Assignment 1:
Analysis of Bank Filings Data – Data Wrangling and Exploratory data analysis using Tableau Case Study

Under guidance of :

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Team 1

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Part 1:
Analyzing Banks with asset values greater than $10 Billion

Process workflow:

Step 1 : Web Scraping using Python 3

Step 2 : Cleaning the data

Step 3 : Creating stacked and unstacked CSV file using Pandas

Step 4 : Pre-processing the data for Analysis

Step 5 : Creating Dashboards in Tableau

Step 1 : Web Scraping using Python 3

<u>Modules Used </u>:-

- BeautifulSoup

To parse HTML document

- Requests

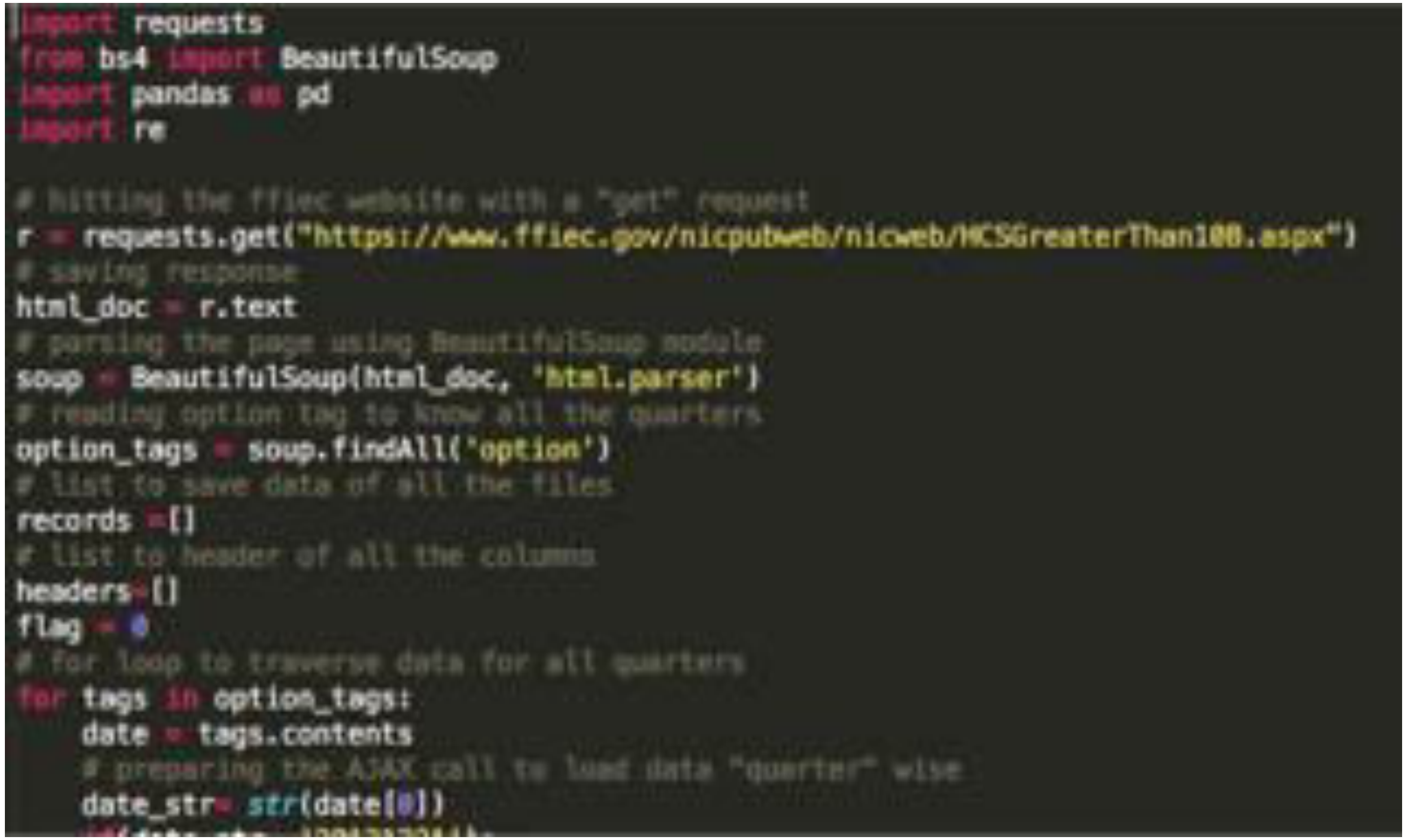
To create a request and

a response to the website

- Panda

To create stacked and

unstacked CSV file



```
import requests
from bs4 import BeautifulSoup
import pandas as pd
import re

# hitting the ffiec website with a "get" request
r = requests.get("https://www.ffiec.gov/nicpubweb/nicweb/HCSGreaterThan10B.aspx")
# saving response
html_doc = r.text
# parsing the page using BeautifulSoup module
soup = BeautifulSoup(html_doc, 'html.parser')
# reading option tag to know all the quarters
option_tags = soup.findAll('option')
# list to save data of all the files
records =[]
# list to header of all the columns
headers=[]
flag = 0
# for loop to traverse data for all quarters
for tags in option_tags:
    date = tags.contents
    # preparing the AJAX call to load data "quarter" wise
    date_str= str(date[0])
```

Step 2 : Cleaning the data

- Extracting the RSSD ID from the bank name
- Made RSSD ID unique column so that no new row gets created if Bank Changes their name in any quarter
- Sanitizing the bank name
- Extracting column headers
- Creating a new column for quarters
- Removing the Rank column

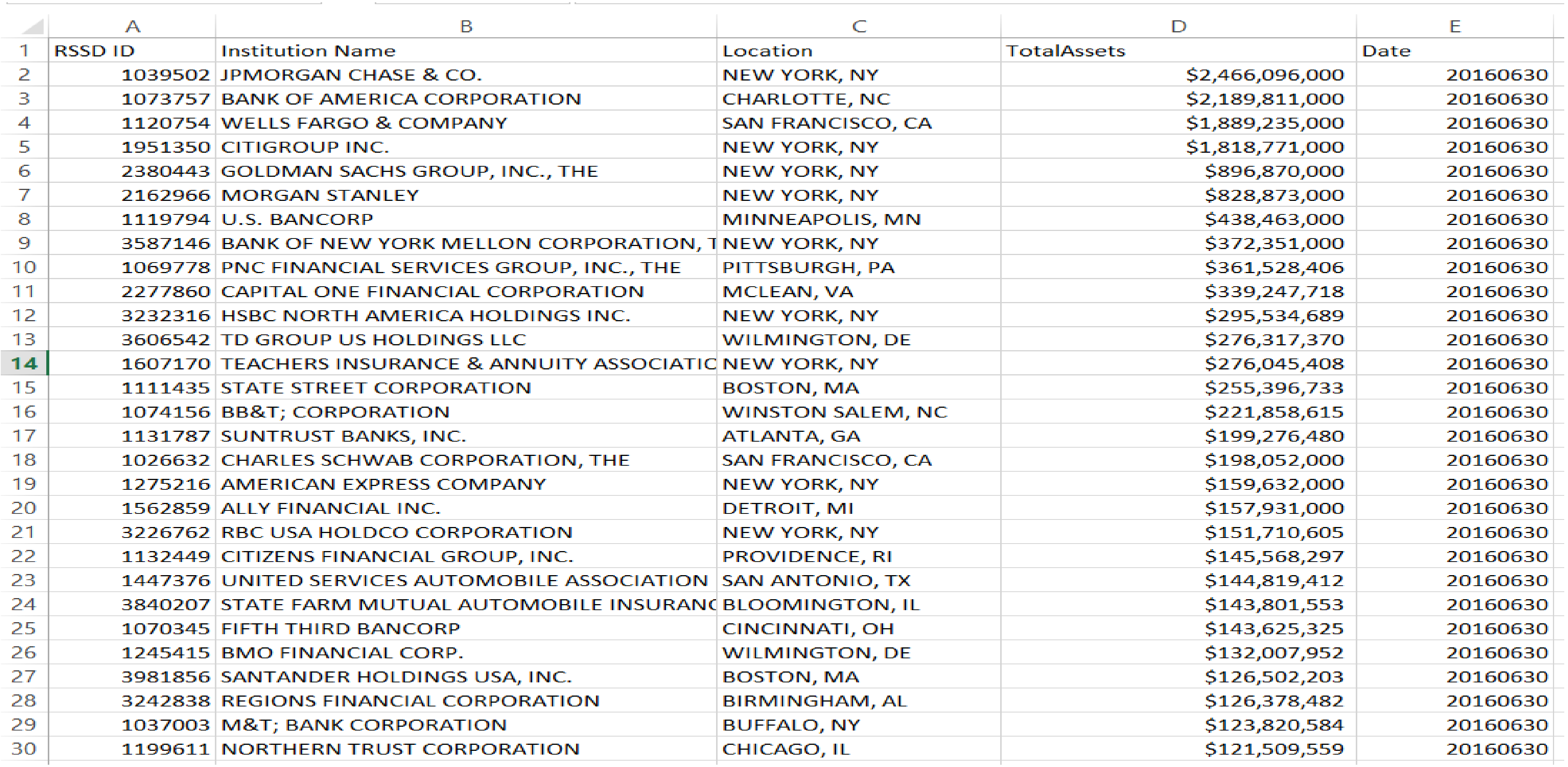
Step 3 : Creating stacked and unstacked CSV file using Pandas

- Creating a 2 dimensional structure for the CSV file.
- Pivoting the data frame to create unstacked version of the file

quest1.py

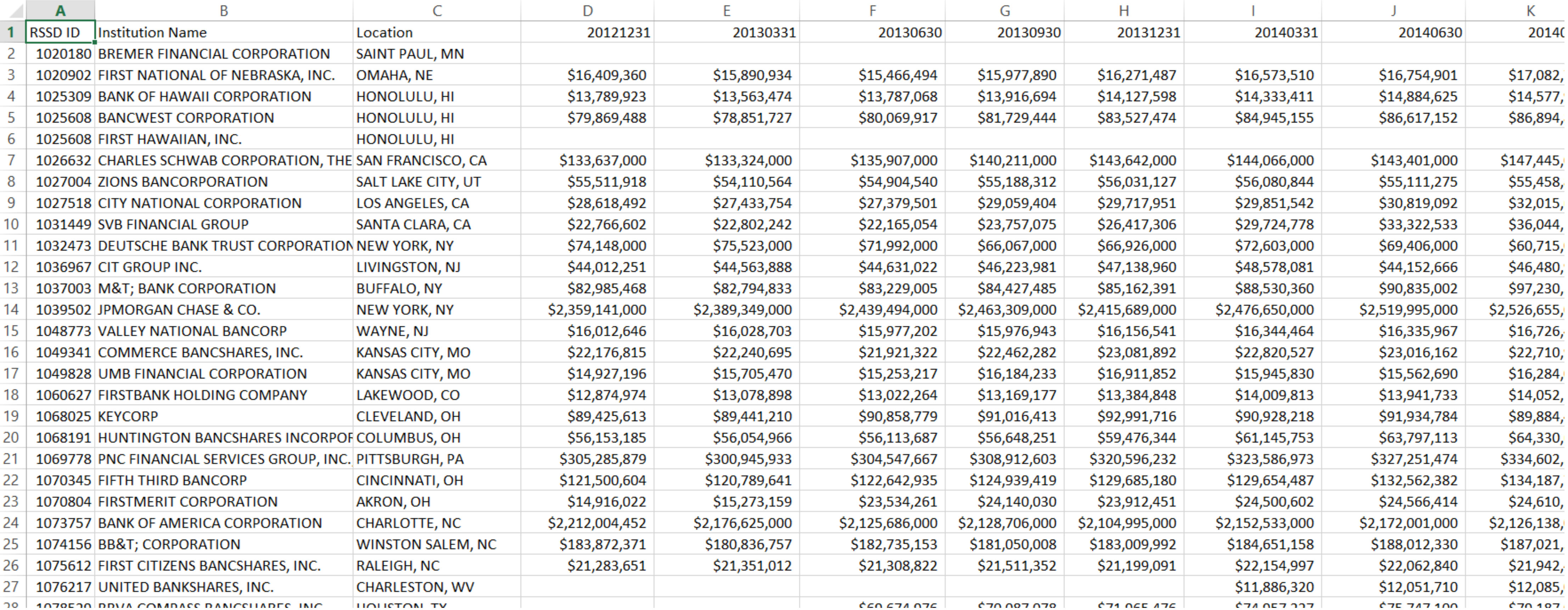
File: Python code for Step 1-3

Output CSV : Stacked Version



	A	B	C	D	E
1	RSSD ID	Institution Name	Location	TotalAssets	Date
2	1039502	JPMORGAN CHASE & CO.	NEW YORK, NY	$2,466,096,000	20160630
3	1073757	BANK OF AMERICA CORPORATION	CHARLOTTE, NC	$2,189,811,000	20160630
4	1120754	WELLS FARGO & COMPANY	SAN FRANCISCO, CA	$1,889,235,000	20160630
5	1951350	CITIGROUP INC.	NEW YORK, NY	$1,818,771,000	20160630
6	2380443	GOLDMAN SACHS GROUP, INC., THE	NEW YORK, NY	$896,870,000	20160630
7	2162966	MORGAN STANLEY	NEW YORK, NY	$828,873,000	20160630
8	1119794	U.S. BANCORP	MINNEAPOLIS, MN	$438,463,000	20160630
9	3587146	BANK OF NEW YORK MELLON CORPORATION, T	NEW YORK, NY	$372,351,000	20160630
10	1069778	PNC FINANCIAL SERVICES GROUP, INC., THE	PITTSBURGH, PA	$361,528,406	20160630
11	2277860	CAPITAL ONE FINANCIAL CORPORATION	MCLEAN, VA	$339,247,718	20160630
12	3232316	HSBC NORTH AMERICA HOLDINGS INC.	NEW YORK, NY	$295,534,689	20160630
13	3606542	TD GROUP US HOLDINGS LLC	WILMINGTON, DE	$276,317,370	20160630
14	1607170	TEACHERS INSURANCE & ANNUITY ASSOCIATIC	NEW YORK, NY	$276,045,408	20160630
15	1111435	STATE STREET CORPORATION	BOSTON, MA	$255,396,733	20160630
16	1074156	BB&T; CORPORATION	WINSTON SALEM, NC	$221,858,615	20160630
17	1131787	SUNTRUST BANKS, INC.	ATLANTA, GA	$199,276,480	20160630
18	1026632	CHARLES SCHWAB CORPORATION, THE	SAN FRANCISCO, CA	$198,052,000	20160630
19	1275216	AMERICAN EXPRESS COMPANY	NEW YORK, NY	$159,632,000	20160630
20	1562859	ALLY FINANCIAL INC.	DETROIT, MI	$157,931,000	20160630
21	3226762	RBC USA HOLDCO CORPORATION	NEW YORK, NY	$151,710,605	20160630
22	1132449	CITIZENS FINANCIAL GROUP, INC.	PROVIDENCE, RI	$145,568,297	20160630
23	1447376	UNITED SERVICES AUTOMOBILE ASSOCIATION	SAN ANTONIO, TX	$144,819,412	20160630
24	3840207	STATE FARM MUTUAL AUTOMOBILE INSURANC	BLOOMINGTON, IL	$143,801,553	20160630
25	1070345	FIFTH THIRD BANCORP	CINCINNATI, OH	$143,625,325	20160630
26	1245415	BMO FINANCIAL CORP.	WILMINGTON, DE	$132,007,952	20160630
27	3981856	SANTANDER HOLDINGS USA, INC.	BOSTON, MA	$126,502,203	20160630
28	3242838	REGIONS FINANCIAL CORPORATION	BIRMINGHAM, AL	$126,378,482	20160630
29	1037003	M&T; BANK CORPORATION	BUFFALO, NY	$123,820,584	20160630
30	1199611	NORTHERN TRUST CORPORATION	CHICAGO, IL	$121,509,559	20160630

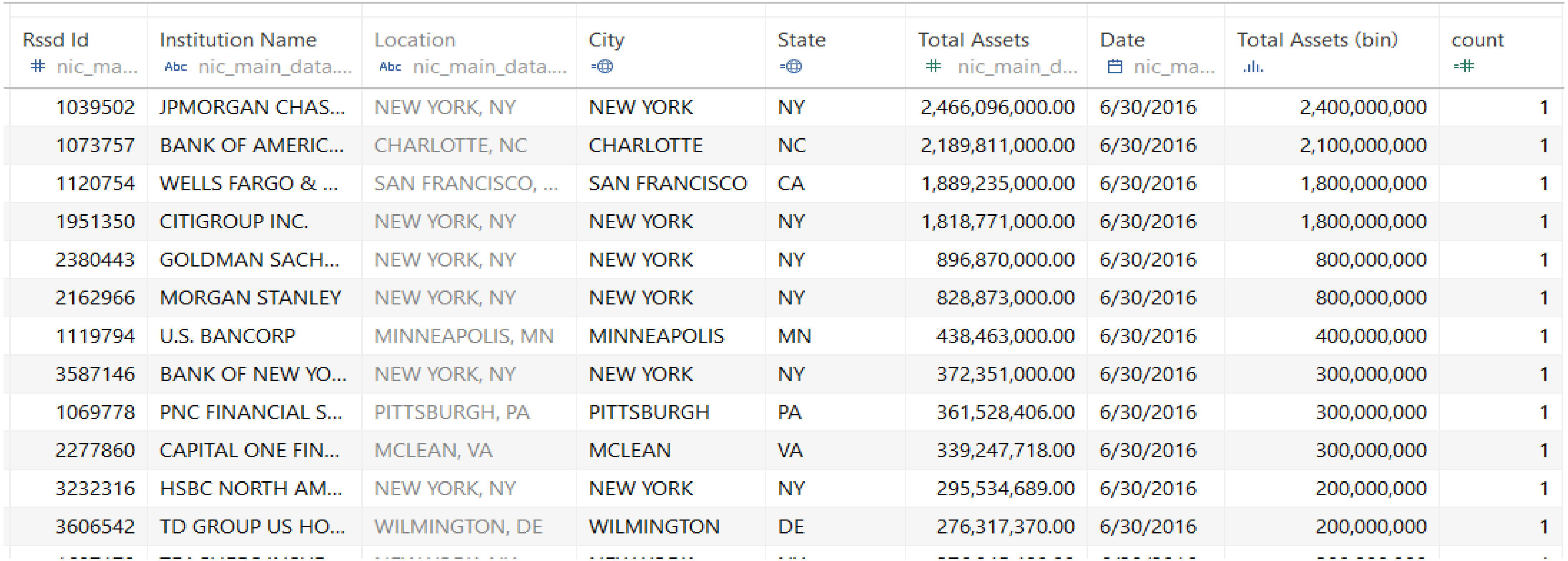
Output CSV : Unstacked Version



	A	B	C	D	E	F	G	H	I	J	K
1	RSSD ID	Institution Name	Location	20121231	20130331	20130630	20130930	20131231	20140331	20140630	2014
2	1020180	BREMER FINANCIAL CORPORATION	SAINT PAUL, MN								
3	1020902	FIRST NATIONAL OF NEBRASKA, INC.	OMAHA, NE	$16,409,360	$15,890,934	$15,466,494	$15,977,890	$16,271,487	$16,573,510	$16,754,901	$17,082,
4	1025309	BANK OF HAWAII CORPORATION	HONOLULU, HI	$13,789,923	$13,563,474	$13,787,068	$13,916,694	$14,127,598	$14,333,411	$14,884,625	$14,577,
5	1025608	BANCWEST CORPORATION	HONOLULU, HI	$79,869,488	$78,851,727	$80,069,917	$81,729,444	$83,527,474	$84,945,155	$86,617,152	$86,894,
6	1025608	FIRST HAWAIIAN, INC.	HONOLULU, HI								
7	1026632	CHARLES SCHWAB CORPORATION, THE	SAN FRANCISCO, CA	$133,637,000	$133,324,000	$135,907,000	$140,211,000	$143,642,000	$144,066,000	$143,401,000	$147,445,
8	1027004	ZIONS BANCORPORATION	SALT LAKE CITY, UT	$55,511,918	$54,110,564	$54,904,540	$55,188,312	$56,031,127	$56,080,844	$55,111,275	$55,458,
9	1027518	CITY NATIONAL CORPORATION	LOS ANGELES, CA	$28,618,492	$27,433,754	$27,379,501	$29,059,404	$29,717,951	$29,851,542	$30,819,092	$32,015,
10	1031449	SVB FINANCIAL GROUP	SANTA CLARA, CA	$22,766,602	$22,802,242	$22,165,054	$23,757,075	$26,417,306	$29,724,778	$33,322,533	$36,044,
11	1032473	DEUTSCHE BANK TRUST CORPORATION	NEW YORK, NY	$74,148,000	$75,523,000	$71,992,000	$66,067,000	$66,926,000	$72,603,000	$69,406,000	$60,715,
12	1036967	CIT GROUP INC.	LIVINGSTON, NJ	$44,012,251	$44,563,888	$44,631,022	$46,223,981	$47,138,960	$48,578,081	$44,152,666	$46,480,
13	1037003	M&T; BANK CORPORATION	BUFFALO, NY	$82,985,468	$82,794,833	$83,229,005	$84,427,485	$85,162,391	$88,530,360	$90,835,002	$97,230,
14	1039502	JPMORGAN CHASE & CO.	NEW YORK, NY	$2,359,141,000	$2,389,349,000	$2,439,494,000	$2,463,309,000	$2,415,689,000	$2,476,650,000	$2,519,995,000	$2,526,655,
15	1048773	VALLEY NATIONAL BANCORP	WAYNE, NJ	$16,012,646	$16,028,703	$15,977,202	$15,976,943	$16,156,541	$16,344,464	$16,335,967	$16,726,
16	1049341	COMMERCE BANCSHARES, INC.	KANSAS CITY, MO	$22,176,815	$22,240,695	$21,921,322	$22,462,282	$23,081,892	$22,820,527	$23,016,162	$22,710,
17	1049828	UMB FINANCIAL CORPORATION	KANSAS CITY, MO	$14,927,196	$15,705,470	$15,253,217	$16,184,233	$16,911,852	$15,945,830	$15,562,690	$16,284,
18	1060627	FIRSTBANK HOLDING COMPANY	LAKEWOOD, CO	$12,874,974	$13,078,898	$13,022,264	$13,169,177	$13,384,848	$14,009,813	$13,941,733	$14,052,
19	1068025	KEYCORP	CLEVELAND, OH	$89,425,613	$89,441,210	$90,858,779	$91,016,413	$92,991,716	$90,928,218	$91,934,784	$89,884,
20	1068191	HUNTINGTON BANCSHARES INCORPOR	COLUMBUS, OH	$56,153,185	$56,054,966	$56,113,687	$56,648,251	$59,476,344	$61,145,753	$63,797,113	$64,330,
21	1069778	PNC FINANCIAL SERVICES GROUP, INC.	PITTSBURGH, PA	$305,285,879	$300,945,933	$304,547,667	$308,912,603	$320,596,232	$323,586,973	$327,251,474	$334,602,
22	1070345	FIFTH THIRD BANCORP	CINCINNATI, OH	$121,500,604	$120,789,641	$122,642,935	$124,939,419	$129,685,180	$129,654,487	$132,562,382	$134,187,
23	1070804	FIRSTMERIT CORPORATION	AKRON, OH	$14,916,022	$15,273,159	$23,534,261	$24,140,030	$23,912,451	$24,500,602	$24,566,414	$24,610,
24	1073757	BANK OF AMERICA CORPORATION	CHARLOTTE, NC	$2,212,004,452	$2,176,625,000	$2,125,686,000	$2,128,706,000	$2,104,995,000	$2,152,533,000	$2,172,001,000	$2,126,138,
25	1074156	BB&T; CORPORATION	WINSTON SALEM, NC	$183,872,371	$180,836,757	$182,735,153	$181,050,008	$183,009,992	$184,651,158	$188,012,330	$187,021,
26	1075612	FIRST CITIZENS BANCSHARES, INC.	RALEIGH, NC	$21,283,651	$21,351,012	$21,308,822	$21,511,352	$21,199,091	$22,154,997	$22,062,840	$21,942,
27	1076217	UNITED BANKSHARES, INC.	CHARLESTON, WV						$11,886,320	$12,051,710	$12,085,
28	1078529	BBVA COMPASS BANCSHARES, INC.	HOUSTON, TX			$69,674,976	$70,087,078	$71,065,476	$74,957,227	$75,747,100	$79,187,

Step 4 : Pre-processing the data for Analysis

- Splitting the Location into city and state for analysis purpose on Tableau

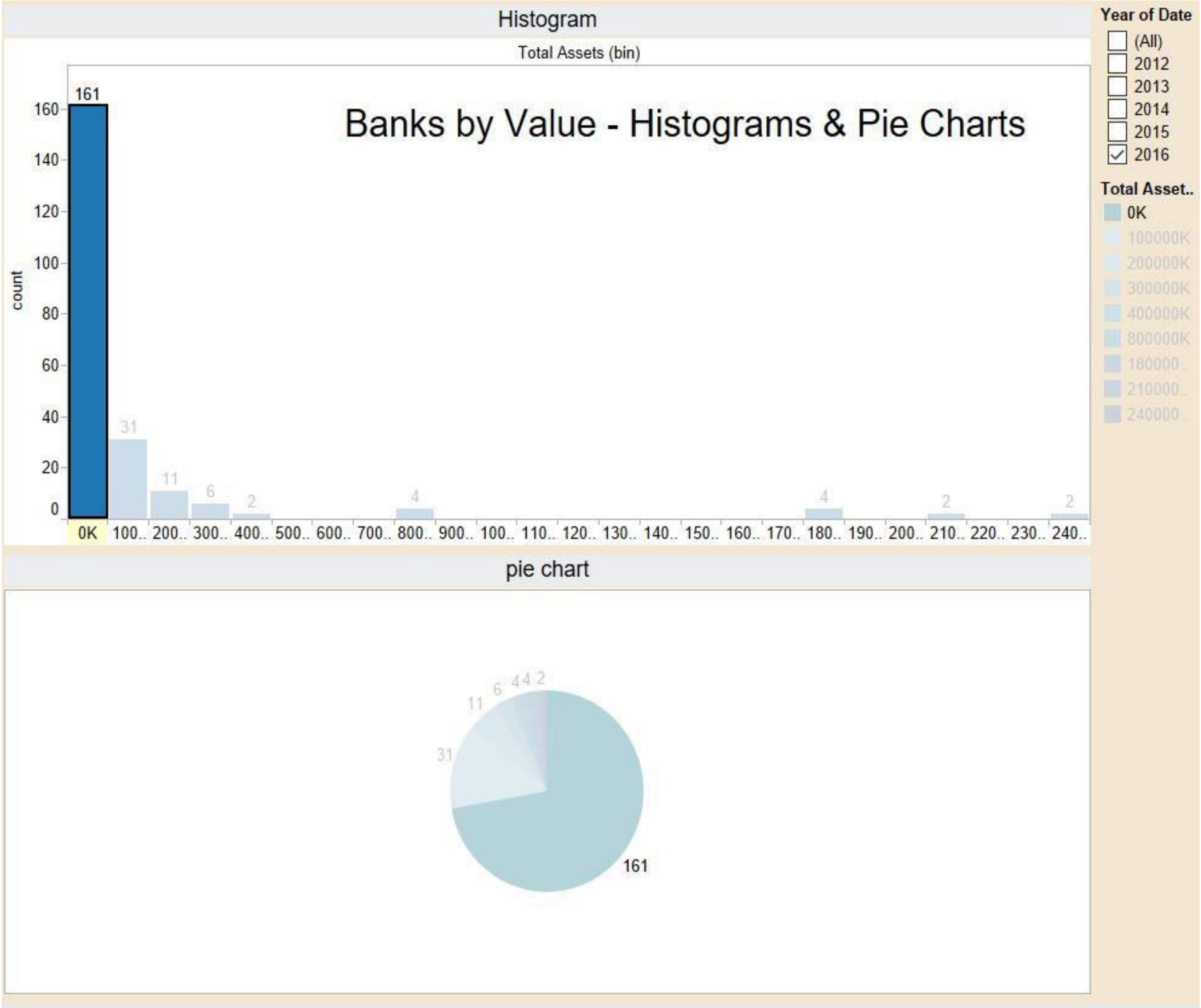


Rssd Id # nic_ma...	Institution Name Abc nic_main_data....	Location Abc nic_main_data....	City 🌐	State 🌐	Total Assets # nic_main_d...	Date 📅 nic_ma...	Total Assets (bin) ılı	count #
1039502	JPMORGAN CHAS...	NEW YORK, NY	NEW YORK	NY	2,466,096,000.00	6/30/2016	2,400,000,000	1
1073757	BANK OF AMERIC...	CHARLOTTE, NC	CHARLOTTE	NC	2,189,811,000.00	6/30/2016	2,100,000,000	1
1120754	WELLS FARGO & ...	SAN FRANCISCO, ...	SAN FRANCISCO	CA	1,889,235,000.00	6/30/2016	1,800,000,000	1
1951350	CITIGROUP INC.	NEW YORK, NY	NEW YORK	NY	1,818,771,000.00	6/30/2016	1,800,000,000	1
2380443	GOLDMAN SACH...	NEW YORK, NY	NEW YORK	NY	896,870,000.00	6/30/2016	800,000,000	1
2162966	MORGAN STANLEY	NEW YORK, NY	NEW YORK	NY	828,873,000.00	6/30/2016	800,000,000	1
1119794	U.S. BANCORP	MINNEAPOLIS, MN	MINNEAPOLIS	MN	438,463,000.00	6/30/2016	400,000,000	1
3587146	BANK OF NEW YO...	NEW YORK, NY	NEW YORK	NY	372,351,000.00	6/30/2016	300,000,000	1
1069778	PNC FINANCIAL S...	PITTSBURGH, PA	PITTSBURGH	PA	361,528,406.00	6/30/2016	300,000,000	1
2277860	CAPITAL ONE FIN...	MCLEAN, VA	MCLEAN	VA	339,247,718.00	6/30/2016	300,000,000	1
3232316	HSBC NORTH AM...	NEW YORK, NY	NEW YORK	NY	295,534,689.00	6/30/2016	200,000,000	1
3606542	TD GROUP US HO...	WILMINGTON, DE	WILMINGTON	DE	276,317,370.00	6/30/2016	200,000,000	1

Step 5 : Creating Dashboards in Tableau

Banks by Value:

- Histograms shows the count of companies in the range on the x axis.
- Pie chart shows the count of companies in the range. Gives us insights about the percentage of the total value.



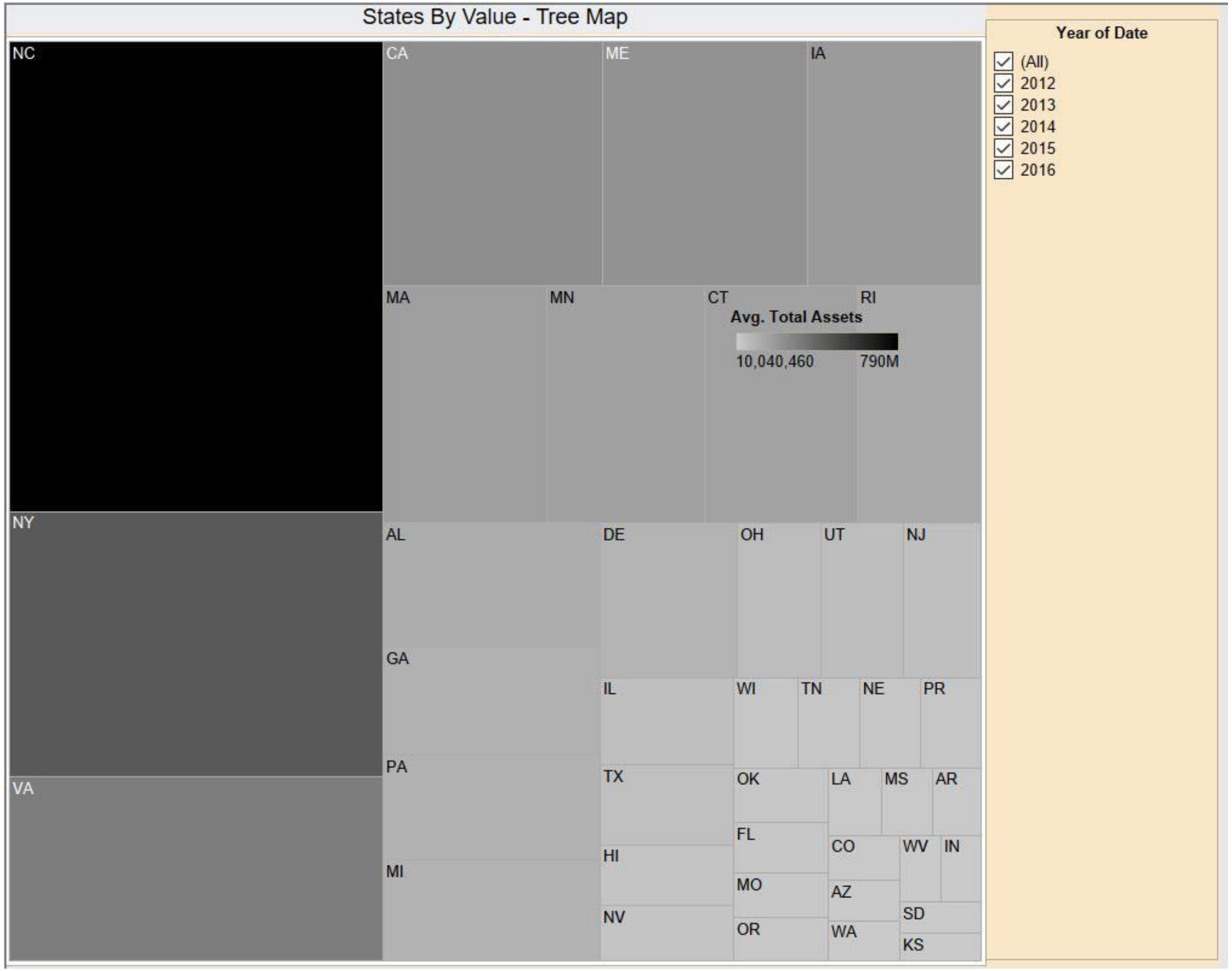
Banks by Value - Histograms & Pie Charts

Year of Date

□ (All)
□ 2012
□ 2013
□ 2014
□ 2015
☑ 2016

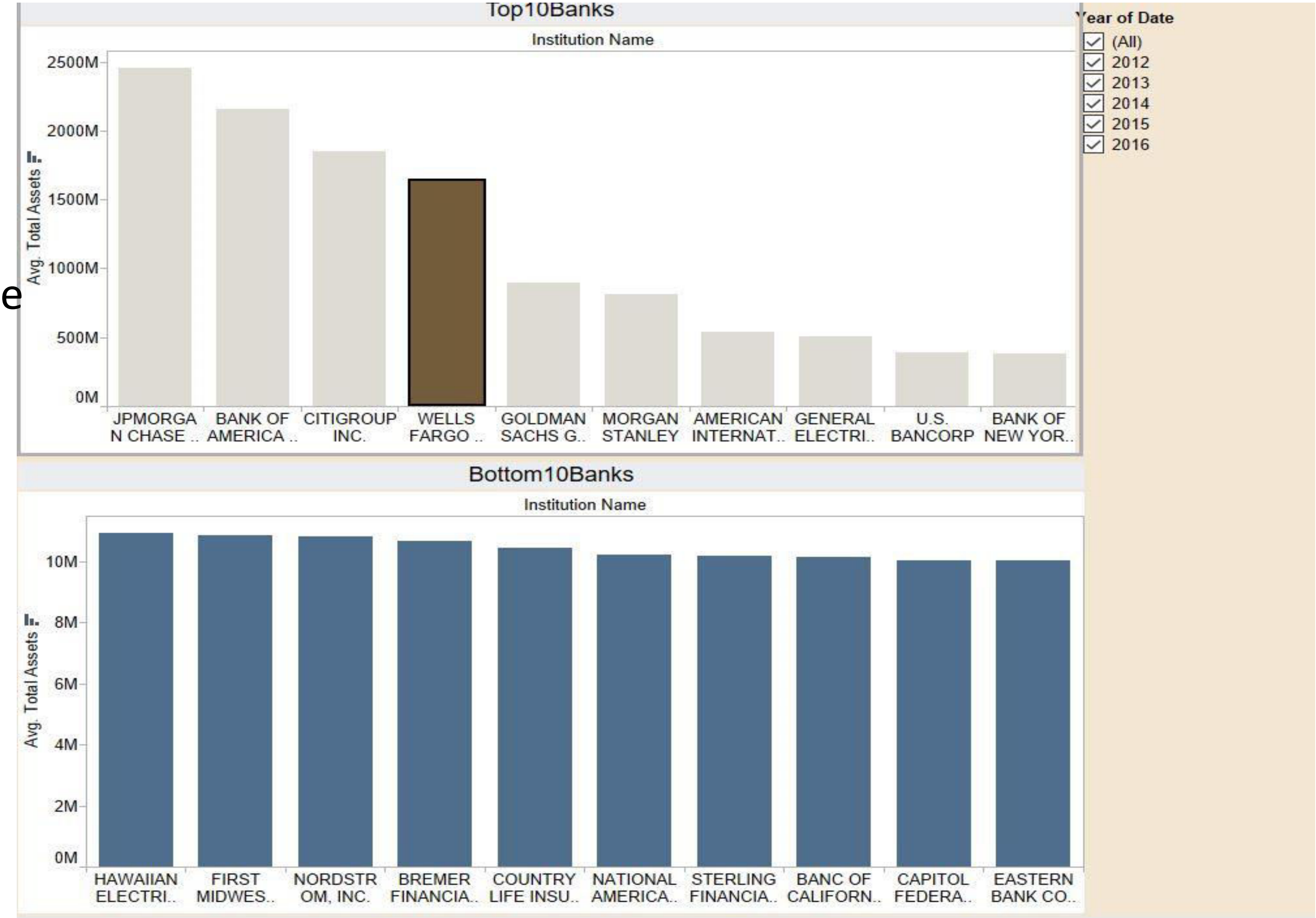
States by Value:

- Tree map here shows the assets of companies grouped by the state of where they are located.
- The values are filtered according to the Year. If multiple years are selected it takes the average of the values



Top and Bottom 10 banks:

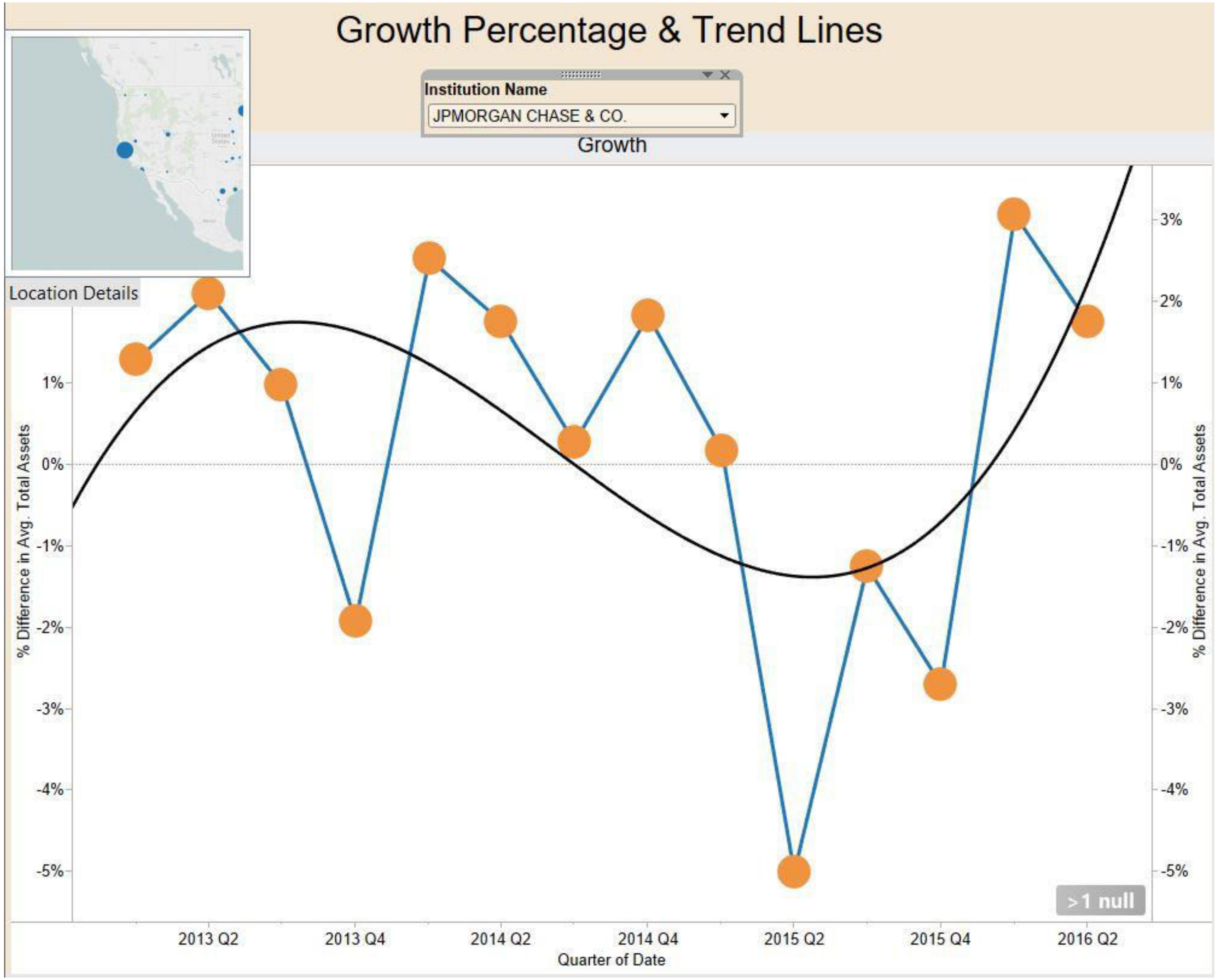
- The bar chart shows the top 10 and bottom 10 banks by value of their assets
- The values are filtered according to the Year. If multiple years are selected it takes the average of the values



Year of Date
☑ (All)
☑ 2012
☑ 2013
☑ 2014
☑ 2015
☑ 2016

Growth Percentage:

- Shows the percentage growth of assets & trend lines with respect to successive quarters
- The figure shows the trend line for JP Morgan, which shows their assets are expected to increase in the next quarter.



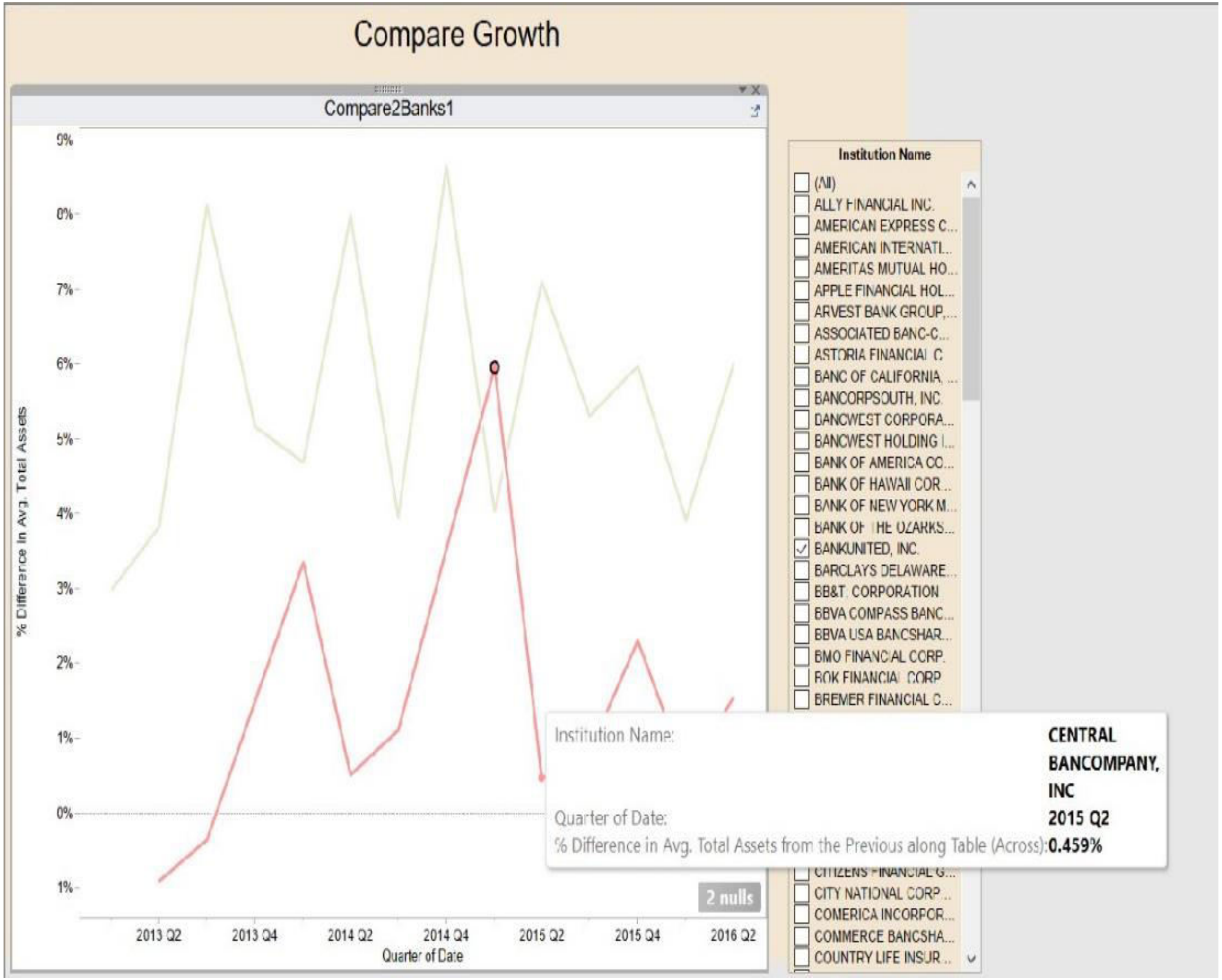
Growth Percentage & Trend Lines

Institution Name

JPMORGAN CHASE & CO.

Growth comparison:

- The graph compares the asset growth of companies selected for every quarter.
- The figure shows that % asset growth of Central bankcompany Inc. is generally lower than Bankunited Inc



Institution Name

- □ (All)
- □ ALLY FINANCIAL INC.
- □ AMERICAN EXPRESS C...
- □ AMERICAN INTERNATI...
- □ AMERITAS MUTUAL HO...
- □ APPLE FINANCIAL HOL...
- □ ARVEST BANK GROUP,...
- □ ASSOCIATED BANC-C...
- □ ASTORIA FINANCIAL C
- □ BANC OF CALIFORNIA, ...
- □ BANCORPSOUTH, INC.
- □ BANCWEST CORPORA...
- □ BANCWEST HOLDING I...
- □ BANK OF AMERICA CO...
- □ BANK OF HAWAII COR...
- □ BANK OF NEW YORK M...
- □ BANK OF THE OZARKS...
- ☑ BANKUNITED, INC.
- □ BARCLAYS DELAWARE...
- □ BB&T CORPORATION
- □ BBVA COMPASS BANC...
- □ BBVA USA BANCSHAR...
- □ BMO FINANCIAL CORP.
- □ BOK FINANCIAL CORP
- □ BREMER FINANCIAL C...
- □ CITIZENS FINANCIAL G...
- □ CITY NATIONAL CORP...
- □ COMERICA INCORPOR...
- □ COMMERCE BANCSHA...
- □ COUNTRY LIFE INSUR...

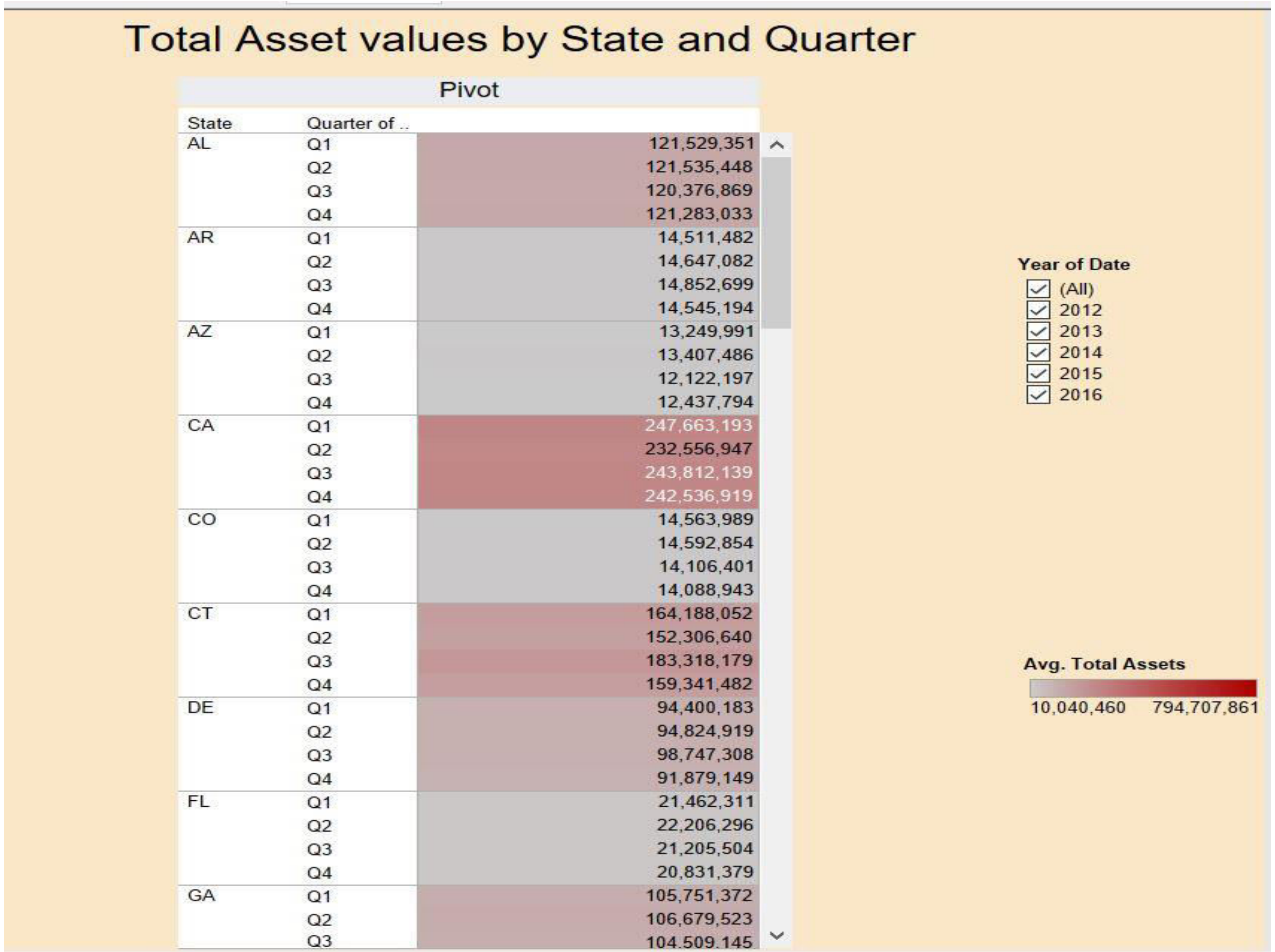
Institution Name: CENTRAL BANCOMPANY, INC

Quarter of Date: 2015 Q2

% Difference in Avg. Total Assets from the Previous along Table (Across): 0.459%

Total Asset value:

- The figure shows total asset values grouped by the states for every quarter.



Total Asset values by State and Quarter

Pivot

State	Quarter of ..	
AL	Q1	121,529,351
	Q2	121,535,448
	Q3	120,376,869
	Q4	121,283,033
AR	Q1	14,511,482
	Q2	14,647,082
	Q3	14,852,699
	Q4	14,545,194
AZ	Q1	13,249,991
	Q2	13,407,486
	Q3	12,122,197
	Q4	12,437,794
CA	Q1	247,663,193
	Q2	232,556,947
	Q3	243,812,139
	Q4	242,536,919
CO	Q1	14,563,989
	Q2	14,592,854
	Q3	14,106,401
	Q4	14,088,943
CT	Q1	164,188,052
	Q2	152,306,640
	Q3	183,318,179
	Q4	159,341,482
DE	Q1	94,400,183
	Q2	94,824,919
	Q3	98,747,308
	Q4	91,879,149
FL	Q1	21,462,311
	Q2	22,206,296
	Q3	21,205,504
	Q4	20,831,379
GA	Q1	105,751,372
	Q2	106,679,523
	Q3	104,509,145

Year of Date

☑ (All)
☑ 2012
☑ 2013
☑ 2014
☑ 2015
☑ 2016

Avg. Total Assets

10,040,460 794,707,861

Part 2:
Data Scraping for BHCPR Average Reports

Process workflow:

Step 1 : Scrape WebPage to get all the reqd. PDF files (Peer 1)

Step 2 : Scraping the PDF file

Step 3 : Cleaning the data

Step 4 : Creating and saving the data into CSV file

Step 5 : Repeating Step 2-4 for all Peer 1 files

Note : Used Python2.7

Step 1 : Scrape WebPage to get all the PDFs

<u>Modules used:</u>

- Beautiful Soup

To parse HTML document

- Requests

To create a request and

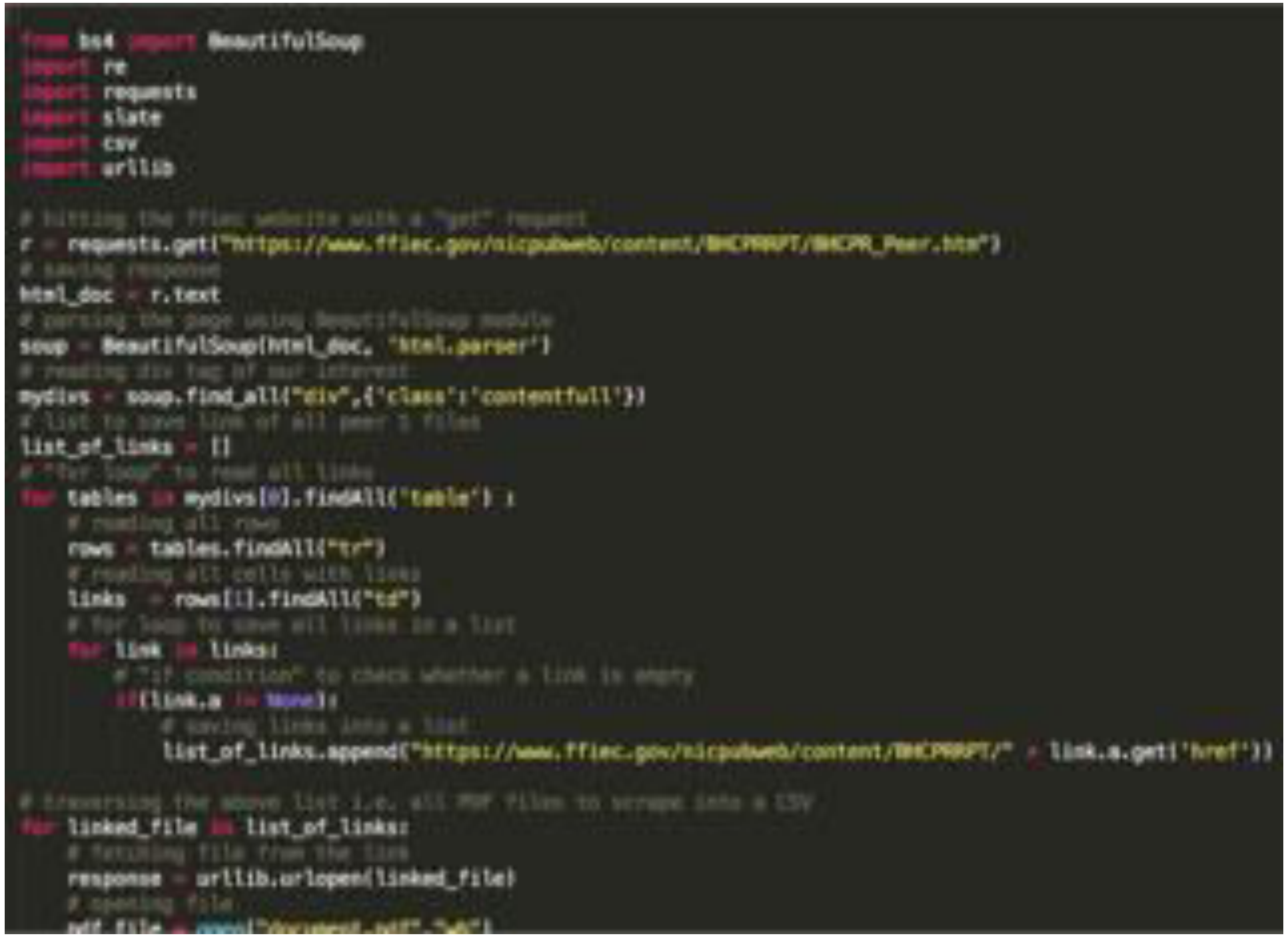
a response to the website

- Slate

To scrape PDFs

- Urllib

Fetch file from HTTPResponse



```
from bs4 import BeautifulSoup
import re
import requests
import slate
import csv
import urllib

# hitting the ffiec website with a "get" request
r = requests.get("https://www.ffiec.gov/nicpubweb/content/BHCPRRPT/BHCPR_Peer.htm")
# saving response
html_doc = r.text
# parsing the page using BeautifulSoup module
soup = BeautifulSoup(html_doc, 'html.parser')
# reading div tag of our interest
mydivs = soup.find_all("div",{'class':'contentfull'})
# list to save link of all peer 1 files
list_of_links = []
# "for loop" to read all links
for tables in mydivs[0].findAll('table') :
    # reading all rows
    rows = tables.findAll("tr")
    # reading all cells with links
    links  = rows[1].findAll("td")
    # for loop to save all links in a list
    for link in links:
        # "if condition" to check whether a link is empty
        if(link.a != None):
            # saving links into a list
            list_of_links.append("https://www.ffiec.gov/nicpubweb/content/BHCPRRPT/" + link.a.get('href'))

# traversing the above list i.e. all PDF files to scrape into a CSV
for linked_file in list_of_links:
    # fetching file from the link
    response = urllib.urlopen(linked_file)
    # opening file
    pdf_file = open("document.pdf","wb")
```

Step 2 : Scraping the PDF file

- Used “slate 0.5.2” package for scraping all PDFs.
- “slate” is a wrapper package for PDFMiner
- Fetched all PDF file links using “urllib” library

Step 3 : Cleaning the Data

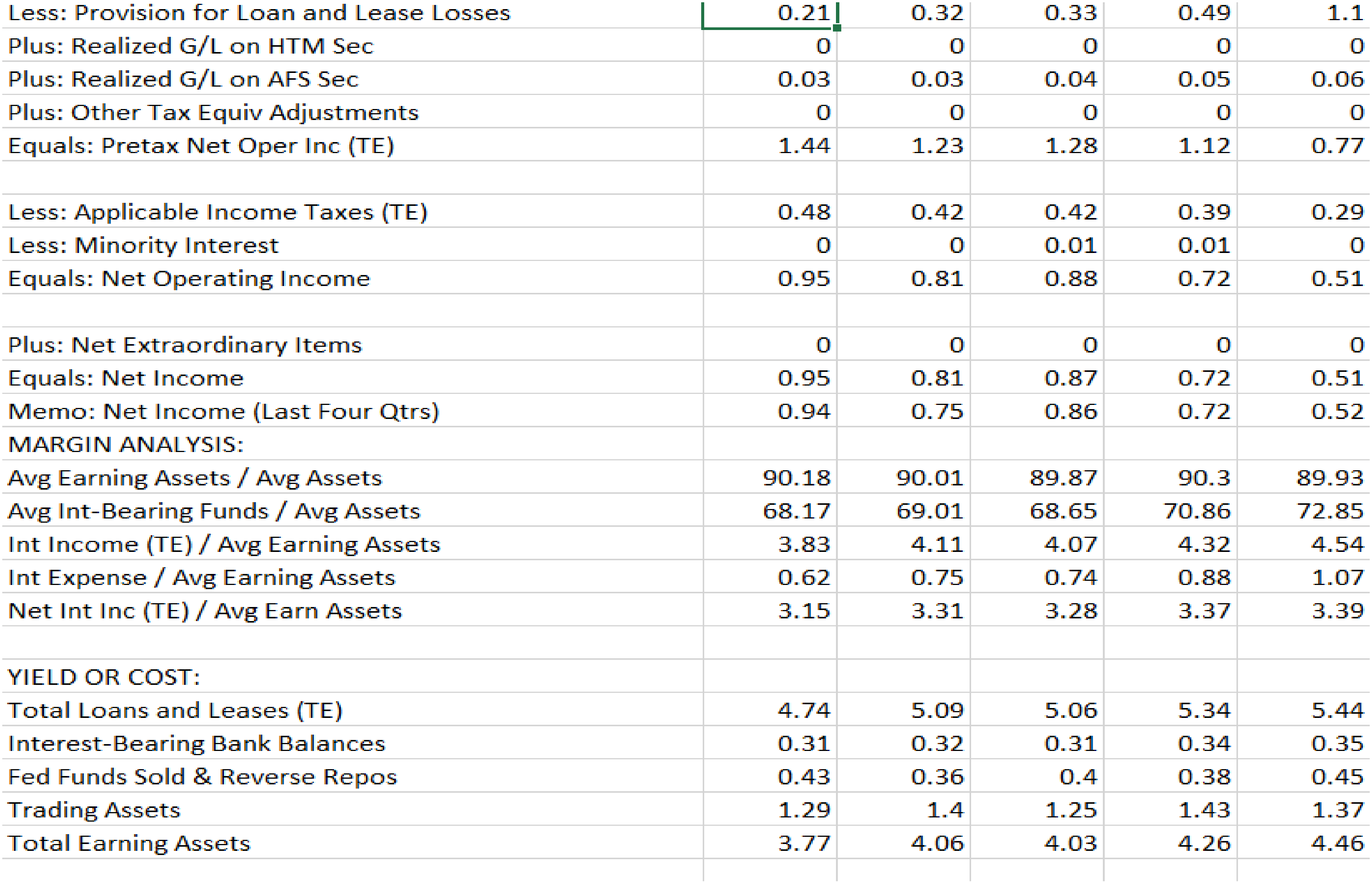
- Identified the rows & columns by recognizing the pattern of formatting in the PDF file
- Created a list of lists containing the data of PDF file
- Removed all the white spaces
- Removed all redundant lines
- Aligned the headers & data in respective positions

Step 4 : Creating and saving the data into CSV

- Created File name as reqd. by extracting it from the online PDF file itself i.e. from https://www.ffiec.gov/nicpubweb/content/BHCPRRPT/REPORTS/BHCPR_PEER/June2016/PeerGroup_1_June2016.pdf

  to "Peer1_2016_June.csv"
- Using "csv" module, made a CSV file for each quarter

Output CSV



Less: Provision for Loan and Lease Losses	0.21	0.32	0.33	0.49	1.1
Plus: Realized G/L on HTM Sec	0	0	0	0	0
Plus: Realized G/L on AFS Sec	0.03	0.03	0.04	0.05	0.06
Plus: Other Tax Equiv Adjustments	0	0	0	0	0
Equals: Pretax Net Oper Inc (TE)	1.44	1.23	1.28	1.12	0.77
Less: Applicable Income Taxes (TE)	0.48	0.42	0.42	0.39	0.29
Less: Minority Interest	0	0	0.01	0.01	0
Equals: Net Operating Income	0.95	0.81	0.88	0.72	0.51
Plus: Net Extraordinary Items	0	0	0	0	0
Equals: Net Income	0.95	0.81	0.87	0.72	0.51
Memo: Net Income (Last Four Qtrs)	0.94	0.75	0.86	0.72	0.52
MARGIN ANALYSIS:					
Avg Earning Assets / Avg Assets	90.18	90.01	89.87	90.3	89.93
Avg Int-Bearing Funds / Avg Assets	68.17	69.01	68.65	70.86	72.85
Int Income (TE) / Avg Earning Assets	3.83	4.11	4.07	4.32	4.54
Int Expense / Avg Earning Assets	0.62	0.75	0.74	0.88	1.07
Net Int Inc (TE) / Avg Earn Assets	3.15	3.31	3.28	3.37	3.39
YIELD OR COST:					
Total Loans and Leases (TE)	4.74	5.09	5.06	5.34	5.44
Interest-Bearing Bank Balances	0.31	0.32	0.31	0.34	0.35
Fed Funds Sold & Reverse Repos	0.43	0.36	0.4	0.38	0.45
Trading Assets	1.29	1.4	1.25	1.43	1.37
Total Earning Assets	3.77	4.06	4.03	4.26	4.46

Step 5 : Repeating Step 2-4 for all Peer 1 files

- Traverse through the list of links of PDF files fetched in Step 1
- For every PDF file, scrape, clean & save a new CSV

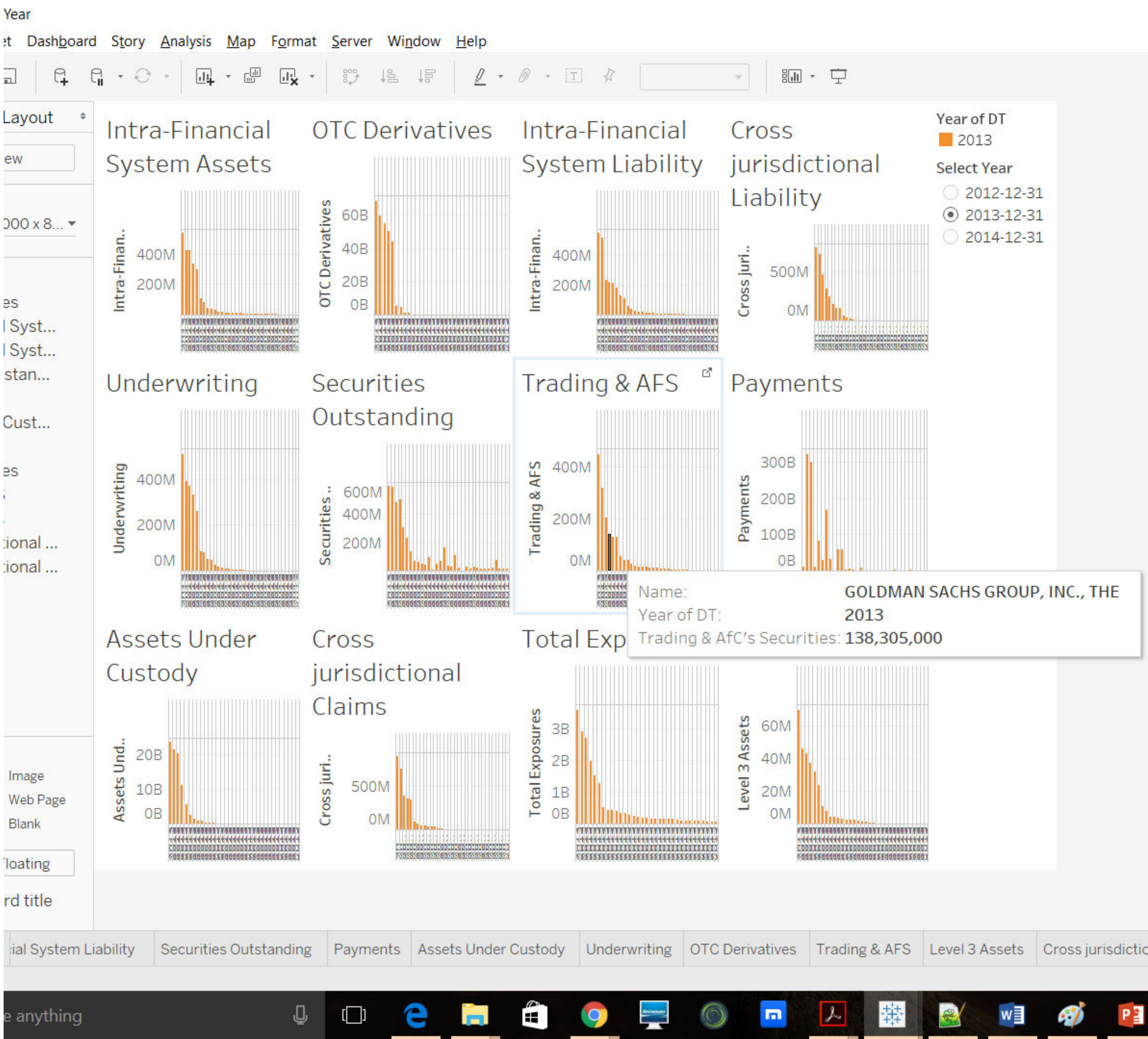
quest2.py

File: Python code for Part 2

Part 3:
Analysis of Banking Organization Systemic Risk Reports for the years 2012, 2013 and 2014

Graphs Dashboard

- 12 bar charts for Measures for each Bank.
- Filtering based on Year.

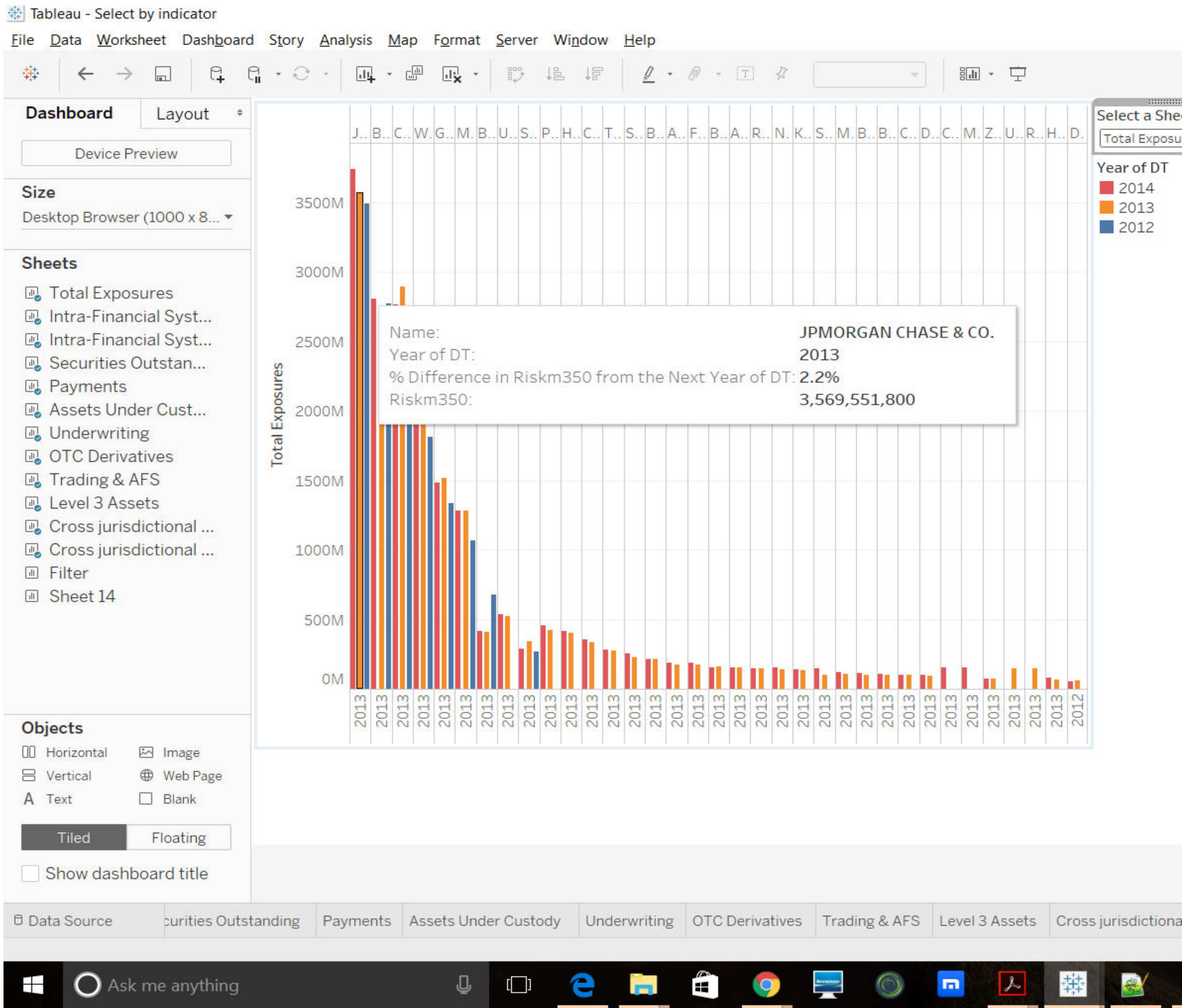


Select Year
○ 2012-12-31
● 2013-12-31
○ 2014-12-31

Name:	GOLDMAN SACHS GROUP, INC., THE
Year of DT:	2013
Trading & AfC's Securities:	138,305,000

Time Series Dashboard

- Shows Year to Year comparison in form of Percentage Change values.
- Sheet Selector as Dashboard filter, to select Measure value over the 3 years.



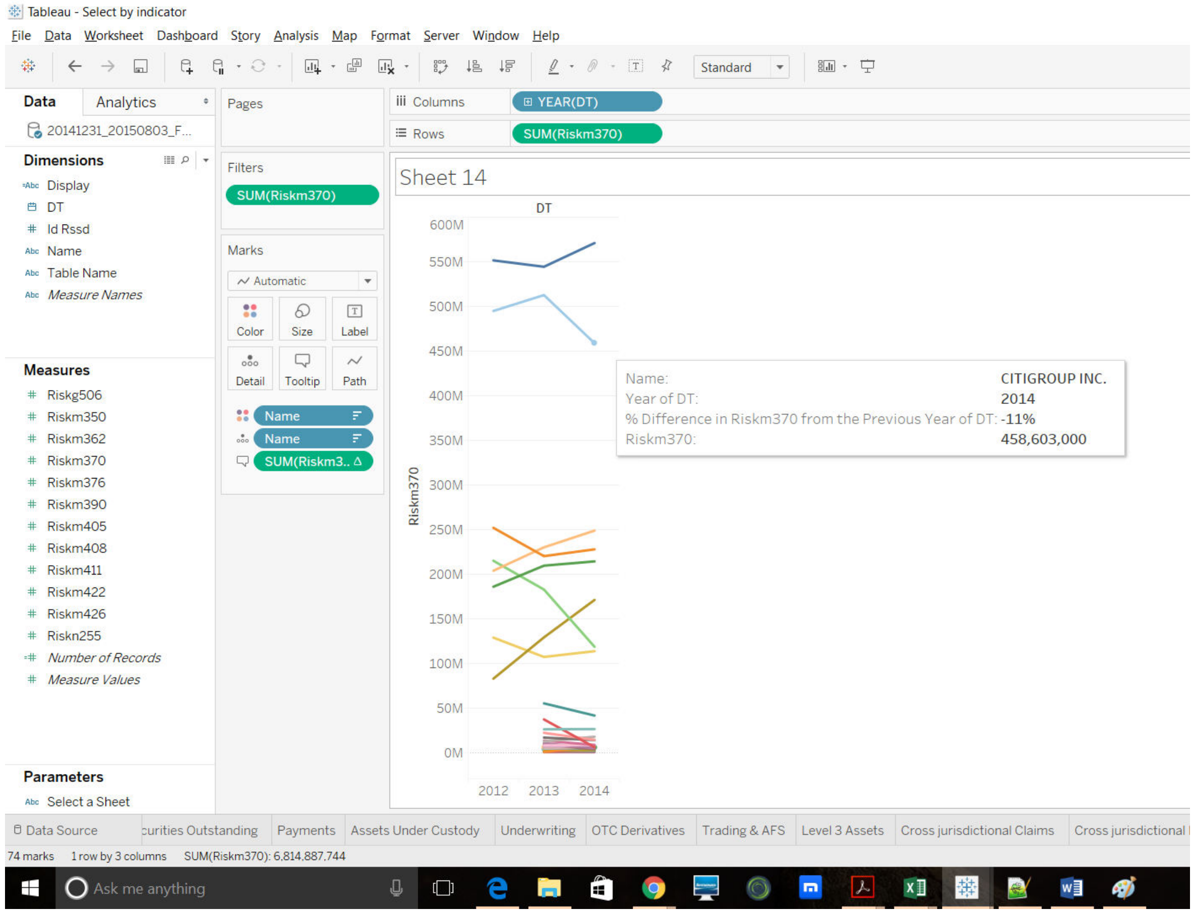
Name: JPMORGAN CHASE & CO.
Year of DT: 2013
% Difference in Riskm350 from the Next Year of DT: 2.2%
Riskm350: 3,569,551,800

☐ Show dashboard title

Alternative Visualization techniques

Line Graph

- Progressive visual of a measure for each bank over the years.
- Tooltip Indicates percentage change.
- Indicates the rise & fall of a measure for each bank.



Name: CITIGROUP INC.
Year of DT: 2014
% Difference in Riskm370 from the Previous Year of DT: -11%
Riskm370: 458,603,000

74 marks 1 row by 3 columns SUM(Riskm370): 6,814,887,744

Contd..

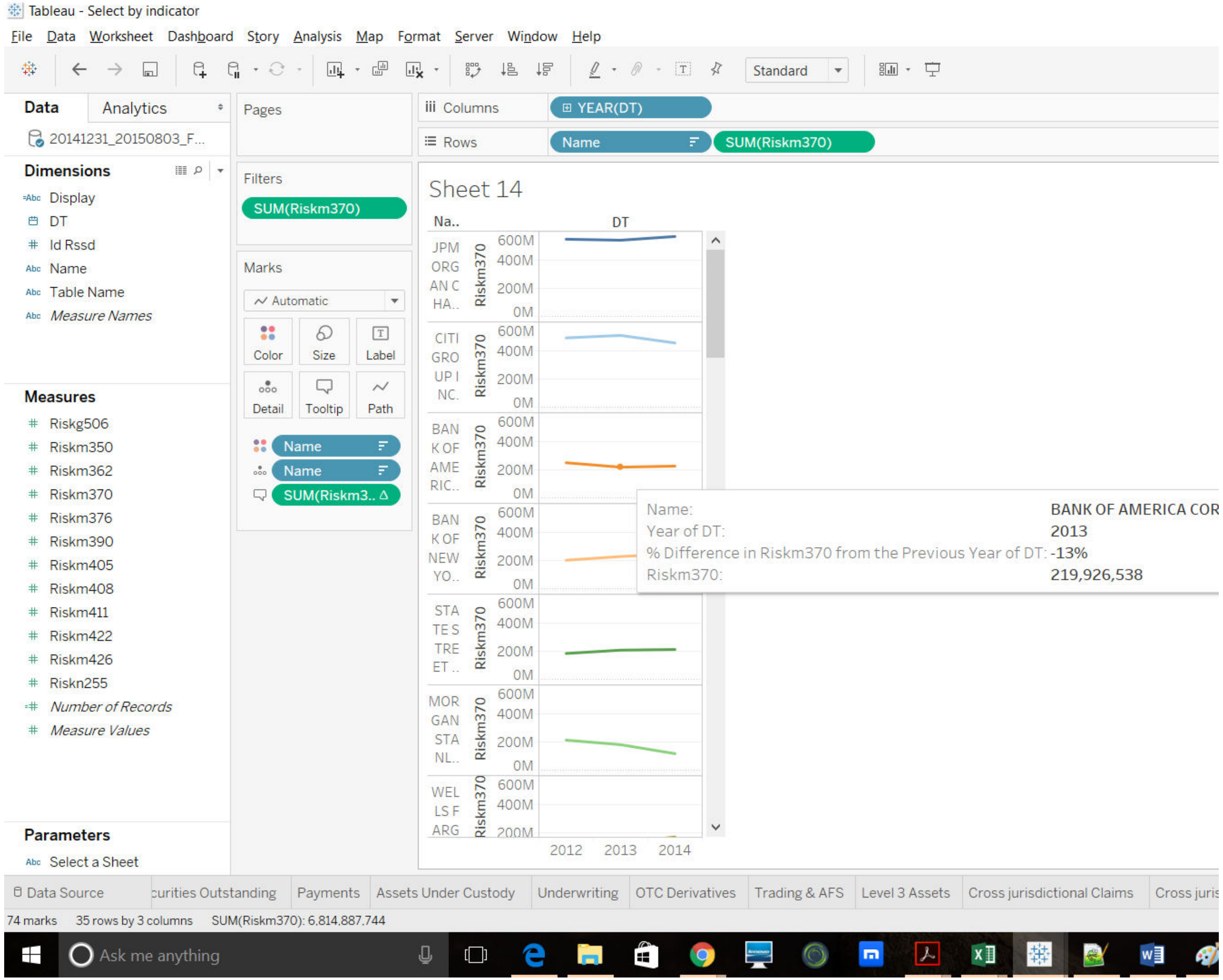


Tableau - Select by indicator

Columns: YEAR(DT)

Rows: Name, SUM(Riskm370)

Filters: SUM(Riskm370)

Marks: Automatic

Name

Name

SUM(Riskm3.. Δ

Sheet 14

Name: BANK OF AMERICA COR

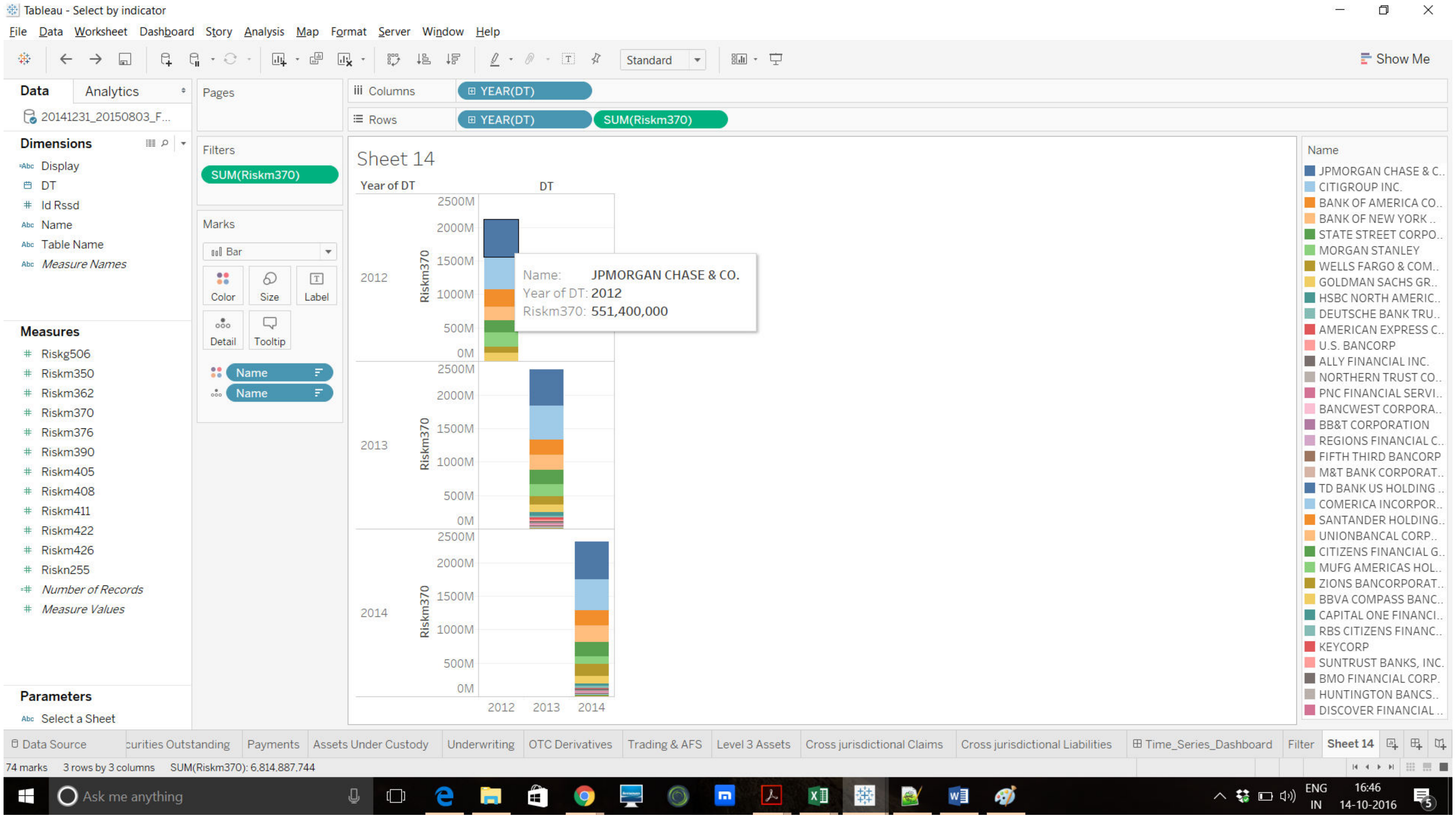
Year of DT: 2013

% Difference in Riskm370 from the Previous Year of DT: -13%

Riskm370: 219,926,538

74 marks 35 rows by 3 columns SUM(Riskm370): 6,814,887,744

Contd..



Data source: 20141231_20150803_F...

Columns: YEAR(DT)

Rows: YEAR(DT) SUM(Riskm370)

Filters: SUM(Riskm370)

Marks: Bar; Color: Name; Detail: Name

Dimensions: Display, DT, Id Rssd, Name, Table Name, *Measure Names*

Measures: Riskg506, Riskm350, Riskm362, Riskm370, Riskm376, Riskm390, Riskm405, Riskm408, Riskm411, Riskm422, Riskm426, Riskn255, *Number of Records*, *Measure Values*

Parameters: Select a Sheet

Sheet 14

Name: JPMORGAN CHASE & CO.
Year of DT: 2012
Riskm370: 551,400,000

Name

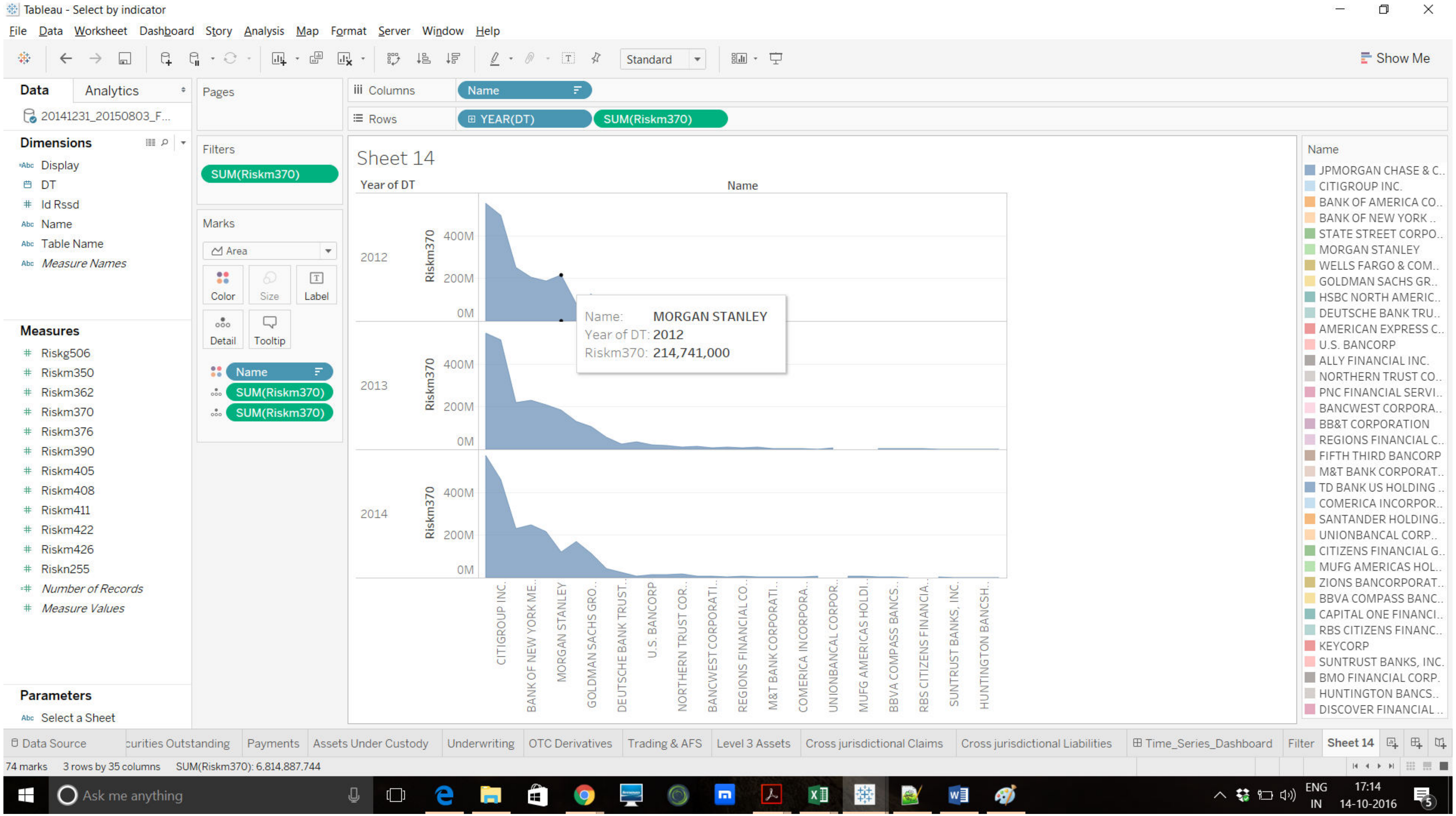
- 🟦 JPMORGAN CHASE & C..
- 🟦 CITIGROUP INC.
- 🟧 BANK OF AMERICA CO..
- 🟧 BANK OF NEW YORK ..
- 🟩 STATE STREET CORPO..
- 🟩 MORGAN STANLEY
- 🟨 WELLS FARGO & COM..
- 🟨 GOLDMAN SACHS GR..
- 🟩 HSBC NORTH AMERIC..
- 🟩 DEUTSCHE BANK TRU..
- 🟥 AMERICAN EXPRESS C..
- 🟥 U.S. BANCORP
- ⬛ ALLY FINANCIAL INC.
- ⬜ NORTHERN TRUST CO..
- 🟪 PNC FINANCIAL SERVI..
- 🟪 BANCWEST CORPORA..
- 🟪 BB&T CORPORATION
- 🟪 REGIONS FINANCIAL C..
- 🟫 FIFTH THIRD BANCORP
- 🟫 M&T BANK CORPORAT..
- 🟦 TD BANK US HOLDING ..
- 🟦 COMERICA INCORPOR..
- 🟧 SANTANDER HOLDING..
- 🟧 UNIONBANCAL CORP..
- 🟩 CITIZENS FINANCIAL G..
- 🟩 MUFG AMERICAS HOL..
- 🟨 ZIONS BANCORPORAT..
- 🟨 BBVA COMPASS BANC..
- 🟩 CAPITAL ONE FINANCI..
- 🟩 RBS CITIZENS FINANC..
- 🟥 KEYCORP
- 🟥 SUNTRUST BANKS, INC.
- ⬛ BMO FINANCIAL CORP.
- ⬜ HUNTINGTON BANCS..
- 🟪 DISCOVER FINANCIAL ..

Data Source | curities Outstanding | Payments | Assets Under Custody | Underwriting | OTC Derivatives | Trading & AFS | Level 3 Assets | Cross jurisdictional Claims | Cross jurisdictional Liabilities | Time_Series_Dashboard | Filter | Sheet 14

74 marks   3 rows by 3 columns   SUM(Riskm370): 6,814,887,744

ENG IN 16:46 14-10-2016

Contd..

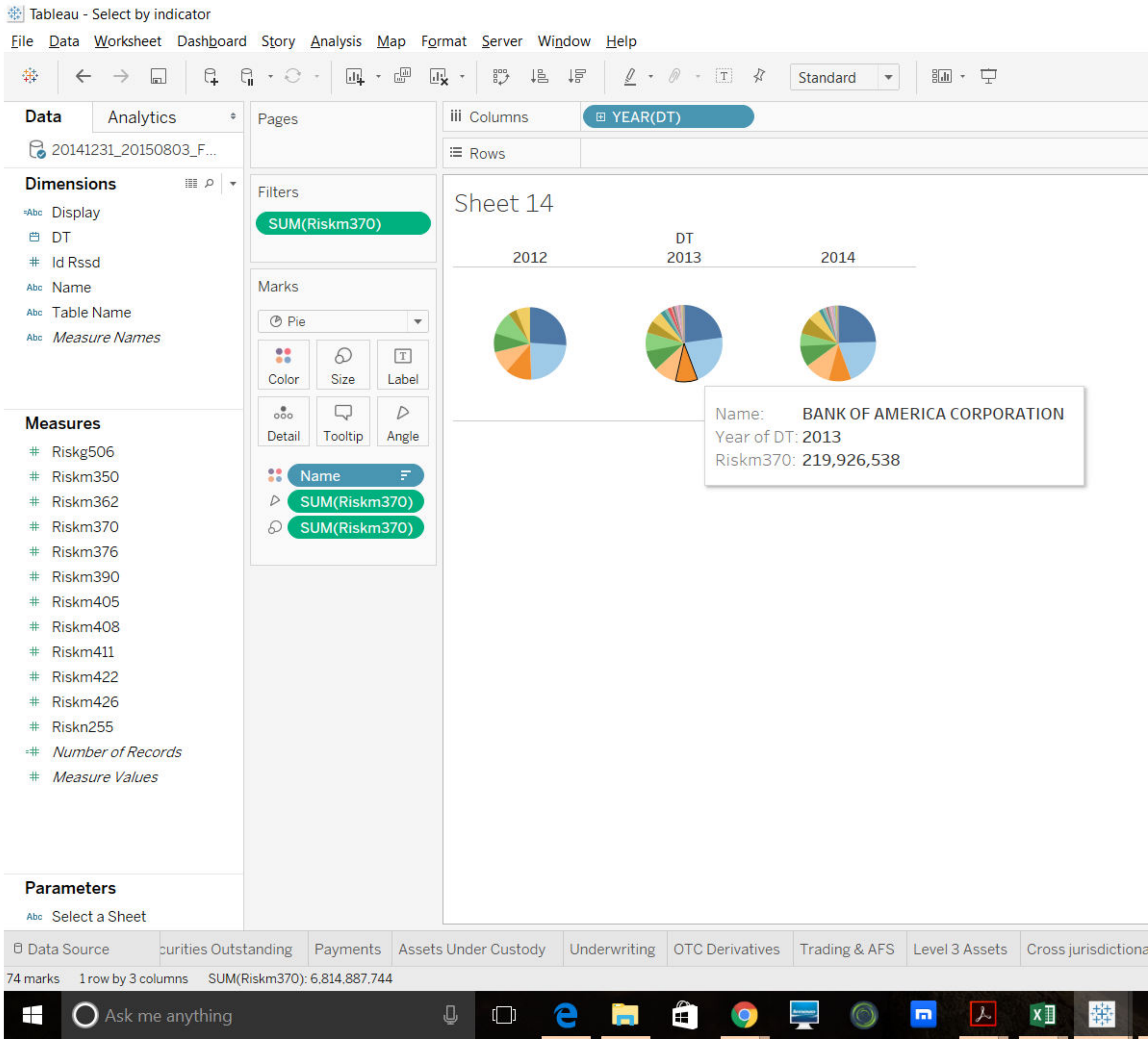


Name: MORGAN STANLEY
Year of DT: 2012
Riskm370: 214,741,000

74 marks 3 rows by 35 columns SUM(Riskm370): 6,814,887,744

Pie Chart

- Year Wise Distribution of individual measure for all the banks.
- Chart shows data for all the banks & its measure distribution for each year.

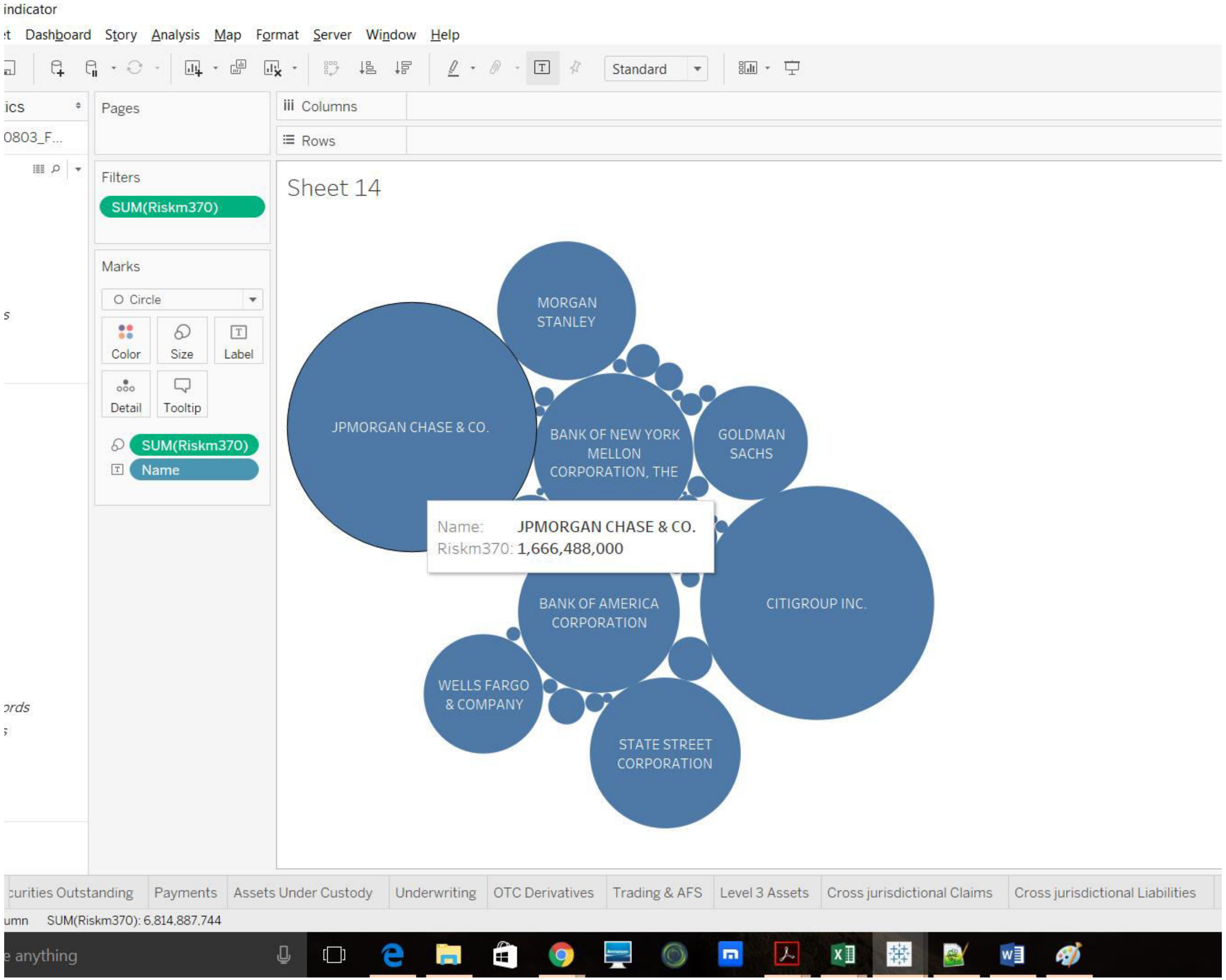


Name: BANK OF AMERICA CORPORATION
Year of DT: 2013
Riskm370: 219,926,538

74 marks 1 row by 3 columns SUM(Riskm370): 6,814,887,744

Packed Bubbles

- Total Bank Distribution of a measure value computed for all years.
- Combined Distribution for all banks for all the years for an individual measure.

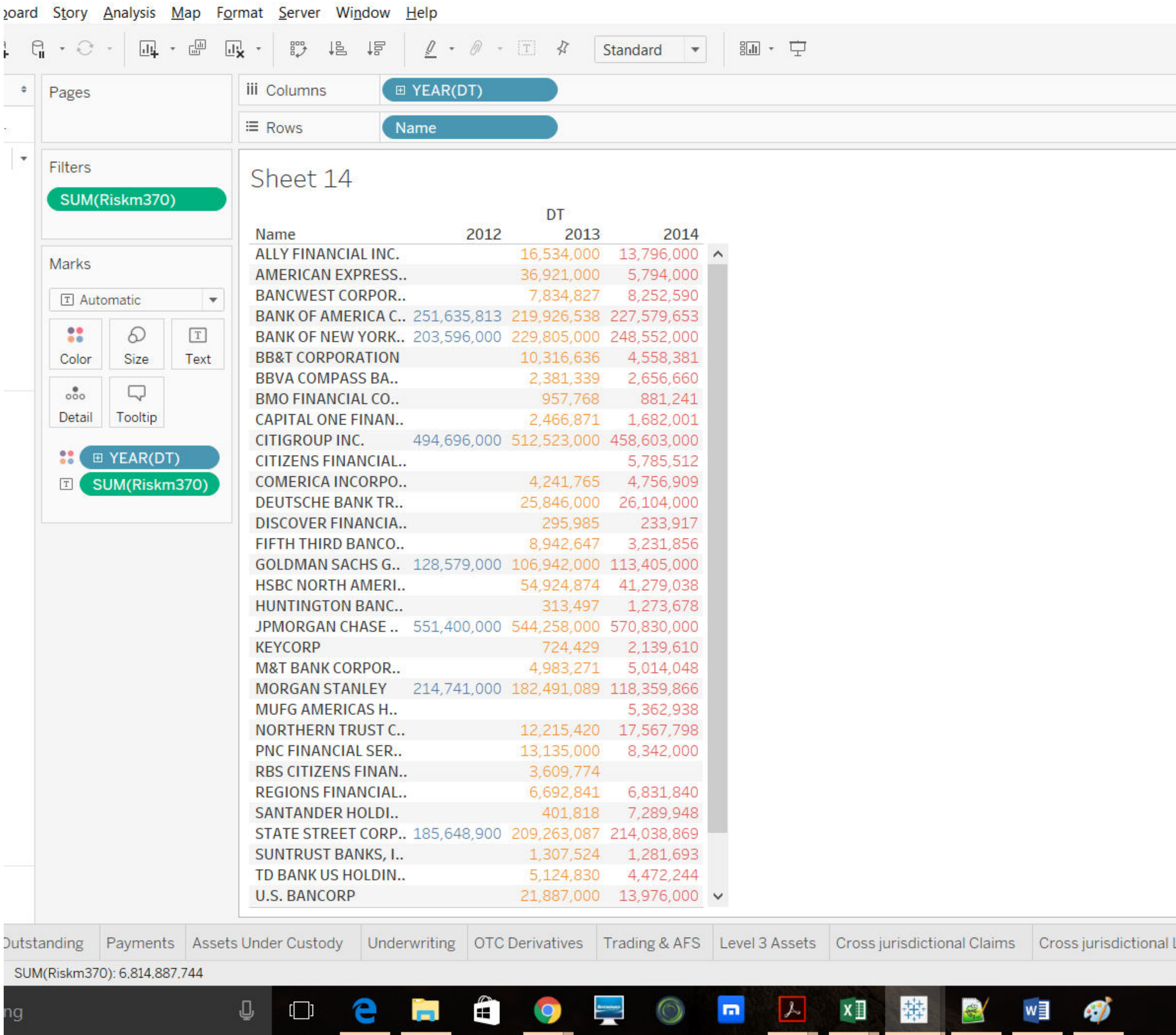


Name: JPMORGAN CHASE & CO.
Riskm370: 1,666,488,000

umn SUM(Riskm370): 6,814,887,744

Text Tables/Highlight Tables

- Tabular data for bank assets over 3 years.



Columns: YEAR(DT)

Rows: Name

Filters: SUM(Riskm370)

Marks: YEAR(DT), SUM(Riskm370)

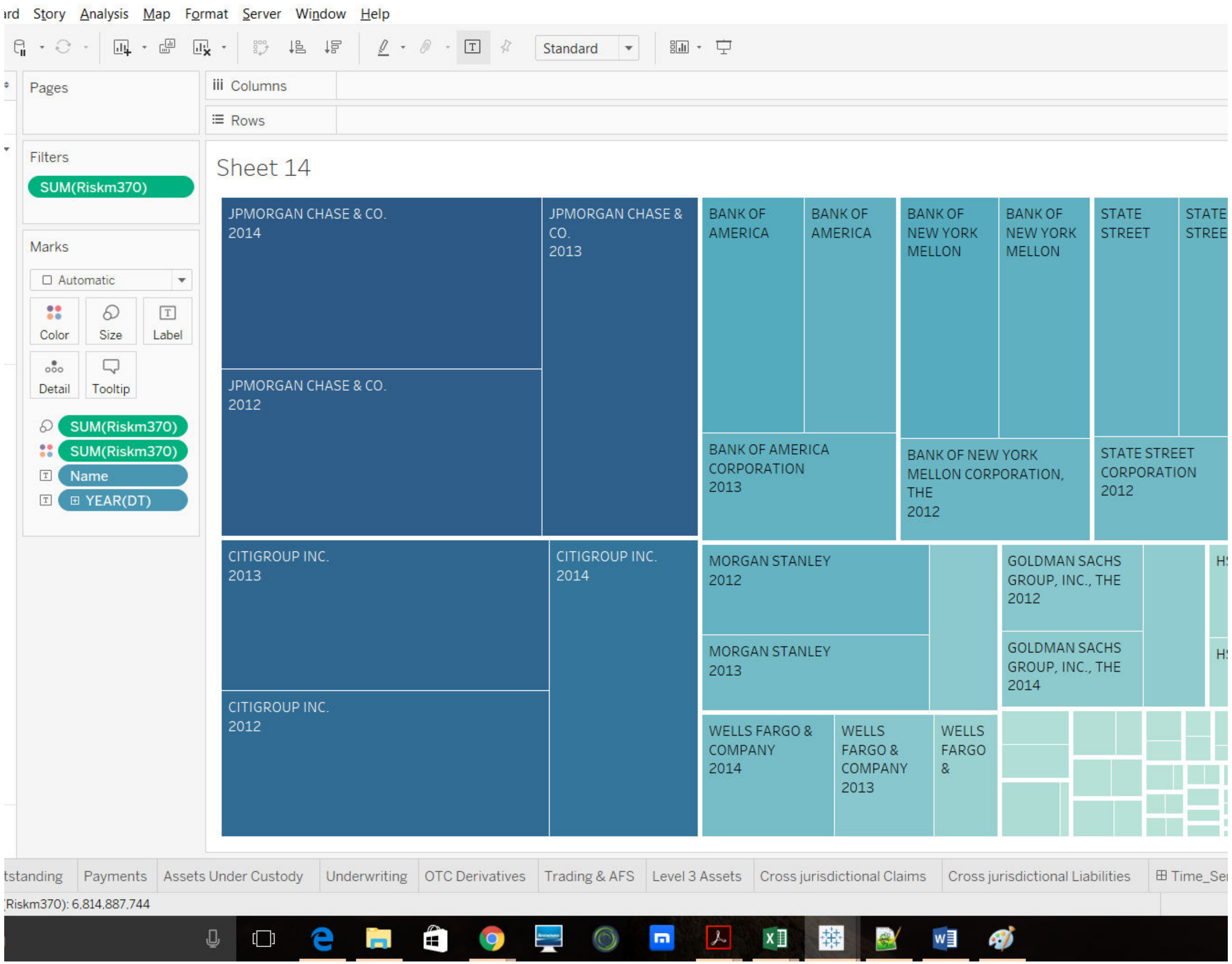
Sheet 14

	DT		
Name	2012	2013	2014
ALLY FINANCIAL INC.		16,534,000	13,796,000
AMERICAN EXPRESS..		36,921,000	5,794,000
BANCWEST CORPOR..		7,834,827	8,252,590
BANK OF AMERICA C..	251,635,813	219,926,538	227,579,653
BANK OF NEW YORK..	203,596,000	229,805,000	248,552,000
BB&T CORPORATION		10,316,636	4,558,381
BBVA COMPASS BA..		2,381,339	2,656,660
BMO FINANCIAL CO..		957,768	881,241
CAPITAL ONE FINAN..		2,466,871	1,682,001
CITIGROUP INC.	494,696,000	512,523,000	458,603,000
CITIZENS FINANCIAL..			5,785,512
COMERICA INCORPO..		4,241,765	4,756,909
DEUTSCHE BANK TR..		25,846,000	26,104,000
DISCOVER FINANCIA..		295,985	233,917
FIFTH THIRD BANCO..		8,942,647	3,231,856
GOLDMAN SACHS G..	128,579,000	106,942,000	113,405,000
HSBC NORTH AMERI..		54,924,874	41,279,038
HUNTINGTON BANC..		313,497	1,273,678
JPMORGAN CHASE ..	551,400,000	544,258,000	570,830,000
KEYCORP		724,429	2,139,610
M&T BANK CORPOR..		4,983,271	5,014,048
MORGAN STANLEY	214,741,000	182,491,089	118,359,866
MUFG AMERICAS H..			5,362,938
NORTHERN TRUST C..		12,215,420	17,567,798
PNC FINANCIAL SER..		13,135,000	8,342,000
RBS CITIZENS FINAN..		3,609,774	
REGIONS FINANCIAL..		6,692,841	6,831,840
SANTANDER HOLDI..		401,818	7,289,948
STATE STREET CORP..	185,648,900	209,263,087	214,038,869
SUNTRUST BANKS, I..		1,307,524	1,281,693
TD BANK US HOLDIN..		5,124,830	4,472,244
U.S. BANCORP		21,887,000	13,976,000

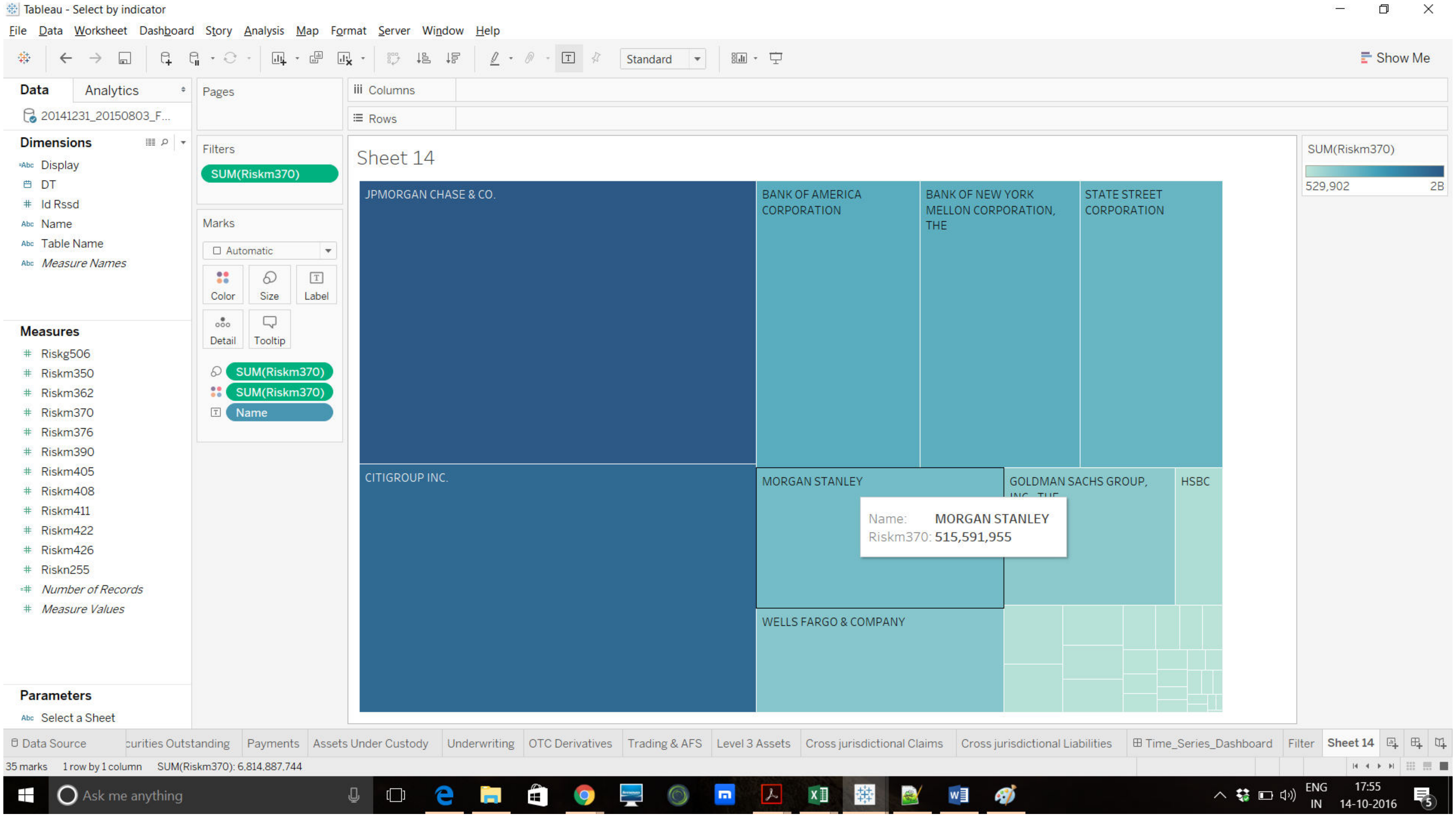
SUM(Riskm370): 6,814,887,744

Tree Maps

- Year wise measure distribution for banks.
- Coloring the rectangles by measure value



Contd..



Name: MORGAN STANLEY
Riskm370: 515,591,955

35 marks 1 row by 1 column SUM(Riskm370): 6,814,887,744

Box Plots

- Shows Median of the measure value along with 1st & 3rd Quartiles.
- Shows the skewness of data.
- Shows details about the outliers

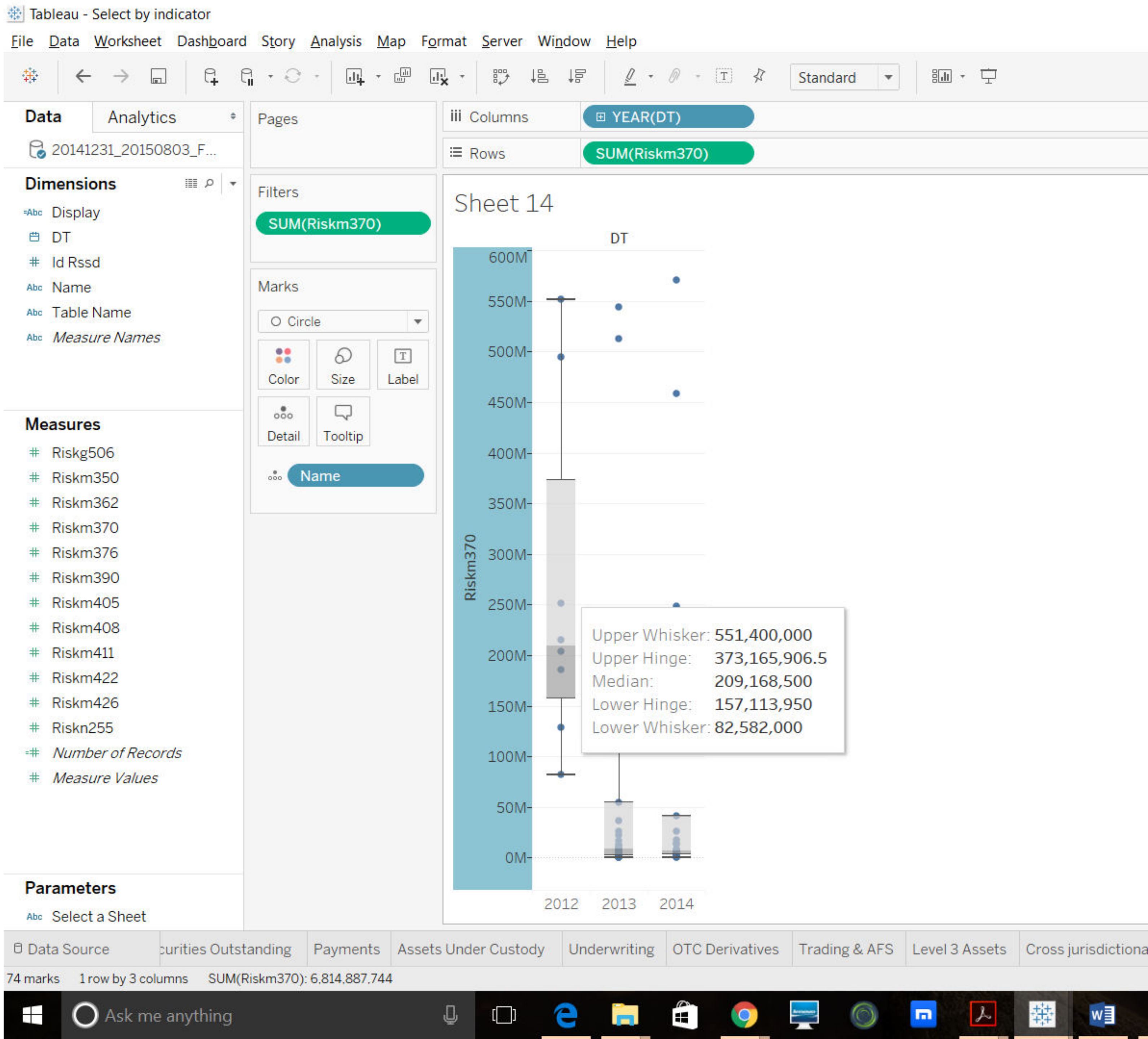


Tableau - Select by indicator

Columns: YEAR(DT)

Rows: SUM(Riskm370)

Filters: SUM(Riskm370)

Marks: Circle

Detail: Name

Upper Whisker: 551,400,000
Upper Hinge: 373,165,906.5
Median: 209,168,500
Lower Hinge: 157,113,950
Lower Whisker: 82,582,000

74 marks 1 row by 3 columns SUM(Riskm370): 6,814,887,744

Side-by-Side Circle Views

- Technique to accentuate data on scatter plots.
- Tells about relative concentration of data.

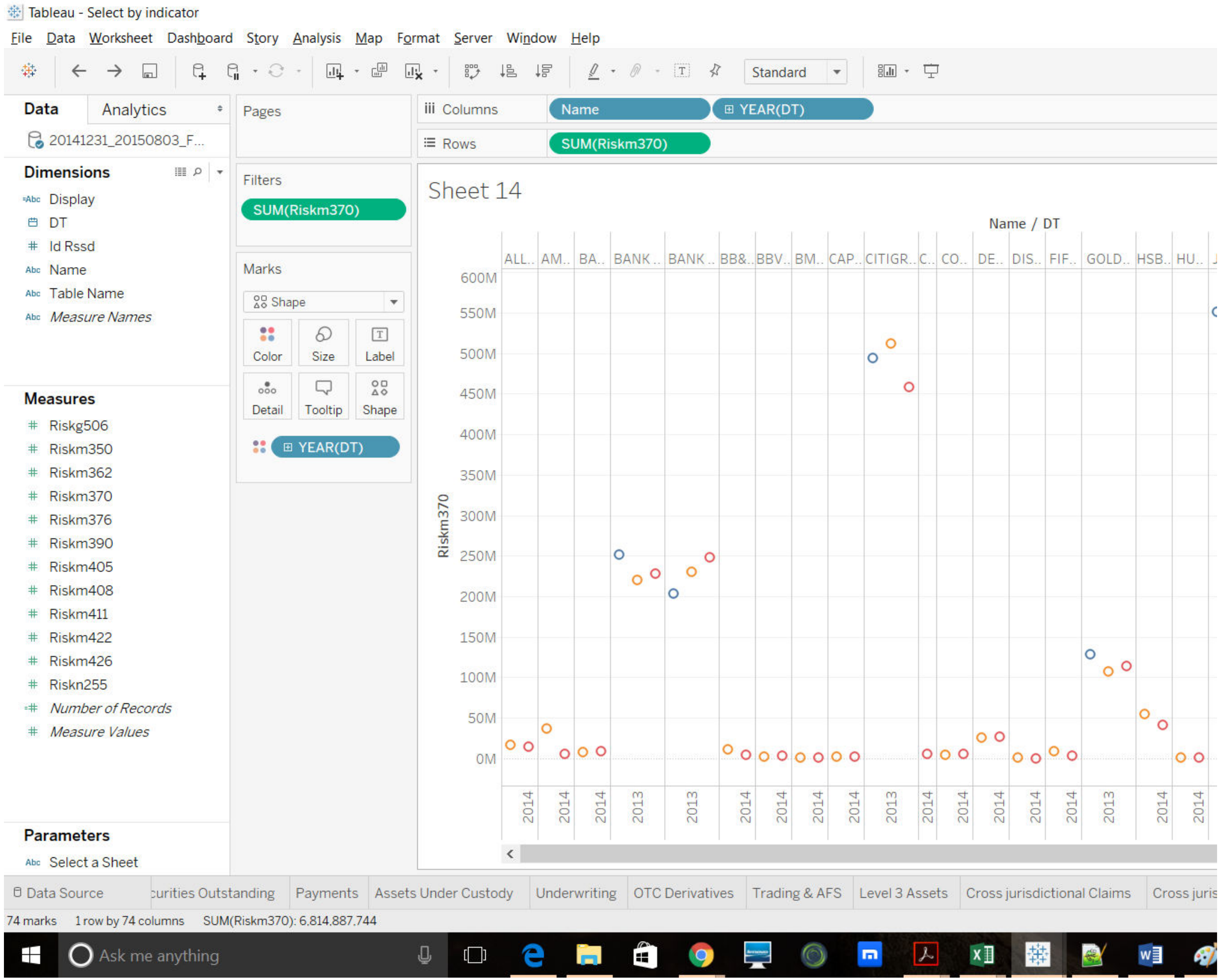


Tableau - Select by indicator

Columns: Name, YEAR(DT)

Rows: SUM(Riskm370)

Filters: SUM(Riskm370)

Marks: Shape; YEAR(DT)

Sheet 14

74 marks 1 row by 74 columns SUM(Riskm370): 6,814,887,744

Thank you!