Homework 5

Vladislav Zakatov

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This document has been created as part of the fifth homework assignment in Econometrics at CMF.

Initially, the working directory, system locale are set and the required packages are loaded.

```
##### Initialisation #####
setwd("~/CMF/Courses/Applied Financial Econometrics/5. Extreme value theory/Homework 5")
library("evd")
Sys.setlocale("LC_ALL","English")
```

The data from csv file is then loaded into R and the total sum by rows is calculated.

```
##### Loading and processing data #####
data = read.csv("Data/loss_train.csv")
debt = rowSums(data)
T = length(debt)
```

We now set the required confidence levels at 1%, 5%, 10%. We also use the same value for α as we require the same probability for all three levels.

```
##### Set debt levels #####
u = numeric()
alpha = 1-1/1000;
u[1] = sort(debt)[0.99 * T]
u[2] = sort(debt)[0.95 * T]
u[3] = sort(debt)[0.90 * T]
```

Finally, we fit Generalized Pareto distribution and calculate the appropriate levels.

```
##### Fit GPD and find levels #####
result = numeric()
for (i in 1:3)
{
  gpd.fit = fpot(debt,threshold=u[i],model="gpd",method="SANN")
  beta = gpd.fit$estimate[1]
  xi = gpd.fit$estimate[2]
  Fu = gpd.fit$pat
  result[i] = u[i]+beta/xi*(((1-alpha)/Fu)^(-xi)-1)

  print(result)
}
```

```
## [1] 355064.3
## [1] 355064.3 357290.0
## [1] 355064.3 357290.0 359888.5
```