field Name", and "Description". The "Table Name" column contains the value "LoanDetails" for all rows. The "Field Name" column lists ten fields: "id", "loan_amnt", "funded_amnt", "term", "int_rate", "installment", "grade", "sub_grade", "issue_d", and "purpose". The "Description" column provides a brief explanation for each field.

Table Name	Field Name	Description
LoanDetails	id	Unique identifier for each loan.
	loan_amnt	The amount of money requested by the borrower.
	funded_amnt	The actual amount of money funded for the loan.
	term	The duration of the loan in months.
	int_rate	The interest rate of the loan.
	installment	The monthly payment owed by the borrower.
	grade	The loan grade assigned by the lending company.
	sub_grade	The loan subgrade assigned by the lending company.
	issue_d	The month in which the loan was funded.
	purpose	The reason provided by the borrower for the loan.

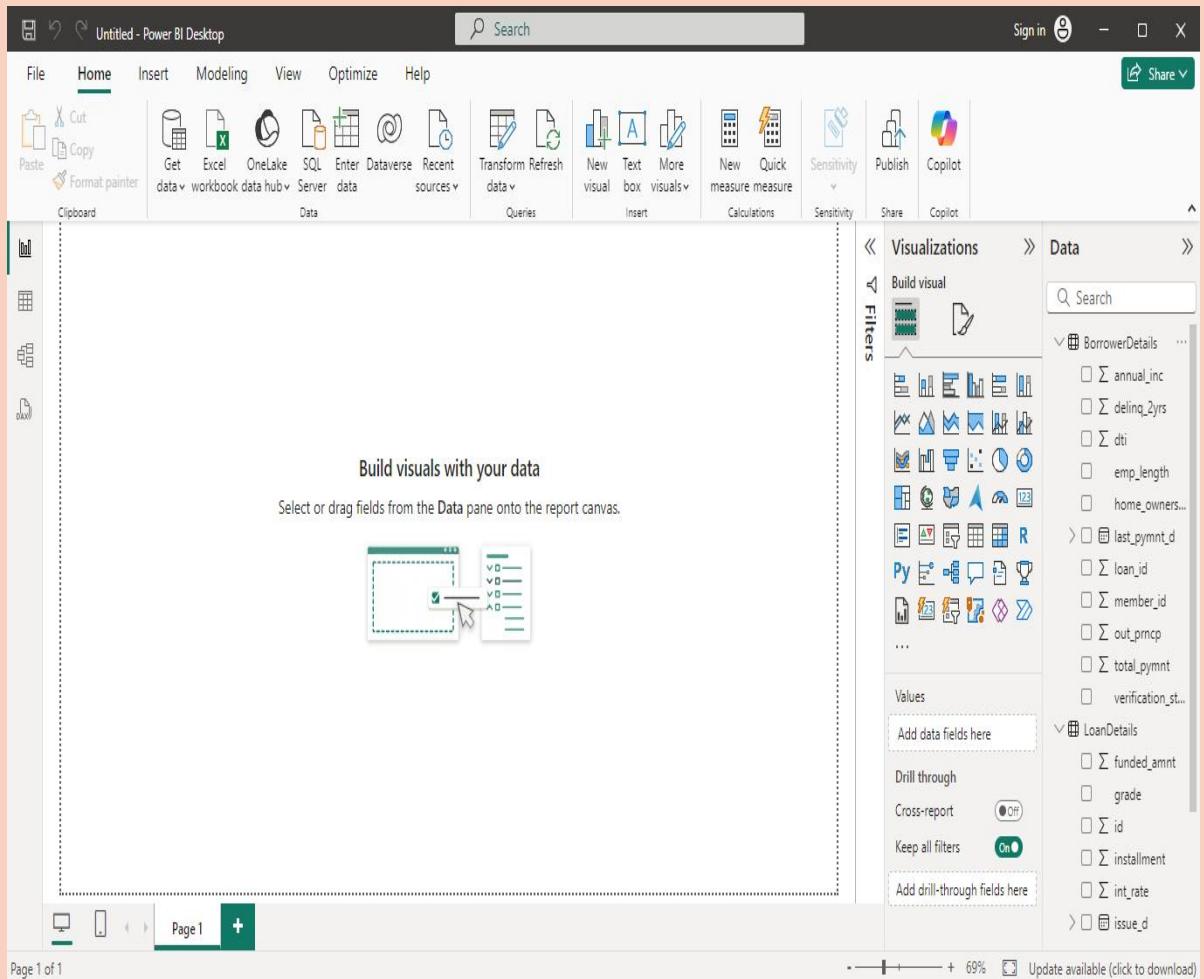
BorrowerDetails	id	Unique identifier for each loan.
	member_id	Unique identifier for each borrower.
	emp_length	Employment length in years.
	home_ownership	The status of home ownership reported by the borrower.
	annual_inc	The annual income reported by the borrower.
	verification_status	Indicates if the borrower's income was verified.
	dti	The debt-to-income ratio of the borrower.
	delinq_2yrs	The number of past-due incidences in the borrower's credit file.
	last_pymnt_d	The month of the last payment received.
	total_pymnt	The total amount received in payments.
	out_prncp	The remaining outstanding principal amount of the loan.

Page 2 / 6 - +

Project Steps and Objectives

1) Importing Data

➤ Import the "LoanDetails" and "BorrowerDetails" sheets from the "bank loan.xlsx" file into Power BI.



2) Transformation Using Power Query

Borrower Details

Power Query Editor - Untitled - BorrowerDetails

APPLIED STEPS

- Changed Type

	member_id	loan_id	emp_length	home_ownership	annual_inc	verification
1	1296599	1077501	10+ years	RENT	24000	Verified
2	1314167	1077430	< 1 year	RENT	30000	Source Verifi
3	1313524	1077175	10+ years	RENT	12252	Not Verified
4	1277178	1076863	10+ years	RENT	49200	Source Verifi
5	1311748	1075358	1 year	RENT	80000	Source Verifi
6	1311441	1075269	3 years	RENT	36000	Source Verifi
7	1304742	1069639	8 years	RENT	47004	Not Verified
8	1288686	1072059	9 years	RENT	48000	Source Verifi
9	1306957	1071795	4 years	OWN	40000	Source Verifi
10	1306721	1071570	< 1 year	RENT	15000	Verified
11	1305201	1070078	5 years	OWN	72000	Not Verified
12	1305008	1065998	10+ years	OWN	75000	Source Verifi
13	1298717	1064687	< 1 year	RENT	30000	Source Verifi
14	1304956	1069865	3 years	RENT	15000	Source Verifi
15	1303503	1069057	7 years	RENT	100000	Source Verifi
16	1304871	1069759	< 1 year	RENT	28000	Not Verified
17	1299699	1065775	4 years	RENT	42000	Not Verified
18	1304884	1065971	10+ years	MORTGAGE	110000	Not Verified
19	1294539	1062474	1 year	MORTGAGE	84000	Verified
20	1304855	1069742	6 years	RENT	77385.19	Not Verified
21	1284848	1069740	3 years	RENT	43370	Verified
22	1269083	1039153	10+ years	RENT	105000	Verified
23	1304821	1069710	10+ years	OWN	50000	Source Verifi
24						

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Loan details

Power Query Editor - Untitled - LoanDetails

APPLIED STEPS

- Changed Type

	id	loan_amnt	funded_amnt	term	int_rate	installment
1	1077501	5000	4975	36 months	10.65	
2	1077430	2500	2500	60 months	15.27	
3	1077175	2400	2400	36 months	15.96	
4	1076863	10000	10000	36 months	13.49	
5	1075358	3000	3000	60 months	12.69	
6	1075269	5000	5000	36 months	7.9	
7	1069639	7000	7000	60 months	15.96	
8	1072053	3000	3000	36 months	18.64	
9	1071795	5600	5600	60 months	21.28	
10	1071570	5375	5350	60 months	12.69	
11	1070078	6500	6500	60 months	14.65	
12	1069908	12000	12000	36 months	12.69	
13	1064687	9000	9000	36 months	13.49	
14	1069866	3000	3000	36 months	9.91	
15	1069057	10000	10000	36 months	10.65	
16	1069759	1000	1000	36 months	16.29	
17	1065775	10000	10000	36 months	15.27	
18	1065971	3600	3600	36 months	6.03	
19	1062474	6000	6000	36 months	11.71	
20	1069742	9200	9200	36 months	6.03	
21	1069740	20250	19142.16108	60 months	15.27	
22	1039153	21000	21000	36 months	12.42	
23	1069710	10000	10000	36 months	11.71	
24						

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Data Cleaning

Handling Missing Values and Duplicates:

- Replace missing values (null) in the 'emp_length' column of the "BorrowerDetails" table with '0 year'.

Screenshot of Power Query Editor showing the 'BorrowerDetails' and 'LoanDetails' tables. The 'LoanDetails' table is selected, displaying columns: loan_id, emp_length, home_ownership, annual_inc, verification_status. A formula bar at the top shows: = Table.ReplaceValue(#"Filtered Rows", null, "0 Year", Replacer.ReplaceValue, {"emp_length"}). The 'APPLIED STEPS' pane shows a step: Replaced Value 0 yr.

loan_id	emp_length	home_ownership	annual_inc	verification_status
1 302032	1067644 '0 Year'	OWN	12000	Source Verified
2 290516	1058717 '0 Year'	MORTGAGE	60000	Verified
3 298394	1064582 '0 Year'	RENT	24000	Source Verified
4 298164	1064366 '0 Year'	RENT	18408	Not Verified
5 296491	1063912 '0 Year'	MORTGAGE	31500	Verified
6 295380	1062897 '0 Year'	MORTGAGE	37800	Not Verified
7 294654	1062781 '0 Year'	MORTGAGE	70000	Source Verified
8 294802	1062535 '0 Year'	MORTGAGE	42000	Not Verified
9 266720	1036838 '0 Year'	MORTGAGE	32000	Verified
10 292992	1061194 '0 Year'	OWN	41100	Not Verified
11 292813	1060848 '0 Year'	MORTGAGE	46212	Verified
12 292242	1060485 '0 Year'	MORTGAGE	45696	Verified
13 290942	1059128 '0 Year'	MORTGAGE	25000	Not Verified
14 287582	1056011 '0 Year'	MORTGAGE	17352	Verified
15 282516	1051228 '0 Year'	OWN	34848	Verified
16 246619	1018385 '0 Year'	MORTGAGE	24000	Verified
17 289493	1057726 '0 Year'	RENT	60000	Verified
18 288882	1057318 '0 Year'	RENT	35000	Not Verified
19 146931	926180 '0 Year'	OWN	40000	Source Verified
20 287654	1056081 '0 Year'	OWN	57000	Source Verified
21 287282	1055716 '0 Year'	RENT	27050	Source Verified
22 287125	1055566 '0 Year'	RENT	84855	Verified
23 286548	1054695 '0 Year'	MORTGAGE	100000	Source Verified
24				

➤ Remove rows with missing values in the 'last_pymnt_d' and 'delinq_2yrs' columns.

Screenshot of Power Query Editor showing the 'BorrowerDetails' and 'LoanDetails' tables. The 'LoanDetails' table is selected, displaying columns: verification_status, dti, delinq_2yrs, last_pymnt_d, total_pymnt. A formula bar at the top shows: = Table.SelectRows(#"Removed Duplicates in delinq 2 yrs", each {[delinq_2yrs] <> null}). The 'APPLIED STEPS' pane shows steps: Filtered Rows!, Filtered Rows, and Removed Duplicates in delin... .

verification_status	dti	delinq_2yrs	last_pymnt_d	total_pymnt
1 24000	27.65	0	01-01-2015	5861.071414
2 84000	18.44	2	01-02-2015	7164.499852
3 50004	13.97	3	01-12-2019	1609.12
4 26000	5.63	1	01-04-2020	4484.79
5 20000	21.16	4	01-07-2020	10324.26
6 40000	23.1	6	01-07-2019	6455.23
7 90000	10.67	5	01-06-2021	6300.059491
8 35000	9.7	8	01-08-2019	4849.59
9 38000	19.93	7	01-06-2021	11362.05711
10 30000	8.82	9	01-05-2021	6218.892494
11 53000	9.74	11	01-03-2021	5868.743445
12 45000	0.53	13	01-09-2017	6159.31
13 50000	17.74	15	01-07-2015	5239.72
14 52000	28.42	10	01-12-2015	23931.04
15 45000	22.48	12	01-12-2015	12631.31
16 48000	24.5	17	01-07-2015	6491.25
17 81000	12.4	18	01-12-2015	18653.71
18 51500	10.16	29	01-11-2021	2766.267664
19 98000	18.16	24	01-01-2016	27345.38
20 50000	17.1	14	01-07-2020	2869.48
21 32646	26.36	21	01-12-2015	1399.31
22 50155	12.28	22	01-09-2015	4427.06
23 55000	11.79	19	01-01-2016	2025.97
24				

➤ Remove duplicate rows in the 'id' column of the "LoanDetails" table.

11 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

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Dealing with Inconsistencies

- Ensure words in the 'purpose' column are separated by spaces instead of underscores (e.g., "credit card" instead of "credit_card").

11 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

PREVIEW DOWNLOADED ON 09 OCTOBER 2024

- Format the 'purpose' and 'home_ownership' columns to proper case.

Untitled - Power Query Editor

File **Home** **Transform** **Add Column** **View** **Tools** **Help**

Queries [2]

BorrowerDetails

	A _C grade	A _C sub_grade	issue_d	A _C loan_status	A _C purpose
1	162.87	B2	01-12-2018	Fully Paid	credit card
2	59.83	C	01-12-2018	Charged Off	car
3	84.33	C5	01-12-2018	Fully Paid	small business
4	339.31	C	01-12-2018	Fully Paid	other
5	67.79	B5	01-12-2018	Current	other
6	156.46	A	01-12-2018	Fully Paid	wedding
7	170.08	C	01-12-2018	Current	debt consolidation
8	109.43	E	01-12-2018	Fully Paid	car
9	152.39	F	01-12-2018	Charged Off	small business
10	121.45	B	01-12-2018	Charged Off	other
11	153.45	C	01-12-2018	Fully Paid	debt consolidation
12	402.54	B	01-12-2018	Fully Paid	debt consolidation
13	305.38	C	01-12-2018	Charged Off	debt consolidation
14	96.68	B	01-12-2018	Fully Paid	credit card
15	325.74	B	01-12-2018	Charged Off	other
16	35.31	D	01-12-2018	Fully Paid	debt consolidation
17	347.98	C	01-12-2018	Fully Paid	home improvement
18	109.57	A	01-12-2018	Fully Paid	major purchase
19	198.46	B	01-12-2018	Fully Paid	medical
20	280.01	A	01-12-2018	Fully Paid	debt consolidation
21	484.63	C	01-12-2018	Fully Paid	debt consolidation
22	701.73	B	01-12-2018	Charged Off	debt consolidation
23	330.76	B	01-12-2018	Fully Paid	credit card
24					

11 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

LoanDetails

Properties

Name: LoanDetails

All Properties

Applied Steps

- Source
- Navigation
- Promoted Headers
- Changed Type
- replace underscores into spaces

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➤ Format the 'purpose' and 'home_ownership' columns to proper case.

Untitled - Power Query Editor

File **Home** **Transform** **Add Column** **View** **Tools** **Help**

Queries [2]

BorrowerDetails

	A _C member_id	A _C loan_id	A _C emp_length	A _C home_ownership	1.2 annual_inc	A _C verification
1	1296599	1077501	10+ years	Rent	24000	Verified
2	1294539	1062474	1 year	Mortgage	84000	Verified
3	1304764	1069657	2 years	Rent	50004	Not Verified
4	1304678	1065790	10+ years	Mortgage	106000	Not Verified
5	1237299	1045966	1 year	Mortgage	120000	Source Verified
6	1237118	1010121	2 years	Rent	40000	Not Verified
7	1235765	1009060	4 years	Rent	90000	Not Verified
8	955364	755513	2 years	Rent	35000	Not Verified
9	937109	739530	10+ years	Mortgage	130000	Verified
10	890529	699027	5 years	Rent	53000	Source Verified
11	111361	113231	2 years	Mortgage	45000	Not Verified
12	11649961	9798051	4 years	Rent	50000	Verified
13	10771452	8988624	9 years	Mortgage	62000	Verified
14	6499370	5177012	1 year	Rent	51500	Not Verified
15	4593084	3540486	5 years	Rent	98000	Source Verified
16	37116406	34453079	2 years	Rent	50155	Not Verified
17	31178028	28644790	10+ years	Mortgage	57000	Not Verified

11 COLUMNS, 17 ROWS Column profiling based on top 1000 rows

Properties

Name: BorrowerDetails

All Properties

Applied Steps

- Source
- Navigation
- Promoted Headers
- Changed Type
- Removed Duplicates in dellin...
- Filtered Rows1
- Filtered Rows
- Removed Duplicates in last p...
- home_ownership in proper ca...

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Queries [2]

BorrowerDetails

LoanDetails

Grade Sub Grade Issue D Loan Status Purpose

	A _C grade	A _C sub_grade	A _C issue_d	A _C loan_status	A _C purpose
1	162.87	B2	01-12-2018	Fully Paid	Credit Card
2	59.83	C	01-12-2018	Charged Off	Car
3	84.33	C	01-12-2018	Fully Paid	Small Business
4	339.31	C	01-12-2018	Fully Paid	Other
5	67.79	B	01-12-2018	Current	Other
6	156.46	A	01-12-2018	Fully Paid	Wedding
7	170.08	C	01-12-2018	Current	Debt Consolidation
8	105.43	E	01-12-2018	Fully Paid	Car
9	152.39	F	01-12-2018	Charged Off	Small Business
10	121.45	B	01-12-2018	Charged Off	Other
11	153.45	C	01-12-2018	Fully Paid	Debt Consolidation
12	402.54	B	01-12-2018	Fully Paid	Debt Consolidation
13	305.38	C	01-12-2018	Charged Off	Debt Consolidation
14	96.68	B	01-12-2018	Fully Paid	Credit Card
15	325.74	B	01-12-2018	Charged Off	Other
16	35.31	D	01-12-2018	Fully Paid	Debt Consolidation
17	347.98	C	01-12-2018	Fully Paid	Home Improvement
18	105.57	A	01-12-2018	Fully Paid	Major Purchase
19	198.46	B	01-12-2018	Fully Paid	Medical
20	280.01	A	01-12-2018	Fully Paid	Debt Consolidation
21	484.63	C	01-12-2018	Fully Paid	Debt Consolidation
22	701.73	B	01-12-2018	Charged Off	Debt Consolidation
23	330.76	B	01-12-2018	Fully Paid	Credit Card
24					

11 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

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Data Transformation

Column Transformation:

➤ Change the data type of the 'total_pymnt' column to 'Fixed decimal number'.

Queries [2]

BorrowerDetails

LoanDetails

Status DTI Delinq 2yrs Last Pymnt D Total Pymnt Out Prncp

	A _C status	A _C dti	A _C delinq_2yrs	A _C last_pymnt_d	A _C total_pymnt	A _C out_prncp
1		27.65	0	01-01-2015	5,861.07	0
2		18.44	2	01-02-2015	7,164.50	0
3		13.97	3	01-12-2019	1,609.12	0
4		5.63	1	01-04-2020	4,484.79	0
5		21.16	4	01-07-2020	10,324.26	0
6		23.1	6	01-07-2019	6,455.23	0
7		10.67	5	01-06-2021	6,300.06	0
8		9.7	8	01-08-2019	4,849.59	0
9		8.82	9	01-05-2021	6,218.89	0
10		9.74	11	01-03-2021	5,868.74	0
11		0.53	13	01-09-2017	6,159.31	0
12		17.74	15	01-07-2015	5,239.72	0
13		28.42	10	01-12-2015	23,931.04	9776.29
14		10.16	29	01-11-2021	2,766.27	0
15		18.16	24	01-01-2016	27,345.38	1298.02
16		12.28	22	01-09-2015	4,427.06	0
17		17.33	16	01-06-2015	6,654.21	0

11 COLUMNS, 17 ROWS Column profiling based on top 1000 rows

PREVIEW DOWNLOADED ON SATURDAY

➤ Round off the numbers in the 'funded_amnt' column to 2 decimal places.

Queries [2]

= Table.TransformColumnTypes(#"Removed Duplicates", {"funded_amnt", Currency.Type})

	loan_amnt	funded_amnt	term	int_rate	installment	grade
1	5000	4,975.00	36 months	10.65	162.87	B
2	2500	2,500.00	60 months	15.27	59.83	C
3	2400	2,400.00	36 months	15.96	84.33	C
4	10000	10,000.00	36 months	13.49	339.31	C
5	3000	3,000.00	60 months	12.69	67.79	B
6	5000	5,000.00	36 months	7.9	156.46	A
7	7000	7,000.00	60 months	15.96	170.08	C
8	3000	3,000.00	36 months	18.64	108.43	E
9	5800	5,600.00	60 months	21.28	152.39	F
10	5375	5,350.00	60 months	12.69	121.45	B
11	6500	6,500.00	60 months	14.65	153.45	C
12	12000	12,000.00	36 months	12.69	402.54	B
13	9000	9,000.00	36 months	13.49	305.38	C
14	3000	3,000.00	36 months	9.91	96.68	B
15	10000	10,000.00	36 months	10.65	325.74	B
16	1000	1,000.00	36 months	16.29	35.31	D
17	10000	10,000.00	36 months	15.27	347.98	C
18	3600	3,600.00	36 months	6.03	109.57	A
19	6000	6,000.00	36 months	11.71	198.46	B
20	9200	9,200.00	36 months	6.03	280.01	A
21	20250	19,142.16	60 months	15.27	484.63	C
22	21000	21,000.00	36 months	12.42	701.73	B
23	10000	10,000.00	36 months	11.71	330.76	B
24						

11 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

PREVIEW DOWNLOADED ON SATURDAY

Column Renaming:

➤ Rename the column 'issue_d' to 'issue_date'.

Queries [2]

= Table.RenameColumns(#"funded amt in currency", {"issue_d", "issue_date"})

	installment	grade	sub_grade	issue_date	loan_status
1	10.65	162.87	B	01-12-2018	Fully Paid
2	15.27	59.83	C	01-12-2018	Charged Off
3	15.96	84.33	C	01-12-2018	Fully Paid
4	13.49	339.31	C	01-12-2018	Fully Paid
5	12.69	67.79	B	01-12-2018	Current
6	7.9	156.46	A	01-12-2018	Fully Paid
7	15.96	170.08	C	01-12-2018	Current
8	18.64	108.43	E	01-12-2018	Fully Paid
9	21.28	152.39	F	01-12-2018	Charged Off
10	12.69	121.45	B	01-12-2018	Charged Off
11	14.65	153.45	C	01-12-2018	Fully Paid
12	12.69	402.54	B	01-12-2018	Fully Paid
13	18.49	305.38	C	01-12-2018	Charged Off
14	9.91	96.68	B	01-12-2018	Fully Paid
15	10.65	325.74	B	01-12-2018	Charged Off
16	16.29	35.31	D	01-12-2018	Fully Paid
17	15.27	347.98	C	01-12-2018	Fully Paid
18	6.03	109.57	A	01-12-2018	Fully Paid
19	11.71	198.46	B	01-12-2018	Fully Paid
20	6.03	280.01	A	01-12-2018	Fully Paid
21	15.27	484.63	C	01-12-2018	Fully Paid
22	12.42	701.73	B	01-12-2018	Charged Off
23	11.71	330.76	B	01-12-2018	Fully Paid
24					

11 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

PREVIEW DOWNLOADED ON SATURDAY

➤ Rename the column 'last_pymnt_d' to 'last_pymnt_date'.

Queries [2] < fx = Table.RenameColumns(#"Capitalized Each Word", {"last_pymnt_d", "last_pymnt_date"})

	status	dti	delinq_2yrs	last_pymnt_date	total_pymnt	out_prncp
1		27.65	0	01-01-2015	5,861.07	1414
2		1	0	01-04-2020	1,008.71	
3		8.72	0	01-06-2021	3,003.65	
4		20	0	01-01-2015	12,226.30	
5		17.94	0	01-01-2016	3,242.17	761
6		11.2	0	01-01-2015	5,631.38	
7		23.51	0	01-01-2016	8,136.84	1889
8		5.35	0	01-01-2015	3,938.14	
9		5.55	0	01-04-2019	646.02	
10		18.08	0	01-11-2019	1,476.19	
11		16.12	0	01-06-2020	7,677.52	
12		10.78	0	01-09-2020	13,943.08	
13		10.08	0	01-07-2019	2,270.70	
14		12.56	0	01-01-2015	12,519.26	
15		7.06	0	01-10-2020	7,471.99	
16		20.31	0	01-01-2015	1,270.17	
17		18.6	0	01-01-2015	3,478.98	
18		10.52	0	01-05-2020	3,785.02	
19		18.44	2	01-02-2015	7,164.50	
20		9.86	0	01-07-2019	9,459.96	
21		26.53	0	01-08-2015	27,663.04	
22		13.22	0	01-09-2020	14,025.40	
23		11.18	0	01-01-2015	11,902.56	
24						

11 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows PREVIEW DOWNLOADED ON SATURDAY

Creating New Columns:

- Create a new custom column named 'total_amount_paid' to calculate the total amount paid by each borrower by subtracting 'out_prncp' from 'total_pymnt'.

Queries [2] < fx = Table.TransformColumnTypes(#"Added Custom", {"total_amnt_paid", Currency.Type})

	status	dti	delinq_2yrs	last_pymnt_date	total_pymnt	out_prncp	total_amnt_paid
1		27.65	0	01-01-2015	5,861.07	1414	5,861.07
2		1	0	01-04-2020	1,008.71		1,008.71
3		8.72	0	01-06-2021	3,003.65		3,003.65
4		20	0	01-01-2015	12,226.30		12,226.30
5		17.94	0	01-01-2016	3,242.17	761	2,475.27
6		11.2	0	01-01-2015	5,631.38		5,631.38
7		23.51	0	01-01-2016	8,136.84	1889	6,247.69
8		5.35	0	01-01-2015	3,938.14		3,938.14
9		5.55	0	01-04-2019	646.02		646.02
10		18.08	0	01-11-2019	1,476.19		1,476.19
11		16.12	0	01-06-2020	7,677.52		7,677.52
12		10.78	0	01-09-2020	13,943.08		13,943.08
13		10.08	0	01-07-2019	2,270.70		2,270.70
14		12.56	0	01-01-2015	12,519.26		3,478.98
15		7.06	0	01-10-2020	7,471.99		7,471.99
16		20.31	0	01-01-2015	1,270.17		1,270.17
17		18.6	0	01-01-2015	3,478.98		3,478.98
18		10.52	0	01-05-2020	3,785.02		3,785.02
19		18.44	2	01-02-2015	7,164.50		7,164.50
20		9.86	0	01-07-2019	9,459.96		9,459.96
21		26.53	0	01-08-2015	27,663.04		27,663.04
22		13.22	0	01-09-2020	14,025.40		14,025.40
23		11.18	0	01-01-2015	11,902.56		11,902.56
24							

12 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows PREVIEW DOWNLOADED ON SATURDAY

- Add a new conditional column named 'delinquency_status' to identify if the borrower has any delinquencies. If the number of delinquencies in 'delinq_2yrs' is greater than 0, the status should be "Delinquent", otherwise "Not Delinquent".

13 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

PREVIEW DOWNLOADED ON SATURDAY

Column Dropping:

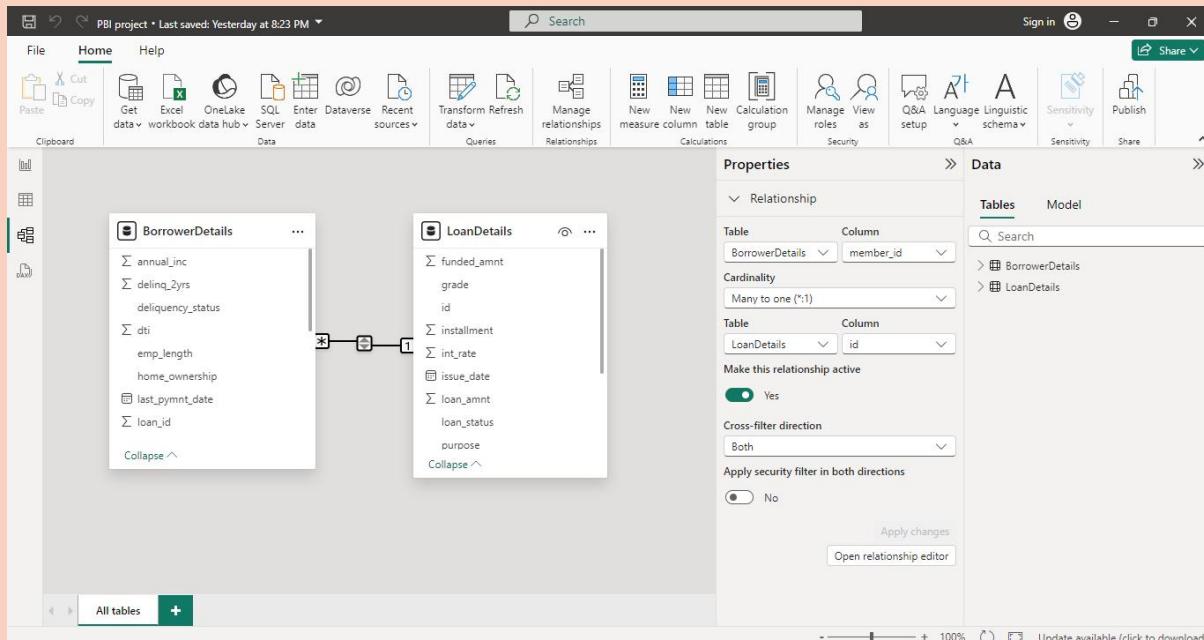
➤ Remove the 'sub_grade' column as that does not significantly contribute to the analysis.

10 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

PREVIEW DOWNLOADED ON 26 OCTOBER 2024

3) Data Modeling

➤ Identify the common column between both the tables and establish relationships between the two tables. Ensure the cross-filter direction is set to "Both". This step is crucial for enabling cross-table analysis and ensuring data integrity within the dataset.



4) Creating Measures and Calculated Columns using DAX

➤ Create a new calculated column named 'remaining_installments' using DAX in the "BorrowerDetails" table to calculate the number of remaining installments by dividing the remaining principal amount ('out_prncp') by the monthly instalment amount ('installment') and round up the result using the CEILING() function to account for any partial payments.

FORMULA :

```
remaining_installments =  
DIVIDE(BorrowerDetails[out_prncp], RELATED(LoanDetails[installment]), 0)
```

```
round off = CEILING(BorrowerDetails[remaining_installments], 1)
```

PBI project * Last saved: Yesterday at 8:23 PM

Column tools

Name	round off	Format	Whole number	Summarization	Sum	Sort by column	Data groups	Manage relationships	New columns
Data type	Whole number	\$,	0					
Structure Formatting Properties Sort Data groups Relationships Calculations									
<code>1 round off = CEILING(BorrowerDetails[remaining_installments],1)</code>									
verification_status	dti	delinq_2yrs	last_pymnt_date	total_pymnt	out_prncp	total_amnt_paid	delinquency_status	remaining_installments	round
rifed	6.21	0	01 November 2020	23996.94	0	\$23,996.94	Not Delinquent		0
rifed	21.5	0	01 June 2021	22756.2027	0	\$22,756.20	Not Delinquent		0
rifed	18.45	0	01 February 2015	20596.97	0	\$20,596.97	Not Delinquent		0
rifed	21.45	0	01 June 2020	16632.6	0	\$16,632.60	Not Delinquent		0
rifed	14.61	0	01 June 2021	21630.52	0	\$21,630.52	Not Delinquent		0
rifed	23.34	0	01 January 2019	4587.44	0	\$4,587.44	Not Delinquent		0
rifed	6.15	0	01 March 2019	8314.15	0	\$8,314.15	Not Delinquent		0
rifed	11.71	0	01 June 2021	13303.6626	0	\$13,303.66	Not Delinquent		0
rifed	19.66	0	01 May 2019	15848.53	0	\$15,848.53	Not Delinquent		0
rifed	12.33	0	01 October 2018	20191.73	0	\$20,191.73	Not Delinquent		0
rifed	8.73	0	01 January 2020	7471.48	0	\$7,471.48	Not Delinquent		0
rifed	21.62	0	01 July 2021	21624.7793	0	\$21,624.78	Not Delinquent		0
rifed	12.57	0	01 February 2021	41662.89	0	\$41,662.89	Not Delinquent		0
rifed	14.14	0	01 February 2021	11630.13	0	\$11,630.13	Not Delinquent		0
rifed	6.84	0	01 January 2020	6815.21	0	\$6,815.21	Not Delinquent		0
rifed	8.88	0	01 August 2019	10436.19	0	\$10,436.19	Not Delinquent		0
rifed	8.31	0	01 July 2018	219.11	0	\$219.11	Not Delinquent		0
rifed	16.63	0	01 June 2021	7609.7545	0	\$7,609.75	Not Delinquent		0
rifed	13.78	0	01 August 2020	22944.69	0	\$22,944.69	Not Delinquent		0
rifed	12.65	0	01 February 2020	27552.36	0	\$27,552.36	Not Delinquent		0
rifed	16.13	0	01 February 2019	8731.4	0	\$8,731.40	Not Delinquent		0
rifed	20.31	0	01 November 2021	35494.4771	0	\$35,494.48	Not Delinquent		0

Table: BorrowerDetails (4,65,773 rows) Column: round off (185 distinct values)

➤ Create a measure named 'Non-Verified Borrowers Count' using DAX to count the number of loans that have been 'Not Verified'.

Formula :

```
Non-verified Borrower count =
COUNTX(FILTER(BorrowerDetails, BorrowerDetails[verification_status] = "Not
verified"), BorrowerDetails[verification_status])
```

PBI project * Last saved: Yesterday at 8:23 PM

Visualizations

Filters

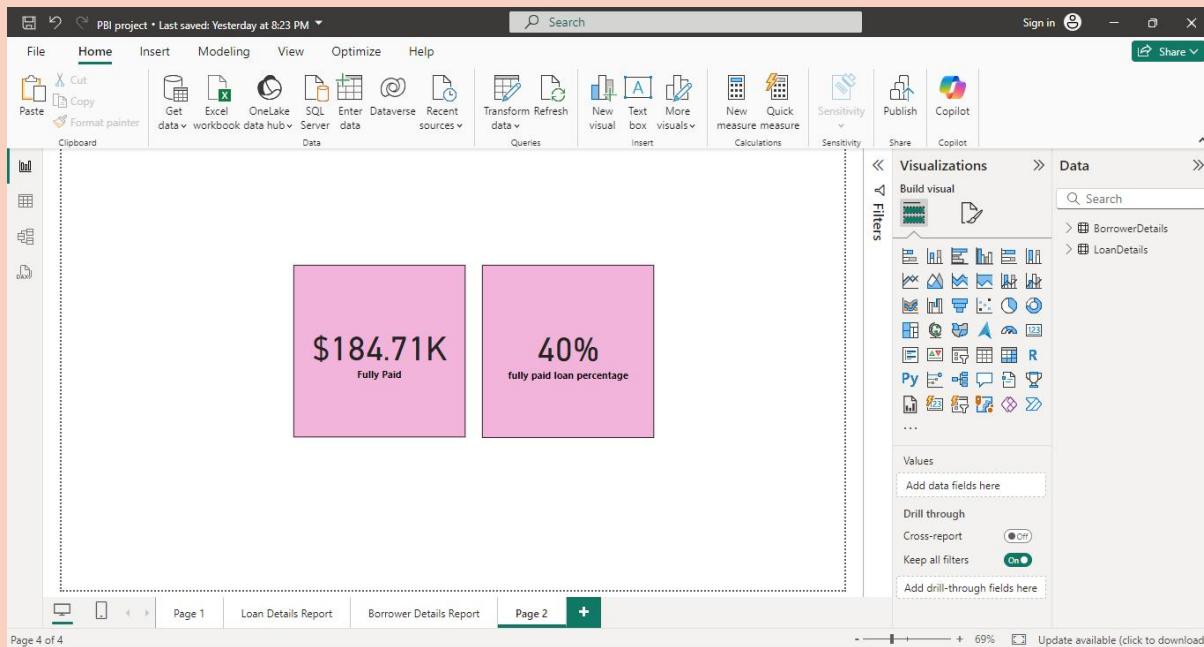
148K
Non-verified Borrower count

Page 1 | Loan Details Report | Borrower Details Report | Page 2 | + | Page 4 of 4

- Create a measure named 'Fully Paid Loan Percentage' to calculate the percentage of fully paid loans. Divide the number of loans with a "Fully Paid" loan status by the total number of loans and then format this measure as Percentage.

Formula :

```
Fully Paid = COUNTX(FILTER(LoanDetails,LoanDetails[loan_status]="fully paid"),LoanDetails[loan_status])
fully paid loan percentage = (LoanDetails[Fully Paid]/LoanDetails[total num loans])
```



5) Creating Comprehensive Reports

General Instructions for Report:

- Create two insightful reports:

★ **Report 1: Loan Performance Analysis**

★ **Report 2: Borrower Profile Analysis**

- Ensure each report and its charts are titled appropriately for easy identification.

- Maintain a clean and professional layout throughout both reports.

- Format and customize the charts to enhance visual appeal and comprehension.
- Utilize slicers for dynamic data exploration and filtering.
- Add tooltips to provide additional context and details for data points when hovered over.
- Include a summary or key insights section in each report to highlight main findings and observations.

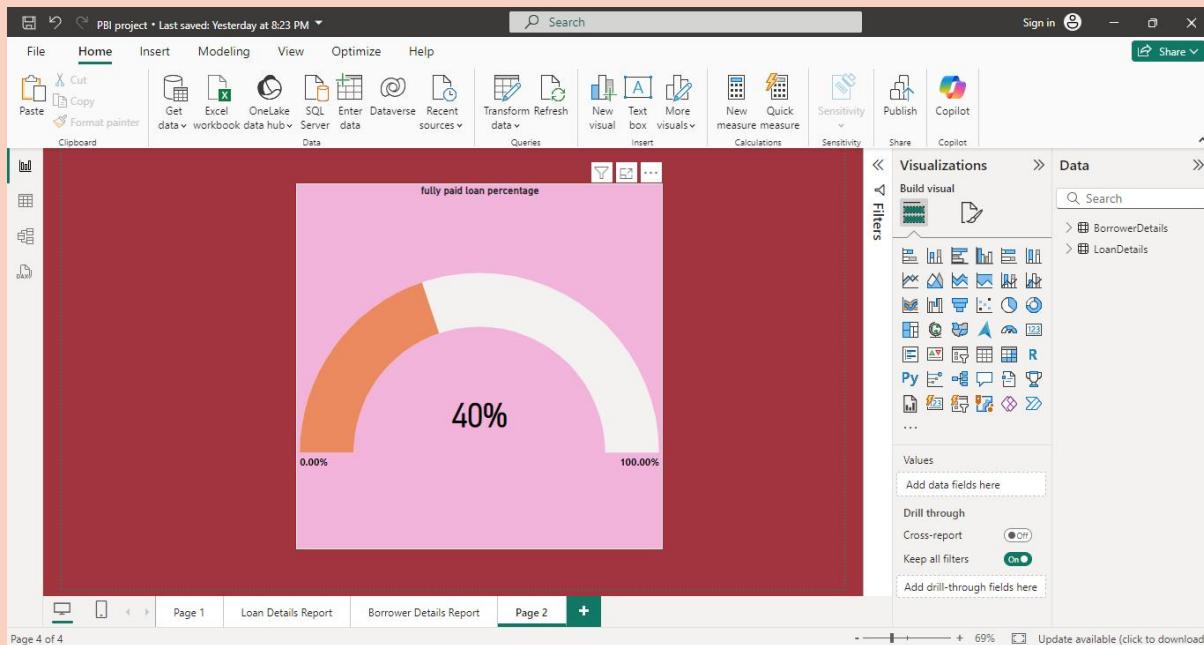
Report 1: Loan Performance Analysis

The Loan Performance Analysis report aims to provide insights into the performance of loans based on various factors such as loan amount, loan status, term, interest rate, and purpose.

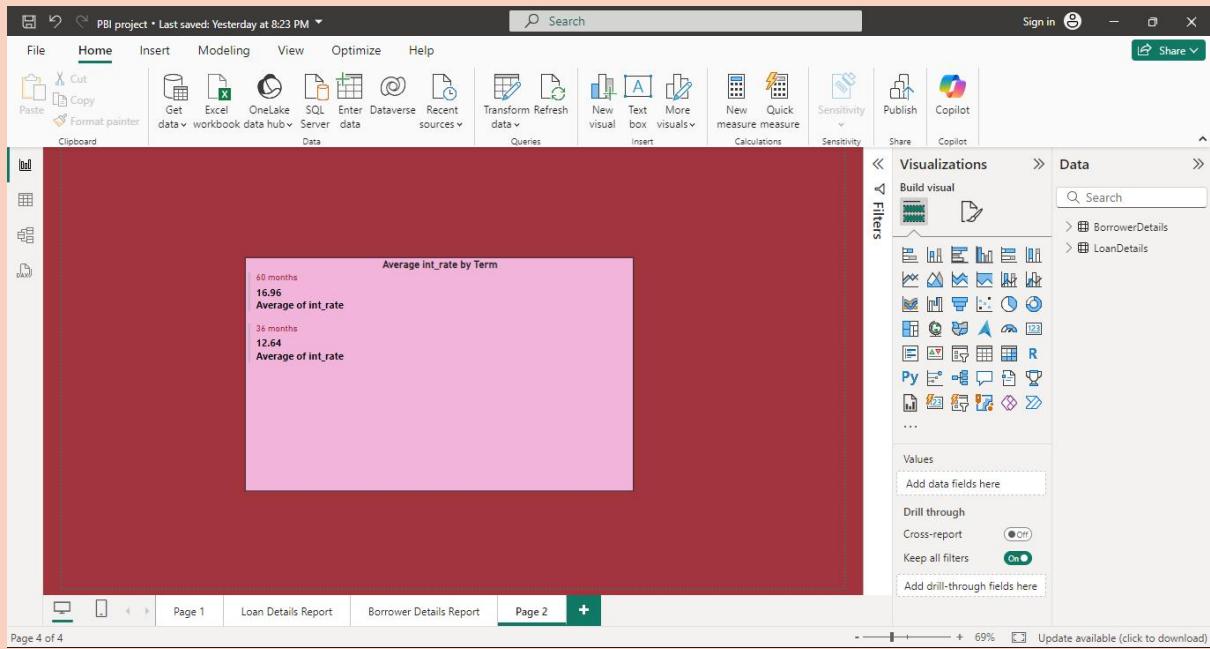
- **Total Funded Amount:** Create a card visual to display the total funded amount.

The screenshot shows the Microsoft Power BI desktop interface. The main canvas displays a single card visual with the text '\$6.63bn' and 'Sum of funded_amnt' below it. The Power BI ribbon is visible at the top, showing the 'Home' tab is selected. In the bottom right corner of the canvas, there is a small watermark-like text 'Page 4 of 4'. On the right side of the screen, the 'Visualizations' pane is open, showing the card visual selected. The 'Data' pane is also visible, showing two data sources: 'BorrowerDetails' and 'LoanDetails'. The 'Wallpaper' settings for the canvas are being edited, with a color set to dark red and transparency at 0%.

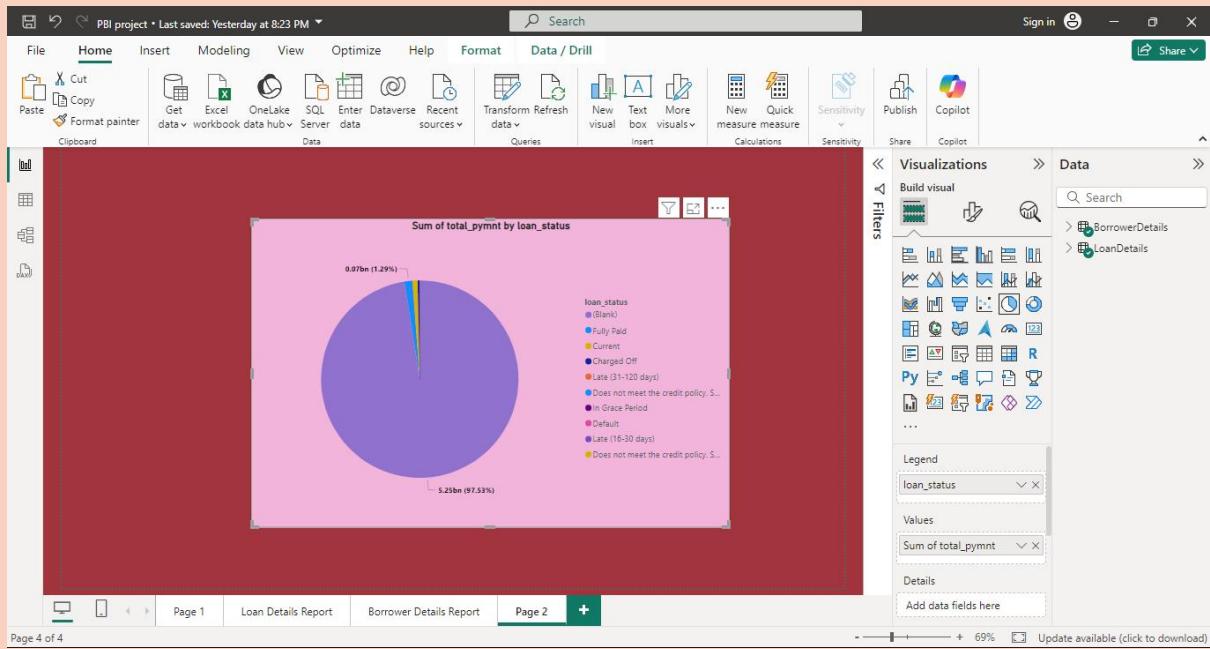
➤ **Fully Paid Loan Percentage:** Create a gauge chart to display the 'Fully Paid Loan Percentage' measure.



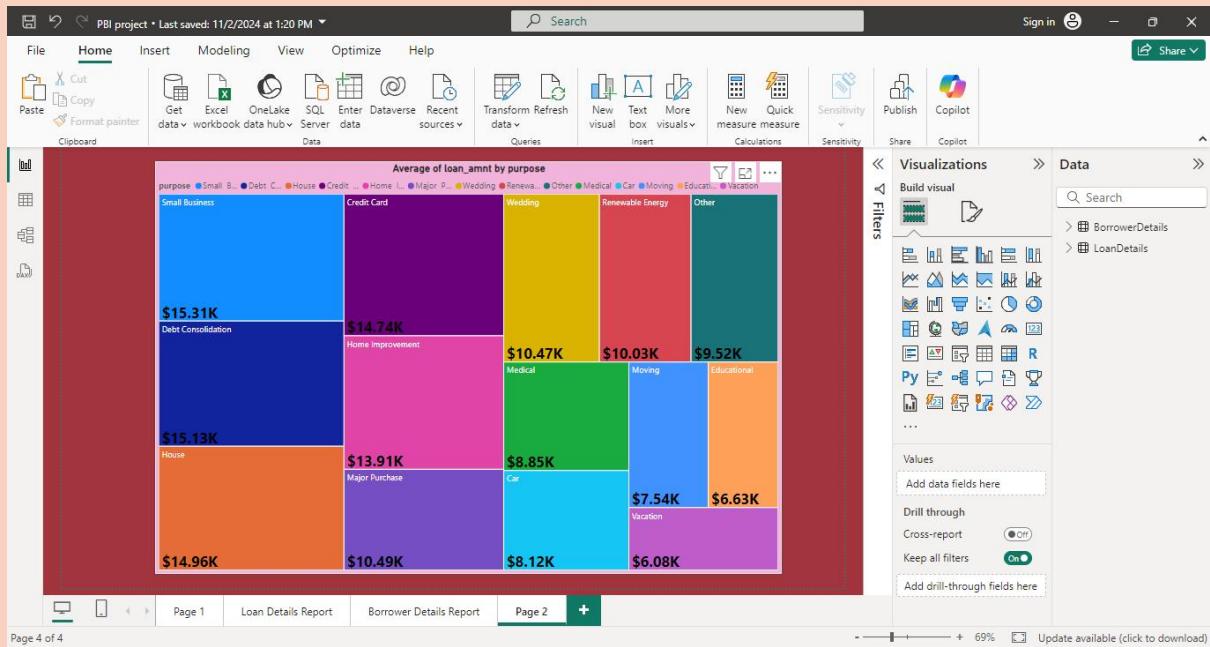
➤ **Average Interest Rate by Term:** Create a multi-row card to show the average interest rate for each term.



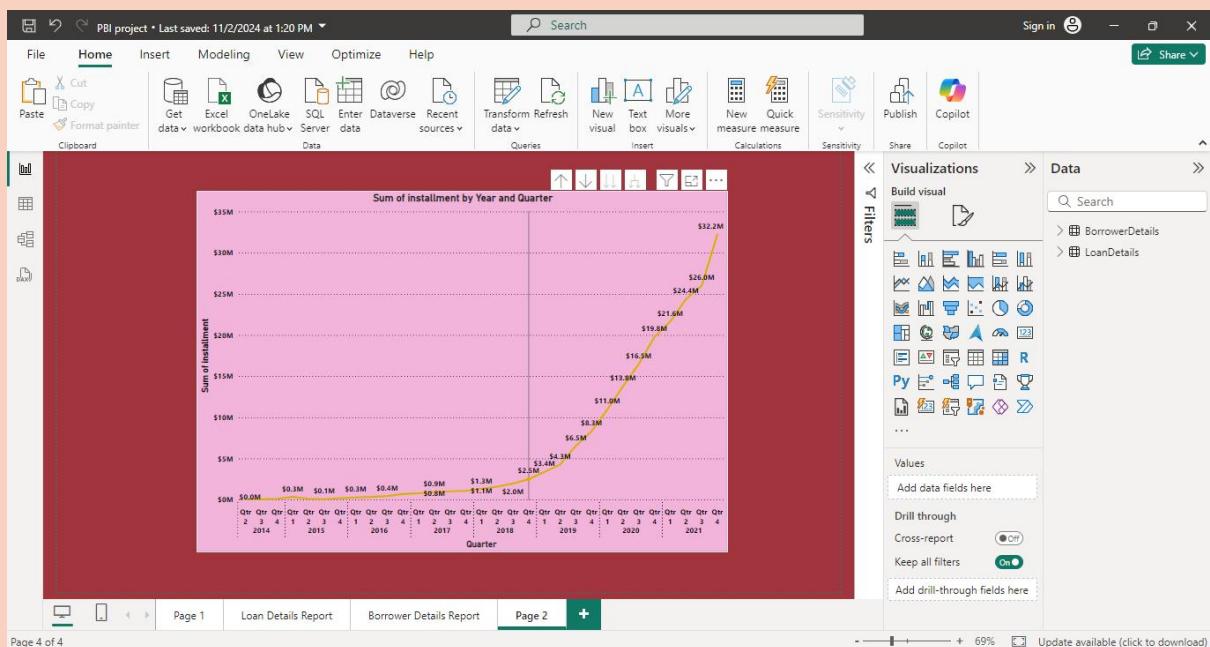
➤ **Loan Status Distribution:** Create a pie chart to visualize the sum of total payments by loan status.



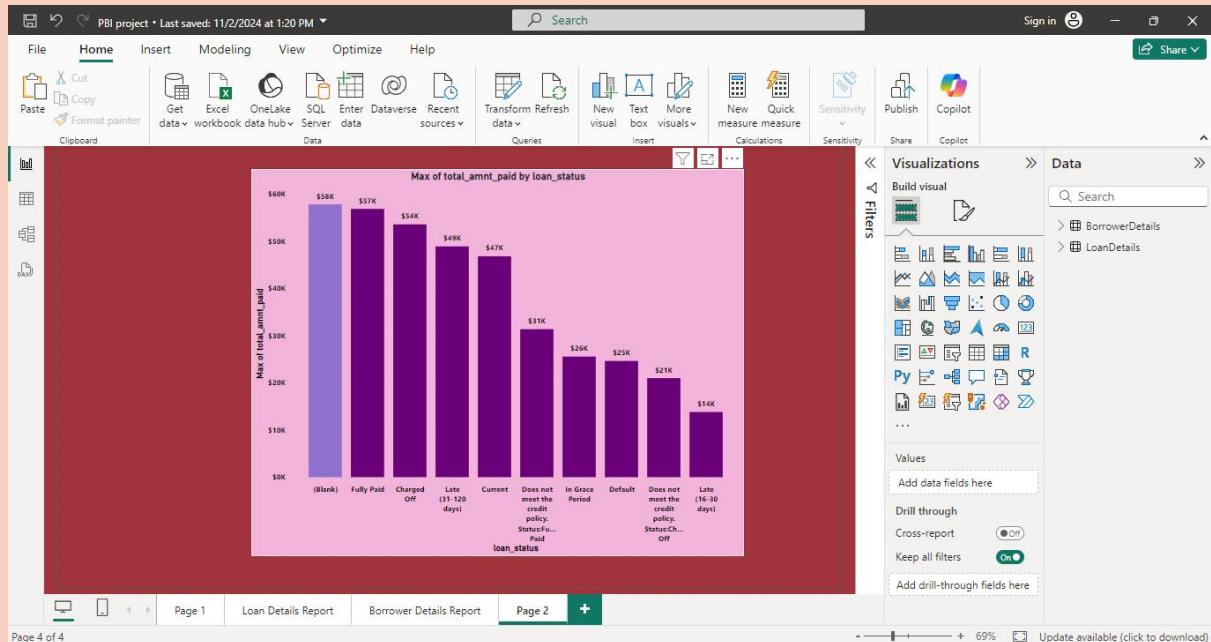
➤ **Loan Amount by Purpose:** Create a treemap to show the average loan amount by purpose.



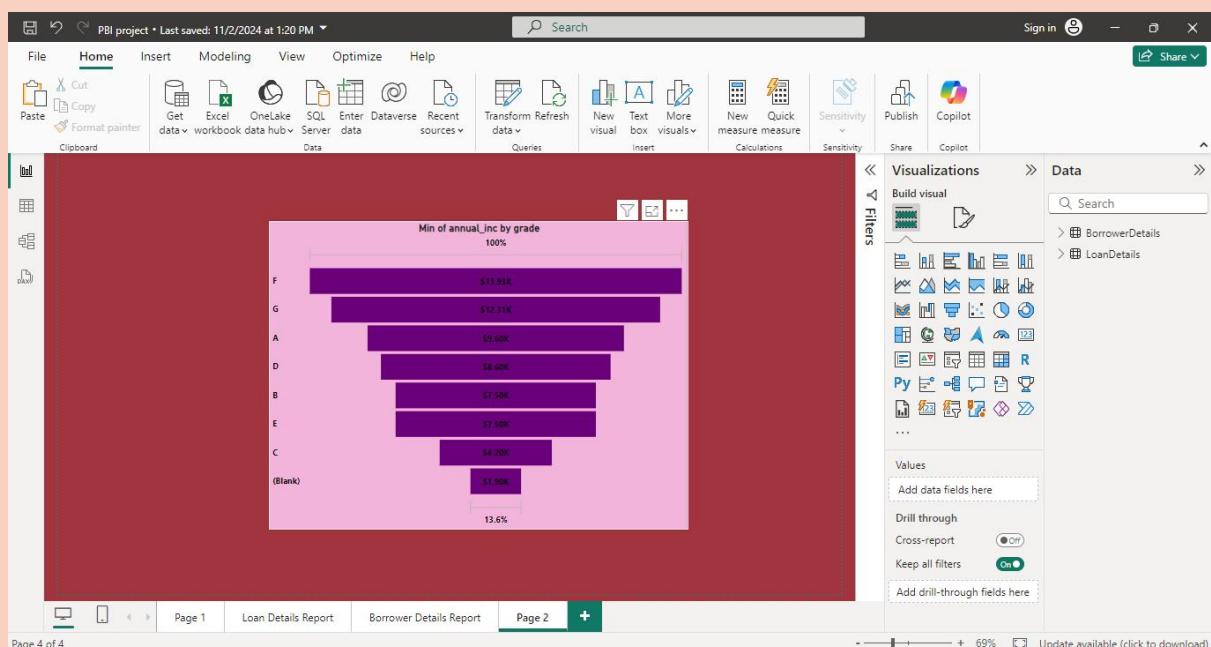
➤ **Installment Over Time:** Create a line chart to visualize the sum of installments by Year and Quarter of the issue date.



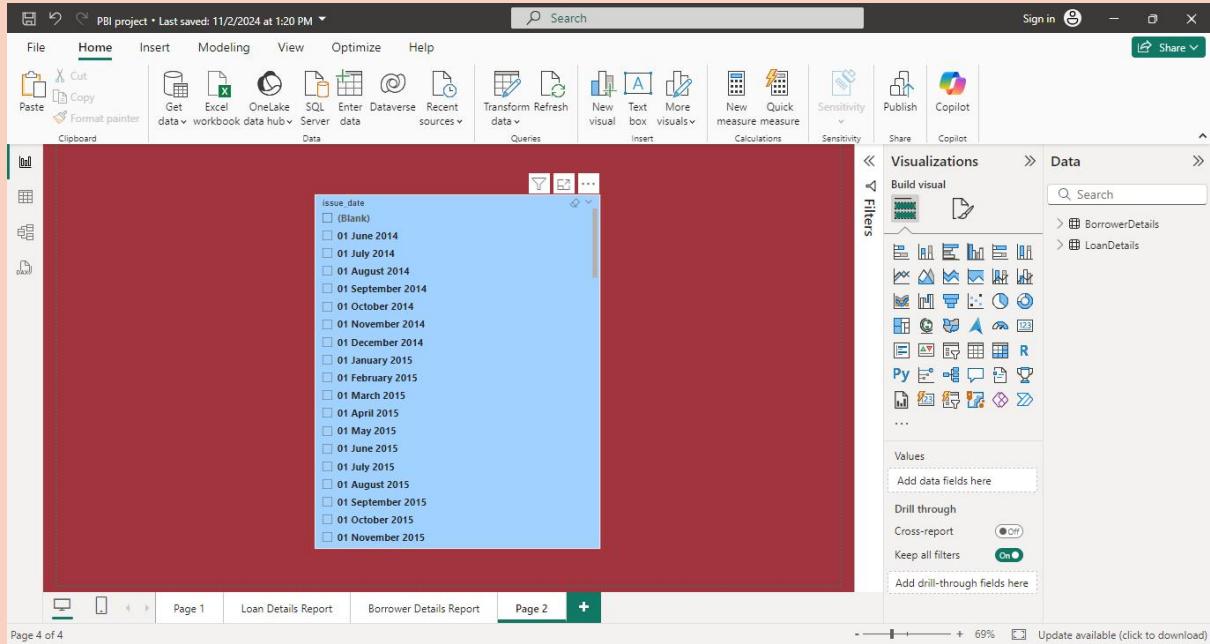
➤ **Maximum Total Amount Paid by Loan Status:** Create a column chart to display the maximum total amount paid by loan status.



➤ **Minimum Annual Income by Grade:** Create a funnel chart to show the minimum annual income by grade.

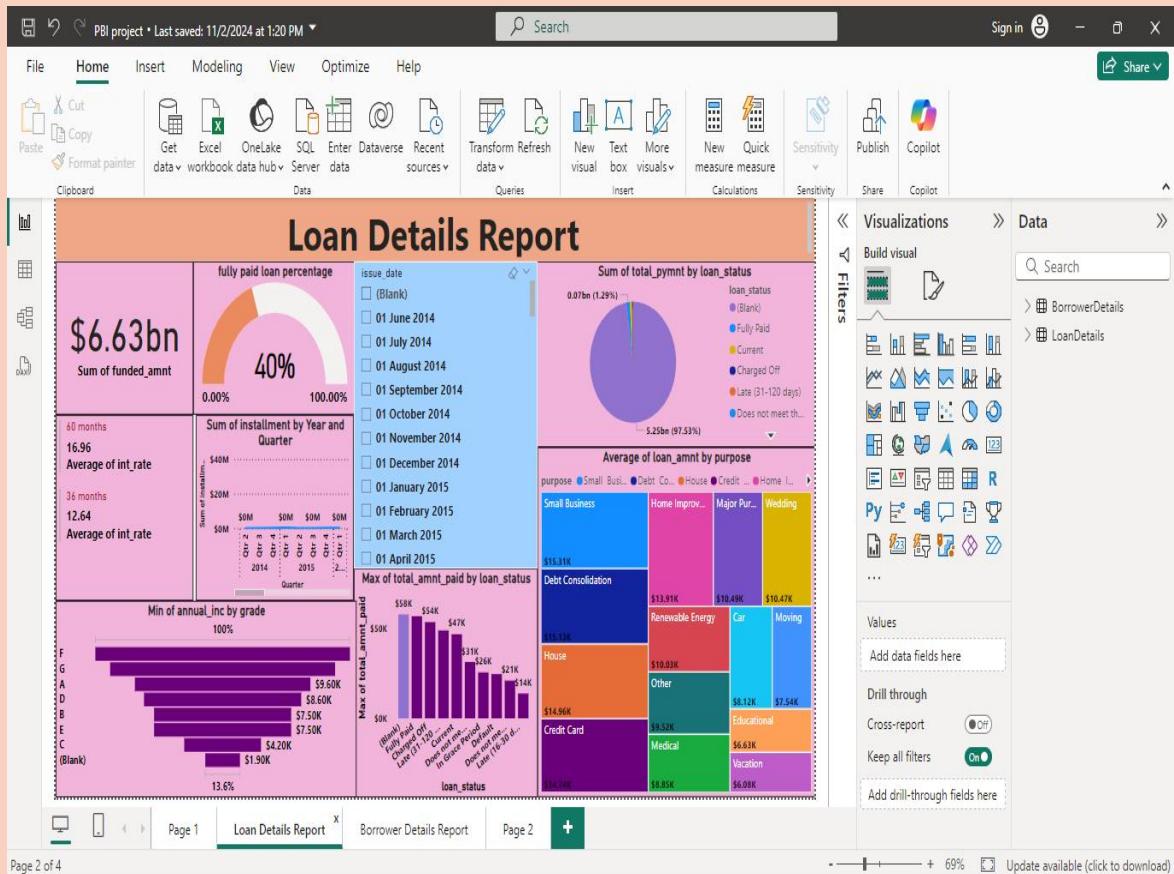


➤ **Issue Date Slicer:** Add a slicer for the Month of the issue date to enable dynamic data exploration.



The screenshot shows the Microsoft Power BI desktop interface. A slicer titled "issue.date" is displayed, listing dates from "01 June 2014" to "01 November 2015". The Power BI ribbon is visible at the top, and the "Visualizations" pane on the right shows various chart and report options. The status bar at the bottom indicates "Page 4 of 4".

Loan Details Report

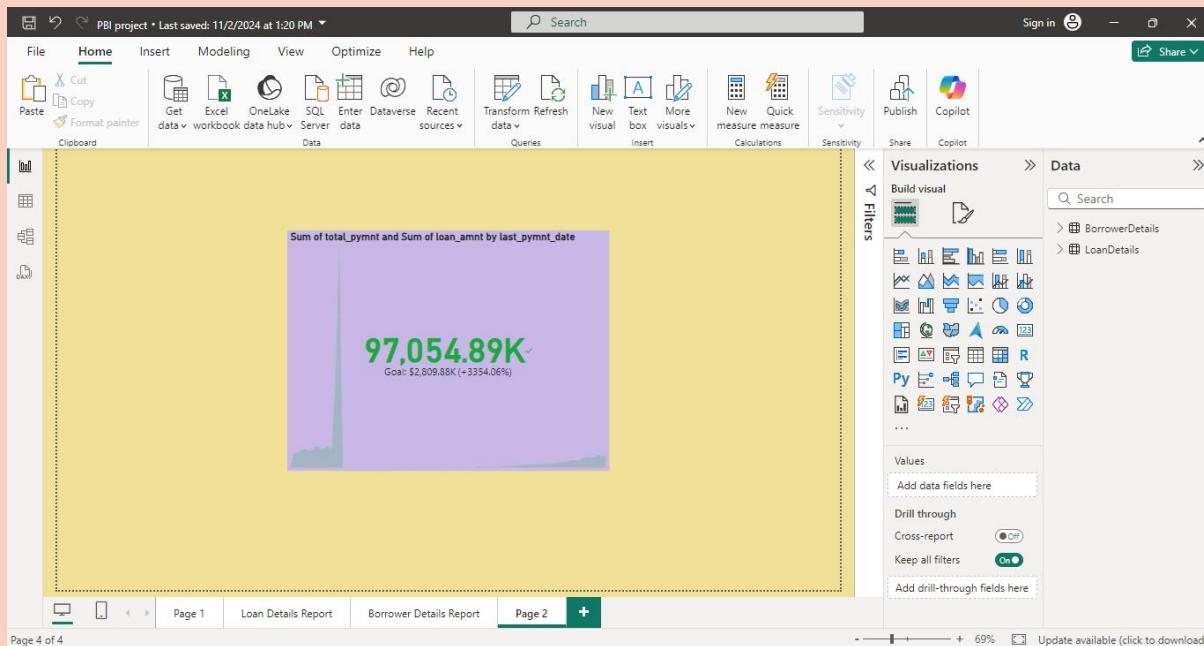


This loan details report let us understand the information by showing us the total payments, installments, interest rate per month, client loan purpose, loan full payment, etc.

Report 2: Borrower Profile Analysis

The Borrower Profile Analysis report aims to provide insights into the characteristics of borrowers such as home ownership, annual income, employment length, verification status, debt-to-income ratio, and delinquency history.

➤ **KPI Visual:** Create a KPI visual with the sum of total payment as the value, the year of last payment date as the trend axis, and the sum of loan amount as the target. Round off to 2 decimal points and format as \$ currency.



➤ **Average of Annual Income:** Display the average of annual income using a card visual.

The screenshot shows the Microsoft Power BI Home screen. In the center, there is a large purple card visual displaying the text '\$73.29K' and the subtitle 'Average of annual_inc'. The Power BI ribbon is visible at the top, showing tabs like File, Home, Insert, Modeling, View, Optimize, and Help. The Home tab is selected. On the right side, the Visualizations pane is open, showing various visualization icons. The Data pane below it lists data sources: 'BorrowerDetails' and 'LoanDetails'. The bottom of the screen shows a navigation bar with 'Page 1', 'Loan Details Report', 'Borrower Details Report', 'Page 2', and a '+' button.

➤ **Non-Verified Borrowers Count:** Display the count of non-verified borrowers using a card visual.

The screenshot shows the Microsoft Power BI Home screen. In the center, there is a large purple card visual displaying the text '148K' and the subtitle 'Non-verified Borrower count'. The Power BI ribbon is visible at the top, showing tabs like File, Home, Insert, Modeling, View, Optimize, and Help. The Home tab is selected. On the right side, the Visualizations pane is open, showing various visualization icons. The Data pane below it lists data sources: 'BorrowerDetails' and 'LoanDetails'. The bottom of the screen shows a navigation bar with 'Page 1', 'Loan Details Report', 'Borrower Details Report', 'Page 2', and a '+' button.

➤ **Average Debt-to-Income by Delinquency Status:** Create a multi-row card to show the average debt-to-income ratio by delinquency status.

The screenshot shows a Microsoft Power BI interface with a report containing two cards. The first card, titled 'Not Delinquent', displays the average DTI as 17.23. The second card, titled 'Delinquent', displays the average DTI as 17.16. Both cards also mention 'Average of dti'.

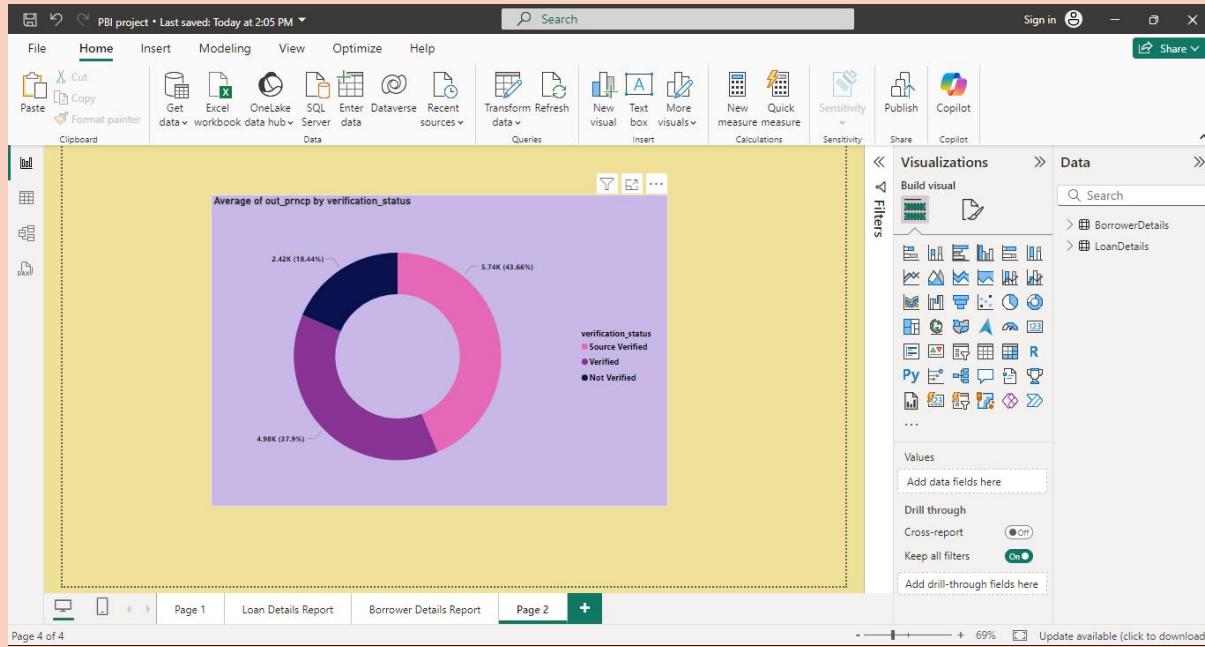
Report navigation: Page 1, Loan Details Report, Borrower Details Report, Page 2, +

➤ Sum of Loan Amount by Home Ownership: Create a table to show the total loan amount by home ownership.

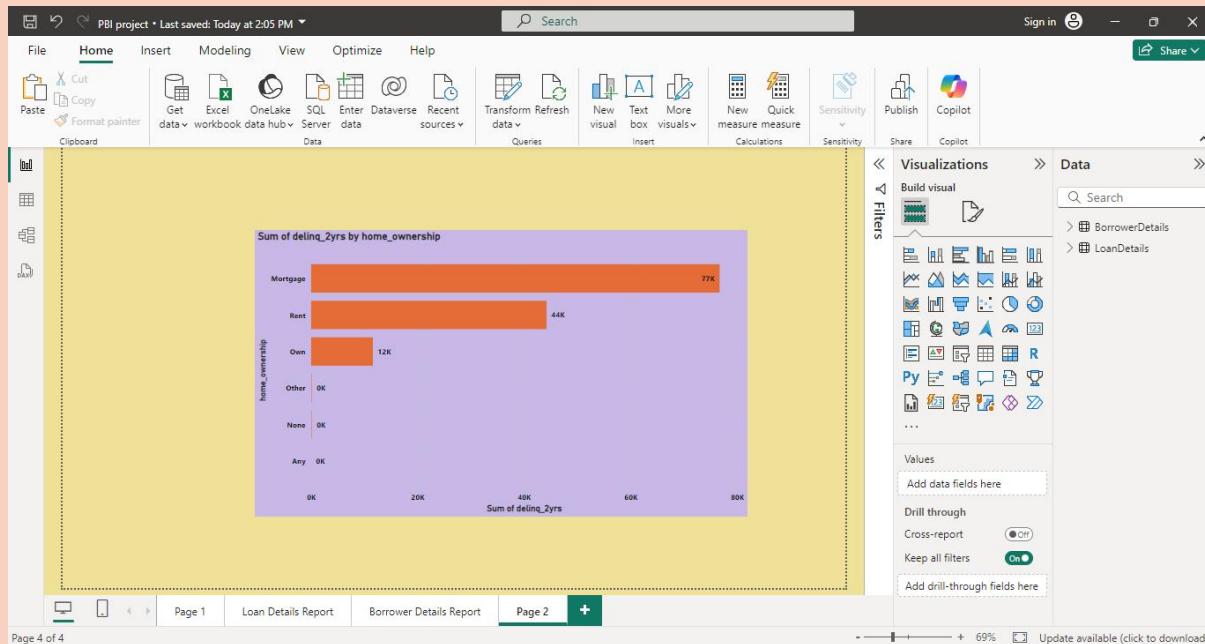
The screenshot shows a Microsoft Power BI interface with a report containing one card. The card displays a table titled 'Sum of loan_amnt_by_home_ownership' with the following data:

Home Ownership	Sum of loan_amnt
Rent	\$6,38,40,885
Own	\$1,29,07,370
Other	\$1,05,150
Mortgage	\$7,36,08,220
Total	\$6,67,44,56,000

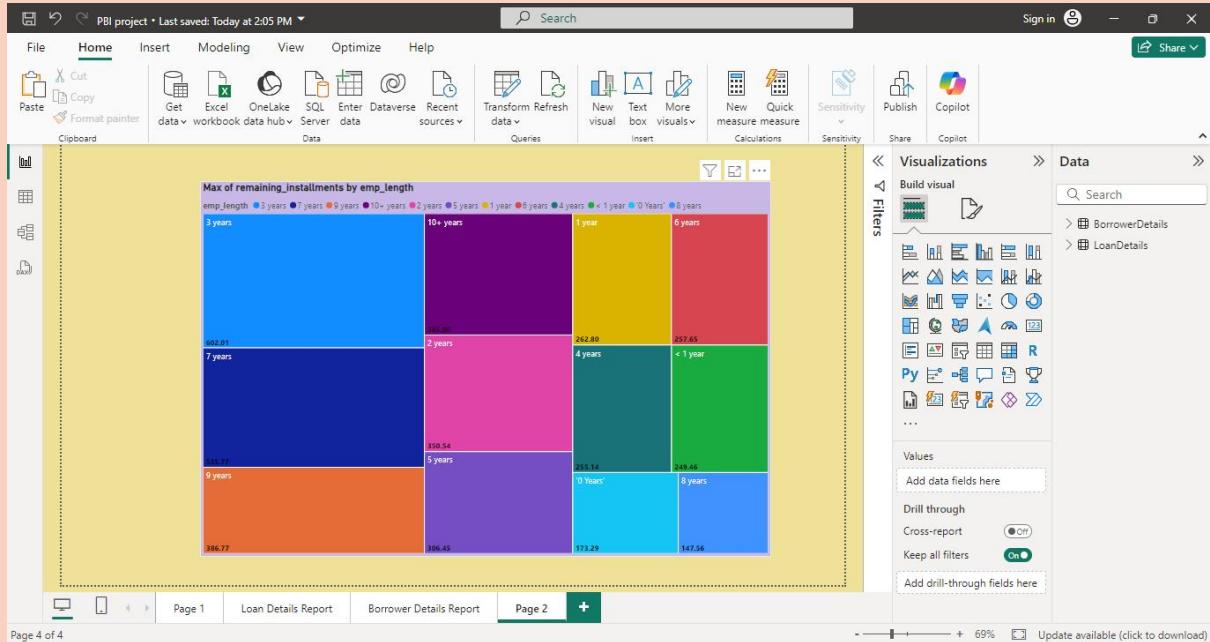
➤ **Average Remaining Principal by Verification Status:** Create a donut chart to display the average remaining outstanding principal by verification status.



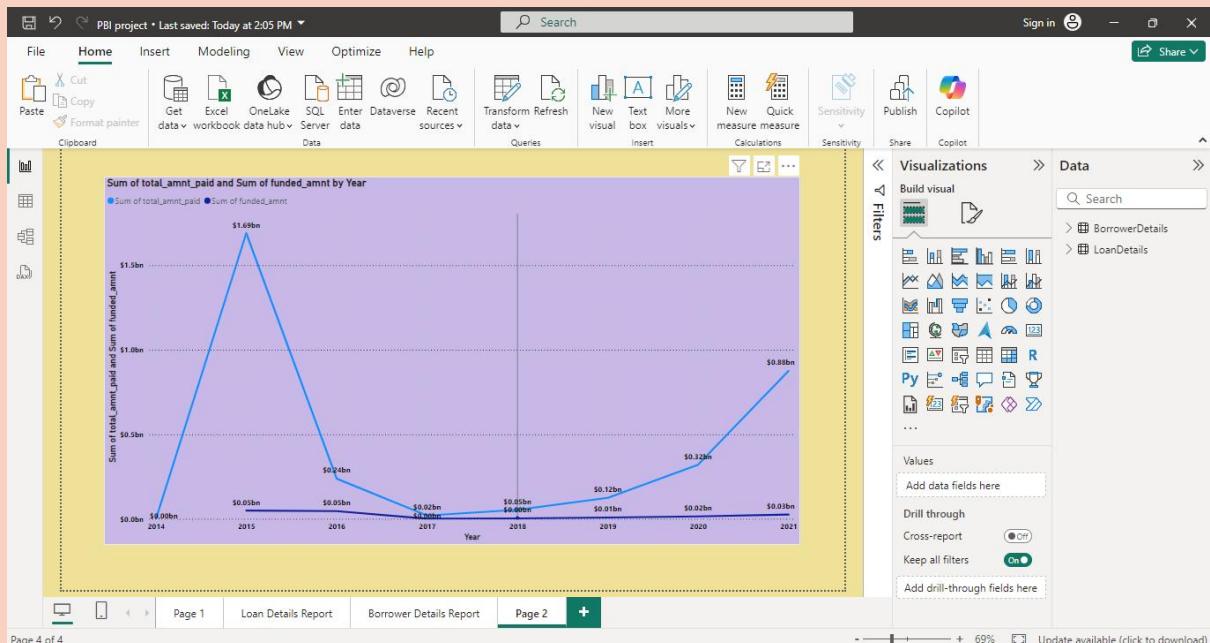
➤ **Sum of Delinquencies by Home Ownership:** Create a bar chart to show the total number of delinquencies in the past 2 years by home ownership and filter the visual to display only Mortgage, Rent, and Own.



➤ **Max Remaining Installments by Employment Length:** Create a treemap to show the maximum remaining installments by employment length.



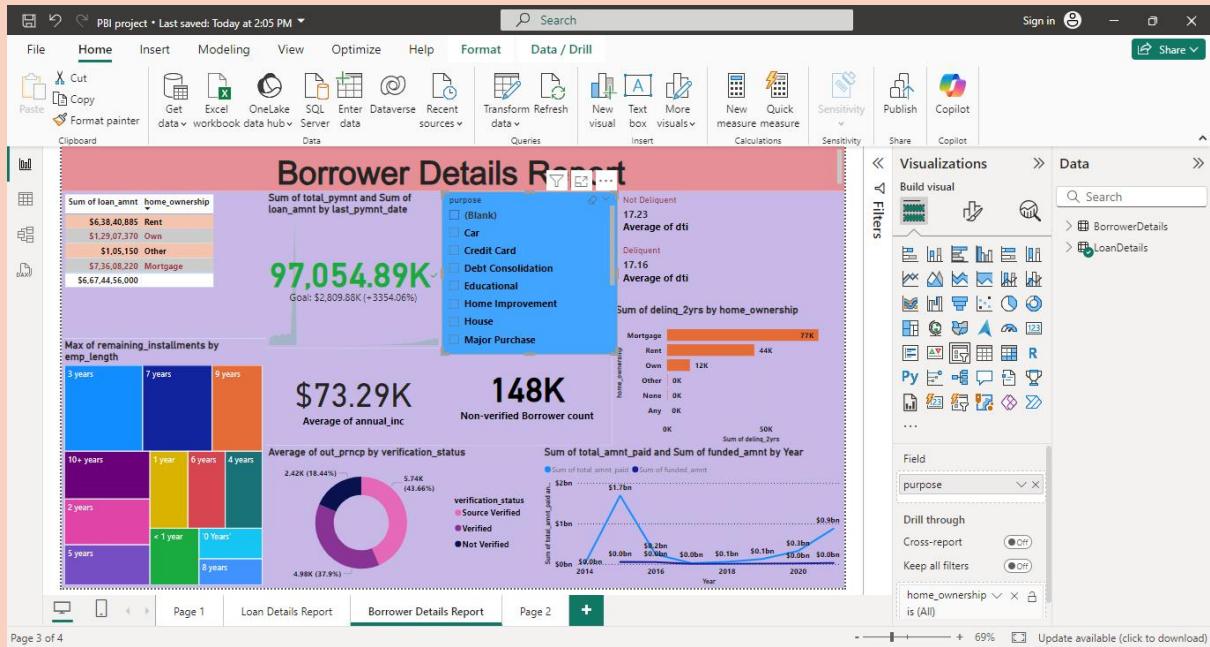
➤ **Total Amount Paid and Funded Amount Over Time:** Create a line chart to display the sum of total amount paid and the sum of funded amount by the year of last payment date.



➤ **Purpose Slicer:** Add a slicer for loan purpose to enable dynamic data exploration.

The screenshot shows the Microsoft Power BI desktop interface. The main area displays a report page titled "Borrower Details Report". On the left, there is a navigation pane with icons for Home, Insert, Modeling, View, Optimize, and Help. The "Home" tab is selected. Below the navigation pane, there is a ribbon bar with sections for Clipboard, Data, Queries, Insert, Calculations, Sensitivity, Share, Publish, and Copilot. The central workspace contains a blue rectangular area with a list of categories under the heading "purpose". The list includes: (Blank), Car, Credit Card, Debt Consolidation, Educational, Home Improvement, House, Major Purchase, Medical, Moving, Other, Renewable Energy, Small Business, Vacation, and Wedding. To the right of the workspace, there is a "Visualizations" pane showing various chart and report icons, and a "Data" pane showing data sources like "BorrowerDetails" and "LoanDetails". At the bottom of the screen, there are navigation buttons for "Page 1", "Loan Details Report", "Borrower Details Report", "Page 2", and a plus sign for adding new pages. The status bar at the bottom indicates "Page 4 of 4" and "69%".

Borrower Details Report



This borrower details report provides information on the borrower's average debit income by delinquency status, borrower verification status, total loan payment amount by house ownership, average yearly income, number of non-verified borrowers, and more.

Conclusion :

Only 40% of the total loan amount was paid by the borrower at the end of the bank loan project. Compared to the other loans, the mortgage loan is more expensive. According to this project report, the borrower can only receive a small company loan. Lastly, the loan report provides us with information about the loan by date, month, and year, while the borrower report provides information about the borrower by purpose. These reports are utilized to analyze and make wise decisions for the bank's future.