In [141]:

```
import pandas as pd
```

In [142]:

```
data = pd.read_csv("D:\KSR\Python\ExcelFile\investment_banking.csv")
```

In [143]:

```
data.shape
```

Out[143]:

```
(753089, 9)
```

In [144]:

```
data.head(5)
```

Out[144]:

| | broker_id | city |
|---|---|---|
| 0 | BRXX-1 | PLANTATION, FL |
| 1 | BRXX-1 | BRANFORD, CT |
| 2 | BRXX-1 | JONESBORO, GA |
| 3 | BRXX-2 | VIENNA, VA |
| 4 | BRXX-3 | CHAGRIN FALLS, OH |

In [145]:

```
data[['broker_id']].nunique()  #1178brokers (objective --> how many brokers are loyal)
```

Out[145]:

```
broker_id    1178
dtype: int64
```

In [146]:

```
data.isna().sum()    #missing values
```

Out[146]:

```
broker_id            0
city                 0
broker_type          0
fund_category        0
email_opened    434545
webex_meet      667429
sales_call      573091
```

```
firm_sales            0
global_sales          0
dtype: int64
```

In [147]:

```
(data.isna().sum() / data.shape[0]) *100
```

Out[147]:

```
broker_id         0.000000
city              0.000000
broker_type       0.000000
fund_category     0.000000
email_opened     57.701679
webex_meet       88.625514
sales_call       76.098708
firm_sales        0.000000
global_sales      0.000000
dtype: float64
```

In [148]:

```
#missing value treatment
data['webex_meet'] = data['webex_meet'].fillna("N")
data['email_opened'] = data['email_opened'].fillna("N")
data['sales_call'] = data['sales_call'].fillna("N")
```

In [149]:

```
(data.isna().sum() / data.shape[0]) *100
```

Out[149]:

```
broker_id        0.0
city             0.0
broker_type      0.0
fund_category    0.0
email_opened     0.0
webex_meet       0.0
sales_call       0.0
firm_sales       0.0
global_sales     0.0
dtype: float64
```

In [150]:

```
data.head(5)
```

Out[150]:

| | broker_id | city |
|---|---|---|
| 0 | BRXX-1 | PLANTATION, FL |
| 1 | BRXX-1 | BRANFORD, CT |
| 2 | BRXX-1 | JONESBORO, GA |
| 3 | BRXX-2 | VIENNA, VA |
| 4 | BRXX-3 | CHAGRIN FALLS, OH |

In [151]:

```
data.groupby('broker_type')['broker_id'].nunique()
```

Out[151]:

```
broker_type
Inter-dealer broker    1173
full-service broker       5
Name: broker_id, dtype: int64
```

In [152]:

```
data[['city','state']] = data['city'].str.split(",",n=1,expand =True)
```

In [153]:

```
data.head(5)
```

Out[153]:

| | broker_id | city |
|---|---|---|
| 0 | BRXX-1 | PLANTATION |
| 1 | BRXX-1 | BRANFORD |
| 2 | BRXX-1 | JONESBORO |
| 3 | BRXX-2 | VIENNA |
| 4 | BRXX-3 | CHAGRIN FALLS |

In [154]:

```
data[['state']].head(5)
```

Out[154]:

| | state |
|---|---|
| 0 | FL |
| 1 | CT |
| 2 | GA |
| 3 | VA |
| 4 | OH |

In [155]:

```
data['state'].nunique()
```

Out[155]:

60

In [156]:

```
data[data['state'].str.len()>=7].sort_values("state", ascending = False).head(10)
```

Out[156]:

| | broker_id | city |
|---|---|---|
| 64117 | BRXX-80 | KNOXVILLE |
| 105020 | BRXX-80 | KNOXVILLE |
| 161873 | BRXX-80 | KNOXVILLE |
| 168087 | BRXX-80 | KNOXVILLE |
| 168090 | BRXX-80 | KNOXVILLE |
| 188332 | BRXX-80 | KNOXVILLE |
| 215953 | BRXX-80 | KNOXVILLE |
| 215964 | BRXX-80 | KNOXVILLE |
| 257010 | BRXX-80 | KNOXVILLE |
| 466084 | BRXX-80 | KNOXVILLE |

In [157]:

```
data['state'].unique()
```

Out[157]:

```
array([' FL', ' CT', ' GA', ' VA', ' OH', ' CA', ' WA', ' MD', ' NJ',
       ' SC', ' OR', ' NY', ' TX', ' NC', ' KS', ' UT', ' PA', ' AZ',
       ' TN', ' HI', ' AL', ' OK', ' MA', ' WV', ' NH', ' IN', ' MI',
       ' ME', ' MN', ' DC', ' MS', ' IL', ' LA', ' CO', ' MO', ' IA',
       ' ND', ' WI', ' KY', ' ID', ' DE', ' NM', ' RI', ' AR', ' PR',
       ' WY', ' SD', ' AK', ' MT', ' VT', ' NE', ' NV', ', MD', ', CT',
       ', WI', ' TN, TN', ', VT', ', CA', ' GU', ' DC, DC'], dtype=object)
```

In [158]:

```
#corrections to state columns
data['state']=data['state'].str.replace(' ','')
data['state'] = data['state'].str.replace(',','')
```

In [159]:

```
data['state'].unique()
```

Out[159]:

```
array(['FL', 'CT', 'GA', 'VA', 'OH', 'CA', 'WA', 'MD', 'NJ', 'SC', 'OR',
       'NY', 'TX', 'NC', 'KS', 'UT', 'PA', 'AZ', 'TN', 'HI', 'AL', 'OK',
       'MA', 'WV', 'NH', 'IN', 'MI', 'ME', 'MN', 'DC', 'MS', 'IL', 'LA',
       'CO', 'MO', 'IA', 'ND', 'WI', 'KY', 'ID', 'DE', 'NM', 'RI', 'AR',
```

```
       'PR', 'WY', 'SD', 'AK', 'MT', 'VT', 'NE', 'NV', 'TNTN', 'GU',
       'DCDC'], dtype=object)
```

In [160]:

```
data[data['state'].str.len()>=4].sort_values("state", ascending = False).head(10)
```

Out[160]:

| | broker_id | city |
|---|---|---|
| 64117 | BRXX-80 | KNOXVILLE |
| 105020 | BRXX-80 | KNOXVILLE |
| 161873 | BRXX-80 | KNOXVILLE |
| 168087 | BRXX-80 | KNOXVILLE |
| 168090 | BRXX-80 | KNOXVILLE |
| 188332 | BRXX-80 | KNOXVILLE |
| 215953 | BRXX-80 | KNOXVILLE |
| 215964 | BRXX-80 | KNOXVILLE |
| 257010 | BRXX-80 | KNOXVILLE |
| 466084 | BRXX-80 | KNOXVILLE |

In [161]:

```
data['state'] = data['state'].str.replace('TNTN','TN')
data['state'] = data['state'].str.replace('DCDC','DC')
```

In [162]:

```
data[data['state'].str.len()==2].sort_values("state", ascending = False).head(10)
#make sure at any cost this should not yeild any results
```

Out[162]:

| | broker_id | city |
|---|---|---|
| 689078 | BRXX-298 | ROCK SPRINGS |
| 448643 | BRXX-327 | CHEYENNE |
| 393351 | BRXX-253 | CODY |
| 672717 | BRXX-298 | AFTON |
| 654993 | BRXX-262 | ROCK SPRINGS |
| 372991 | BRXX-78 | GILLETTE |
| 529140 | BRXX-374 | CHEYENNE |
| 182298 | BRXX-172 | CHEYENNE |
| 198107 | BRXX-456 | CODY |
| 417882 | BRXX-172 | CASPER |

In [163]:

```
data['state'].str.isnumeric().sum()
```

Out[163]:

```
np.int64(0)
```

In [164]:

```
data['city'].str.isnumeric().sum()
```

Out[164]:

```
np.int64(37)
```

In [165]:

```
data[data['city'].str.isnumeric()].head(40)
```

Out[165]:

| | broker_id | city |
|---|---|---|
| 12956 | BRXX-188 | 64150 |
| 31538 | BRXX-77 | 15801 |
| 45478 | BRXX-188 | 64150 |
| 95111 | BRXX-77 | 15801 |
| 107878 | BRXX-188 | 64150 |
| 122236 | BRXX-70 | 95678 |
| 143794 | BRXX-77 | 15801 |
| 151921 | BRXX-77 | 15801 |
| 158007 | BRXX-77 | 15801 |
| 170498 | BRXX-188 | 64150 |
| 174723 | BRXX-188 | 64150 |
| 178474 | BRXX-77 | 15801 |
| 231891 | BRXX-188 | 64150 |
| 233080 | BRXX-188 | 64150 |
| 236546 | BRXX-70 | 95678 |
| 239104 | BRXX-70 | 95678 |
| 242904 | BRXX-70 | 95678 |
| 258485 | BRXX-77 | 15801 |
| 266507 | BRXX-188 | 64150 |
| 286301 | BRXX-70 | 95678 |
| 343116 | BRXX-70 | 95678 |
| 361358 | BRXX-77 | 15801 |
| 384772 | BRXX-70 | 95678 |
| 434361 | BRXX-77 | 15801 |
| 452242 | BRXX-70 | 95678 |
| 485769 | BRXX-77 | 15801 |
| 527815 | BRXX-70 | 95678 |
| 531297 | BRXX-77 | 15801 |
| 536996 | BRXX-77 | 15801 |
| 549610 | BRXX-77 | 15801 |
| 553111 | BRXX-188 | 64150 |
| 566408 | BRXX-188 | 64150 |
| 570387 | BRXX-77 | 15801 |
| 578599 | BRXX-77 | 15801 |
| 599098 | BRXX-77 | 15801 |

| | | |
|---|---|---|
| 609244 | BRXX-77 | 15801 |
| 633459 | BRXX-77 | 15801 |

In [166]:

```
#37 records have some numbers in city columns (mistake)
```

In [167]:

```
(37 /data.shape[0]) *100 # = ~0.005% there is mistake
```

Out[167]:

0.004913098

In [168]:

```
data[data['city'].str.isnumeric()]['city'].unique()
```

Out[168]:

```
array(['64150', '15801', '95678'], dtype=object)
```

In [169]:

```
data['city']= data['city'].str.replace('64150','Riverside')
data['city']= data['city'].str.replace('15801','DuBois')
data['city']= data['city'].str.replace('95678','Roseville')
#external source ---> change pin to city name
```

In [170]:

```
data['city'].str.isnumeric().sum()
```

Out[170]:

```
np.int64(0)
```

In [171]:

```
data['email_opened'].unique()
```

Out[171]:

```
array(['N', 'Y'], dtype=object)
```

In [172]:

```
data[data['email_opened'].str.len()>1].head(5)
```

Out[172]:

| | broker_id | city |
|---|---|---|

In [173]:

```
data['email_opened'].str.isnumeric().sum()
```

Out[173]:

```
np.int64(0)
```

In [174]:

```
#Assignment
#check if there is no character in firm sales/ global sales
```

In [175]:

```
data.dtypes
```

Out[175]:

```
broker_id         object
city              object
broker_type       object
fund_category     object
email_opened      object
webex_meet        object
sales_call        object
firm_sales       float64
global_sales     float64
state             object
dtype: object
```

In [176]:

```
data['firm_sales'].astype(str).str.isnumeric().sum()
```

Out[176]:

```
np.int64(0)
```

In [177]:

```
data['global_sales'].astype(str).str.isnumeric().sum()
```

Out[177]:

```
np.int64(0)
```

In [178]:

```
data[data['broker_id']=='BRXX-1'].head(5)
```

Out[178]:

| | broker_id | city |
|---|---|---|
| 0 | BRXX-1 | PLANTATION |
| 1 | BRXX-1 | BRANFORD |
| 2 | BRXX-1 | JONESBORO |
| 7 | BRXX-1 | OWINGS MILLS |
| 13 | BRXX-1 | AUSTIN |

In [179]:

```
data.groupby('broker_id')[['firm_sales','global_sales']].sum()
```

Out[179]:

| | firm_sales | global_sales |
|---|---|---|
| broker_id | | |
| BRXX-1 | 11157673.73 | 1.07E+08 |
| BRXX-10 | 0 | 7.48E+05 |
| BRXX-100 | 267918.14 | 8.15E+06 |
| BRXX-1000 | 0 | 0.00E+00 |
| BRXX-1001 | 0 | 1.09E+06 |
| ... | ... | ... |
| BRXX-995 | 0 | 1.81E+04 |
| BRXX-996 | 0 | 3.20E+04 |
| BRXX-997 | 0 | 1.66E+05 |
| BRXX-998 | 0 | 0.00E+00 |
| BRXX-999 | 0 | 1.29E+04 |

1178 rows × 2 columns

In [180]:

```
data[data['broker_id']=='BRXX-1'][['firm_sales']].sum()
```

Out[180]:

```
firm_sales    11157673.73
dtype: float64
```

In [181]:

```
data[data['broker_id']=='BRXX-1'][['global_sales']].sum().astype(int)
```

Out[181]:

```
global_sales    106631687
dtype: int64
```

In [182]:

```
#how much he has purchased in our bank
(11157673.73/106631687) * 100
```

Out[182]:

```
10.46375055
```

In [183]:

```
#BRXX-1 ---> 10% from our bank and 90% from others
```

In [201]:

```
df = data.groupby('broker_id')[['firm_sales','global_sales']].sum().reset_index()
```

In [202]:

```
df.head(10)
```

Out[202]:

| | broker_id | firm_sales |
|---|---|---|
| 0 | BRXX-1 | 11157673.73 |
| 1 | BRXX-10 | 0 |
| 2 | BRXX-100 | 267918.14 |
| 3 | BRXX-1000 | 0 |
| 4 | BRXX-1001 | 0 |
| 5 | BRXX-1002 | 29387.17 |
| 6 | BRXX-1003 | 0 |
| 7 | BRXX-1004 | 0 |
| 8 | BRXX-1005 | 77.23 |
| 9 | BRXX-1006 | 0 |

In [203]:

```
df['loyality_Per'] = (df['firm_sales']/df['global_sales']) * 100
```

In [204]:

```
df.head(10)
```

Out[204]:

| | broker_id | firm_sales |
|---|---|---|
| 0 | BRXX-1 | 11157673.73 |
| 1 | BRXX-10 | 0 |
| 2 | BRXX-100 | 267918.14 |
| 3 | BRXX-1000 | 0 |
| 4 | BRXX-1001 | 0 |

| | | |
|---|---|---|
| 5 | BRXX-1002 | 29387.17 |
| 6 | BRXX-1003 | 0 |
| 7 | BRXX-1004 | 0 |
| 8 | BRXX-1005 | 77.23 |
| 9 | BRXX-1006 | 0 |

In [205]:

```
df.sort_values("loyality_Per",ascending = False).head(10)
```

Out[205]:

| | broker_id | firm_sales |
|---|---|---|
| 8 | BRXX-1005 | 77.23 |
| 23 | BRXX-1019 | 5571.97 |
| 42 | BRXX-1036 | 245.76 |
| 621 | BRXX-498 | 13042.03 |
| 858 | BRXX-710 | 27438.3 |
| 895 | BRXX-744 | 4352339.58 |
| 137 | BRXX-1121 | 754618.93 |
| 335 | BRXX-24 | 15800032.61 |
| 1118 | BRXX-945 | 25429.96 |
| 287 | BRXX-197 | 1000213.01 |

In [206]:

```
#expected output
#broker_id / firm_sales / global_sales / loyality_per / loyality_category
```

In [207]:

```
def loyality_check(loy_percent):
    if loy_percent == 100:
        return "Loyal Broker"
    elif loy_percent > 85 and loy_percent < 100:
        return "Steadyfast Broker"
    elif loy_percent >= 50 and loy_percent < 85:
        return "Reasonably Devoted Brokers(Moderate)"
    elif loy_percent < 50 and loy_percent > 0:
        return "Less Inclined Brokers"
    elif loy_percent == 0:
        return "Non-Commited Brokers"
    else:
        return "Stagnant Brokers"
```

In [208]:

```
df['loyality_Category'] = df['loyality_Per'].apply(loyality_check)
```

In [192]:

```
df.head(10)
```

Out[192]:

| | broker_id | firm_sales |
|---|---|---|
| 0 | BRXX-1 | 11157673.73 |
| 1 | BRXX-10 | 0 |
| 2 | BRXX-100 | 267918.14 |
| 3 | BRXX-1000 | 0 |
| 4 | BRXX-1001 | 0 |
| 5 | BRXX-1002 | 29387.17 |
| 6 | BRXX-1003 | 0 |
| 7 | BRXX-1004 | 0 |
| 8 | BRXX-1005 | 77.23 |
| 9 | BRXX-1006 | 0 |

In [193]:

```
df.shape
```

Out[193]:

```
(1178, 5)
```

In [213]:

```
df2 = df.groupby('loyality_Category')[['broker_id']].count().sort_values('broker_id', ascendi
```

In [214]:

```
df.dtypes
```

Out[214]:

```
broker_id             object
firm_sales           float64
global_sales         float64
loyality_Per         float64
loyality_Category     object
dtype: object
```

In [215]:

```
#Assignment
# total brokers = 1178
```

In [217]:

```
df2['Loyality_Broker_Percentage'] = (df2['No_of_brokers'] / 1178) * 100
```

In [198]:

df.head(10)

Out[198]:

| | loyality_Category | No_of_brokers |
|---|---|---|
| 0 | Non-Commited Brokers | 686 |
| 1 | Less Inclined Brokers | 310 |
| 2 | Stagnant Brokers | 166 |
| 3 | Reasonably Devoted Brokers(Moderate) | 7 |
| 4 | Steadyfast Broker | 5 |
| 5 | Loyal Broker | 4 |

In [218]:

df.head(10)

Out[218]:

| | broker_id | firm_sales |
|---|---|---|
| 0 | BRXX-1 | 11157673.73 |
| 1 | BRXX-10 | 0 |
| 2 | BRXX-100 | 267918.14 |
| 3 | BRXX-1000 | 0 |
| 4 | BRXX-1001 | 0 |
| 5 | BRXX-1002 | 29387.17 |
| 6 | BRXX-1003 | 0 |
| 7 | BRXX-1004 | 0 |
| 8 | BRXX-1005 | 77.23 |
| 9 | BRXX-1006 | 0 |

In [122]:

data.head(2)

Out[122]:

| | broker_id | city |
|---|---|---|
| 0 | BRXX-1 | PLANTATION |
| 1 | BRXX-1 | BRANFORD |

In [238]:

```
df3 = pd.merge(data,df, on = "broker_id", how = "inner") \
[["broker_id","city","state","broker_type","fund_category","email_opened","webex_meet","sales
```

In [239]:

df3.head(5)

Out[239]:

| | broker_id | city |
|---|---|---|
| 0 | BRXX-1 | PLANTATION |
| 1 | BRXX-1 | BRANFORD |
| 2 | BRXX-1 | JONESBORO |

| | | |
|---|---|---|
| 3 | BRXX-2 | VIENNA |
| 4 | BRXX-3 | CHAGRIN FALLS |

In [227]:

```
df3.groupby(['webex_meet','loyality_Category'])[['broker_id']].nunique()
```

Out[227]:

| | | broker_id |
|---|---|---|
| webex_meet | loyality_Category | |
| N | Less Inclined Brokers | 310 |
| | Loyal Broker | 4 |
| | Non-Commited Brokers | 658 |
| | Reasonably Devoted Brokers(Moderate) | 7 |
| | Stagnant Brokers | 156 |
| | Steadyfast Broker | 5 |
| Y | Less Inclined Brokers | 191 |
| | Non-Commited Brokers | 56 |
| | Reasonably Devoted Brokers(Moderate) | 1 |
| | Stagnant Brokers | 11 |
| | Steadyfast Broker | 2 |

In [247]:

```
df4 = df3.groupby(['broker_type','loyality_Category'])[['broker_id']].nunique().sort_values('
```

In [248]:

```
df4.head(10)
```

Out[248]:

| | | broker_id |
|---|---|---|
| broker_type | loyality_Category | |
| Inter-dealer broker | Non-Commited Brokers | 685 |
| | Less Inclined Brokers | 306 |
| | Stagnant Brokers | 166 |
| | Reasonably Devoted Brokers(Moderate) | 7 |
| | Steadyfast Broker | 5 |
| | Loyal Broker | 4 |
| full-service broker | Less Inclined Brokers | 4 |
| | Non-Commited Brokers | 1 |

In [ ]:

| broker_type | fund_category |
|---|---|
| Inter-dealer broker | Emerging-Markets Local-Currency Bond |
| Inter-dealer broker | Utilities |
| Inter-dealer broker | Intermediate Government |
| Inter-dealer broker | Intermediate Government |
| full-service broker | Target-Date 2050 |

| broker_type | fund_category |
|---|---|
| Inter-dealer broker | Emerging-Markets Local-Currency Bond |
| Inter-dealer broker | Utilities |
| Inter-dealer broker | Intermediate Government |
| Inter-dealer broker | Intermediate Government |
| full-service broker | Target-Date 2050 |


| broker_type | fund_category |
|---|---|
| Inter-dealer broker | Emerging-Markets Local-Currency Bond |
| Inter-dealer broker | Utilities |
| Inter-dealer broker | Intermediate Government |
| Inter-dealer broker | Intermediate Government |
| full-service broker | Target-Date 2050 |

| broker_type | fund_category |
| --- | --- |
| Inter-dealer broker | Mid-Cap Growth |
| Inter-dealer broker | Bank Loan |
| Inter-dealer broker | World Small/Mid Stock |
| Inter-dealer broker | Allocation--70% to 85% Equity |
| Inter-dealer broker | High Yield Muni |
| Inter-dealer broker | Long-Short Credit |
| Inter-dealer broker | Large Growth |
| Inter-dealer broker | Short-Term Bond |
| Inter-dealer broker | Allocation--30% to 50% Equity |
| Inter-dealer broker | Allocation--50% to 70% Equity |

| broker_type | fund_category |
| --- | --- |
| Inter-dealer broker | Mid-Cap Growth |
| Inter-dealer broker | Bank Loan |
| Inter-dealer broker | World Small/Mid Stock |
| Inter-dealer broker | Allocation--70% to 85% Equity |
| Inter-dealer broker | High Yield Muni |
| Inter-dealer broker | Long-Short Credit |
| Inter-dealer broker | Large Growth |
| Inter-dealer broker | Short-Term Bond |
| Inter-dealer broker | Allocation--30% to 50% Equity |
| Inter-dealer broker | Allocation--50% to 70% Equity |

| broker_type | fund_category |
| --- | --- |
| Inter-dealer broker | Ultrashort Bond |
| Inter-dealer broker | Preferred Stock |
| Inter-dealer broker | Intermediate Government |
| Inter-dealer broker | Small Value |
| Inter-dealer broker | Intermediate-Term Bond |
| Inter-dealer broker | Allocation--50% to 70% Equity |
| Inter-dealer broker | Diversified Emerging Mkts |
| Inter-dealer broker | Intermediate-Term Bond |
| Inter-dealer broker | World Large Stock |
| Inter-dealer broker | Allocation--70% to 85% Equity |

| broker_type | fund_category |
|---|---|
| Inter-dealer broker | Equity Energy |
| Inter-dealer broker | World Small/Mid Stock |
| Inter-dealer broker | Emerging Markets Bond |
| Inter-dealer broker | World Bond |
| Inter-dealer broker | Short-Term Bond |
| Inter-dealer broker | Allocation--70% to 85% Equity |
| Inter-dealer broker | Foreign Large Blend |
| Inter-dealer broker | Corporate Bond |
| Inter-dealer broker | World Large Stock |
| Inter-dealer broker | Nontraditional Bond |
| Inter-dealer broker | Foreign Large Value |
| Inter-dealer broker | Nontraditional Bond |
| Inter-dealer broker | High Yield Bond |
| Inter-dealer broker | World Allocation |
| Inter-dealer broker | Short-Term Bond |
| Inter-dealer broker | World Allocation |
| Inter-dealer broker | Bank Loan |
| Inter-dealer broker | Large Value |
| Inter-dealer broker | Large Growth |
| Inter-dealer broker | Multisector Bond |
| Inter-dealer broker | High Yield Bond |
| Inter-dealer broker | Convertibles |
| Inter-dealer broker | Large Blend |
| Inter-dealer broker | Small Blend |
| Inter-dealer broker | Large Value |
| Inter-dealer broker | Allocation--50% to 70% Equity |
| Inter-dealer broker | Intermediate-Term Bond |
| Inter-dealer broker | Diversified Emerging Mkts |
| Inter-dealer broker | Multialternative |
| Inter-dealer broker | Mid-Cap Growth |
| Inter-dealer broker | Intermediate-Term Bond |
| Inter-dealer broker | Bank Loan |
| Inter-dealer broker | World Allocation |
| Inter-dealer broker | Target-Date 2040 |
| Inter-dealer broker | Short-Term Bond |

| | |
|---|---|
| Inter-dealer broker | Emerging-Markets Local-Currency Bond |
| Inter-dealer broker | Mid-Cap Value |

| broker_type | fund_category |
| --- | --- |

| broker_type | fund_category |
|---|---|
| Inter-dealer broker | Emerging-Markets Local-Currency Bond |
| Inter-dealer broker | Utilities |
| Inter-dealer broker | Intermediate Government |
| Inter-dealer broker | World Large Stock |
| Inter-dealer broker | Intermediate-Term Bond |

| global_sales |
|---|
| 1.07E+08 |
| 7.48E+05 |
| 8.15E+06 |
| 0.00E+00 |
| 1.09E+06 |
| 9.65E+04 |
| 4.35E+04 |
| 4.81E+04 |
| 7.72E+01 |
| 3.00E+04 |

| global_sales | loyality_Per |
|---|---|
| 1.07E+08 | 10.46375 |
| 7.48E+05 | 0 |
| 8.15E+06 | 3.287194 |
| 0.00E+00 | NaN |
| 1.09E+06 | 0 |

| | |
|---|---|
| 9.65E+04 | 30.444123 |
| 4.35E+04 | 0 |
| 4.81E+04 | 0 |
| 7.72E+01 | 100 |
| 3.00E+04 | 0 |

| global_sales | loyality_Per |
|---|---|
| 77.23 | 100 |
| 5571.97 | 100 |
| 245.76 | 100 |
| 13042.03 | 100 |
| 27627.97 | 99.313486 |
| 4389608.62 | 99.150971 |
| 775703.36 | 97.281895 |
| 16787455.29 | 94.118092 |
| 27142.96 | 93.688971 |
| 1203312.21 | 83.121654 |

| global_sales | loyality_Per |
|---:|---:|
| 1.07E+08 | 10.46375 |
| 7.48E+05 | 0 |
| 8.15E+06 | 3.287194 |
| 0.00E+00 | NaN |
| 1.09E+06 | 0 |
| 9.65E+04 | 30.444123 |
| 4.35E+04 | 0 |
| 4.81E+04 | 0 |
| 7.72E+01 | 100 |
| 3.00E+04 | 0 |

```
ng = False).reset_index().rename(columns = {'broker_id':'No_of_brokers'})
```

| Loyality_Broker_Percentage |
|---:|
| 58.234295 |
| 26.315789 |
| 14.091681 |
| 0.594228 |
| 0.424448 |
| 0.339559 |

| global_sales | loyality_Per |
|---:|---:|
| 1.07E+08 | 10.46375 |
| 7.48E+05 | 0 |
| 8.15E+06 | 3.287194 |
| 0.00E+00 | NaN |
| 1.09E+06 | 0 |
| 9.65E+04 | 30.444123 |
| 4.35E+04 | 0 |
| 4.81E+04 | 0 |
| 7.72E+01 | 100 |
| 3.00E+04 | 0 |

| broker_type | fund_category |
|---|---|
| Inter-dealer broker | Emerging-Markets Local-Currency Bond |
| Inter-dealer broker | Utilities |

_call","firm_sales_x","global_sales_x","loyality_Category","loyality_Per"]]

| state | broker_type |
|---|---|
| FL | Inter-dealer broker |
| CT | Inter-dealer broker |
| GA | Inter-dealer broker |

| | |
|---|---|
| VA | Inter-dealer broker |
| OH | full-service broker |

broker_id', ascending = False)

| email_opened | webex_meet | sales_call | firm_sales |
|---|---|---|---|
| NaN | NaN | NaN | 174.62 |
| NaN | NaN | NaN | 0 |
| NaN | NaN | NaN | 0 |
| Y | NaN | NaN | 0 |
| Y | NaN | Y | 0 |

| email_opened | webex_meet | sales_call | firm_sales |
|---|---|---|---|
| N | N | N | 174.62 |
| N | N | N | 0 |
| N | N | N | 0 |
| Y | N | N | 0 |
| Y | N | Y | 0 |


| email_opened | webex_meet | sales_call | firm_sales |
|---|---|---|---|
| N | N | N | 174.62 |
| N | N | N | 0 |
| N | N | N | 0 |
| Y | N | N | 0 |
| Y | N | Y | 0 |

| email_opened | webex_meet | sales_call | firm_sales |
|---|---|---|---|
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |

| email_opened | webex_meet | sales_call | firm_sales |
|---|---|---|---|
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |

| email_opened | webex_meet | sales_call | firm_sales |
|---|---|---|---|
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| Y | Y | N | 0 |
| N | N | N | 0 |
| Y | N | N | 0 |

| email_opened | webex_meet | sales_call | firm_sales |
|---|---|---|---|
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 160313.6 |
| N | N | N | 1684.01 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 446.01 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 686.65 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 141.02 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 21907.99 |
| N | N | N | 0 |
| N | N | N | 32.99 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 548.01 |

| | | | |
|---|---|---|---|
| N | N | N | 744.67 |
| N | N | N | 0 |

| | email_opened | webex_meet | sales_call | firm_sales |
|---|---|---|---|---|

| email_opened | webex_meet | sales_call | firm_sales |
|---|---|---|---|
| N | N | N | 174.62 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |
| N | N | N | 0 |

| loyality_Category |
|---|
| Less Inclined Brokers |
| Non-Commited Brokers |
| Less Inclined Brokers |
| Stagnant Brokers |
| Non-Commited Brokers |
| Less Inclined Brokers |
| Non-Commited Brokers |
| Non-Commited Brokers |
| Loyal Broker |
| Non-Commited Brokers |

| loyality_Category |
|---|
| Less Inclined Brokers |
| Non-Commited Brokers |
| Less Inclined Brokers |
| Stagnant Brokers |
| Non-Commited Brokers |
| Less Inclined Brokers |
| Non-Commited Brokers |
| Non-Commited Brokers |
| Loyal Broker |
| Non-Commited Brokers |

| email_opened | webex_meet | sales_call | firm_sales |
|---|---|---|---|
| N | N | N | 174.62 |
| N | N | N | 0 |

| fund_category | email_opened | webex_meet | sales_call |
|---|---|---|---|
| Emerging-Markets Local-Currency Bond | N | N | N |
| Utilities | N | N | N |
| Intermediate Government | N | N | N |

| | | | |
|---|---|---|---|
| Intermediate Government | Y | N | N |
| Target-Date 2050 | Y | N | Y |

| global_sales |
| ---: |
| 174.62 |
| 0 |
| 0 |
| 30709 |
| 0 |

| global_sales |
| ---: |
| 174.62 |
| 0 |
| 0 |
| 30709 |
| 0 |

| global_sales | state |
| ---: | --- |
| 174.62 | FL |
| 0 | CT |
| 0 | GA |
| 30709 | VA |
| 0 | OH |

| global_sales | state |
|---:|---|
| 600 | TN, TN |
| 0 | TN, TN |
| 244.78 | TN, TN |
| 75 | TN, TN |
| 345.98 | TN, TN |
| 0 | TN, TN |
| 28803.07 | TN, TN |
| 325 | TN, TN |
| 25118 | TN, TN |
| 4616.81 | TN, TN |

| global_sales | state |
| --- | --- |
| 600 | TNTN |
| 0 | TNTN |
| 244.78 | TNTN |
| 75 | TNTN |
| 345.98 | TNTN |
| 0 | TNTN |
| 28803.07 | TNTN |
| 325 | TNTN |
| 25118 | TNTN |
| 4616.81 | TNTN |

| global_sales | state |
| --- | --- |
| 3075.71 | WY |
| 12696.61 | WY |
| 0 | WY |
| 10519.45 | WY |
| 40405.09 | WY |
| 73.13 | WY |
| 5261.12 | WY |
| 156791.34 | WY |
| 0 | WY |
| 450 | WY |

| global_sales | state |
| --- | --- |
| 0 | MO |
| 5110.16 | PA |
| 0 | MO |
| 0 | PA |
| 0 | MO |
| 670.64 | CA |
| 162621.11 | PA |
| 1684.01 | PA |
| 4117.37 | PA |
| 0 | MO |
| 0 | MO |
| 12786.01 | PA |
| 0 | MO |
| 0 | MO |
| 692287 | CA |
| 4500 | CA |
| 63404 | CA |
| 12590.98 | PA |
| 165100 | MO |
| 663179.12 | CA |
| 947.5 | CA |
| 0 | PA |
| 600 | CA |
| 1569.25 | PA |
| 62.5 | CA |
| 16148.94 | PA |
| 60875 | CA |
| 25197.99 | PA |
| 0 | PA |
| 32.99 | PA |
| 0 | MO |
| 0 | MO |
| 8933.8 | PA |
| 168.8 | PA |
| 548.01 | PA |

| | |
|---|---|
| 744.67 | PA |
| 0 | PA |

| global_sales | state |
| --- | --- |

| global_sales | state |
| --- | --- |
| 174.62 | FL |
| 0 | CT |
| 0 | GA |
| 4807.68 | MD |
| 600 | TX |

| global_sales | state |
|---|---|
| 174.62 | FL |
| 0 | CT |

| firm_sales_x | global_sales_x | loyality_Category | loyality_Per |
|---|---|---|---|
| 174.62 | 174.62 | Less Inclined Brokers | 10.46375 |
| 0 | 0 | Less Inclined Brokers | 10.46375 |
| 0 | 0 | Less Inclined Brokers | 10.46375 |

| | | | |
|---|---|---|---|
| 0 | 30709 | Non-Commited Brokers | 0 |
| 0 | 0 | Less Inclined Brokers | 2.472971 |