Exploratory Data Analysis

Team 4

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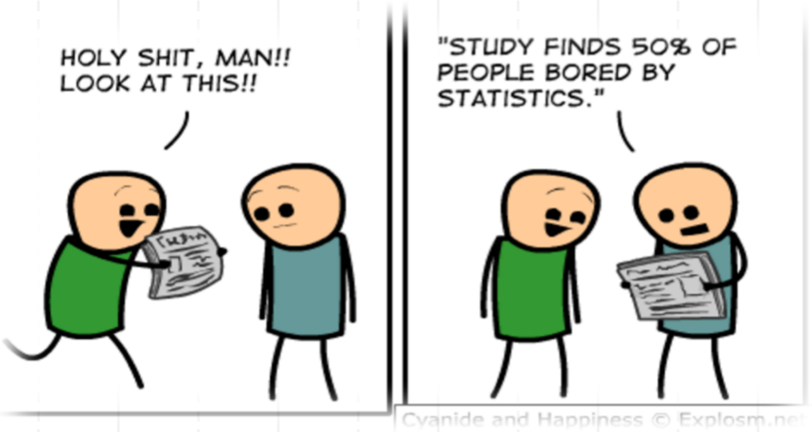
In DATA we TRUST!!



Every day, three times per second, we produce the equivalent of the amount of data that the Library of Congress has in its entire print collection, right? But most of it is like cat videos on YouTube or 13-year-olds exchanging text messages about the next Twilight movie.

– Nate Silver

Analysis of Bank Filings Data

– Data Wrangling and Exploratory data analysis using Tableau

Case Study

1

Step1:

Scrapping data from the below url for 15 quarters into 15 different csv files using R
https://www.ffiec.gov/nicpubweb/nicweb/HCSGreaterThan10B.aspx

- ```
  install.packages("rvest")
  install.packages("RSelenium")
  ```
- ```
  remDrv <- remoteDriver(remoteServerAddr = "localhost", port = 4444, browserName = "firefox")
  ```
- ```
  remDrv$navigate("https://www.ffiec.gov/nicpubweb/nicweb/HCSGreaterThan10B.aspx")
  ```
- ```
  timeframe <- xpathSApply(html page, "//option", function(u) xmlAttrs(u)["value"])
  ```
- ```
  for(i in timeframe){
          option <- remDrv$findElement(using = 'xpath', paste('//*/option[@value=',i,"]"))
          option$clickElement()
          xt <- readHTMLTable(tables[[3]]…………………)
          write.csv(xt, file = paste("quarter_",i,'.csv'))
  }
  ```
  ```

Step2:

Cleaning and merging data from all 15 csv files into a single csv file in the form of stacked data and unstacked data

- Merging all 15 csv files (**STACKED**) and renaming column header for the purpose of merging

```
for (i in timeframe){
        y <- data.frame(read.csv(paste("quarter_",i,".csv"), header = TRUE))
        x<-replicate(nrow(y),i)
        y$quarter <- as.Date(x,"%Y%m%d")
        colnames(y) <- c('SNo', 'Rank','Company', 'Location', 'Assets', 'Quarter')
        w <- rbind(w,y)  }
```

- Splitting company ID and Location

```
install.packages('reshape2')

w1 <- with(w, cbind(Rank, colsplit(w$Company, pattern = "\\(", names = c('Institution Name', 'RSSDId')),colsplit(w$Location, pattern = "\\,", names = c('City', 'State')), Assets, Quarter))

w2 <- as.data.frame(sapply(w1,gsub,pattern=")",replacement=""))
```

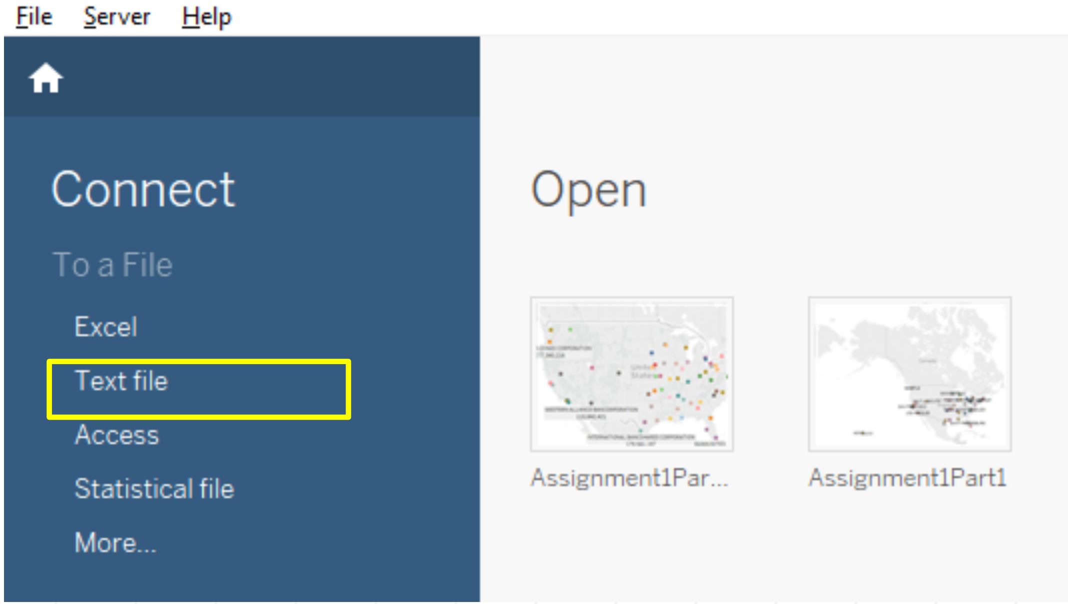
- Merging all 15 csv files (**UNSTACKED**)and renaming column header for the purpose of merging

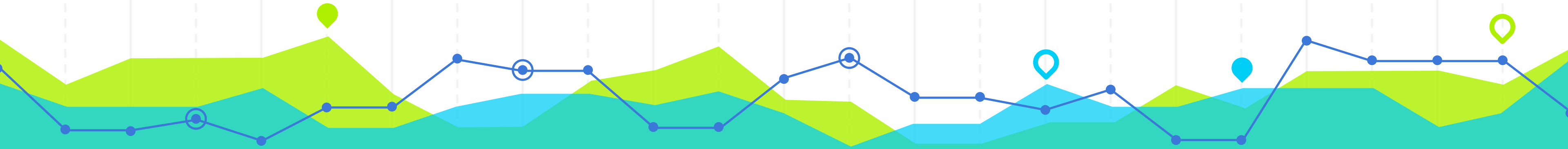
```
unstacked = NULL
counter <- 1
for (i in timeframe){
    unstacked_ <- data.frame(read.csv(paste("quarter_",i,".csv"), header = TRUE))
    quarter_row<-replicate(nrow(unstacked_),i)
    unstacked_$quarter <- as.Date(quarter_row,"%Y%m%d")
    colnames(unstacked_) <- c('SNo', 'Rank','Company', 'Location', 'Assets', 'Quarter')

    if (counter == 1){
            unstacked <- unstacked_
            counter <- 2
    }   else{
            unstacked <- merge(unstacked,unstacked_, by="Company“ , all.unstacked
            =TRUE , all.unstacked_= TRUE)
    }
}
```

Step 3:

Importing the csv file (which has stacked data) as a “text” file in Tableau for the purpose of analysis

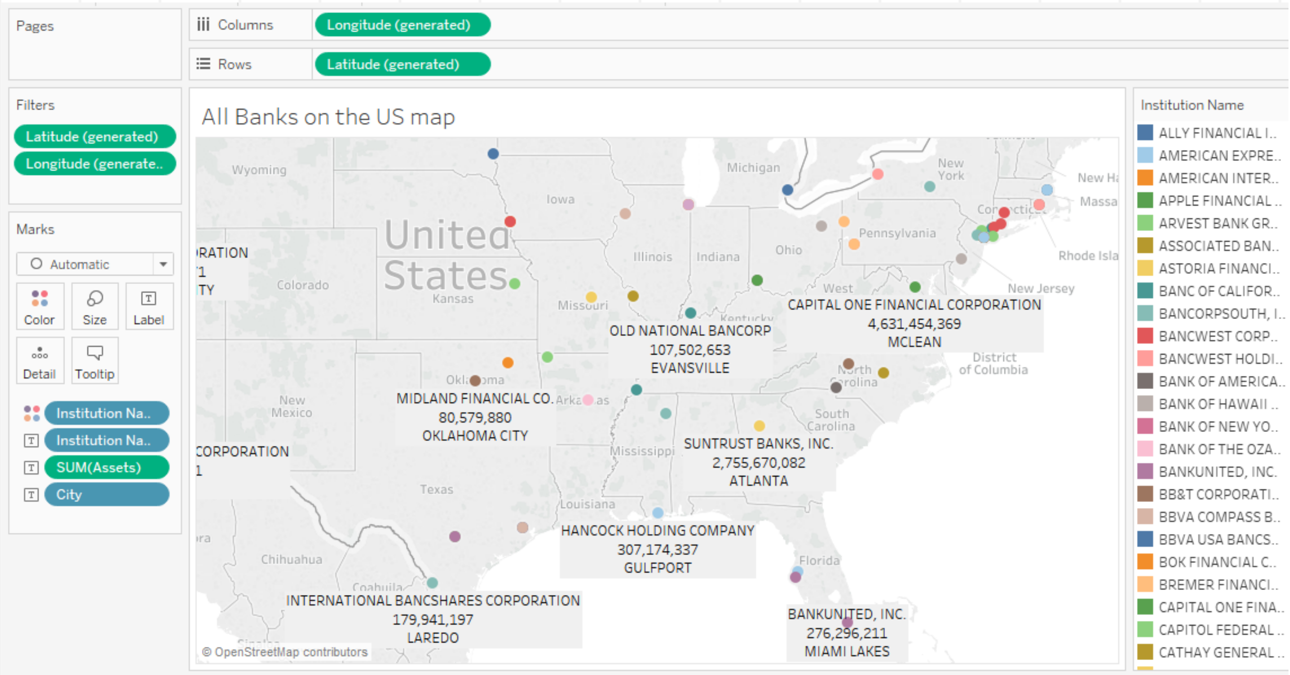




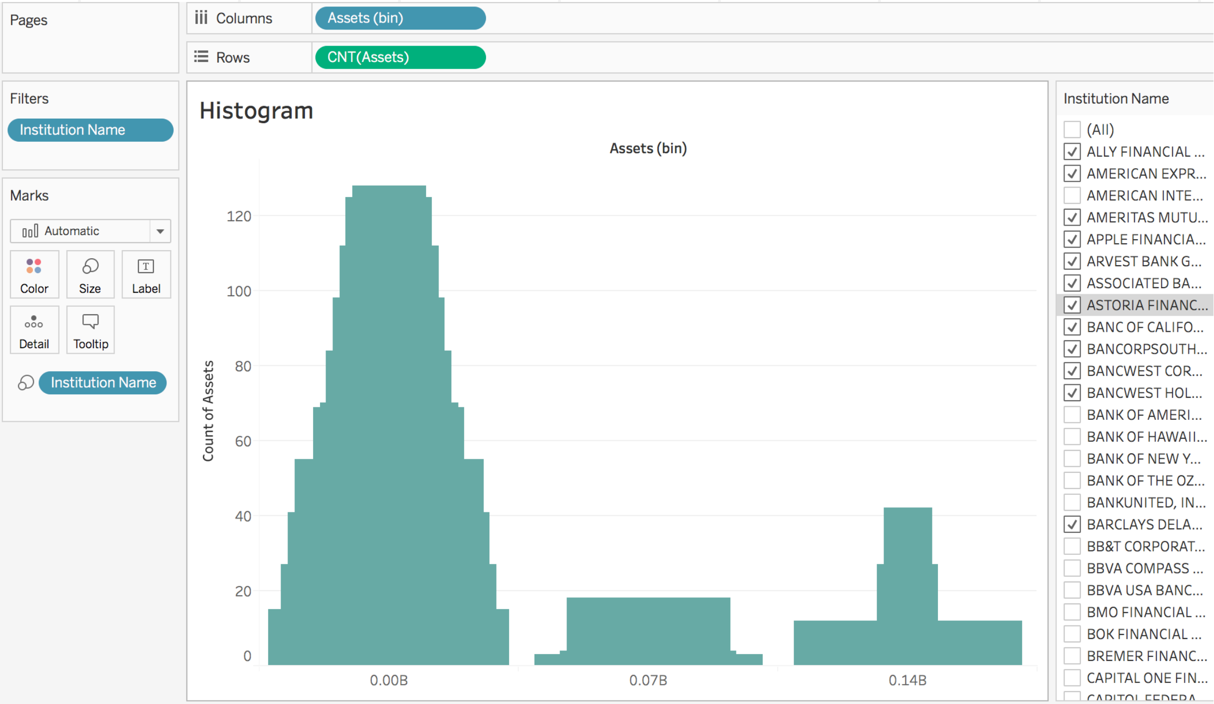
Dashboards

All banks on the US Map using location information

All the banks with their total assets and city , highlighted with different colors on the map

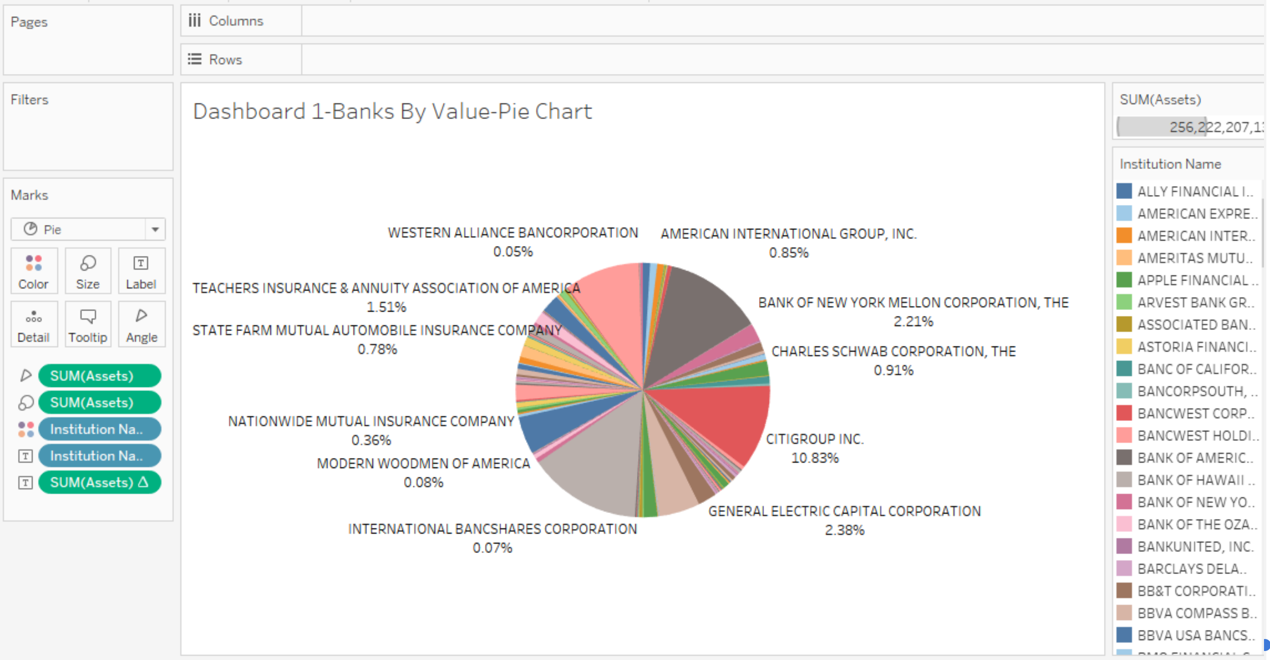


1.a: Histogram describing the banks by value



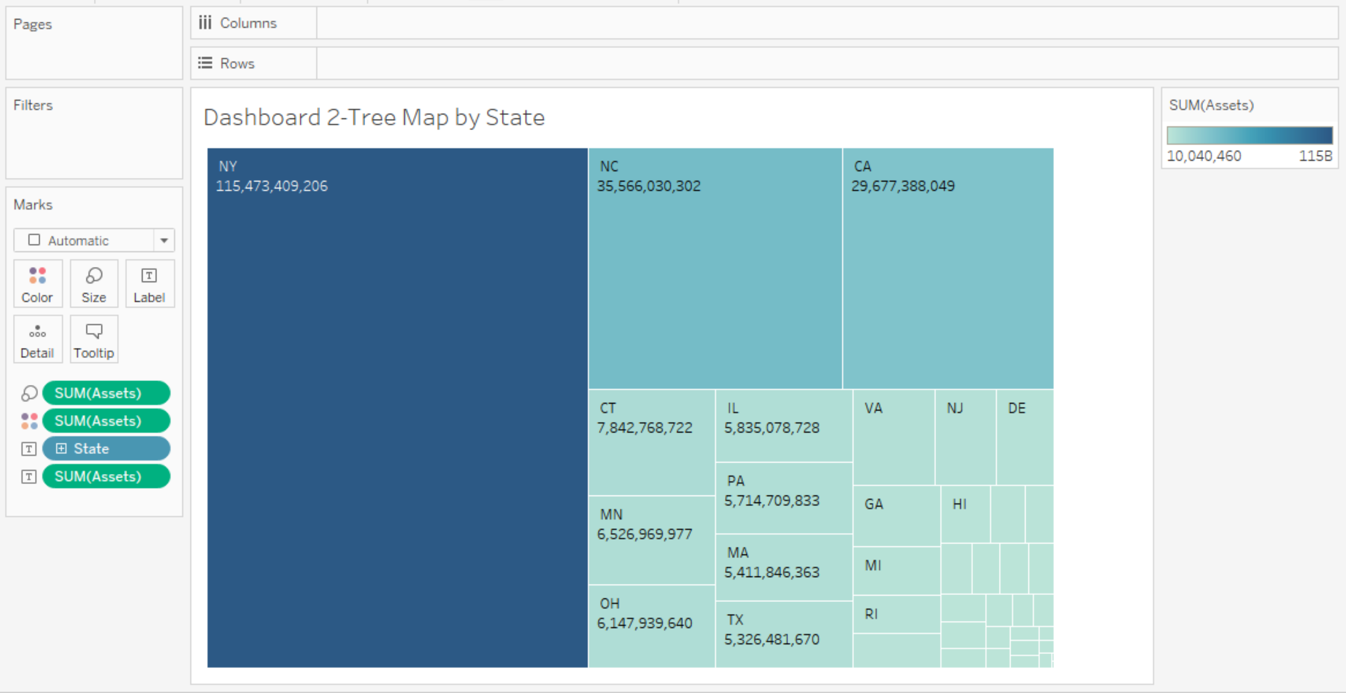
1.b: Pie Chart describing the banks by value

Based on 15 quarters, the pie chart represents that, the major portion is occupied by companies like JP Morgan(14%), Bank of America(12%), Citi group(10%), etc.



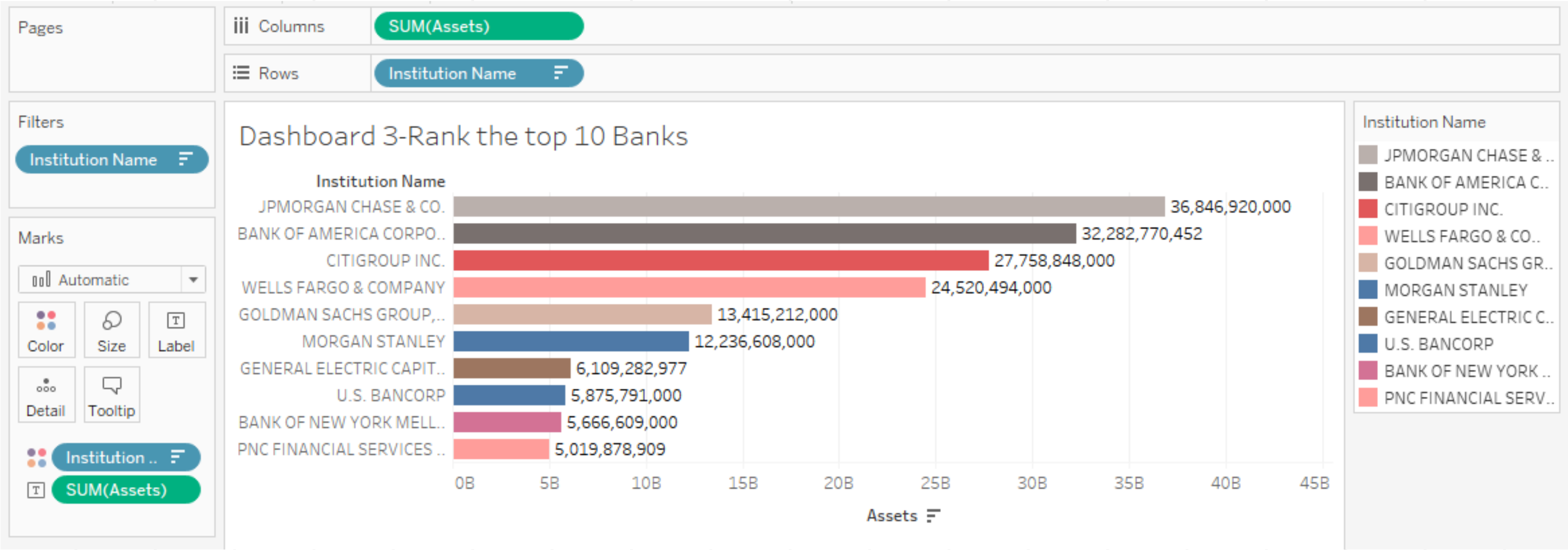
2: Tree Map by State

The chart represents that the states with almost similar assets have similar size and color. The size of the rectangle decreases with decrease in the total asset value .



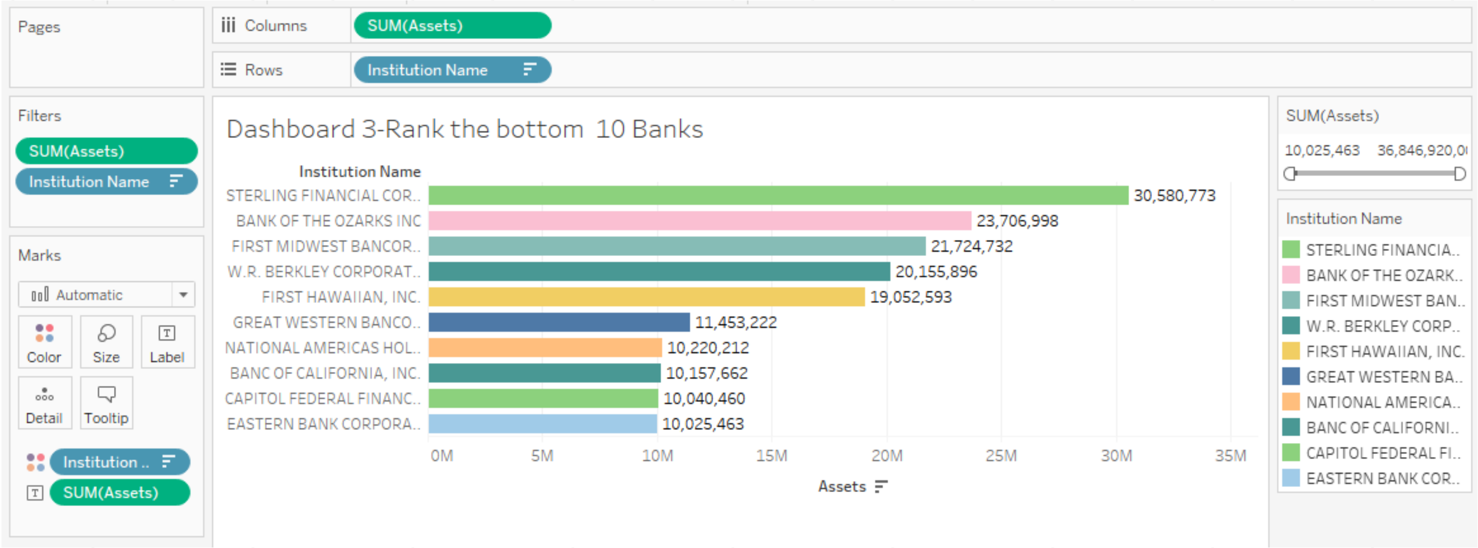
3.1: Ranking the top 10 banks

The ranking of top 10 banks is based on total assets combined using 15 quarters.



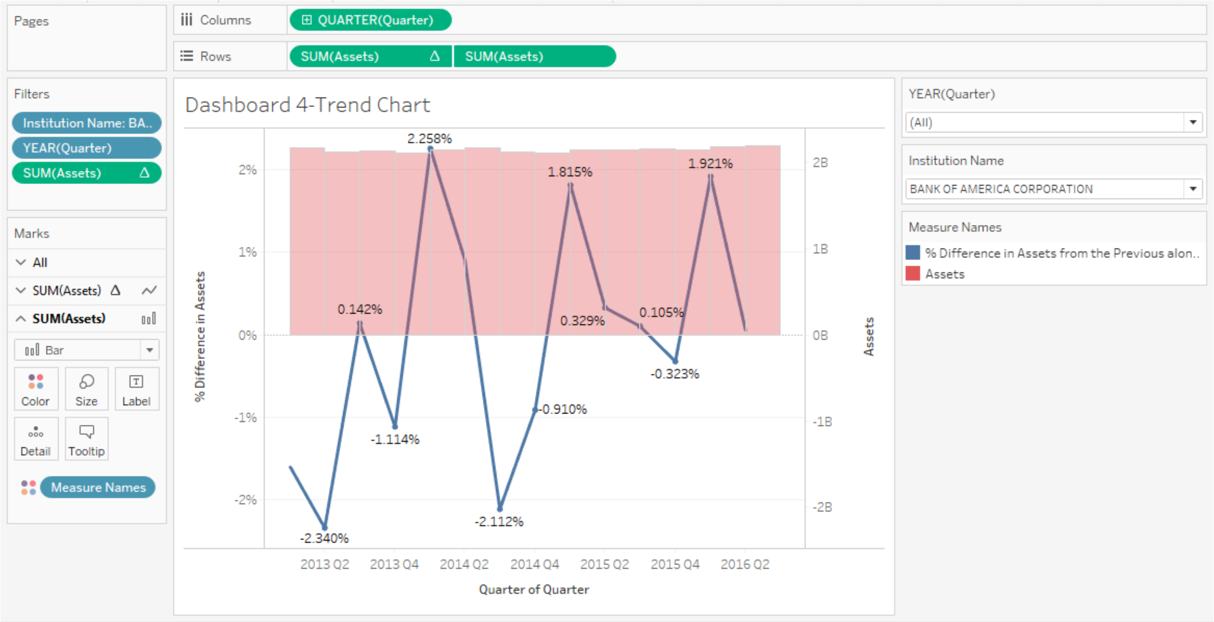
3.2: Ranking the bottom 10 banks

The ranking of bottom 10 banks is based on total assets combined using 15 quarters.



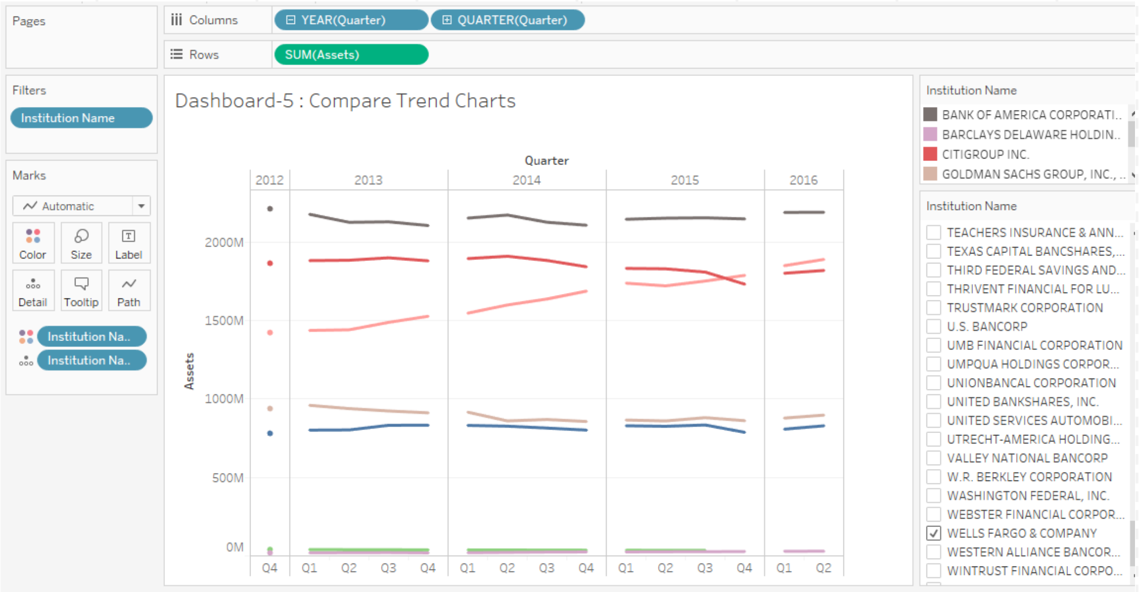
4: Trend Charts - per company

The chart consists of trend lines that represent growth rate.
With decrease in asset value for a particular quarter, the line goes in the negative quadrant.



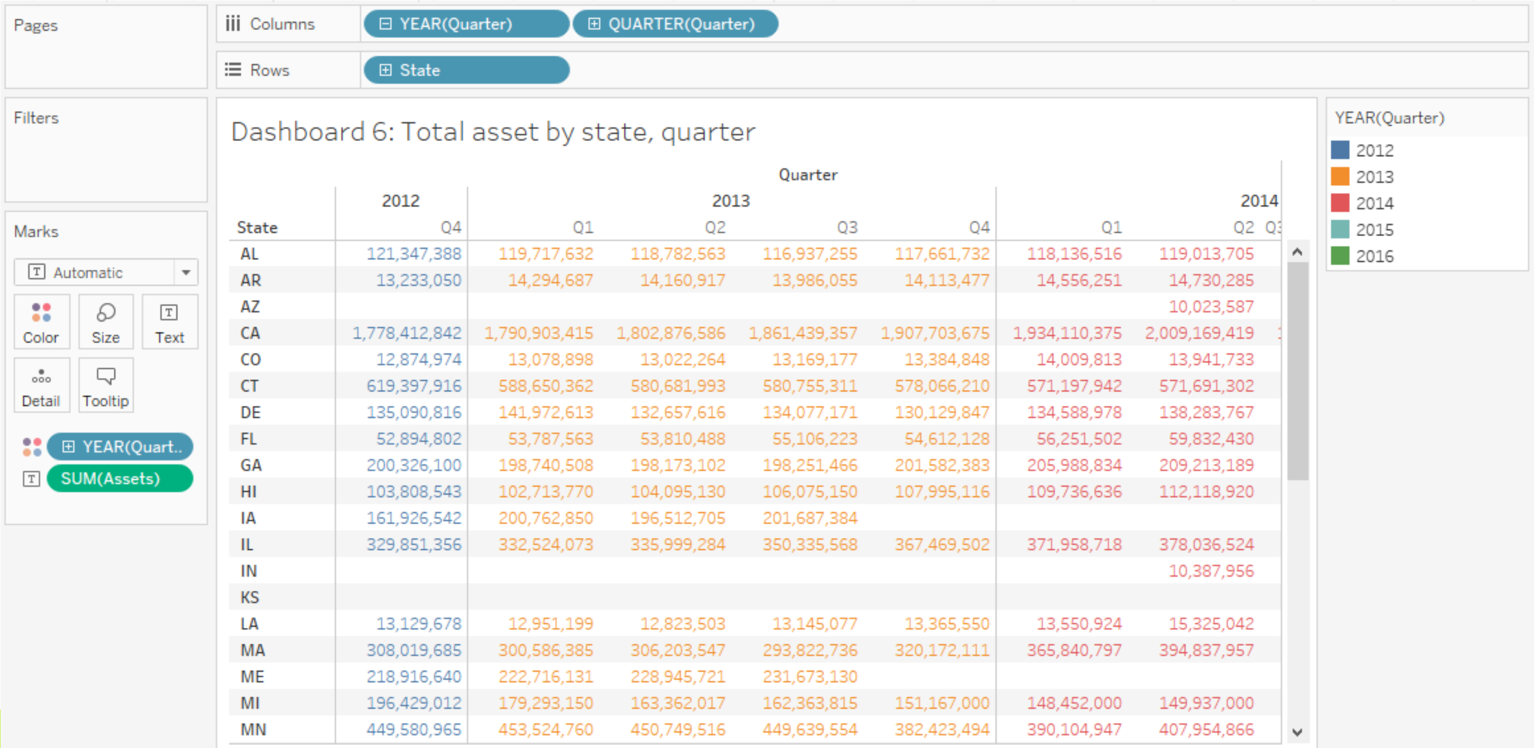
5: Comparing companies using Trend Charts

Different trend lines represent different companies for all 15 quarters.



6: Pivot table- total asset by state, quarter

The table represents total assets for all the states, year wise and quarter wise



	Quarter						
	2012	2013				2014	
State	Q4	Q1	Q2	Q3	Q4	Q1	Q2
AL	121,347,388	119,717,632	118,782,563	116,937,255	117,661,732	118,136,516	119,013,705
AR	13,233,050	14,294,687	14,160,917	13,986,055	14,113,477	14,556,251	14,730,285
AZ							10,023,587
CA	1,778,412,842	1,790,903,415	1,802,876,586	1,861,439,357	1,907,703,675	1,934,110,375	2,009,169,419
CO	12,874,974	13,078,898	13,022,264	13,169,177	13,384,848	14,009,813	13,941,733
CT	619,397,916	588,650,362	580,681,993	580,755,311	578,066,210	571,197,942	571,691,302
DE	135,090,816	141,972,613	132,657,616	134,077,171	130,129,847	134,588,978	138,283,767
FL	52,894,802	53,787,563	53,810,488	55,106,223	54,612,128	56,251,502	59,832,430
GA	200,326,100	198,740,508	198,173,102	198,251,466	201,582,383	205,988,834	209,213,189
HI	103,808,543	102,713,770	104,095,130	106,075,150	107,995,116	109,736,636	112,118,920
IA	161,926,542	200,762,850	196,512,705	201,687,384			
IL	329,851,356	332,524,073	335,999,284	350,335,568	367,469,502	371,958,718	378,036,524
IN							10,387,956
KS							
LA	13,129,678	12,951,199	12,823,503	13,145,077	13,365,550	13,550,924	15,325,042
MA	308,019,685	300,586,385	306,203,547	293,822,736	320,172,111	365,840,797	394,837,957
ME	218,916,640	222,716,131	228,945,721	231,673,130			
MI	196,429,012	179,293,150	163,362,017	162,363,815	151,167,000	148,452,000	149,937,000
MN	449,580,965	453,524,760	450,749,516	449,639,554	382,423,494	390,104,947	407,954,866

Data scraping

– Data Wrangling and Exploratory data analysis using Tableau
Case Study

2

1: Very Unclean Data

Filter

	BHCPR.PERCENTILE.DISTRIBUTION.REPORT	ALLOWANCE.AND.NET.LOAN.AND.LEASE.LOSSES	X	X.1	X.2	X.3	PAGE.6
1	PEER GROUP 1	NA	NA	NA	NA	NA	NA
2	NA	PEER	NA	NA	NA	NA	BHC
3	ANALYSIS RATIOS	RATIO5%10%25%50%	75%	90%	95%	NA	COUNT
5	Provision for Ln&Ls Losses/Avg Assets	0.24-0.060.000.070.15	0.31	0.58	1.41	NA	93
6	Provision for Ln&Ls Losses/Avg Lns&Ls	0.40-0.100.000.100.27	0.57	1.07	1.93	NA	93
7	Provision for Ln&Ls Losses/Net Losses	163.62 -325.8719.8695.14119.44	195.48	388.01	775.77	NA	93
9	Ln&Ls Allowance/Total Loans & Leases	1.150.290.530.851.12	1.34	1.96	2.57	NA	93
10	Ln&Ls Allowance/Net Ln&Ls Losses (X)	7.151.151.482.684.63	9.76	18.31	32.00	NA	83
11	ALLL/Nonaccrual Assets	153.4542.9065.1493.75129.26	200.63	298.26	395.35	NA	91
12	Ln&Ls Allow/90+ Days PD+Nonaccr Ln&L	124.4626.4742.4874.5997.36	155.13	290.04	327.89	NA	93
14	Gross Ln&Ls Losses/Avg Loans & Leases	0.400.050.060.120.29	0.55	1.02	2.19	NA	93
15	Recoveries/Avg Loans and Leases	0.120.000.010.040.09	0.18	0.34	0.46	NA	93
16	Net Losses/Avg Loans and Leases	0.28-0.07-0.000.050.18	0.41	0.73	1.72	NA	93
17	Write-downs, Trans Lns HFS/Avg Lns&Ls	0.000.000.000.000.00	0.00	0.00	0.01	NA	93
18	Recoveries/Prior Year-End Losses	9.870.902.955.768.50	13.06	22.44	32.80	NA	92
19	Earnings Coverage of Net Losses (X)	12.61 -117.95-15.153.738.29	21.99	44.71	72.39	NA	93
21	NET LOAN AND LEASE LOSSES BY TYPE	NA	NA	NA	NA	NA	NA
23	Real Estate Loans	0.04-0.21-0.03-0.000.01	0.08	0.18	0.26	NA	92
24	RE Loans Secured By 1-4 Family	0.09-0.10-0.030.000.05	0.15	0.30	0.50	NA	90
25	Revolving	0.18-0.10-0.080.000.00	0.33	0.60	1.06	NA	89
26	Closed-End	0.07-0.09-0.05-0.000.04	0.11	0.27	0.45	NA	90

UNCLEAN CLUBBE DATA

Step1:

Package to read pdf's not in cran as a library yet, but a project extracted from github
https://github.com/ropenscilabs/tabulizer

```
install.packages("devtools", dependencies = TRUE)
library(devtools)
devtools::install_github(c("ropenscilabs/tabulizerjars", "ropenscilabs/tabulizer"), args = "--no-multiarch")
```

Step 2:

Set this to your jre link in the system

```
Sys.setenv(JAVA_HOME='C://Program Files//Java//jre1.8.0_101')
install.packages("rJava")
library(rJava)
```

Step3:

To read tables from pdf, data manipulation and string splitiing of column cells to clean dirty/combined data

```
install.packages("devtools", dependencies = TRUE)
library(devtools)
devtools::install_github(c("ropenscilabs/tabulizerjars", "ropenscilabs/tabulizer"), args = "--no-multiarch")
```

Step 4:

Extracting the file

```
f <-system.file("examples", "PeerGroup_1_March2016.pdf",package="tabulizer")
```

Step 5:

Making tabular structure of each page [list of 28 pages as 28 tables]

```
out1 <- extract_tables(f,guess=FALSE,method = "data.frame")
```

Step 6:

Initialize the final result data set

```
dfresult <- NULL
```

Step 7:

Now the pdf structure is such that the pdf's each table is broken in 2 halves
set 1:- page 1- page 13
set 2:- page 14- page 26
set 3:- page 27,28

```
j <- 14
i<-1
```

Step 8:

```
for(i in length(out1)/2-1)
```

Step 9:

Logic to replace empty values as na, if "all" cell values are na we "remove" the row also remove the rows havin '---' as the values first for 2nd half of pdf's, second for 1st half

```
df2 <-as.data.frame(apply(out1[[j]], 2, function(x) gsub("^$|^ $", NA, x)))
  row.has.na <-(apply(df2, 1, function(x){all(is.na(x))}))
  sum(row.has.na)
  df2 <-as.data.frame(df2[!row.has.na,])
  del<-which(apply(df2, 1, function(x) any(grepl("\\--", x))))
  df2<-df2[-del,]
```

Step 10:

Logic to unlist the values and flatten out the common cell values as a single list basically done to merge the 2 subsets of data to form 1 logical table logic to match the 'number of rows' to be able to do 'bind by column'

```
df2<-df2[-c(1:2),]
names(df2)=unlist(df2[c(1),])
names(df2)

df2 <- as.data.frame(df2[-1,])

df1<-df1[-c(1:2),]
names(df1)=unlist(df1[c(1),])
names(df2)
df1 <- as.data.frame(df1[-1,])
```

Step 11:

Clean the data by using regex patterns for subset 2 values that are stuck in 1 column used 'gsub' function to be able to remove columns with entire 'na' values

```
df2.trial <- data.frame(t(sapply(df2[,2], function(y) gsub('(^-*[0-9]*.[0-9]{2})(-*[0-9]*.[0-9]{2})(-*[0-9]*.[0-9]{2})(-*[0-9]*.[0-9]{2})(-*[0-9]*.[0-9]{2})(-*[0-9]*.[0-9]{2})(-*[0-9]*.[0-9]{2})(-*[0-9]*.[0-9]{2})', '\\1d\\2d\\3d\\4d\\5d\\6d\\7d\\8', y))))
  divisions<-8
```

Step 12:

Clean the data by using regex patterns for subset 1 values that are stuck in 1 column used 'gsub' function to be able to remove columns with entire 'na' values

```
df1.trial <- data.frame(t(sapply(df1[,2], function(y) gsub('(^-*[0-9]*.[0-9]{2})(-*[0-9]*.[0-9]{2})', '\\1d\\2', y))))
  divisions<-2
```

2: Semi Clean And Structured

Filter

	ANALYSIS RATIOS	Ratio	5%	10%	25%	50%	75%	90%	95%	BHC COUNT
5	Provision for Ln&Ls Losses/Avg Assets	0.24	-0.06	0.00	0.07	0.15	0.31	0.58	1.41	93
6	Provision for Ln&Ls Losses/Avg Lns&Ls	0.40	-0.10	0.00	0.10	0.27	0.57	1.07	1.93	93
7	Provision for Ln&Ls Losses/Net Losses	163.62 -325.8719.3695.14119.44					195.48	388.01	775.77	93
9	Ln&Ls Allowance/Total Loans & Leases	1.15	0.29	0.53	0.85	1.12	1.34	1.96	2.57	93
10	Ln&Ls Allowance/Net Ln&Ls Losses (X)	7.15	1.15	1.48	2.68	4.63	9.76	18.31	32.00	83
11	ALLL/Nonaccrual Assets	153.45	42.00	65.14	93.75	129.26	200.63	298.26	395.35	91
12	Ln&Ls Allow/90+ Days PD+NonaccrLn&Ls	124.46	26.47	42.48	74.59	97.36	155.13	290.04	327.89	93
14	Gross Ln&Ls Losses/Avg Loans & Leases	0.40	0.05	0.06	0.12	0.20	0.55	1.02	2.10	93
15	Recoveries/Avg Loans and Leases	0.12	0.00	0.01	0.04	0.09	0.18	0.34	0.46	93
16	Net Losses/Avg Loans and Leases	0.28	-0.07	-0.00	0.05	0.18	0.41	0.73	1.72	93
17	Write-downs, Trans Lns HFS/Avg Lns&Ls	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	93
18	Recoveries/Prior Year-End Losses	9.87	0.90	2.95	5.76	8.50	13.06	22.44	32.80	92
19	Earnings Coverage of Net Losses (X)	12.01 -117.95-15.153.738.29					21.99	44.71	72.39	93
21	NET LOAN AND LEASE LOSSES BY TYPE						NA	NA	NA	NA
23	Real Estate Loans	0.04	-0.21	-0.03	-0.00	0.01	0.08	0.18	0.26	92
24	RE Loans Secured By 1-4 Family	0.09	-0.10	-0.03	0.00	0.05	0.15	0.30	0.50	90
25	Revolving	0.18	-0.19	-0.08	0.00	0.09	0.33	0.60	1.06	89
26	Closed-End	0.07	-0.09	-0.05	-0.00	0.04	0.11	0.27	0.45	90
27	Commercial Real Estate Loans	-0.00	-0.31	-0.09	-0.03	-0.00	0.00	0.07	0.18	91
28	Construction and Land Dev	-0.03	-0.65	-0.22	-0.08	-0.01	0.00	0.16	0.31	87

SEMI CLEAN DATA AND STRUCTURED DATA

Step 13:

cbind to form the original data tables that were distorted while being written on pdf's

```
if(nrow(df1.yo1)==nrow(df2.yo2))
  dffinal1 <-(cbind(as.data.frame(df1.yo1),as.data.frame(df2.yo2)))
```

write.csv(dffinal1, file = paste("page_",i,'.csv'))

```
  dffinal1.new<- dffinal1[,-7]
```

to_be_removed <- names(dffinal1.new)[1]

```
colnames(dffinal1.new)[1] <- "Parameters"
```

final row binding of all the data frames to make 1 csv

```
dfresult <- bind_rows(dfresult,dffinal1.new)
```

outputting the csv

```
write.csv(dfresult, file = paste("PEER1_2016","_Q1",'.csv'))
i<-i+1
j<-j+1
```

3: Clean, structured and beautiful data

Parameters	03/31/2016	03/31/2015	12/31/2015	12/31/2104	12/31/2013	Ratio	5%	10%	25%	50%	75%	90%	95%	BHC COUNT
Provision for Ln&Ls Losses/Avg Assets	0.24	0.13	0.17	0.14	0.19	0.24	-0.06	0.00	0.07	0.15	0.31	0.58	1.41	93
Provision for Ln&Ls Losses/Avg Lns&Ls	0.40	0.20	0.28	0.23	0.32	0.40	-0.10	0.00	0.10	0.27	0.57	1.07	1.93	93
Provision for Ln&Ls Losses/Net Losses	163.63	89.81	109.43	105.35	64.28	163.62 -325.8719.8695.14119.44					195.48	388.01	775.77	93
Ln&Ls Allowance/Total Loans & Leases	1.16	1.22	1.14	1.23	1.40	1.15	0.29	0.53	0.85	1.12	1.34	1.96	2.57	93
Ln&Ls Allowance/Net Ln&Ls Losses (X)	7.15	10.34	9.29	11.58	7.42	7.15	1.15	1.48	2.68	4.63	9.76	18.31	32.00	83
ALLL/Nonaccrual Assets	153.45	166.35	164.24	165.18	147.71	153.45	42.90	65.14	93.75	129.26	200.63	298.26	395.35	91
Ln&Ls Allow/90+ Days PD+Nonaccr Ln&Ls	124.47	128.45	125.86	130.23	114.92	124.46	26.47	42.48	74.59	97.36	155.13	290.04	327.89	93
Gross Ln&Ls Losses/Avg Loans & Leases	0.41	0.36	0.44	0.45	0.63	0.40	0.05	0.06	0.12	0.29	0.55	1.02	2.19	93
Recoveries/Avg Loans and Leases	0.13	0.13	0.14	0.15	0.18	0.12	0.00	0.01	0.04	0.09	0.18	0.34	0.46	93
Net Losses/Avg Loans and Leases	0.28	0.23	0.31	0.30	0.44	0.28	-0.07	-0.00	0.05	0.18	0.41	0.73	1.72	93
Write-downs, Trans Lns HFS/Avg Lns&Ls	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	93
Recoveries/Prior Year-End Losses	9.88	9.39	39.28	33.44	23.10	9.87	0.90	2.95	5.76	8.50	13.06	22.44	32.80	92
Earnings Coverage of Net Losses (X)	12.61	16.67	15.90	32.42	19.55	12.61 -117.95-15.153.738.29					21.99	44.71	72.39	93
NET LOAN AND LEASE LOSSES BY TYPE				NA	NA						NA	NA	NA	NA
Real Estate Loans	0.04	0.11	0.09	0.17	0.34	0.04	-0.21	-0.03	-0.00	0.01	0.08	0.18	0.26	92
RE Loans Secured By 1-4 Family	0.09	0.15	0.12	0.22	0.45	0.09	-0.10	-0.03	0.00	0.05	0.15	0.30	0.50	90
Revolving	0.18	0.25	0.19	0.30	0.57	0.18	-0.19	-0.08	0.00	0.09	0.33	0.60	1.06	89
Closed-End	0.07	0.12	0.10	0.18	0.39	0.07	-0.09	-0.05	-0.00	0.04	0.11	0.27	0.45	90
Commercial Real Estate Loans	-0.01	0.01	0.00	0.07	0.20	-0.00	-0.31	-0.09	-0.03	-0.00	0.00	0.07	0.18	91

CLEAN AND WELL STRUCTURED DATA WITH COMMON COLUMNS FOR 'rbind'

Analysis of Banking Organization

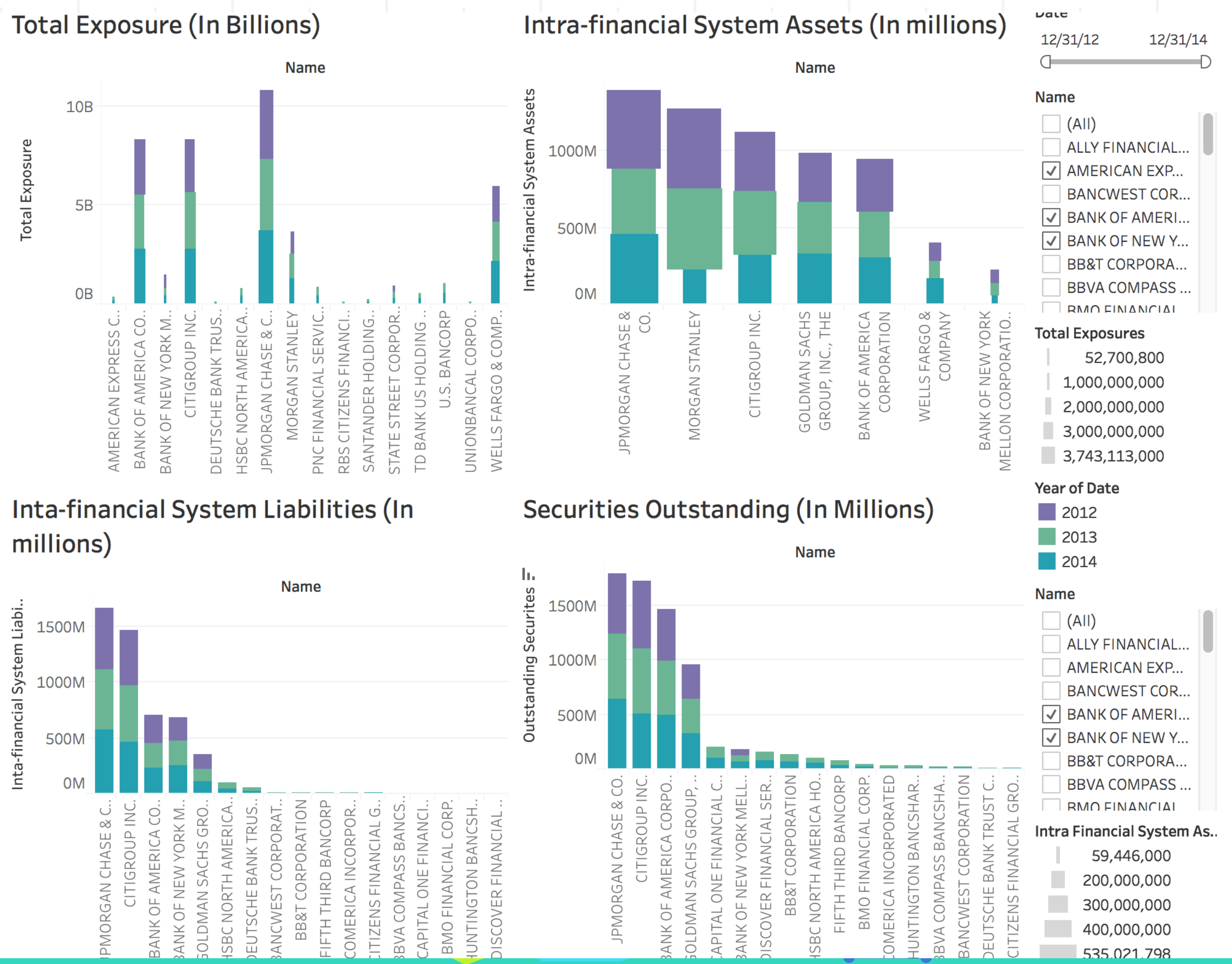
3

Risk Reports for the years 2012, 2013 and 2014

Graphs Dashboard

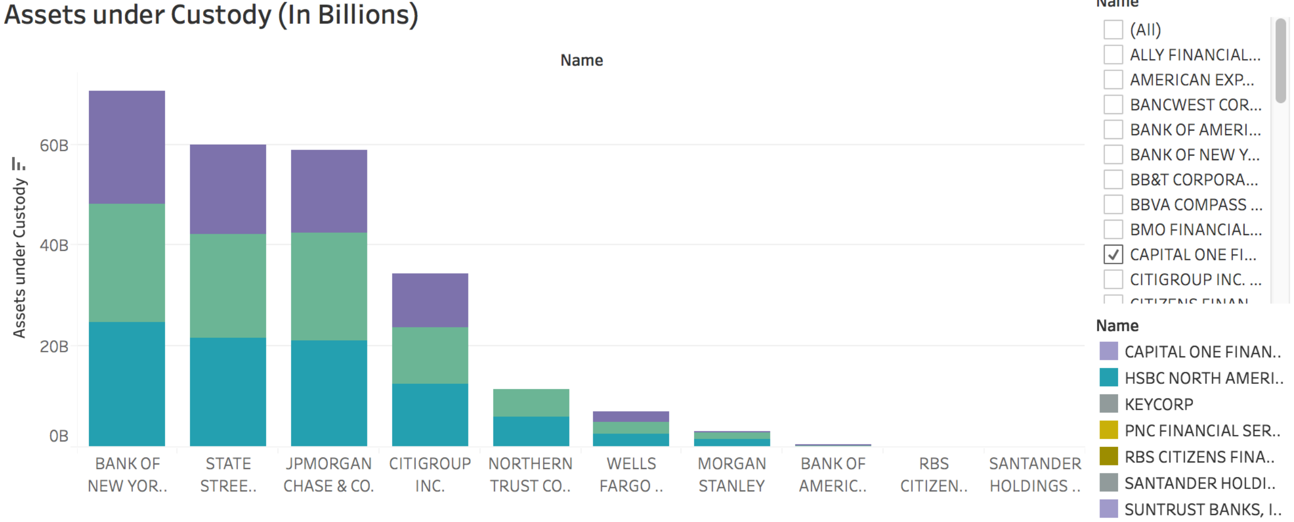
The charts are designed in the “**Marimekko**” design which represents the change in total exposure and Intra-financial system assets

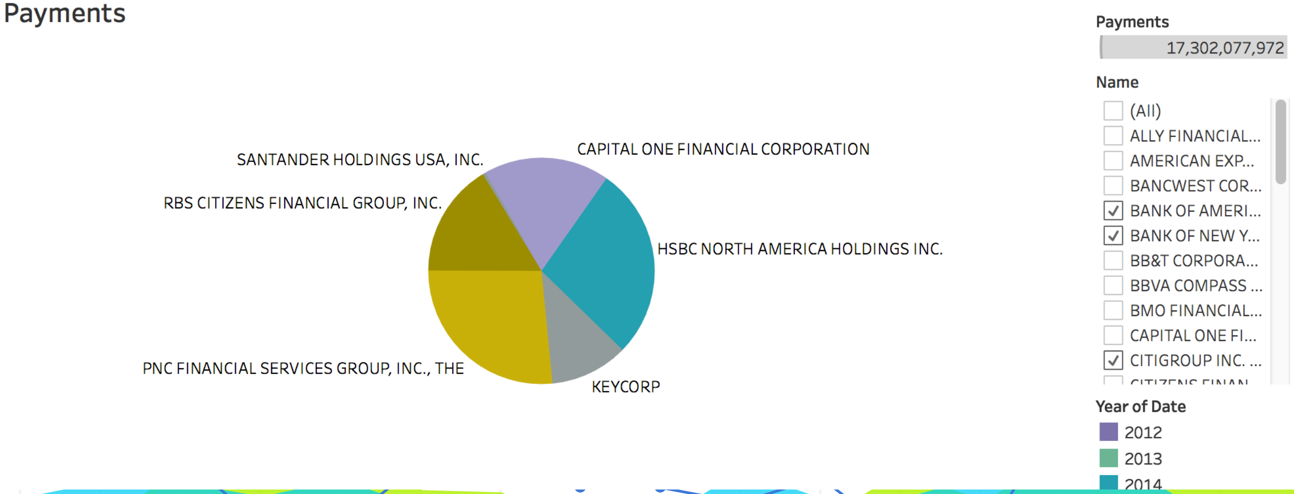
The height along with the width represents the change in values over time.



The bar chart represents the value of the clients assets held by the company over the period of 3 years.

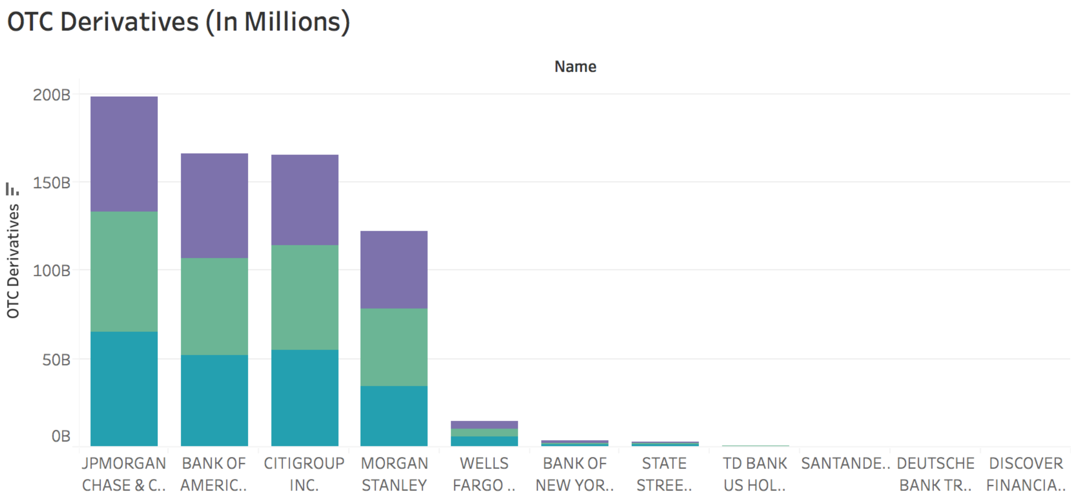
The pie chart depicts the total payment value of different companies combined for all 3 years.

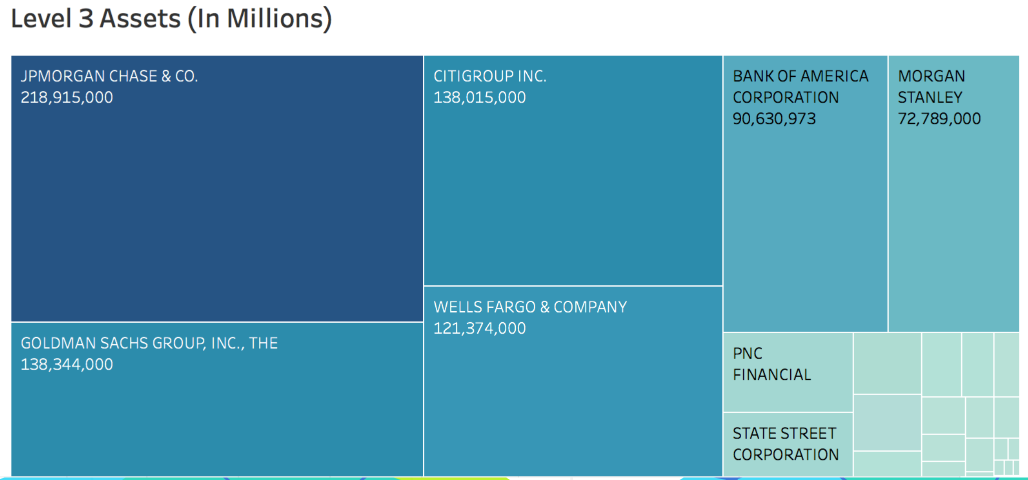


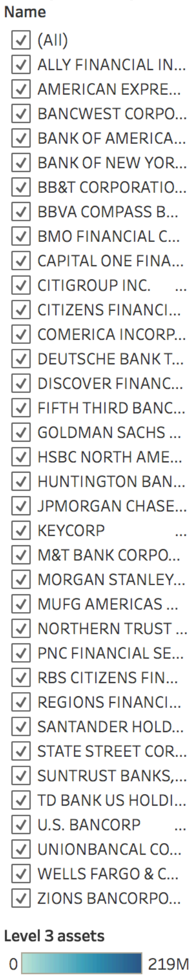


"Over-the-counter" (OTC) Derivatives refers to the derivatives that are traded through a dealer network as opposed to a centralized exchange such as New York Stock Exchange (NYSE). Different colors represent values for 3 different year.

From the tree map we see that JP Morgan holds the maximum level three assets for all the 3 years.

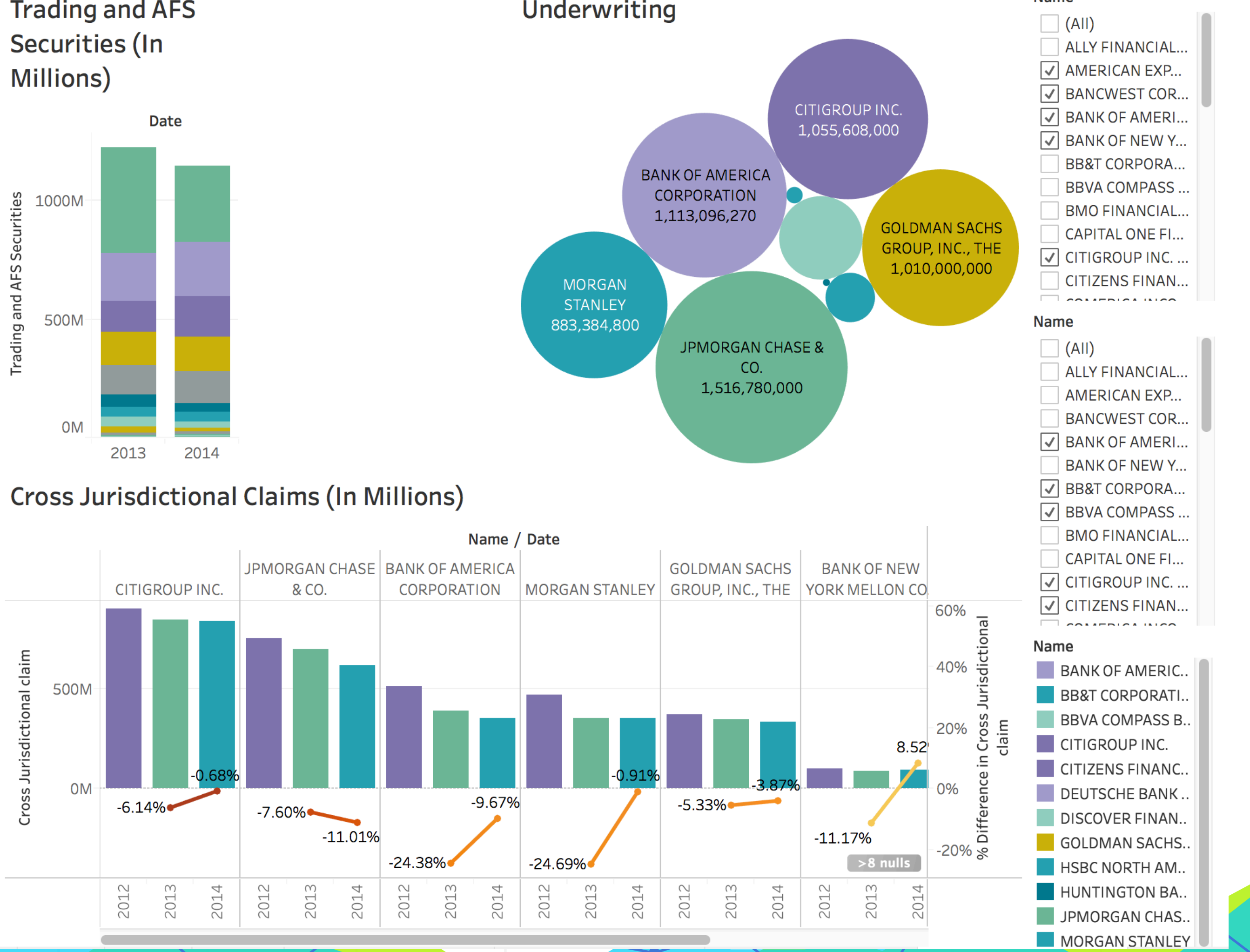




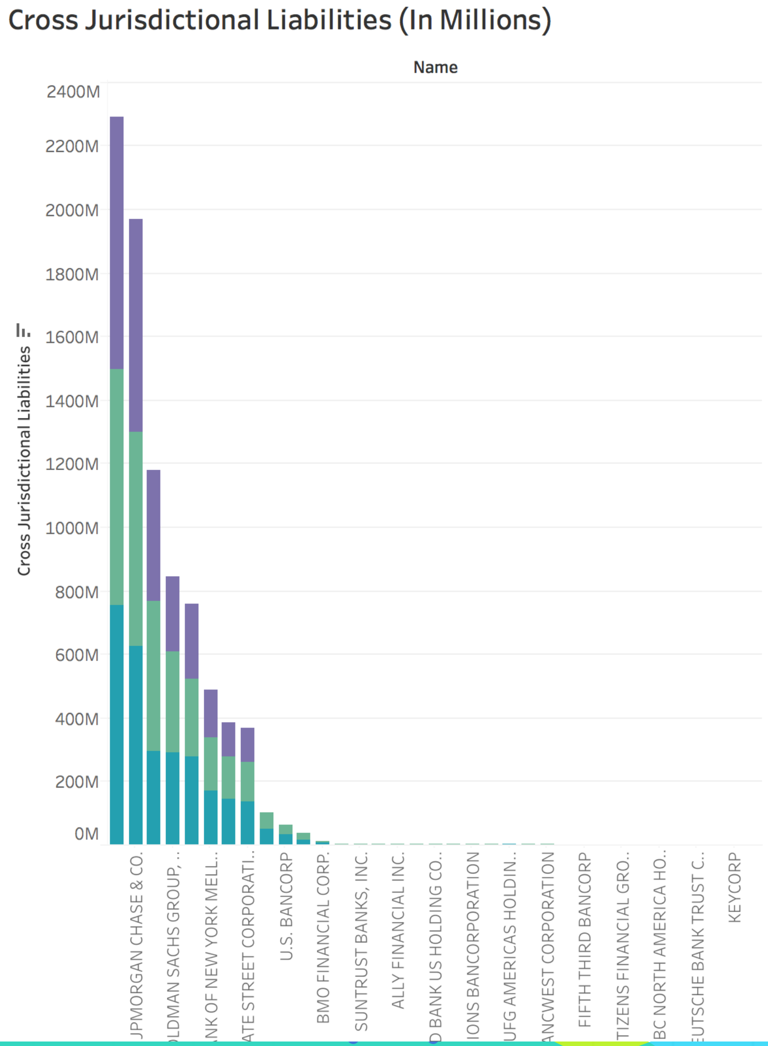


The bubble chart is showing the investment capital that each firm raised on behalf of their corporation. As JPMorgan has the highest value it is occupying the biggest bubble.

A cross claim jurisdiction represents a demand that is filed against a party on the same side of lawsuit. The trend chart clearly represents that over time the claims have declined for almost all the companies



The table highlights the cross jurisdictional liabilities in different range. The green shows the maximum value and the yellow is minimum.

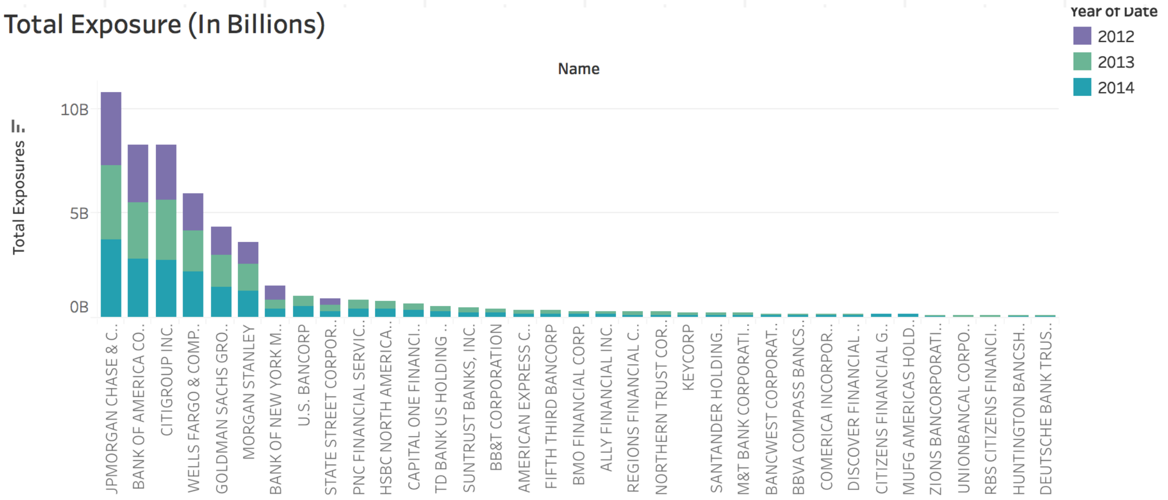


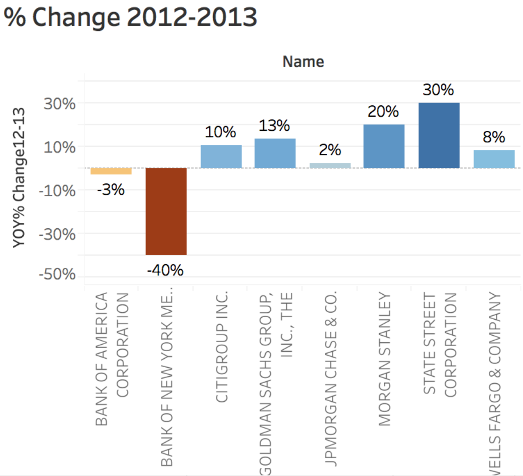
Cross Jurisdictional Liabilities

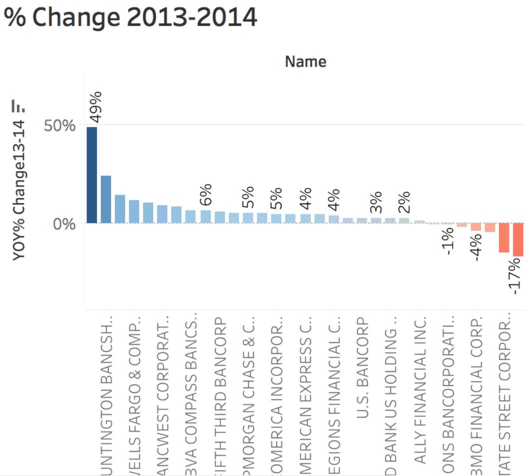
Cross-Jurisd.. 0 – 2B

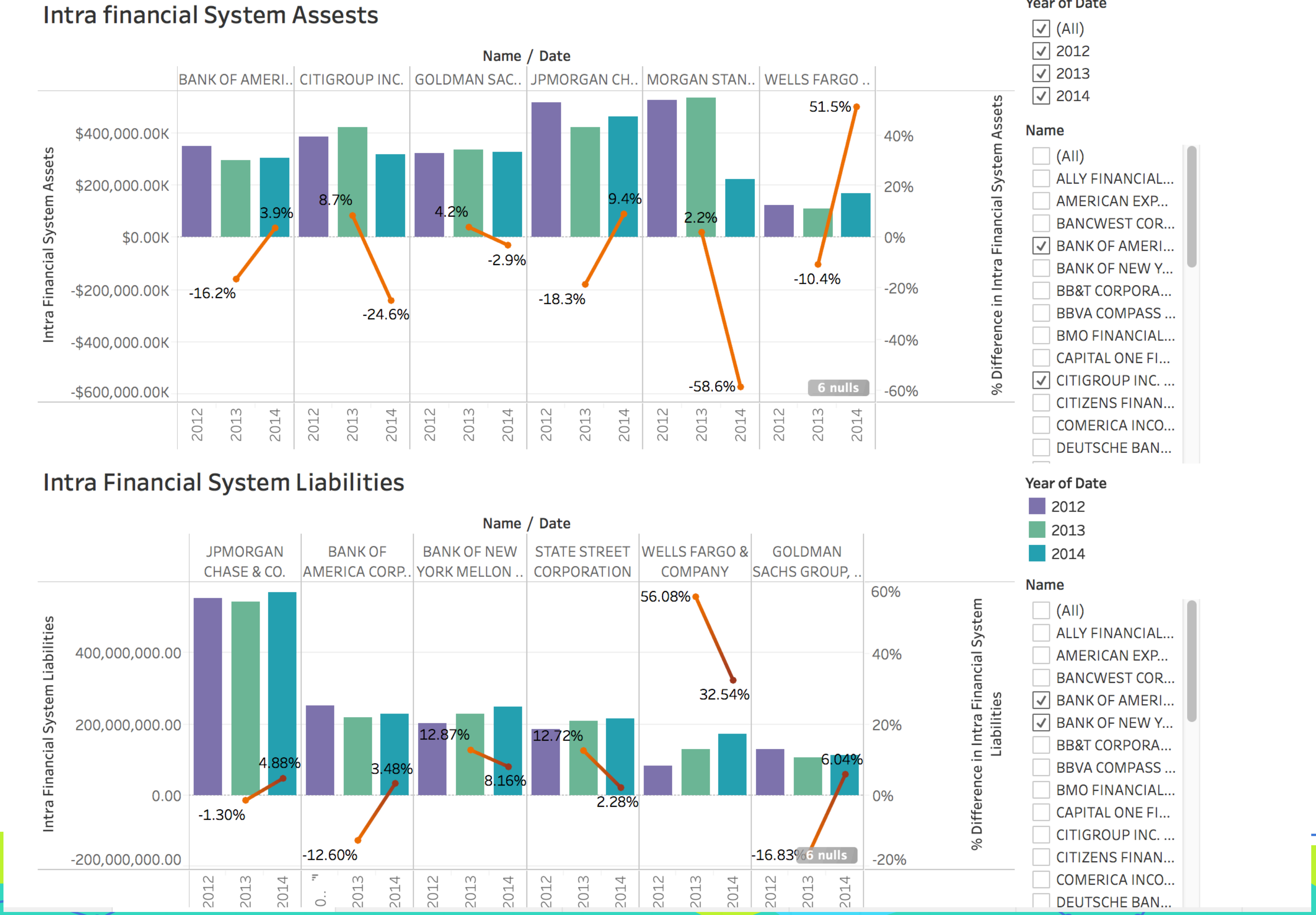
Name	
ALLY FINANCIAL INC.	3,554,000
AMERICAN EXPRESS COMPANY	37,447,000
BANCWEST CORPORATION	2,197,851
BANK OF AMERICA CORPORATION	759,001,000
BANK OF NEW YORK MELLON CORPOR..	487,825,000
BB&T CORPORATION	2,468,000
BBVA COMPASS BANCSHARES, INC.	3,793,000
BMO FINANCIAL CORP.	12,949,000
CAPITAL ONE FINANCIAL CORPORATIO..	2,351,918
CITIGROUP INC.	2,293,070,000
CITIZENS FINANCIAL GROUP, INC.	947,000
COMERICA INCORPORATED	3,421,000
DEUTSCHE BANK TRUST CORPORATION	50,000
DISCOVER FINANCIAL SERVICES	39,000
FIFTH THIRD BANCORP	1,155,000
GOLDMAN SACHS GROUP, INC., THE	843,661,000
HSBC NORTH AMERICA HOLDINGS INC.	900,963
HUNTINGTON BANCSHARES INCORPO..	0
JPMORGAN CHASE & CO.	1,970,187,000
KEYCORP	35,000
M&T BANK CORPORATION	66,752
MORGAN STANLEY	1,179,585,193
MUFG AMERICAS HOLDINGS CORPOR..	2,439,000
NORTHERN TRUST CORPORATION	101,872,603
PNC FINANCIAL SERVICES GROUP, INC..	4,648,000
RBS CITIZENS FINANCIAL GROUP, INC.	954,000
REGIONS FINANCIAL CORPORATION	943,000
SANTANDER HOLDINGS USA, INC.	1,784,448
STATE STREET CORPORATION	370,835,000
SUNTRUST BANKS, INC.	4,065,585
TD BANK US HOLDING COMPANY	3,050,000
U.S. BANCORP	66,490,000
UNIONBANCAL CORPORATION	2,618,361
WELLS FARGO & COMPANY	385,679,000

Time Series Dashboard:

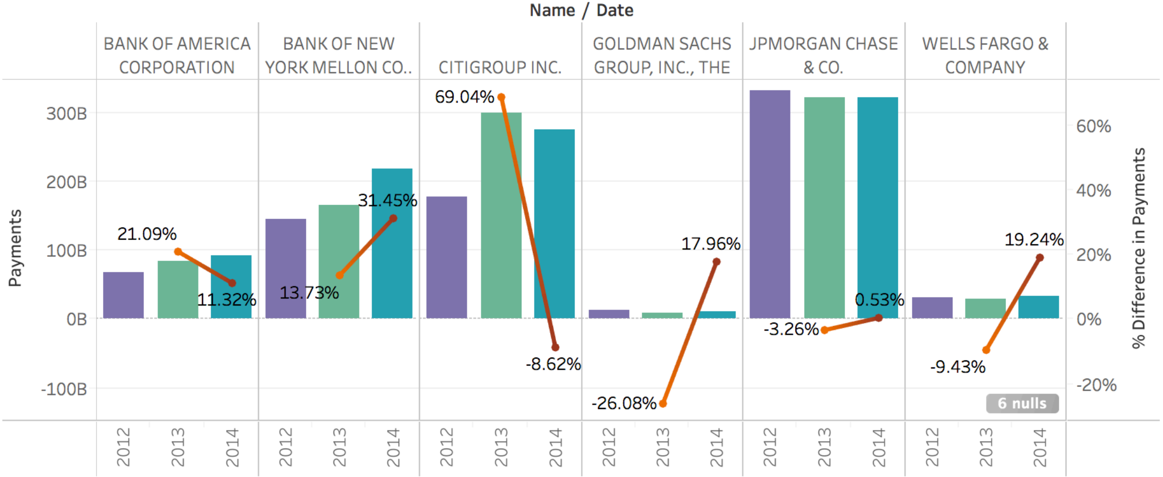







Intra financial System Assests
Name / Date
BANK OF AMERI..
CITIGROUP INC.
GOLDMAN SAC..
JPMORGAN CH..
MORGAN STAN..
WELLS FARGO ..
Intra Financial System Assets
$400,000.00K
$200,000.00K
$0.00K
-$200,000.00K
-$400,000.00K
-$600,000.00K
3.9%
-16.2%
8.7%
-24.6%
4.2%
-2.9%
9.4%
-18.3%
2.2%
-58.6%
51.5%
-10.4%
6 nulls
40%
20%
0%
-20%
-40%
-60%
% Difference in Intra Financial System Assets
2012
2013
2014
Year of Date
(All)
2012
2013
2014
Name
(All)
ALLY FINANCIAL...
AMERICAN EXP...
BANCWEST COR...
BANK OF AMERI...
BANK OF NEW Y...
BB&T CORPORA...
BBVA COMPASS ...
BMO FINANCIAL...
CAPITAL ONE FI...
CITIGROUP INC. ...
CITIZENS FINAN...
COMERICA INCO...
DEUTSCHE BAN...
Intra Financial System Liabilities
Name / Date
JPMORGAN CHASE & CO.
BANK OF AMERICA CORP..
BANK OF NEW YORK MELLON ..
STATE STREET CORPORATION
WELLS FARGO & COMPANY
GOLDMAN SACHS GROUP, ..
Intra Financial System Liabilities
400,000,000.00
200,000,000.00
0.00
-200,000,000.00
4.88%
-1.30%
3.48%
-12.60%
12.87%
8.16%
12.72%
2.28%
56.08%
32.54%
6.04%
-16.83%
6 nulls
60%
40%
20%
0%
-20%
% Difference in Intra Financial System Liabilities
Year of Date
2012
2013
2014
Name
(All)
ALLY FINANCIAL...
AMERICAN EXP...
BANCWEST COR...
BANK OF AMERI...
BANK OF NEW Y...
BB&T CORPORA...
BBVA COMPASS ...
BMO FINANCIAL...
CAPITAL ONE FI...
CITIGROUP INC. ...
CITIZENS FINAN...
COMERICA INCO...
DEUTSCHE BAN...

Payments



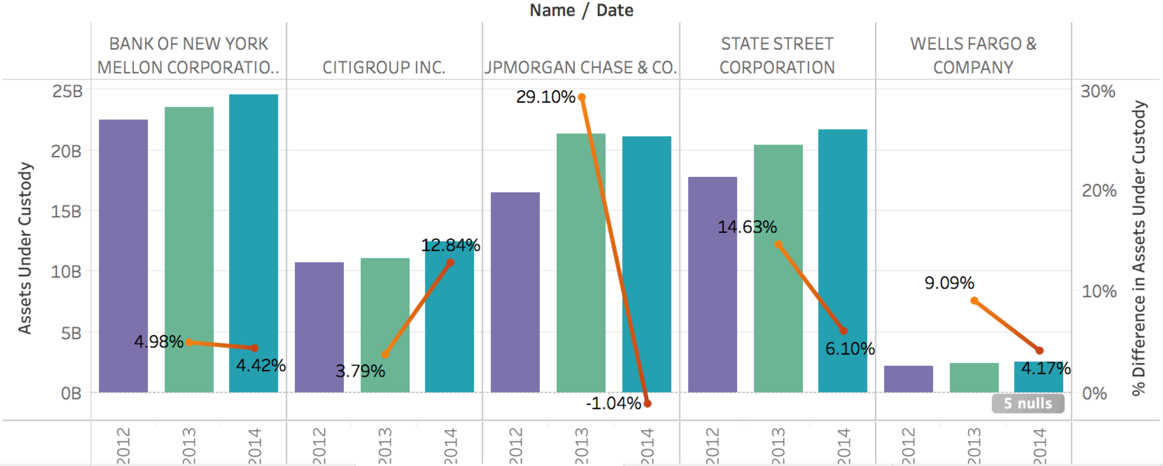
Name

- [ ] (All)
- [ ] ALLY FINANCIAL...
- [ ] AMERICAN EXP...
- [ ] BANCWEST COR...
- [x] BANK OF AMERI...
- [x] BANK OF NEW Y...
- [ ] BB&T CORPORA...
- [ ] BBVA COMPASS ...
- [ ] BMO FINANCIAL...
- [ ] CAPITAL ONE FI...
- [x] CITIGROUP INC. ...
- [ ] CITIZENS FINAN...
- [ ] COMERICA INCO...
- [ ] DEUTSCHE BAN...
- [ ] DISCOVER FINA...
- [ ] FIFTH THIRD BA...
- [x] GOLDMAN SAC...

Year of Date

- 2012
- 2013
- 2014

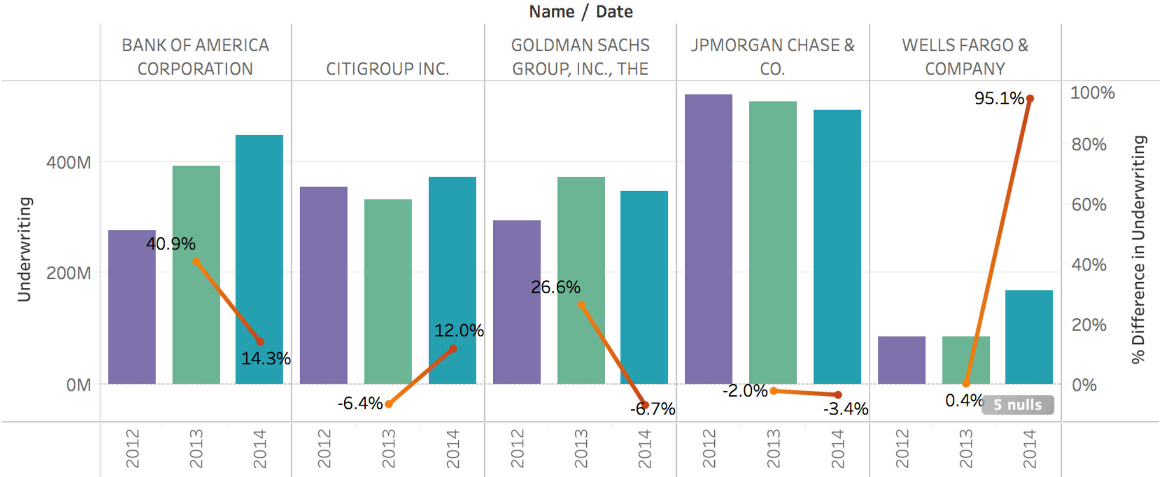
Assets Under Custody



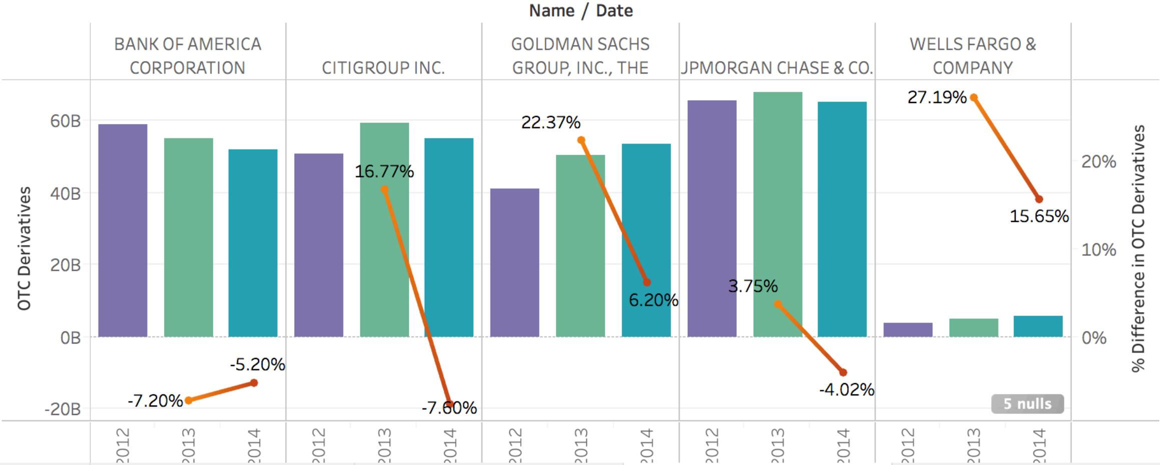
Name

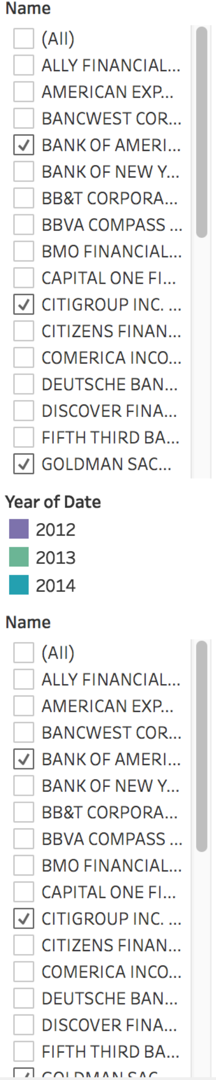
- [ ] (All)
- [ ] ALLY FINANCIAL...
- [ ] AMERICAN EXP...
- [ ] BANCWEST COR...
- [ ] BANK OF AMERI...
- [x] BANK OF NEW Y...
- [ ] BB&T CORPORA...
- [ ] BBVA COMPASS ...
- [ ] BMO FINANCIAL...
- [ ] CAPITAL ONE FI...
- [x] CITIGROUP INC. ...
- [ ] CITIZENS FINAN...
- [ ] COMERICA INCO...
- [ ] DEUTSCHE BAN...
- [ ] DISCOVER FINA...
- [ ] FIFTH THIRD BA...
- [ ] GOLDMAN SAC...

Underwriting

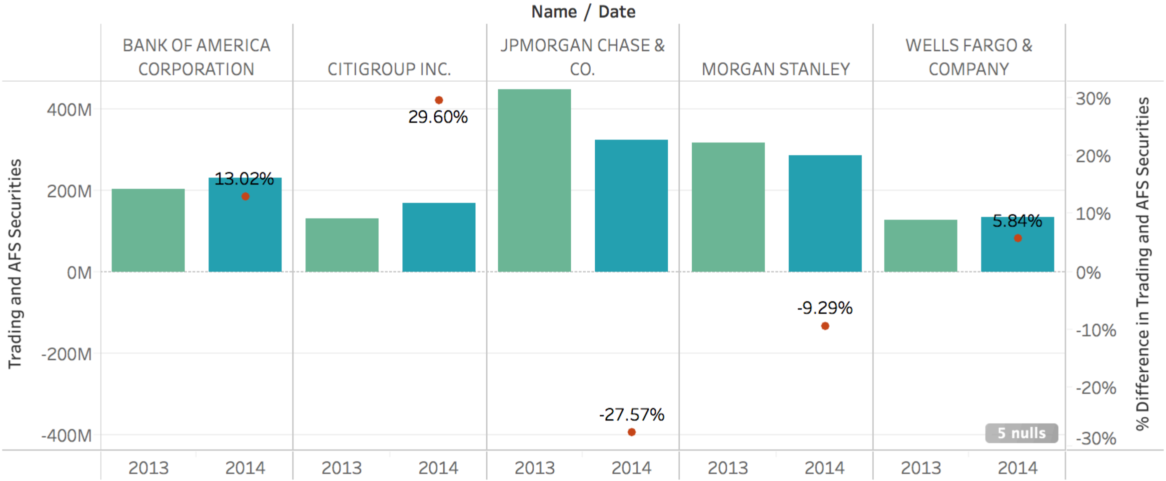


OTC Derivatives





Trading and AFS Securities



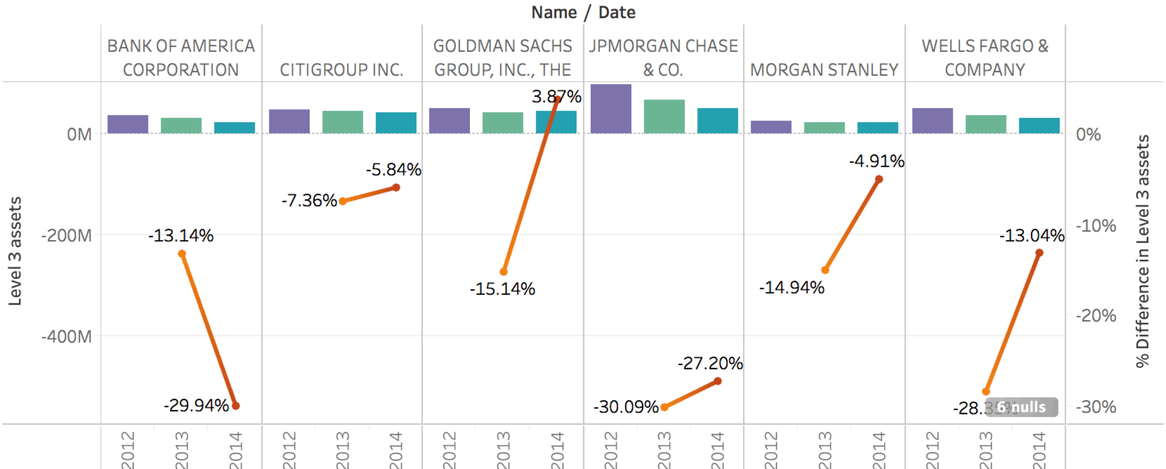
Name

- (All)
- ALLY FINANCIAL...
- AMERICAN EXP...
- BANCWEST COR...
- ☑ BANK OF AMERI...
- BANK OF NEW Y...
- BB&T CORPORA...
- BBVA COMPASS ...
- BMO FINANCIAL...
- CAPITAL ONE FI...
- ☑ CITIGROUP INC. ...
- CITIZENS FINAN...
- COMERICA INCO...
- DEUTSCHE BAN...
- DISCOVER FINA...
- FIFTH THIRD BA...
- GOLDMAN SAC...
- HSBC NORTH A...

Year of Date

- 2013
- 2014

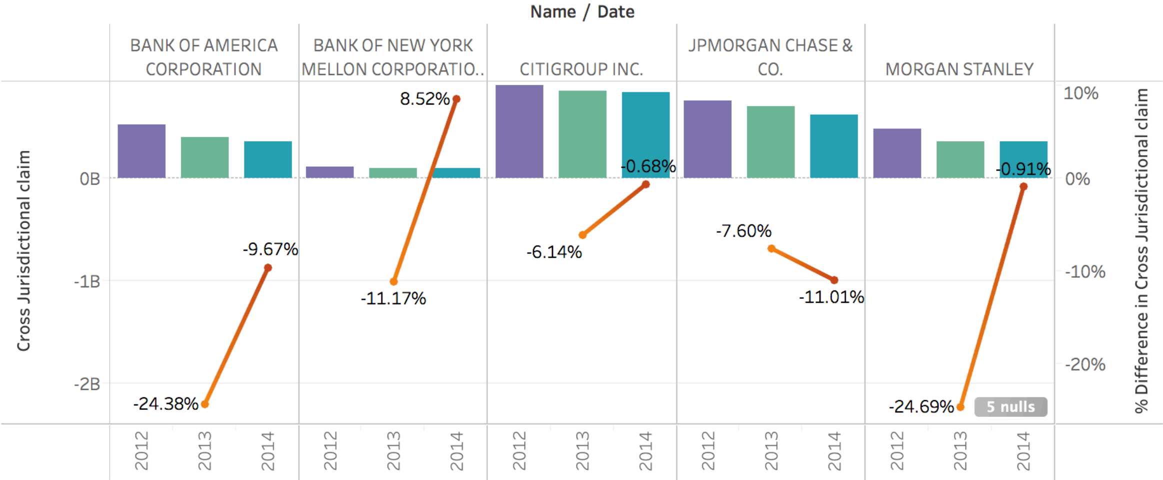
Level 3 Assets



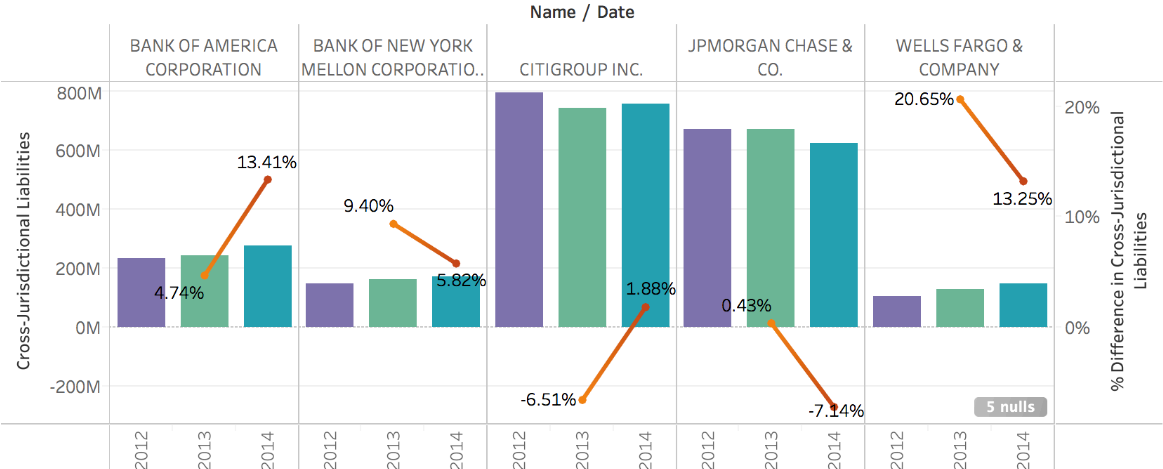
Name

- (All)
- ALLY FINANCIAL...
- AMERICAN EXP...
- BANCWEST COR...
- ☑ BANK OF AMERI...
- BANK OF NEW Y...
- BB&T CORPORA...
- BBVA COMPASS ...
- BMO FINANCIAL...
- CAPITAL ONE FI...
- ☑ CITIGROUP INC. ...
- CITIZENS FINAN...
- COMERICA INCO...
- DEUTSCHE BAN...
- DISCOVER FINA...
- FIFTH THIRD BA...
- ☑ GOLDMAN SAC...

Cross Jurisdictional Claims



Cross Jurisdictional Liabilities



Name

- ☐ (All)
- ☐ ALLY FINANCIAL...
- ☐ AMERICAN EXP...
- ☐ BANCWEST COR...
- ☑ BANK OF AMERI...
- ☑ BANK OF NEW Y...
- ☐ BB&T CORPORA...
- ☐ BBVA COMPASS ...
- ☐ BMO FINANCIAL...
- ☐ CAPITAL ONE FI...
- ☑ CITIGROUP INC. ...
- ☐ CITIZENS FINAN...
- ☐ COMERICA INCO...
- ☐ DEUTSCHE BAN...
- ☐ DISCOVER FINA...
- ☐ FIFTH THIRD BA...
- ☐ GOLDMAN SAC...

Year of Date

- 2012
- 2013
- 2014

Name

- ☐ (All)
- ☐ ALLY FINANCIAL...
- ☐ AMERICAN EXP...
- ☐ BANCWEST COR...
- ☑ BANK OF AMERI...
- ☑ BANK OF NEW Y...
- ☐ BB&T CORPORA...
- ☐ BBVA COMPASS ...
- ☐ BMO FINANCIAL...
- ☐ CAPITAL ONE FI...
- ☑ CITIGROUP INC. ...
- ☐ CITIZENS FINAN...
- ☐ COMERICA INCO...
- ☐ DEUTSCHE BAN...
- ☐ DISCOVER FINA...
- ☐ FIFTH THIRD BA...
- ☐ GOLDMAN SAC...

Thank You!