

User Complaints Mining

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Preparing data

Load and clean the customer complaints data

The data should be downloaded from Kaggle's Consumer Complaints Database.

Loading and removing rows with no complaint narrative and unnecessary columns:

```
df <- read_csv(file="../data/Consumer_Complaints.csv.zip",col_names = TRUE)
df <- df[,-c(1,7,9:18)]
df <- df[!is.na(df[, "Consumer complaint narrative"]),] #199,970
df <- df[!is.na(df[, "Company"]),] # no NA's
df <- df[!is.na(df[, "Product"]),] # no NA's
df <- df[!is.na(df[, "Issue"]),] # no NA's
df <- df[!is.na(df[, "Sub-product"]),] # 147,788 total left
df <- df[!is.na(df[, "Sub-issue"]),] # 81,940 total left
df
```

```
## # A tibble: 81,940 x 6
##   Product `Sub-product` Issue `Sub-issue` `Consumer complaint n~ Company
##   <chr>    <chr>         <chr> <chr>      <chr>                <chr>
## 1 Debt co~ Other (i.e. ~ Disc~ Not given ~ This company refuses ~ The CB~
## 2 Debt co~ Credit card Impr~ Talked to ~ "This complaint is in~ SQUARE~
## 3 Debt co~ Credit card Taki~ Sued w/o p~ "I am writing to requ~ Selip ~
## 4 Debt co~ Other (i.e. ~ Cont~ Debt resul~ My identity was stole~ Southw~
## 5 Student~ Federal stud~ Can~ Can't get ~ "I was dropped from m~ AES/PH~
## 6 Debt co~ Credit card Disc~ Not given ~ The first communicati~ Blatt,~
## 7 Debt co~ Other (i.e. ~ Comm~ Frequent o~ "My complaint is n't ~ AR Res~
## 8 Debt co~ I do not know Fals~ Attempted ~ In a clearance interv~ SANTAN~
## 9 Student~ Non-federal ~ Can~ Can't temp~ XXXX University, XXXX~ Navien~
## 10 Student~ Non-federal ~ Deal~ Received b~ I had attended XXXX a~ CITIZE~
## # ... with 81,930 more rows
```

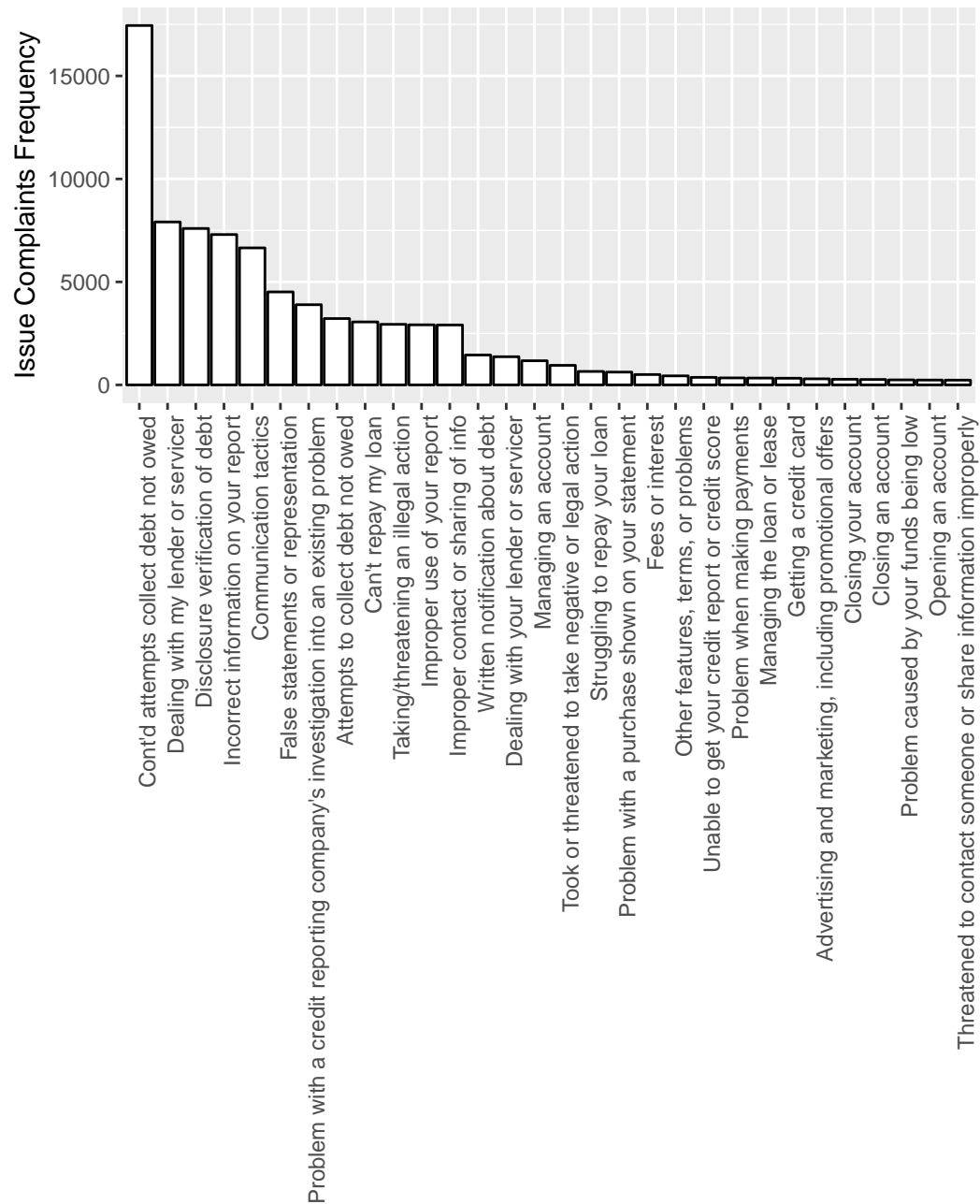
Converting all but narrative columns to factors:

```
df$Product <- as.factor(df$Product)
df$`Sub-product` <- as.factor(df$`Sub-product`)
df$Issue <- as.factor(df$Issue)
df$`Sub-issue` <- as.factor(df$`Sub-issue`)
df$Company <- as.factor(df$Company)
```

Feature engineering

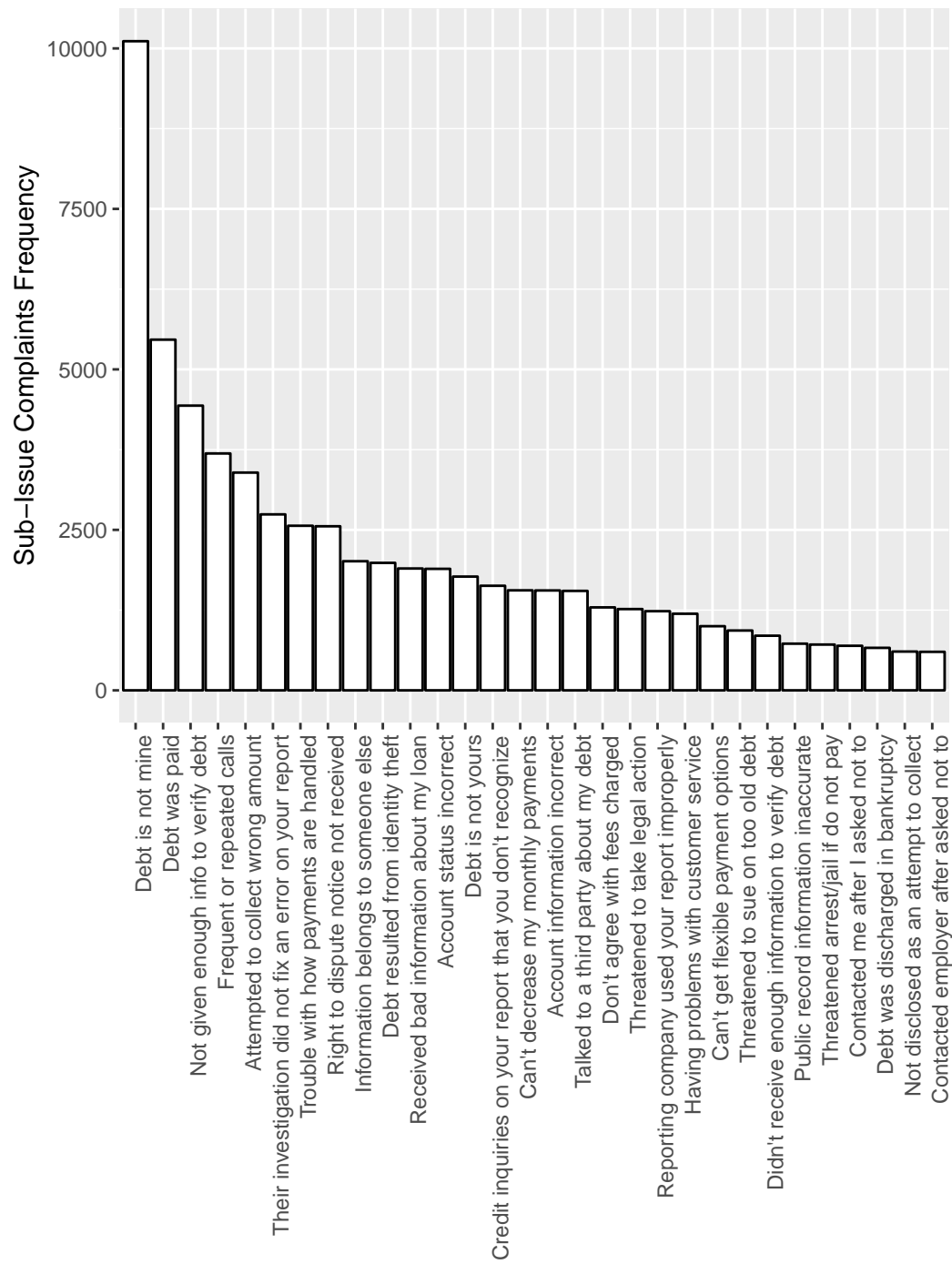
Distribution of the most frequent “Issue” complaints

```
most_freq_issues_list <- levels(fct_infreq(df$Issue))[1:30]
ggplot() + aes(fct_infreq(df[df$Issue %in% most_freq_issues_list,]$Issue)) +
  geom_histogram(colour="black", fill="white", stat = "count") +
  ylab("Issue Complaints Frequency") + xlab("") +
  theme(axis.text.x = element_text(angle = 90, hjust = 1))
```



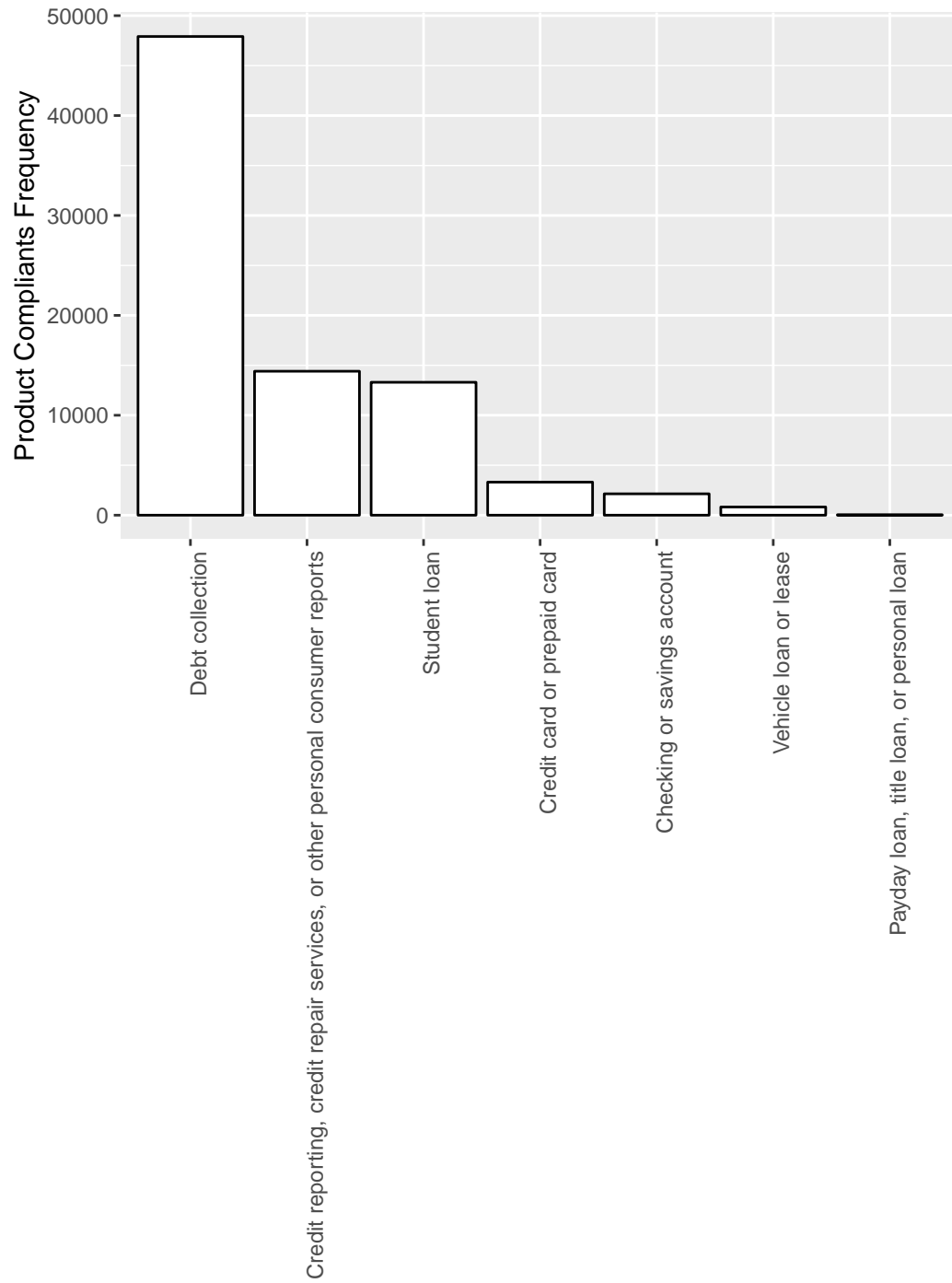
Distribution of the most frequent “Sub-issue” complaints

```
most_freq_subissues_list <- levels(fct_infreq(df$`Sub-issue`))[1:30]
ggplot() + aes(fct_infreq(df[df$`Sub-issue` %in% most_freq_subissues_list,]$`Sub-issue`))+
  geom_histogram(colour="black", fill="white", stat = "count")+
  ylab("Sub-Issue Complaints Frequency") + xlab("")+
  theme(axis.text.x = element_text(angle =90, hjust = 1))
```



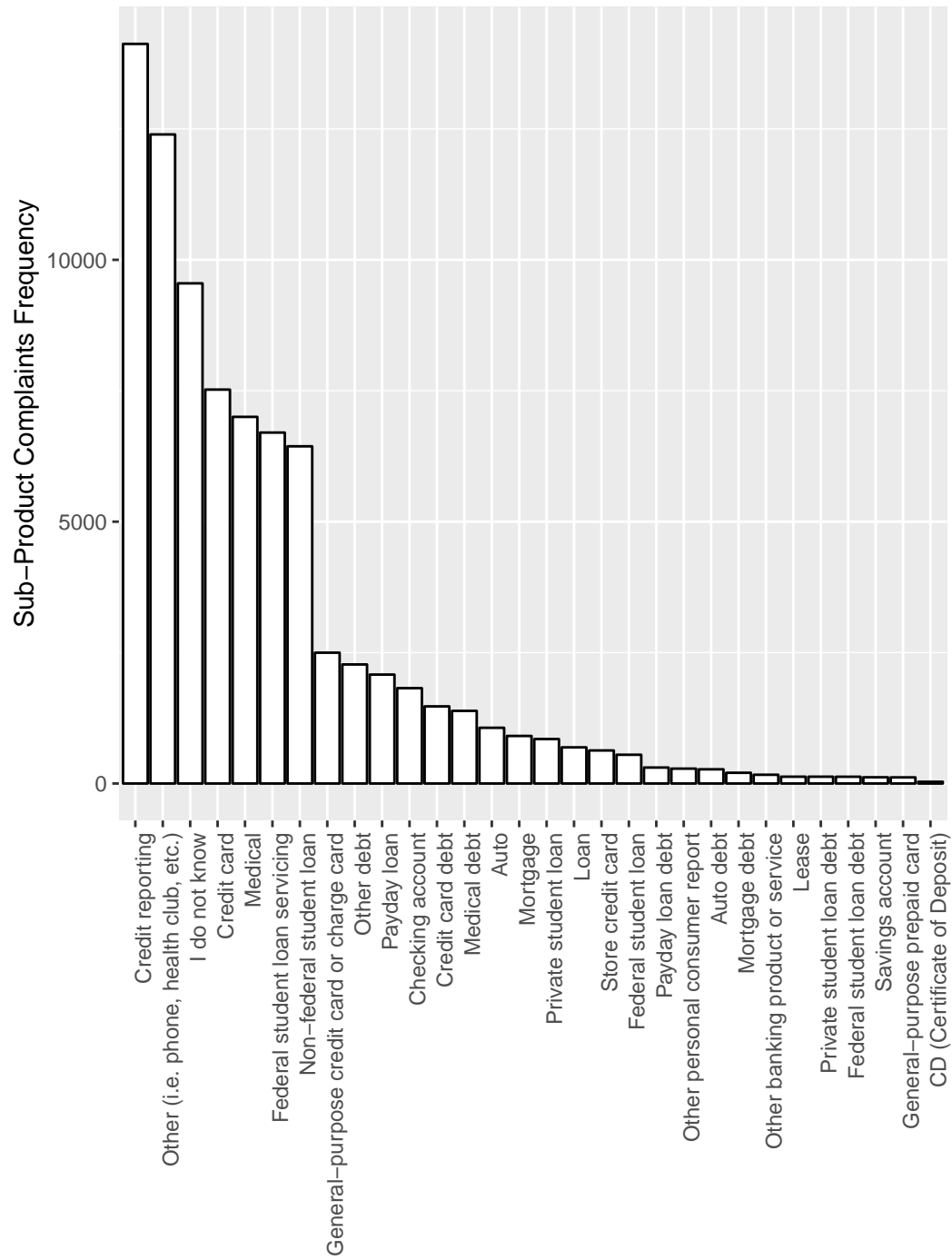
Distribution of the most frequent “Product” complaints

```
most_freq_product_list <- levels(fct_infreq(df$Product))[1:30]
ggplot() + aes(fct_infreq(df[df$Product %in% most_freq_product_list,]$Product))+
  geom_histogram(colour="black", fill="white", stat = "count")+
  ylab("Product Compliants Frequency") + xlab("")+
  theme(axis.text.x = element_text(angle =90, hjust = 1))
```



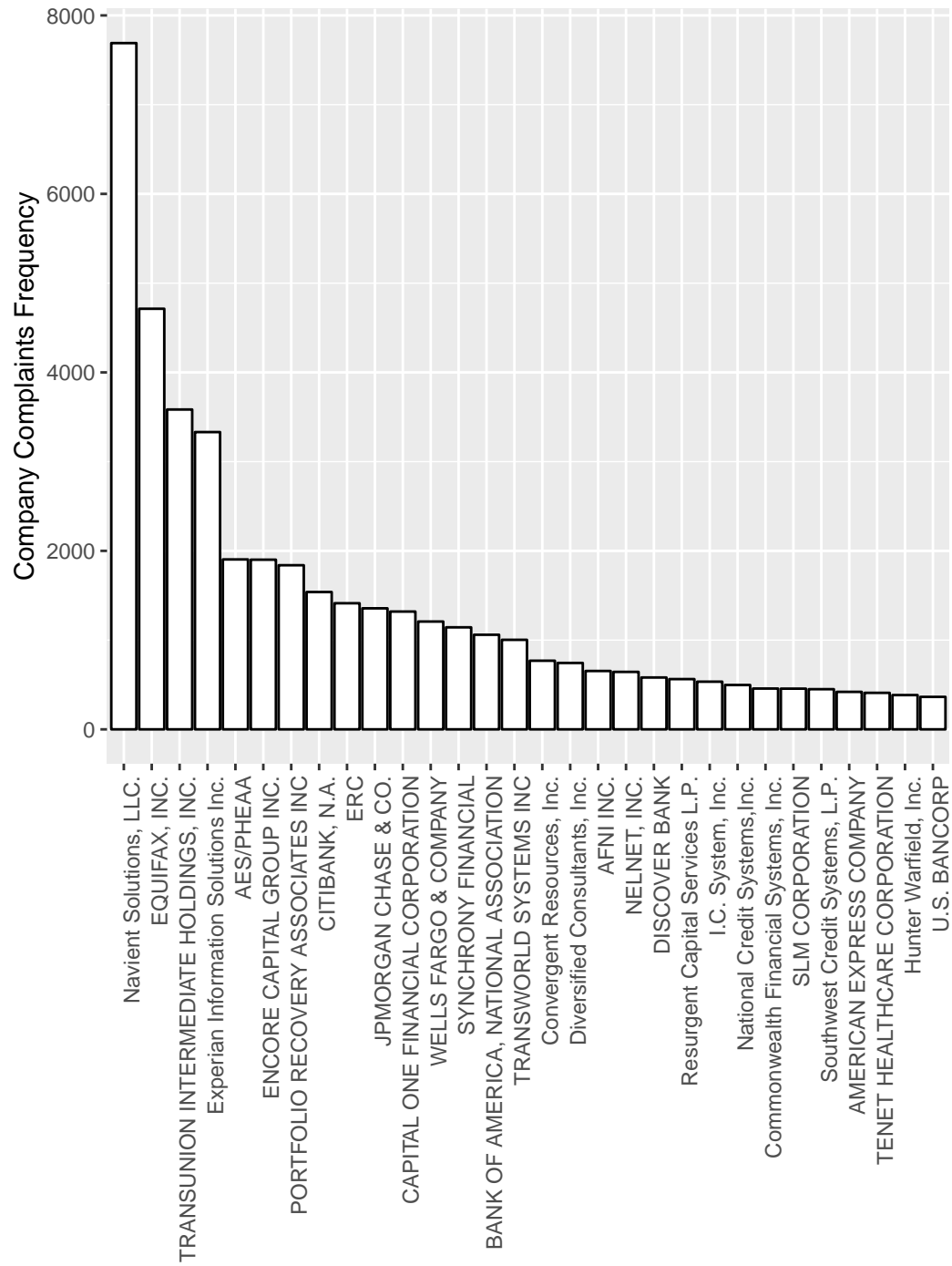
Distribution of the most frequent “Sub-product” complaints

```
most_freq_subproduct_list <- levels(fct_infreq(df$`Sub-product`))[1:30]
ggplot() + aes(fct_infreq(df[df$`Sub-product` %in% most_freq_subproduct_list,]$`Sub-product`))+
  geom_histogram(colour="black", fill="white", stat = "count")+
  ylab("Sub-Product Complaints Frequency") + xlab("")+
  theme(axis.text.x = element_text(angle =90, hjust = 1))
```



Distribution of the most frequent “Company” complaints

```
most_freq_company_list <- levels(fct_infreq(df$Company))[1:30]
ggplot() + aes(fct_infreq(df[df$Company %in% most_freq_company_list,]$Company)) +
  geom_histogram(colour="black", fill="white", stat = "count") +
  ylab("Company Complaints Frequency") + xlab("") +
  theme(axis.text.x = element_text(angle = 90, hjust = 1))
```



Text Minig

Building a corpus, which is a collection of text documents VectorSource specifies that the source is character vectors. After that, the corpus needs a couple of transformations, including changing letters to lower case, removing punctuations/numbers and removing stop words. The general English stop-word list is tailored by adding “available” and “via” and removing “very”.

```
myCorpus <- Corpus(VectorSource(df$`Consumer complaint narrative`))
myCorpus <- tm_map(myCorpus, removePunctuation)
```

```
## Warning in tm_map.SimpleCorpus(myCorpus, removePunctuation): transformation
## drops documents
```

```
myCorpus <- tm_map(myCorpus, removeNumbers)
```

```
## Warning in tm_map.SimpleCorpus(myCorpus, removeNumbers): transformation
## drops documents
```

```
myStopwords <- c(stopwords(language="en", source="smart"), "available", "via", "the")
myCorpus <- tm_map(myCorpus, stripWhitespace)
myCorpus <- tm_map(myCorpus, removeWords, myStopwords)
head(myStopwords, 100)
```

```
## [1] "a"          "a's"        "able"       "about"
## [5] "above"      "according"  "accordingly" "across"
## [9] "actually"   "after"      "afterwards" "again"
## [13] "against"    "ain't"      "all"        "allow"
## [17] "allows"     "almost"     "alone"      "along"
## [21] "already"    "also"       "although"   "always"
## [25] "am"         "among"      "amongst"    "an"
## [29] "and"        "another"    "any"        "anybody"
## [33] "anyhow"     "anyone"     "anything"   "anyway"
## [37] "anyways"    "anywhere"   "apart"      "appear"
## [41] "appreciate" "appropriate" "are"        "aren't"
## [45] "around"     "as"         "aside"      "ask"
## [49] "asking"     "associated" "at"         "available"
## [53] "away"       "awfully"    "b"          "be"
## [57] "became"     "because"    "become"     "becomes"
## [61] "becoming"   "been"       "before"     "beforehand"
## [65] "behind"     "being"      "believe"    "below"
## [69] "beside"     "besides"    "best"       "better"
## [73] "between"    "beyond"     "both"       "brief"
## [77] "but"        "by"         "c"          "c'mon"
## [81] "c's"        "came"       "can"        "can't"
## [85] "cannot"     "cant"       "cause"      "causes"
## [89] "certain"    "certainly"  "changes"    "clearly"
## [93] "co"         "com"        "come"       "comes"
## [97] "concerning" "consequently" "consider"   "considering"
```