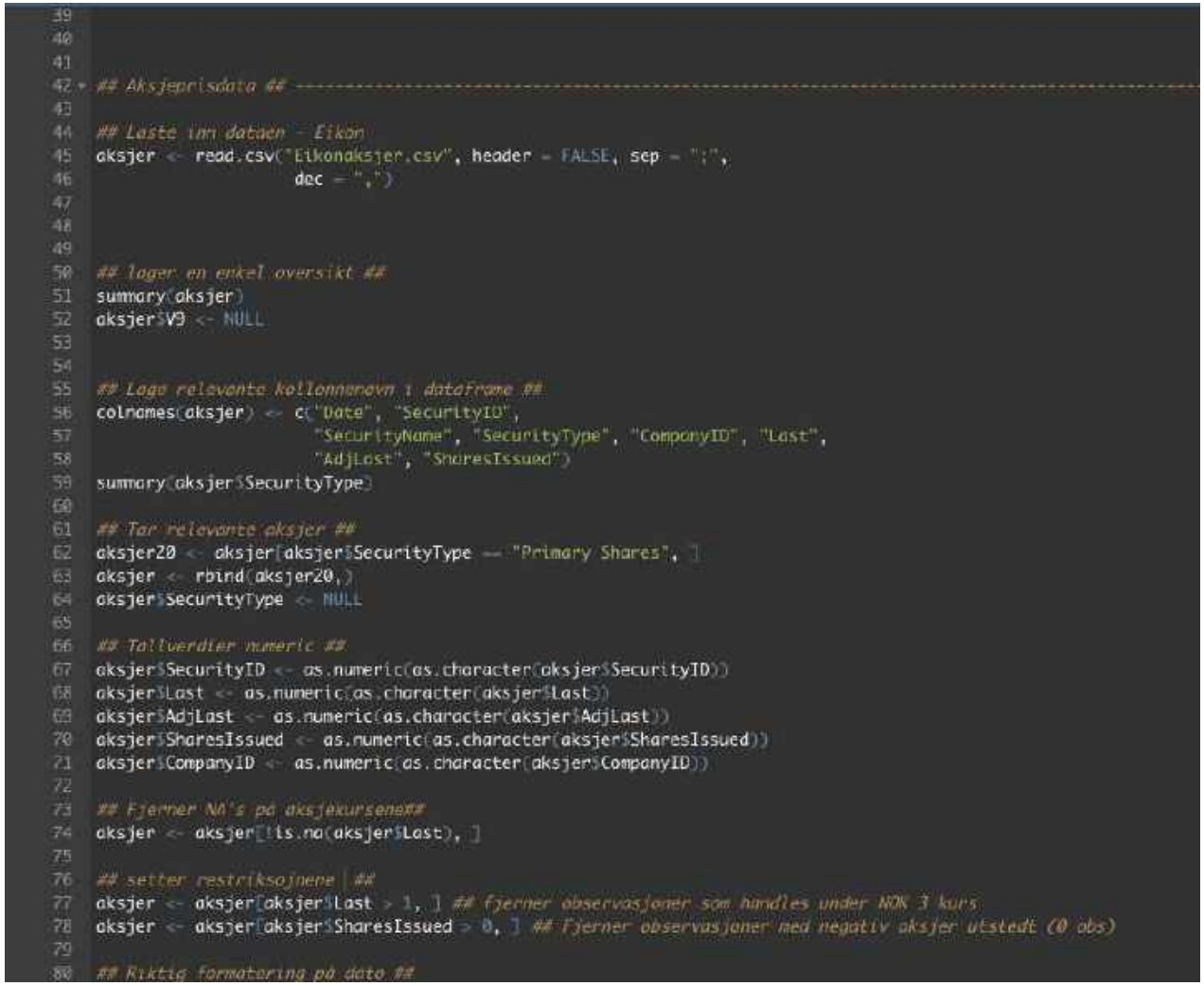
NB!: Jeg fikk ikke lastet opp .R filen, og har derfor brukt bilder slik det kan konventers som en .pdf fil.



```
39
40
41
42  ## Aksjeprisdata ## ----------------------------------------------------------------------------------------
43
44  ## Laste inn dataen - Eikon
45  aksjer <- read.csv("Eikonaksjer.csv", header = FALSE, sep = ";",
46                     dec = ",")
47
48
49
50  ## lager en enkel oversikt ##
51  summary(aksjer)
52  aksjer$V9 <- NULL
53
54
55  ## Lage relevante kolonnenavn i dataframe ##
56  colnames(aksjer) <- c("Date", "SecurityID",
57                        "SecurityName", "SecurityType", "CompanyID", "Last",
58                        "AdjLast", "SharesIssued")
59  summary(aksjer$SecurityType)
60
61  ## Tar relevante aksjer ##
62  aksjer20 <- aksjer[aksjer$SecurityType == "Primary Shares", ]
63  aksjer <- rbind(aksjer20,)
64  aksjer$SecurityType <- NULL
65
66  ## Tallverdier numeric ##
67  aksjer$SecurityID <- as.numeric(as.character(aksjer$SecurityID))
68  aksjer$Last <- as.numeric(as.character(aksjer$Last))
69  aksjer$AdjLast <- as.numeric(as.character(aksjer$AdjLast))
70  aksjer$SharesIssued <- as.numeric(as.character(aksjer$SharesIssued))
71  aksjer$CompanyID <- as.numeric(as.character(aksjer$CompanyID))
72
73  ## Fjerner NA's på aksjekursene##
74  aksjer <- aksjer[!is.na(aksjer$Last), ]
75
76  ## setter restriksojnene | ##
77  aksjer <- aksjer[aksjer$Last > 1, ] ## fjerner observasjoner som handles under NOK 3 kurs
78  aksjer <- aksjer[aksjer$SharesIssued > 0, ] ## fjerner observasjoner med negativ aksjer utstedt (0 obs)
79
80  ## Riktig formatering på dato ##
```

```r
## Fjerner NA's på aksjekursene##
aksjer <- aksjer[!is.na(aksjer$Last), ]

## setter restriksojnene n ##
aksjer <- aksjer[aksjer$Last > 1, ] ## fjerner observasjoner som handles under NOK 3 kurs
aksjer <- aksjer[aksjer$SharesIssued > 0, ] ## Fjerner observasjoner med negativ aksjer utstedt (0 obs)

## Riktig formatering på dato ##
aksjer$Date <- as.Date(aksjer$Date, formate = "%m/%d/%Y")


year <- seq(as.Date("2000-01-01"), as.Date("2020-31-12"), by = "year")
year <- year - 1

aksjer$Date.aux <- cut(aksjer$Date, year, right = T)

aksjer$Date[1]
aksjer$Date.aux[1]

i <- as.numeric(aksjer$Date.aux)
aksjer$Date.aux <- year [i + 1]

aksjer$Date[1:5]
aksjer$Date.aux[1:5]

## finner antall observasjoner per aksjer per år ##
num <- aggregate(aksjer$SecurityID, list(aksjer$Date.aux, aksjer$SecurityID), length)
head(num[num$x > 1, ])

## fjerne dobbelverdier på samme år ##
aksjer <- aksjer[order(aksjer$SecurityID, aksjer$Date), ]
aksjer$row <- 1:nrow(aksjer)
rows <- aggregate(aksjer$row, list(aksjer$Date.aux, aksjer$SecurityID), max)
aksjer <- aksjer[rows$x, ]
aksjer$row <- NULL

## Kun aksjer som handler i slutten av året blir med ##
aksjer$delta.t <- as.numeric(aksjer$Date.aux - aksjer$Date)
summary(aksjer$delta.t)
aksjer <- aksjer[aksjer$delta.t <= 5, ]
aksjer$delta.t <- NULL
```

```r
## dropper dato - og bytter med den nå relevante datoen ##
aksjer$Date <- aksjer$Date.aux
aksjer$Date.aux <- NULL


## Beregne avkastning ##
aksjer$Date.aux2 <- cut(aksjer$Date, year, right = T)

aksjer$Date[1]
aksjer$Date.aux2[1]

i <- as.numeric(aksjer$Date.aux2)
aksjer$Date.aux2 <- year[i + 2]

aksjer$Date[1:5]
aksjer$Date.aux2[1:5]

aksjer <- aksjer[order(aksjer$SecurityID, aksjer$Date.aux2), ]
aksjer$R <- unlist(tapply(aksjer$AdjLast, aksjer$SecurityID,
                          function(v) c(v[-1]/v[-length(v)] - 1, NA)))

aksjer10 <- aksjer[, c("SecurityID","R", "Date.aux2") ]
names(aksjer10) <- c("SecurityID", "R", "Date")

aksjer <- left_join(aksjer, aksjer10, by = c("Date" = "Date", "SecurityID" = "SecurityID"))

aksjer$R.x <- NULL
aksjer$Date.aux2 <- NULL

names(aksjer) <- c("Date", "SecurityID", "SecurityName", "CompanyID", "Last", "AdjLast", "SharesIssued", "R")

## fjerner observasjoner uten avkastningsobservasjoner ##
aksjer <- aksjer[!is.na(aksjer$R), ]

## gjør avkastningen sammenhengende ##
aksjer <- aksjer[order(aksjer$SecurityID, aksjer$Date), ]
aksjer$delta.t <- unlist(tapply(aksjer$Date, list(aksjer$SecurityID),
                                function(v) c(as.numeric(diff(v)), NA)))

```

```r
summary(aksjer$delta.t)
summary(aksjer$R)

aksjer <- aksjer[!is.na(aksjer$delta.t), ]
aksjer <- aksjer[aksjer$delta.t <= 31, ]
aksjer$delta.t <- NULL
nrow(aksjer)


## Winsorientere avkastningen på 1 og 99 prosentilen ##
aksjer$R <- squish(aksjer$R, quantile(aksjer$R, c(.01, .99)))
summary(aksjer$R)

## finner markedsverdien til hver aksje ##
aksjer$MarketCap <- aksjer$Last * aksjer$SharesIssued/1e+03 ## deler på 1000 for å ha tilsvarende betegnelse som regnskapsdataen

## fjerner observasjoner med markedsverdi under NOK 1 000 000 #
aksjer <- aksjer[aksjer$MarketCap > "1000", ]

## filtrerign og restriskjoner av datasettene ####
## Merge dataen til en df ##
databehandling1 <- rbind(aksjer)
nrow(databehandling1)


## oversikt ##
summary(databehandling1)

databehandling1$V9 <- NULL

head(databehandling1)

## Riktig formatering på dato ##

databehandling1$Date <- as.Date(databehandling1$Date, formate = "%m/%d/%Y")

## Fjerne NA samt legge til restriksjoner ##

```

```r
## Fjerne NA samt legge til restriksjoner ##

databehandling20 <- databehandling2[databehandling2$SecurityType == "Primary Shares", ]

databehandling3 <- rbind(databehandling20, databehandling21)
databehandling10 <- rbind(databehandling20, databehandling21)
databehandling15 <- rbind(databehandling20, databehandling21)

databehandling15$SecurityID <- as.numeric(as.character(databehandling10$SecurityID))
databehandling15$Last <- as.numeric(as.character(databehandling10$Last))
databehandling15$AdjLast <- as.numeric(as.character(databehandling10$AdjLast))
databehandling15$SharesIssued <- as.numeric(as.character(databehandling10$SharesIssued))
databehandling15$CompanyID <- as.numeric(as.character(databehandling10$CompanyID))

databehandling10$SecurityID <- as.numeric(as.character(databehandling10$SecurityID))
databehandling10$Last <- as.numeric(as.character(databehandling10$Last))
databehandling10$AdjLast <- as.numeric(as.character(databehandling10$AdjLast))
databehandling10$SharesIssued <- as.numeric(as.character(databehandling10$SharesIssued))
databehandling10$CompanyID <- as.numeric(as.character(databehandling10$CompanyID))

unique(databehandling10$SecurityID) #791 ## antall aksjer
databehandling16 <- databehandling10[databehandling10$SharesIssued == "0", ] # Antall observasjoner med 0 i markedsverdi

## Illustrasjonstabell med nøkkeltall vist i databehandlingsseksjonen ##
overssiktstabell_nøkkeltall_prefilter <- databehandling10 %>%
  select("AdjLast","SharesIssued", "Last") %>%
  describe( ., na.rm = TRUE, skew = FALSE, quant = c(0.25,0.75))

databehandling11 <- databehandling10
databehandling11 <- databehandling3[databehandling11$Last > 10, ] ## hvor mange aksjer vi mister med andre kriterier
databehandling3$SecurityType <- NULL


## Må ha tallverdier numeric ##
databehandling3$SecurityID <- as.numeric(as.character(databehandling3$SecurityID))
databehandling3$Last <- as.numeric(as.character(databehandling3$Last))
databehandling3$AdjLast <- as.numeric(as.character(databehandling3$AdjLast))
databehandling3$SharesIssued <- as.numeric(as.character(databehandling3$SharesIssued))
databehandling3$CompanyID <- as.numeric(as.character(databehandling3$CompanyID))

```

```r
## Fjerner NA's på aksjeprisene ##
databehandling3 <- databehandling3[!is.na(databehandling3$Last), ]
databehandling3 <- databehandling3[!is.na(databehandling3$AdjLast), ] ## Fjerner alle observasjoner


## Restriksjoner ##
databehandling3 <- databehandling3[databehandling3$Last > 1, ]   ##hvor mange observasjoner som forsvinner av restriksjonen
databehandling3 <- databehandling3[databehandling3$SharesIssued > 0, ]



## Rullerende observasjoner ##
year <- seq(as.Date("2000-01-01"), as.Date("2020-01-01"), by = "year")
year <- year - 1

databehandling3$Date.aux <- cut(databehandling3$Date, year, right = T)

databehandling3$Date[1]
databehandling3$Date.aux[1]

i <- as.numeric(databehandling3$Date.aux)
databehandling3$Date.aux <- year[i + 1]

databehandling3$Date[1:5]
databehandling3$Date.aux[1:5]

## sjekke antall observasjoner per aksjer per år ##
num <- aggregate(databehandling3$SecurityID, list(databehandling3$Date.aux, databehandling3$SecurityID), length)

num1 <- (num[num$x > 1, ])
head(num[num$x > 1, ])


## fjerne dobbelverdier på samme år ##

databehandling3 <- databehandling3[order(databehandling3$SecurityID, databehandling3$Date), ]
databehandling3$row <- 1:nrow(databehandling3)
rows <- aggregate(databehandling3$row, list(databehandling3$Date.aux, databehandling3$SecurityID), max)
databehandling3 <- databehandling3[rows$x, ]
```

```r
databehandling3$row <- NULL

## Kun aksjer som handler i slutten av måneden blir med ##
databehandling3$delta.t <- as.numeric(databehandling3$Date.aux - databehandling3$Date)
summary(databehandling3$delta.t)

databehandling3 <- databehandling3[databehandling3$delta.t <= 5, ]
databehandling3$delta.t <- NULL

## dropper dato - og bytter med den nå relevante datoen ##

databehandling3$Date <- databehandling3$Date.aux
databehandling3$Date.aux <- NULL


## Beregne avkastning ##
databehandling3$Date.aux2 <- cut(databehandling3$Date, year, right = T)

databehandling3$Date[1]
databehandling3$Date.aux2[1]

i <- as.numeric(databehandling3$Date.aux2)
databehandling3$Date.aux2 <- year[i + 2]

databehandling3$Date[1:5]
databehandling3$Date.aux2[1:5]

databehandling3 <- databehandling3[order(databehandling3$SecurityID, databehandling3$Date.aux2), ]
databehandling3$R <- unlist(tapply(databehandling3$AdjLast, databehandling3$SecurityID,
                                   function(v) c(v[-1]/v[-length(v)] - 1, NA)))

aksjer1000 <- databehandling3[, c("SecurityID","R", "Date.aux2") ]
names(aksjer1000) <- c("SecurityID", "R", "Date")

databehandling3 <- left_join(databehandling3, aksjer1000, by = c("Date" = "Date", "SecurityID" = "SecurityID"))
```

```r
databehandling3$R.x <- NULL
databehandling3$Date.auxZ <- NULL

names(databehandling3) <- c("Date", "SecurityID", "SecurityName", "CompanyID", "Last", "AdjLast", "SharesIssued", "R")

## Hvor mange observasjoner som forsvinner når jeg fjerner de uten avkastningsdata
databehandling3 <- databehandling3[!is.na(databehandling3$R), ]


## Sørger for at avkastningen er kontinuerlig ##
databehandling3 <- databehandling3[order(databehandling3$SecurityID, databehandling3$Date), ]
databehandling3$delta.t <- unlist(tapply(databehandling3$Date, list(databehandling3$SecurityID),
                                         function(v) c(as.numeric(diff(v)), NA)))


## Hvor mange observasjoner som forsvinner når jeg fjerner de uten avkastningsdata
summary(databehandling3$delta.t)
summary(databehandling3$R)


## Hvor mange observasjoner som forsvinner når jeg fjerner de uten avkastningsdata
databehandling3 <- databehandling3[!is.na(databehandling3$delta.t), ]
databehandling3 <- databehandling3[databehandling3$delta.t <= 31, ]
databehandling3$delta.t <- NULL
nrow(databehandling3)

databehandling12 <- databehandling3


## bruker unadjusted pga det allerede ligger i shares issued##
## Beregner markedsverdien til aksjene ##
databehandling3$MarketCap <- databehandling3$Last * databehandling3$SharesIssued/1e+03

## se hvor mange observasjoner som forsvinner, setter minimum markedsverdikravet ##
databehandling3 <- databehandling3[databehandling3$MarketCap > "1000", ]



summary(databehandling3$R)
summary(databehandling3$MarketCap)

```

```r

## Lager oversiktstabell for nøkkeltall på avkastning og markedsverdi som vist i databehandlingsseksjonen ##
overssiktstabell_nøkkeltall_prefilter1 <- databehandling3 %>%
  select("R","MarketCap") %>%
  describe( ., na.rm = TRUE, skew = FALSE, quant = c(0.25,0.75))



## Winsorientere avkastningen på 1 og 99 prosentilen ##
databehandling3$R <- squish(databehandling3$R, quantile(databehandling3$R, c(.01, .99)))
summary(databehandling3$R)


## Viser endring av at vi winsoriensierer dataen ##
summary_statistics_postfilter_yearly <- databehandling3 %>%
  select("AdjLast","SharesIssued", "R") %>%
  describe( ., na.rm = TRUE, skew = FALSE, quant = c(0.25,0.75))


### Regnskapsdata filtrering ###

r2_2000 <- r_2000[, c("orgnr","aar" ,"P_B")]
r2_2001 <- r_2001[, c("orgnr","aar" ,"P_B")]
r2_2002 <- r_2002[, c("orgnr","aar" ,"P_B")]
r2_2003 <- r_2003[, c("orgnr","aar" ,"P_B")]
r2_2004 <- r_2004[, c("orgnr","aar" ,"P_B")]
r2_2005 <- r_2005[, c("orgnr","aar" ,"P_B")]
r2_2006 <- r_2006[, c("orgnr","aar" ,"P_B")]
r2_2007 <- r_2007[, c("orgnr","aar" ,"P_B")]
r2_2008 <- r_2008[, c("orgnr","aar" ,"P_B")]
r2_2009 <- r_2009[, c("orgnr","aar" ,"P_B")]
r2_2010 <- r_2010[, c("orgnr","aar" ,"P_B")]
r2_2011 <- r_2011[, c("orgnr","aar" ,"P_B")]
r2_2012 <- r_2012[, c("orgnr","aar" ,"P_B")]
r2_2013 <- r_2013[, c("orgnr","aar" ,"P_B")]
r2_2014 <- r_2014[, c("orgnr","aar" ,"P_B")]
r2_2015 <- r_2015[, c("orgnr","aar" ,"P_B")]
r2_2016 <- r_2016[, c("orgnr","aar" ,"P_B")]
r2_2017 <- r_2017[, c("orgnr","aar" ,"P_B")]
r2_2018 <- r_2018[, c("orgnr","aar" ,"P_B")]
r2_2019 <- r_2019[, c("orgnr","aar" ,"P_B")]
r2_2020 <- r_2020[, c("orgnr","aar" ,"P_B")]
```

```r
regnskapsdatautvalg <- rbind(r2_2000, r2_2001, r2_2002, r2_2003, r2_2004, r2_2005, r2_2006
                             ,r2_2007, r2_2008, r2_2009, r2_2010, r2_2011, r2_2012, r2_2013, r2_2014, r2_2015
                             ,r2_2016, r2_2017, r2_2018,r2_2019, r2_2020,)

##  fjerner de med negativ P/B ##
regnskapsdatautvalg <- regnskapsdatautvalg[c(regnskapsdatautvalg$P_B > 0), ]


#  fjerner observasjoner med P/B over 15 ##
regnskapsdatautvalg <- regnskapsdatautvalg[c(regnskapsdatautvalg$P_B < 15), ]


# hvor mange aksjer i utvalget ettersom jeg gjennomfører stegvis filtrering av datasettet ##
lapply(databehandling15, class)

databehandling1$Date <- as.Date(databehandling1$Date, formate = "%m/%d/%Y")

databehandling15 <- databehandling15 %>%
  dplyr::mutate(year = lubridate::year(Date),
                year = lubridate::year(Date),
                day = lubridate::day(Date))


## antall aksjer i datasettet
aksjer_2000_1 <- databehandling15[databehandling15$year == "2000", ]
aksjer_2001_1 <- databehandling15[databehandling15$year == "2001", ]
aksjer_2002_1 <- databehandling15[databehandling15$year == "2002", ]
aksjer_2003_1 <- databehandling15[databehandling15$year == "2003", ]
aksjer_2004_1 <- databehandling15[databehandling15$year == "2004", ]
aksjer_2005_1 <- databehandling15[databehandling15$year == "2005", ]
aksjer_2006_1 <- databehandling15[databehandling15$year == "2006", ]
aksjer_2007_1 <- databehandling15[databehandling15$year == "2007", ]
aksjer_2008_1 <- databehandling15[databehandling15$year == "2008", ]
aksjer_2009_1 <- databehandling15[databehandling15$year == "2009", ]
aksjer_2010_1 <- databehandling15[databehandling15$year == "2010", ]
aksjer_2011_1 <- databehandling15[databehandling15$year == "2011", ]
aksjer_2012_1 <- databehandling15[databehandling15$year == "2012", ]
aksjer_2013_1 <- databehandling15[databehandling15$year == "2013", ]
aksjer_2014_1 <- databehandling15[databehandling15$year == "2014", ]
aksjer_2015_1 <- databehandling15[databehandling15$year == "2015", ]
```

```r
aksjer_2016_1 <- databehandling15[databehandling15$year == "2016", ]
aksjer_2017_1 <- databehandling15[databehandling15$year == "2017", ]
aksjer_2018_1 <- databehandling15[databehandling15$year == "2018", ]
aksjer_2019_1 <- databehandling15[databehandling15$year == "2019", ]
aksjer_2020_1 <- databehandling15[databehandling15$year == "2020", ]


antallaks <- unique(aksjer_2000_1$SecurityID)
antallaks <- unique(aksjer_2001_1$SecurityID)
antallaks <- unique(aksjer_2002_1$SecurityID)
antallaks <- unique(aksjer_2003_1$SecurityID)
antallaks <- unique(aksjer_2004_1$SecurityID)
antallaks <- unique(aksjer_2005_1$SecurityID)
antallaks <- unique(aksjer_2006_1$SecurityID)
antallaks <- unique(aksjer_2007_1$SecurityID)
antallaks <- unique(aksjer_2008_1$SecurityID)
antallaks <- unique(aksjer_2009_1$SecurityID)
antallaks <- unique(aksjer_2010_1$SecurityID)
antallaks <- unique(aksjer_2011_1$SecurityID)
antallaks <- unique(aksjer_2012_1$SecurityID)
antallaks <- unique(aksjer_2013_1$SecurityID)
antallaks <- unique(aksjer_2014_1$SecurityID)
antallaks <- unique(aksjer_2015_1$SecurityID)
antallaks <- unique(aksjer_2016_1$SecurityID)
antallaks <- unique(aksjer_2017_1$SecurityID)
antallaks <- unique(aksjer_2018_1$SecurityID)
antallaks <- unique(aksjer_2019_1$SecurityID)
antallaks <- unique(aksjer_2020_1$SecurityID)



### Kursdata-filtrering ##

databehandling10 <- databehandling10[!is.na(databehandling10$AdjLast), ]

databehandling10 <- databehandling10 %>%
  dplyr::mutate(year = lubridate::year(Date),
                year = lubridate::year(Date),
                day = lubridate::day(Date))
```

```r

aksjer_2000_2 <- databehandling10[databehandling10$year == "2000", ]
aksjer_2001_2 <- databehandling10[databehandling10$year == "2001", ]
aksjer_2002_2 <- databehandling10[databehandling10$year == "2002", ]
aksjer_2003_2 <- databehandling10[databehandling10$year == "2003", ]
aksjer_2004_2 <- databehandling10[databehandling10$year == "2004", ]
aksjer_2005_2 <- databehandling10[databehandling10$year == "2005", ]
aksjer_2006_2 <- databehandling10[databehandling10$year == "2006", ]
aksjer_2007_2 <- databehandling10[databehandling10$year == "2007", ]
aksjer_2008_2 <- databehandling10[databehandling10$year == "2008", ]
aksjer_2009_2 <- databehandling10[databehandling10$year == "2009", ]
aksjer_2010_2 <- databehandling10[databehandling10$year == "2010", ]
aksjer_2011_2 <- databehandling10[databehandling10$year == "2011", ]
aksjer_2012_2 <- databehandling10[databehandling10$year == "2012", ]
aksjer_2013_2 <- databehandling10[databehandling10$year == "2013", ]
aksjer_2014_2 <- databehandling10[databehandling10$year == "2014", ]
aksjer_2015_2 <- databehandling10[databehandling10$year == "2015", ]
aksjer_2016_2 <- databehandling10[databehandling10$year == "2016", ]
aksjer_2017_2 <- databehandling10[databehandling10$year == "2017", ]
aksjer_2018_2 <- databehandling10[databehandling10$year == "2018", ]
aksjer_2019_2 <- databehandling10[databehandling10$year == "2019", ]
aksjer_2020_2 <- databehandling10[databehandling10$year == "2020", ]

antallaks <- unique(aksjer_2000_2$SecurityID)
antallaks <- unique(aksjer_2001_2$SecurityID)
antallaks <- unique(aksjer_2002_2$SecurityID)
antallaks <- unique(aksjer_2003_2$SecurityID)
antallaks <- unique(aksjer_2004_2$SecurityID)
antallaks <- unique(aksjer_2005_2$SecurityID)
antallaks <- unique(aksjer_2006_2$SecurityID)
antallaks <- unique(aksjer_2007_2$SecurityID)
antallaks <- unique(aksjer_2008_2$SecurityID)
antallaks <- unique(aksjer_2009_2$SecurityID)
antallaks <- unique(aksjer_2010_2$SecurityID)
antallaks <- unique(aksjer_2011_2$SecurityID)
antallaks <- unique(aksjer_2012_2$SecurityID)
antallaks <- unique(aksjer_2013_2$SecurityID)
antallaks <- unique(aksjer_2014_2$SecurityID)
antallaks <- unique(aksjer_2015_2$SecurityID)
antallaks <- unique(aksjer_2016_2$SecurityID)
```

```r
antallaks <- unique(aksjer_2016_2$SecurityID)
antallaks <- unique(aksjer_2017_2$SecurityID)
antallaks <- unique(aksjer_2018_2$SecurityID)
antallaks <- unique(aksjer_2019_2$SecurityID)
antallaks <- unique(aksjer_2020_2$SecurityID)


## Kurs over 3kr - filtrering ##

databehandling10 <- databehandling10[databehandling10$Last > 3, ]

aksjer_2000_2 <- databehandling10[databehandling10$year == "2000", ]
aksjer_2001_2 <- databehandling10[databehandling10$year == "2001", ]
aksjer_2002_2 <- databehandling10[databehandling10$year == "2002", ]
aksjer_2003_2 <- databehandling10[databehandling10$year == "2003", ]
aksjer_2004_2 <- databehandling10[databehandling10$year == "2004", ]
aksjer_2005_2 <- databehandling10[databehandling10$year == "2005", ]
aksjer_2006_2 <- databehandling10[databehandling10$year == "2006", ]
aksjer_2007_2 <- databehandling10[databehandling10$year == "2007", ]
aksjer_2008_2 <- databehandling10[databehandling10$year == "2008", ]
aksjer_2009_2 <- databehandling10[databehandling10$year == "2009", ]
aksjer_2010_2 <- databehandling10[databehandling10$year == "2010", ]
aksjer_2011_2 <- databehandling10[databehandling10$year == "2011", ]
aksjer_2012_2 <- databehandling10[databehandling10$year == "2012", ]
aksjer_2013_2 <- databehandling10[databehandling10$year == "2013", ]
aksjer_2014_2 <- databehandling10[databehandling10$year == "2014", ]
aksjer_2015_2 <- databehandling10[databehandling10$year == "2015", ]
aksjer_2016_2 <- databehandling10[databehandling10$year == "2016", ]
aksjer_2017_2 <- databehandling10[databehandling10$year == "2017", ]
aksjer_2018_2 <- databehandling10[databehandling10$year == "2018", ]
aksjer_2019_2 <- databehandling10[databehandling10$year == "2019", ]
aksjer_2020_2 <- databehandling10[databehandling10$year == "2020", ]

```

```r
antallaks <- unique(aksjer_2000_2$SecurityID)
antallaks <- unique(aksjer_2001_2$SecurityID)
antallaks <- unique(aksjer_2002_2$SecurityID)
antallaks <- unique(aksjer_2003_2$SecurityID)
antallaks <- unique(aksjer_2004_2$SecurityID)
antallaks <- unique(aksjer_2005_2$SecurityID)
antallaks <- unique(aksjer_2006_2$SecurityID)
antallaks <- unique(aksjer_2007_2$SecurityID)
antallaks <- unique(aksjer_2008_2$SecurityID)
antallaks <- unique(aksjer_2009_2$SecurityID)
antallaks <- unique(aksjer_2010_2$SecurityID)
antallaks <- unique(aksjer_2011_2$SecurityID)
antallaks <- unique(aksjer_2012_2$SecurityID)
antallaks <- unique(aksjer_2013_2$SecurityID)
antallaks <- unique(aksjer_2014_2$SecurityID)
antallaks <- unique(aksjer_2015_2$SecurityID)
antallaks <- unique(aksjer_2016_2$SecurityID)
antallaks <- unique(aksjer_2017_2$SecurityID)
antallaks <- unique(aksjer_2018_2$SecurityID)
antallaks <- unique(aksjer_2019_2$SecurityID)
antallaks <- unique(aksjer_2020_2$SecurityID)

databehandling12 <- databehandling12 %>%
  dplyr::mutate(year = lubridate::year(Date),
                year = lubridate::year(Date),
                day = lubridate::day(Date))



## Regnskapsdata - filtrering ##

aksjer_2000_3 <- utvalg41[utvalg41$aar == "2000", ]
aksjer_2001_3 <- utvalg41[utvalg41$aar == "2001", ]
aksjer_2002_3 <- utvalg41[utvalg41$aar == "2002", ]
aksjer_2003_3 <- utvalg41[utvalg41$aar == "2003", ]
aksjer_2004_3 <- utvalg41[utvalg41$aar == "2004", ]
aksjer_2005_3 <- utvalg41[utvalg41$aar == "2005", ]
aksjer_2006_3 <- utvalg41[utvalg41$aar == "2006", ]
aksjer_2007_3 <- utvalg41[utvalg41$aar == "2007", ]
aksjer_2008_3 <- utvalg41[utvalg41$aar == "2008", ]
aksjer_2009_3 <- utvalg41[utvalg41$aar == "2009", ]
```

```r
aksjer_2009_3 <- utvalg41[utvalg41$aar == "2009", ]
aksjer_2010_3 <- utvalg41[utvalg41$aar == "2010", ]
aksjer_2011_3 <- utvalg41[utvalg41$aar == "2011", ]
aksjer_2012_3 <- utvalg41[utvalg41$aar == "2012", ]
aksjer_2013_3 <- utvalg41[utvalg41$aar == "2013", ]
aksjer_2014_3 <- utvalg41[utvalg41$aar == "2014", ]
aksjer_2015_3 <- utvalg41[utvalg41$aar == "2015", ]
aksjer_2016_3 <- utvalg41[utvalg41$aar == "2016", ]
aksjer_2017_3 <- utvalg41[utvalg41$aar == "2017", ]
aksjer_2018_3 <- utvalg41[utvalg41$aar == "2018", ]
aksjer_2019_3 <- utvalg41[utvalg41$aar == "2019", ]
aksjer_2020_3 <- utvalg41[utvalg41$aar == "2020", ]


antallaks <- unique(aksjer_2000_3$orgnr)
antallaks <- unique(aksjer_2001_3$orgnr)
antallaks <- unique(aksjer_2002_3$orgnr)
antallaks <- unique(aksjer_2003_3$orgnr)
antallaks <- unique(aksjer_2004_3$orgnr)
antallaks <- unique(aksjer_2005_3$orgnr)
antallaks <- unique(aksjer_2006_3$orgnr)
antallaks <- unique(aksjer_2007_3$orgnr)
antallaks <- unique(aksjer_2008_3$orgnr)
antallaks <- unique(aksjer_2009_3$orgnr)
antallaks <- unique(aksjer_2010_3$orgnr)
antallaks <- unique(aksjer_2011_3$orgnr)
antallaks <- unique(aksjer_2012_3$orgnr)
antallaks <- unique(aksjer_2013_3$orgnr)
antallaks <- unique(aksjer_2014_3$orgnr)
antallaks <- unique(aksjer_2015_3$orgnr)
antallaks <- unique(aksjer_2016_3$orgnr)
antallaks <- unique(aksjer_2017_3$orgnr)
antallaks <- unique(aksjer_2018_3$orgnr)
antallaks <- unique(aksjer_2019_3$orgnr)
antallaks <- unique(aksjer_2020_3$orgnr)
```

```r
## Henter Risikofritt aktivum - NIBOR-renten ##
df2 <- read.csv("NIBOR-2000-2012.csv", skip = 6, header = TRUE, sep =";", dec = ",")
df2 <- df2[, c(1, 5)]
names(df2) <- c("Date", "rf")
df2 <- df2[!is.na(df2$rf), ]
Year <- seq(as.Date("1986-01-01"), as.Date("2013-12-01"), by = "1 year")
year <- year - 1
df2$Date <-year

head(year)

## year
year <- rev(year)
head(year)

df2$Date <- year
df2 <- df2[order(df2$Date), ]
df2$rf <- df2$rf/100


## Neste periode ##
df3 <- read.csv("NIBOR-2013-2020-SSB.csv", skip = 0, header = FALSE, sep =";", dec = ",")
names(df3) <- c("Date", "rf")
head(df3)


Year <- seq(as.Date("2013-01-01"), as.Date("2020-31-01"), by = "1 year")
year <- year - 1
df3$Date <- year

df3$rf <- df3$rf/100

range(df2$Date)
range(df3$Date)


## Setter sammen aksjedata og risikofritt aktivum og beregner meravkastning ##
aksjer <- merge(aksjer, rf, by = "Date")
aksjer$R2 <- aksjer$R - aksjer$rf

```

```r
## Setter sammen aksjedata og risikofritt aktivum og beregner meravkastning ##
aksjer <- merge(aksjer, rf, by = "Date")
aksjer$R2 <- aksjer$R - aksjer$rf



## Betautregning ##

## betaberegningen i henhold til orginale studiet  - lager aksjer til long format og fører over ##
write.csv(aksjer, file = "Betaut")
betautregning1 <- read_excel("betaut1.xlsx", sheet = "beta")

beta.long <- melt(betautregning1, id.vars = "Date")
names(beta.long) <- c("Date", "SecurityID", "beta")
summary(beta.long)

## fjerner verdier uten Beta #
beta.long <- beta.long[!is.na(beta.long$beta), ]
summary(beta.long$beta)

## tilpasser dataframen til R #

beta.long$SecurityID<- gsub('R.', '', beta.long$SecurityID)
lapply(beta.long, class)

beta.long$Date <- as.Date(beta.long$Date, formate = "%m/%d/%Y") ## korrekt klasse på df
beta.long$SecurityID <- as.numeric(beta.long$SecurityID)
summary(beta.long)


## her lager jeg  en dataframe for å kunne lage en representativ markedsverdi og beta i utregningen av de individuelle kvalitetsmålene ##
r2 <- aksjer[ , c(1,2,3,4,9)]
abc <- format(r2, format="%Y")
r2 <- transform(r2, aar = abc)
head(r2)

r1 <- r2[, c(1,2,3,4,5,6)]
head(r1)

```

```r

colnames(r1) <- c("Date","SecurityID", "SecurityName", "CompanyID", "MarketCap", "aar")
head(r1)

orgnrcom <- read_excel("OrgCom.xlsx") ## er for å kombinere aksje unike id-en til aksje og regnskapsdataen
orgnrcom <- orgnrcom[!is.na(orgnrcom$OrgNumber),]

orgnrcom <- read.csv("orgnrCom.csv.csv", header = T)
colnames(orgnrcom) <- c("CompanyID", "orgnr") ## orgnr er unik selskapsid for regnskapsdata og CompanyID er for aksjeprisdataen
head(orgnrcom)

r1 <- left_join(r1, orgnrcom, by = c("CompanyID" = "CompanyID")) ## merger de sammen

head(r1)
sapply(r1, class)
r1$aar <- as.integer(r1$aar) ## lager til riktig klasse

## Tilpasse betaverdiene til regnskapstallene##
r1 <- left_join(r1, beta.long, by = c("SecurityID" = "SecurityID", "Date" = "Date"))
summary(r1$beta)

## finner Årlig beta-tall som skal brukes i enkelte av de individuelle kvalitetsmålene ##
beta1 <- aggregate(beta ~ aar + CompanyID, r1, mean)

r1$aar <- as.numeric(r1$aar)
beta1$aar <- as.numeric(beta1$aar)
beta1 <- left_join(beta1, r1[ c("orgnr", "aar", "CompanyID")], by = c("aar" = "aar", "CompanyID" = "CompanyID"))
summary(beta1$beta)
head(beta1)
beta1$CompanyID <- NULL


## fjerner årlige duplikater og etterlater bare 1 årlig verdi som brukes i de individuelle kvalitetsmål##
beta1 <- beta1[!duplicated(beta1[c('aar', 'orgnr')]),]

## beta rangeres synkende ##
beta1$beta <- -beta1$beta


```

```r
## Koble markedsveredien til aksjekursene ##

head(aksjer)
aksjer <- left_join(aksjer, orgnrcom, by = c("CompanyID" = "CompanyID"))

## For å få markedsverdi i regnskapsdataen - samme som med betaverdiene over ##

AksjedataMarketCap <- r1
head(AksjedataMarketCap)
MarketCap1 <- aggregate(MarketCap ~ aar + CompanyID, AksjedataMarketCap, mean)
MarketCap1 <- left_join(MarketCap1, AksjedataMarketCap[c("orgnr", "aar", "CompanyID")], by = c("aar" = "aar", "CompanyID" = "CompanyID"))
head(MarketCap1)
MarketCap1$CompanyID <- NULL
head(MarketCap1)
MarketCap1 <- MarketCap1[!duplicated(MarketCap1[c('aar', 'orgnr')]),]




## Regnskapsdata - legger inn data ##

### Trasfomerer DTA filer til R-filer, selskapsregnskap ###

ren_akjser_2000 <- read_dta("rskap_sel_2000.dta")
ren_akjser_2001 <- read_dta("rskap_sel_2001.dta")
ren_akjser_2002 <- read_dta("rskap_sel_2002.dta")
ren_akjser_2003 <- read_dta("rskap_sel_2003.dta")
ren_akjser_2004 <- read_dta("rskap0_sel_2004.dta")
ren_akjser_2005 <- read_dta("rskap_sel_2005.dta")
ren_akjser_2006 <- read_dta("rskap_sel_2006.dta")
ren_akjser_2007 <- read_dta("rskap_sel_2007.dta")
ren_akjser_2008 <- read_dta("rskap_sel_2008.dta")
ren_akjser_2009 <- read_dta("rskap_sel_2009.dta")
ren_akjser_2010 <- read_dta("rskap_sel_2010.dta")
ren_akjser_2011 <- read_dta("rskap_sel_2011.dta")
ren_akjser_2012 <- read_dta("rskap_sel_2012.dta")
ren_akjser_2013 <- read_dta("rskap_sel_2013.dta")
ren_akjser_2014 <- read_dta("rskap_sel_2014.dta")
ren_akjser_2015 <- read_dta("rskap_sel_2015.dta")
ren_akjser_2016 <- read_dta("rskap_sel_2016.dta")
ren_akjser_2017 <- read_dta("rskap_sel_2017.dta")
```

```r
ren_akjser_2017 <- read_dta("rskap_sel_2017.dta")
ren_akjser_2018 <- read_dta("rskap_sel_2018.dta")
ren_akjser_2019 <- read_dta("rskap_sel_2019.dta")
ren_akjser_2020 <- read_dta("rskap_sel_2020.dta")


## Aksjerregnskapsdata ##

ard_2000 <- read_dta("rskap0520_kon_2000.dta")
ard_2001 <- read_dta("rskap0520_kon_2001.dta")
ard_2002 <- read_dta("rskap0520_kon_2002.dta")
ard_2003 <- read_dta("rskap0520_kon_2003.dta")
ard_2004 <- read_dta("rskap0520_kon_2004.dta")
ard_2005 <- read_dta("rskap0520_kon_2005.dta")
ard_2006 <- read_dta("rskap0520_kon_2006.dta")
ard_2007 <- read_dta("rskap0520_kon_2007.dta")
ard_2008 <- read_dta("rskap0520_kon_2008.dta")
ard_2009 <- read_dta("rskap0520_kon_2009.dta")
ard_2010 <- read_dta("rskap0520_kon_2010.dta")
ard_2011 <- read_dta("rskap0520_kon_2011.dta")
ard_2012 <- read_dta("rskap0520_kon_2012.dta")
ard_2013 <- read_dta("rskap0520_kon_2013.dta")
ard_2014 <- read_dta("rskap0520_kon_2014.dta")
ard_2015 <- read_dta("rskap0520_kon_2015.dta")
ard_2016 <- read_dta("rskap0520_kon_2016.dta")
ard_2017 <- read_dta("rskap0520_kon_2017.dta")
ard_2018 <- read_dta("rskap0520_kon_2018.dta")
ard_2019 <- read_dta("rskap0520_kon_2019.dta")
ard_2020 <- read_dta("rskap0520_kon_2020.dta")


## Henter ut selskapene ##

borsdata_2000_1 <- (for_2000[for_2000$bors_aks == 1,c(1,28)])
borsdata_2001_1 <- (for_2001[for_2001$bors_aks == 1,c(1,28)])
borsdata_2002_1 <- (for_2002[for_2002$bors_aks == 1,c(1,28)])
borsdata_2003_1 <- (for_2003[for_2003$bors_aks == 1,c(1,28)])
borsdata_2004_1 <- (for_2004[for_2004$bors_aks == 1,c(1,28)])
borsdata_2005_1 <- (for_2005[for_2005$bors_aks == 1,c(1,28)])
borsdata_2006_1 <- (for_2006[for_2006$bors_aks == 1,c(1,28)])
```

```r
borsdata_2006_1 <- (for_2006[for_2006$bors_aks == 1,c(1,28)])
borsdata_2007_1 <- (for_2007[for_2007$bors_aks == 1,c(1,28)])
borsdata_2008_1 <- (for_2008[for_2008$bors_aks == 1,c(1,28)])
borsdata_2009_1 <- (for_2009[for_2009$bors_aks == 1,c(1,28)])
borsdata_2010_1 <- (for_2010[for_2010$bors_aks == 1,c(1,28)])
borsdata_2011_1 <- (for_2011[for_2011$bors_aks == 1,c(1,28)])
borsdata_2012_1 <- (for_2012[for_2012$bors_aks == 1,c(1,28)])
borsdata_2013_1 <- (for_2013[for_2013$bors_aks == 1,c(1,28)])
borsdata_2014_1 <- (for_2014[for_2014$bors_aks == 1,c(1,28)])
borsdata_2015_1 <- (for_2015[for_2015$bors_aks == 1,c(1,28)])
borsdata_2016_1 <- (for_2016[for_2016$bors_aks == 1,c(1,28)])
borsdata_2017_1 <- (for_2017[for_2017$bors_aks == 1,c(1,28)])
borsdata_2018_1 <- (for_2018[for_2018$bors_aks == 1,c(1,28)])
borsdata_2019_1 <- (for_2019[for_2019$bors_aks == 1,c(1,28)])
borsdata_2020_1 <- (for_2020[for_2020$bors_aks == 1,c(1,28)])


## fjerner NA's, feilverdier og tommeverdier ##

borsdata_2000 <- na.omit(borsdata_2000_1)
borsdata_2001 <- na.omit(borsdata_2001_1)
borsdata_2002 <- na.omit(borsdata_2002_1)
borsdata_2003 <- na.omit(borsdata_2003_1)
borsdata_2004 <- na.omit(borsdata_2004_1)
borsdata_2005 <- na.omit(borsdata_2005_1)
borsdata_2006 <- na.omit(borsdata_2006_1)
borsdata_2007 <- na.omit(borsdata_2007_1)
borsdata_2008 <- na.omit(borsdata_2008_1)
borsdata_2009 <- na.omit(borsdata_2009_1)
borsdata_2010 <- na.omit(borsdata_2010_1)
borsdata_2011 <- na.omit(borsdata_2011_1)
borsdata_2012 <- na.omit(borsdata_2012_1)
borsdata_2013 <- na.omit(borsdata_2013_1)
borsdata_2014 <- na.omit(borsdata_2014_1)
borsdata_2015 <- na.omit(borsdata_2015_1)
borsdata_2016 <- na.omit(borsdata_2016_1)
borsdata_2017 <- na.omit(borsdata_2017_1)
borsdata_2018 <- na.omit(borsdata_2018_1)
borsdata_2019 <- na.omit(borsdata_2019_1)
borsdata_2020 <- na.omit(borsdata_2020_1)
```

```r
borsdata_2020 <- na.omit(borsdata_2020_1)


### Slår sammen dataene ###

ren_2000 <- merge(ren_akjser_2000,borsdata_2000_1, by="orgnr")
ren_2001 <- merge(ren_akjser_2001,borsdata_2001_1, by="orgnr")
ren_2002 <- merge(ren_akjserl_2002,borsdata_2002_1, by="orgnr")
ren_2003 <- merge(ren_akjser_2003,borsdata_2003_1, by="orgnr")
ren_2004 <- merge(ren_akjserl_2004,borsdata_2004_1, by="orgnr")
ren_2005 <- merge(ren_akjser_2005,borsdata_2005_1, by="orgnr")
ren_2006 <- merge(ren_akjserl_2006,borsdata_2006_1, by="orgnr")
ren_2007 <- merge(ren_akjser_2007,borsdata_2007_1, by="orgnr")
ren_2008 <- merge(ren_akjserl_2008,borsdata_2008_1, by="orgnr")
ren_2009 <- merge(ren_akjser_2009,borsdata_2009_1, by="orgnr")
ren_2010 <- merge(ren_akjser_2010,borsdata_2010_1, by="orgnr")
ren_2011 <- merge(ren_akjser_2011,borsdata_2011_1, by="orgnr")
ren_2012 <- merge(ren_akjser_2012,borsdata_2012_1, by="orgnr")
ren_2013 <- merge(ren_akjser_2013,borsdata_2013_1, by="orgnr")
ren_2014 <- merge(ren_akjser_2014,borsdata_2014_1, by="orgnr")
ren_2015 <- merge(ren_akjser_2015,borsdata_2015_1, by="orgnr")
ren_2016 <- merge(ren_akjser_2016,borsdata_2016_1, by="orgnr")
ren_2017 <- merge(ren_akjser_2017,borsdata_2017_1, by="orgnr")
ren_2018 <- merge(ren_akjser_2018,borsdata_2018_1, by="orgnr")
ren_2019 <- merge(ren_akjser_2019,borsdata_2019_1, by="orgnr")
ren_2020 <- merge(ren_akjser_2020,borsdata_2020_1, by="orgnr")


kon_2000 <- merge(ard_2000,borsdata_2000_1, by="orgnr")
kon_2001 <- merge(ard_2001,borsdata_2001_1, by="orgnr")
kon_2002 <- merge(ard_2002,borsdata_2002_1, by="orgnr")
kon_2003 <- merge(ard_2003,borsdata_2003_1, by="orgnr")
kon_2004 <- merge(ard_2004,borsdata_2004_1, by="orgnr")
kon_2005 <- merge(ard_2005,borsdata_2005_1, by="orgnr")
kon_2006 <- merge(ard_2006,borsdata_2006_1, by="orgnr")
kon_2007 <- merge(ard_2007,borsdata_2007_1, by="orgnr")
kon_2008 <- merge(ard_2008,borsdata_2008_1, by="orgnr")
kon_2009 <- merge(ard_2009,borsdata_2009_1, by="orgnr")
kon_2010 <- merge(ard_2010,borsdata_2010_1, by="orgnr")
```

```r
kon_2010 <- merge(ard_2010,borsdata_2010_1, by="orgnr")
kon_2011 <- merge(ard_2011,borsdata_2011_1, by="orgnr")
kon_2012 <- merge(ard_2012,borsdata_2012_1, by="orgnr")
kon_2013 <- merge(ard_2013,borsdata_2013_1, by="orgnr")
kon_2014 <- merge(ard_2014,borsdata_2014_1, by="orgnr")
kon_2015 <- merge(ard_2015,borsdata_2015_1, by="orgnr")
kon_2016 <- merge(ard_2016,borsdata_2016_1, by="orgnr")
kon_2017 <- merge(ard_2017,borsdata_2017_1, by="orgnr")
kon_2018 <- merge(ard_2018,borsdata_2018_1, by="orgnr")
kon_2019 <- merge(ard_2019,borsdata_2019_1, by="orgnr")
kon_2020 <- merge(ard_2020,borsdata_2020_1, by="orgnr")

# videre setter jeg  de to sammenslåtte til en"

kon_ren_2000 <- merge(kon_2000,ren_2000, by="orgnr", all.x = T, all.y = T)
kon_ren_2001 <- merge(kon_2001,ren_2001, by="orgnr", all.x = T, all.y = T)
kon_ren_2002 <- merge(kon_2002,ren_2002, by="orgnr", all.x = T, all.y = T)
kon_ren_2003 <- merge(kon_2003,ren_2003, by="orgnr", all.x = T, all.y = T)
kon_ren_2004 <- merge(kon_2004,ren_2004, by="orgnr", all.x = T, all.y = T)
kon_ren_2005 <- merge(kon_2005,ren_2005, by="orgnr", all.x = T, all.y = T)
kon_ren_2006 <- merge(kon_2006,ren_2006, by="orgnr", all.x = T, all.y = T)
kon_ren_2007 <- merge(kon_2007,ren_2007, by="orgnr", all.x = T, all.y = T)
kon_ren_2008 <- merge(kon_2008,ren_2008, by="orgnr", all.x = T, all.y = T)
kon_ren_2009 <- merge(kon_2009,ren_2009, by="orgnr", all.x = T, all.y = T)
kon_ren_2010 <- merge(kon_2010,ren_2010, by="orgnr", all.x = T, all.y = T)
kon_ren_2011 <- merge(kon_2011,ren_2011, by="orgnr", all.x = T, all.y = T)
kon_ren_2012 <- merge(kon_2012,ren_2012, by="orgnr", all.x = T, all.y = T)
kon_ren_2013 <- merge(kon_2013,ren_2013, by="orgnr", all.x = T, all.y = T)
kon_ren_2014 <- merge(kon_2014,ren_2014, by="orgnr", all.x = T, all.y = T)
kon_ren_2015 <- merge(kon_2015,ren_2015, by="orgnr", all.x = T, all.y = T)
kon_ren_2016 <- merge(kon_2016,ren_2016, by="orgnr", all.x = T, all.y = T)
kon_ren_2017 <- merge(kon_2017,ren_2017, by="orgnr", all.x = T, all.y = T)
kon_ren_2018 <- merge(kon_2018,ren_2018, by="orgnr", all.x = T, all.y = T)
kon_ren_2019 <- merge(kon_2019,ren_2019, by="orgnr", all.x = T, all.y = T)
kon_ren_2020 <- merge(kon_2020,ren_2020, by="orgnr", all.x = T, all.y = T)


```

```r
kon1_2000 <- kon_2000
kon1_2001 <- kon_2001
kon1_2002 <- kon_2002
kon1_2003 <- kon_2003
kon1_2004 <- kon_2004
kon1_2005 <- kon_2005
kon1_2006 <- kon_2006
kon1_2007 <- kon_2007
kon1_2008 <- kon_2008
kon1_2009 <- kon_2009
kon1_2010 <- kon_2010
kon1_2011 <- kon_2011
kon1_2012 <- kon_2012
kon1_2013 <- kon_2013
kon1_2014 <- kon_2014
kon1_2015 <- kon_2015
kon1_2016 <- kon_2016
kon1_2017 <- kon_2017
kon1_2018 <- kon_2018
kon1_2019 <- kon_2019
kon1_2020 <- kon_2020


## ta ut de som ikke matcher ##

ren1_2000 <- anti_join(ren_2000, kon1_2000, by = "orgnr")
ren1_2001 <- anti_join(ren_2001, kon1_2001, by = "orgnr")
ren1_2002 <- anti_join(ren_2002, kon1_2002, by = "orgnr")
ren1_2003 <- anti_join(ren_2003, kon1_2003, by = "orgnr")
ren1_2004 <- anti_join(ren_2004, kon1_2004, by = "orgnr")
ren1_2005 <- anti_join(ren_2005, kon1_2005, by = "orgnr")
ren1_2006 <- anti_join(ren_2006, kon1_2006, by = "orgnr")
ren1_2007 <- anti_join(ren_2007, kon1_2007, by = "orgnr")
ren1_2008 <- anti_join(ren_2008, kon1_2008, by = "orgnr")
ren1_2009 <- anti_join(ren_2009, kon1_2009, by = "orgnr")
ren1_2010 <- anti_join(ren_2010, kon1_2010, by = "orgnr")
ren1_2011 <- anti_join(ren_2011, kon1_2011, by = "orgnr")
ren1_2012 <- anti_join(ren_2012, kon1_2012, by = "orgnr")
ren1_2013 <- anti_join(ren_2013, kon1_2013, by = "orgnr")
ren1_2014 <- anti_join(ren_2014, kon1_2014, by = "orgnr")
ren1_2015 <- anti_join(ren_2015, kon1_2015, by = "orgnr")
ren1_2016 <- anti_join(ren_2016, kon1_2016, by = "orgnr")
```

```r
ren1_2016 <- anti_join(ren_2016, kon1_2016, by = "orgnr")
ren1_2017 <- anti_join(ren_2017, kon1_2017, by = "orgnr")
ren1_2018 <- anti_join(ren_2018, kon1_2018, by = "orgnr")
ren1_2019 <- anti_join(ren_2019, kon1_2019, by = "orgnr")
ren1_2020 <- anti_join(ren_2020, kon1_2020, by = "orgnr")

## Loader data ##

load("regnskapsdata2000_1.Rda")
load("regnskapsdata2001_1.Rda")
load("regnskapsdata2002_1.Rda")
load("regnskapsdata2003_1.Rda")
load("regnskapsdata2004_1.Rda")
load("regnskapsdata2005_1.Rda")
load("regnskapsdata2006_1.Rda")
load("regnskapsdata2007_1.Rda")
load("regnskapsdata2008_1.Rda")
load("regnskapsdata2009_1.Rda")
load("regnskapsdata2010_1.Rda")
load("regnskapsdata2011_1.Rda")
load("regnskapsdata2012_1.Rda")
load("regnskapsdata2013_1.Rda")
load("regnskapsdata2014_1.Rda")
load("regnskapsdata2015_1.Rda")
load("regnskapsdata2016_1.Rda")
load("regnskapsdata2017_1.Rda")
load("regnskapsdata2018_1.Rda")
load("regnskapsdata2019_1.Rda")
load("regnskapsdata2020_1.Rda")


load("aksjedata2000.Rda")
load("aksjedata2001.Rda")
load("aksjedata2002.Rda")
load("aksjedata2003.Rda")
load("aksjedata2004.Rda")
load("aksjedata2005.Rda")
load("aksjedata2006.Rda")
load("aksjedata2007.Rda")
load("aksjedata2008.Rda")
```

```r
load("aksjedata2008.Rda")
load("aksjedata2009.Rda")
load("aksjedata2010.Rda")
load("aksjedata2011.Rda")
load("aksjedata2012.Rda")
load("aksjedata2013.Rda")
load("aksjedata2014.Rda")
load("aksjedata2015.Rda")
load("aksjedata2016.Rda")
load("aksjedata2017.Rda")
load("aksjedata2018.Rda")
load("aksjedata2019.Rda")
load("aksjedata2020.Rda")



## Lager dataframe av den relevante regnskapsdataen ##

r_2000 <- rbind(ren1_2000, kon1_2000)
r_2001 <- rbind(ren1_2001, kon1_2001)
r_2002 <- rbind(ren1_2002, kon1_2002)
r_2003 <- rbind(ren1_2003, kon1_2003)
r_2004 <- rbind(ren1_2004, kon1_2004)
r_2005 <- rbind(ren1_2005, kon1_2005)
r_2006 <- rbind(ren1_2006, kon1_2006)
r_2007 <- rbind(ren1_2007, kon1_2007)
r_2008 <- rbind(ren1_2008, kon1_2008)
r_2009 <- rbind(ren1_2009, kon1_2009)
r_2010 <- rbind(ren1_2010, kon1_2010)
r_2011 <- rbind(ren1_2011, kon1_2011)
r_2012 <- rbind(ren1_2012, kon1_2012)
r_2013 <- rbind(ren1_2013, kon1_2013)
r_2014 <- rbind(ren1_2014, kon1_2014)
r_2015 <- rbind(ren1_2015, kon1_2015)
r_2016 <- rbind(ren1_2016, kon1_2016)
r_2017 <- rbind(ren1_2017, kon1_2017)
r_2018 <- rbind(ren1_2018, kon1_2018)
r_2019 <- rbind(ren1_2019, kon1_2019)
r_2020 <- rbind(ren1_2020, kon1_2020)

```

```
## legge ved marketcap og betaverdier i regnskapsdataen til senere utregninger ##
r_2000 <- left_join(r_2000, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2001 <- left_join(r_2001, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2002 <- left_join(r_2002, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2003 <- left_join(r_2003, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2004 <- left_join(r_2004, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2005 <- left_join(r_2005, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2006 <- left_join(r_2006, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2007 <- left_join(r_2007, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2008 <- left_join(r_2008, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2009 <- left_join(r_2009, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2010 <- left_join(r_2010, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2011 <- left_join(r_2011, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2012 <- left_join(r_2012, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2013 <- left_join(r_2013, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2014 <- left_join(r_2014, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2015 <- left_join(r_2015, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2016 <- left_join(r_2016, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2017 <- left_join(r_2017, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2018 <- left_join(r_2018, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2019 <- left_join(r_2019, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2020 <- left_join(r_2020, MarketCap1, by = c("aar" = "aar", "orgnr" = "orgnr"))



r_2000 <- left_join(r_2000, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2001 <- left_join(r_2001, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2002 <- left_join(r_2002, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2003 <- left_join(r_2003, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2004 <- left_join(r_2004, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2005 <- left_join(r_2005, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2006 <- left_join(r_2006, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2007 <- left_join(r_2007, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2008 <- left_join(r_2008, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2009 <- left_join(r_2009, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2010 <- left_join(r_2010, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2011 <- left_join(r_2011, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2012 <- left_join(r_2012, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2013 <- left_join(r_2013, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2014 <- left_join(r_2014, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2015 <- left_join(r_2015, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2016 <- left_join(r_2016, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
```

```
r_2016 <- left_join(r_2016, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2017 <- left_join(r_2017, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2018 <- left_join(r_2018, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2019 <- left_join(r_2019, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))
r_2020 <- left_join(r_2020, beta1, by = c("aar" = "aar", "orgnr" = "orgnr"))



## Legge ved KPI verdier (KPI - basis 2015) ##
kpi <- read_excel("kpi.xlsx")

kpi <- kpi[-1, c(1,2) ]
colnames(kpi) <- c("aar", "kpi")
kpi$kpi<- gsub(',', '.', kpi$kpi)
kpi$kpi <- as.numeric(kpi$kpi)
class(kpi$kpi)
head(kpi)
r_2000 <- left_join(r_2000, kpi, by = c("aar" = "aar"))
r_2001 <- left_join(r_2001, kpi, by = c("aar" = "aar"))
r_2002 <- left_join(r_2002, kpi, by = c("aar" = "aar"))
r_2003 <- left_join(r_2003, kpi, by = c("aar" = "aar"))
r_2004 <- left_join(r_2004, kpi, by = c("aar" = "aar"))
r_2005 <- left_join(r_2005, kpi, by = c("aar" = "aar"))
r_2006 <- left_join(r_2006, kpi, by = c("aar" = "aar"))
r_2007 <- left_join(r_2007, kpi, by = c("aar" = "aar"))
r_2008 <- left_join(r_2008, kpi, by = c("aar" = "aar"))
r_2009 <- left_join(r_2009, kpi, by = c("aar" = "aar"))
r_2010 <- left_join(r_2010, kpi, by = c("aar" = "aar"))
r_2011 <- left_join(r_2011, kpi, by = c("aar" = "aar"))
r_2012 <- left_join(r_2012, kpi, by = c("aar" = "aar"))
r_2013 <- left_join(r_2013, kpi, by = c("aar" = "aar"))
r_2014 <- left_join(r_2014, kpi, by = c("aar" = "aar"))
r_2015 <- left_join(r_2015, kpi, by = c("aar" = "aar"))
r_2016 <- left_join(r_2016, kpi, by = c("aar" = "aar"))
r_2017 <- left_join(r_2017, kpi, by = c("aar" = "aar"))
r_2018 <- left_join(r_2018, kpi, by = c("aar" = "aar"))
r_2019 <- left_join(r_2019, kpi, by = c("aar" = "aar"))
r_2020 <- left_join(r_2020, kpi, by = c("aar" = "aar"))

```

```r
## her lager jeg variabler brukt i beregningen av kvalitetsmålene

## Dummyvariabel ONEG ##


r_2000$OENEG <- ifelse(r_2000$gjeld > r_2000$sumeiend, 1,0)
r_2001$OENEG <- ifelse(r_2001$gjeld > r_2001$sumeiend, 1,0)
r_2002$OENEG <- ifelse(r_2002$gjeld > r_2002$sumeiend, 1,0)
r_2003$OENEG <- ifelse(r_2003$gjeld > r_2003$sumeiend, 1,0)
r_2004$OENEG <- ifelse(r_2004$gjeld > r_2004$sumeiend, 1,0)
r_2005$OENEG <- ifelse(r_2005$gjeld > r_2005$sumeiend, 1,0)
r_2006$OENEG <- ifelse(r_2006$gjeld > r_2006$sumeiend, 1,0)
r_2007$OENEG <- ifelse(r_2007$gjeld > r_2007$sumeiend, 1,0)
r_2008$OENEG <- ifelse(r_2008$gjeld > r_2008$sumeiend, 1,0)
r_2009$OENEG <- ifelse(r_2009$gjeld > r_2009$sumeiend, 1,0)
r_2010$OENEG <- ifelse(r_2010$gjeld > r_2010$sumeiend, 1,0)
r_2011$OENEG <- ifelse(r_2011$gjeld > r_2011$sumeiend, 1,0)
r_2012$OENEG <- ifelse(r_2012$gjeld > r_2012$sumeiend, 1,0)
r_2013$OENEG <- ifelse(r_2013$gjeld > r_2013$sumeiend, 1,0)
r_2014$OENEG <- ifelse(r_2014$gjeld > r_2014$sumeiend, 1,0)
r_2015$OENEG <- ifelse(r_2015$gjeld > r_2015$sumeiend, 1,0)
r_2016$OENEG <- ifelse(r_2016$gjeld > r_2016$sumeiend, 1,0)
r_2017$OENEG <- ifelse(r_2017$gjeld > r_2017$sumeiend, 1,0)
r_2018$OENEG <- ifelse(r_2018$gjeld > r_2018$sumeiend, 1,0)
r_2019$OENEG <- ifelse(r_2019$gjeld > r_2019$sumeiend, 1,0)
r_2020$OENEG <- ifelse(r_2020$gjeld > r_2020$sumeiend, 1,0)

### Lage INTWO dummyvariabel til 0 score###

intwo_2000 <- r_2000
intwo_2001 <- r_2001
intwo_2002 <- r_2002
intwo_2003 <- r_2003
intwo_2004 <- r_2004
intwo_2005 <- r_2005
intwo_2006 <- r_2006
intwo_2007 <- r_2007
intwo_2008 <- r_2008
intwo_2009 <- r_2009
intwo_2010 <- r_2010
intwo_2011 <- r_2011
intwo_2012 <- r_2012
```

```
intwo_2012 <- r_2012
intwo_2013 <- r_2013
intwo_2014 <- r_2014
intwo_2015 <- r_2015
intwo_2016 <- r_2016
intwo_2017 <- r_2017
intwo_2018 <- r_2018
intwo_2019 <- r_2019
intwo_2020 <- r_2020

intwo_2000 <- merge(intwo_2000, r_1999[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2001 <- merge(intwo_2001, r_2000[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2002 <- merge(intwo_2002, r_2001[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2003 <- merge(intwo_2003, r_2002[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2004 <- merge(intwo_2004, r_2003[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2005 <- merge(intwo_2005, r_2004[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2006 <- merge(intwo_2006, r_2005[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2007 <- merge(intwo_2007, r_2006[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2008 <- merge(intwo_2008, r_2007[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2009 <- merge(intwo_2009, r_2008[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2010 <- merge(intwo_2010, r_2009[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2011 <- merge(intwo_2011, r_2010[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2012 <- merge(intwo_2012, r_2011[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2013 <- merge(intwo_2013, r_2012[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2014 <- merge(intwo_2014, r_2013[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2015 <- merge(intwo_2015, r_2014[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2016 <- merge(intwo_2016, r_2015[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2017 <- merge(intwo_2017, r_2016[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2018 <- merge(intwo_2018, r_2017[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2019 <- merge(intwo_2019, r_2019[ , c("orgnr","aarsrs" )], by = "orgnr")
intwo_2020 <- merge(intwo_2020, r_2020[ , c("orgnr","aarsrs" )], by = "orgnr")

intwo_2000$INTWO1 <- ifelse(intwo_2000$aarsrs.x < 0, 1 ,0)
intwo_2001$INTWO1 <- ifelse(intwo_2001$aarsrs.x < 0, 1 ,0)
intwo_2002$INTWO1 <- ifelse(intwo_2002$aarsrs.x < 0, 1 ,0)
intwo_2003$INTWO1 <- ifelse(intwo_2003$aarsrs.x < 0, 1 ,0)
intwo_2004$INTWO1 <- ifelse(intwo_2004$aarsrs.x < 0, 1 ,0)
intwo_2005$INTWO1 <- ifelse(intwo_2005$aarsrs.x < 0, 1 ,0)
intwo_2006$INTWO1 <- ifelse(intwo_2006$aarsrs.x < 0, 1 ,0)
intwo_2007$INTWO1 <- ifelse(intwo_2007$aarsrs.x < 0, 1 ,0)
```

```r
intwo_2007$INTWO1 <- ifelse(intwo_2007$aarsrs.x < 0, 1 ,0)
intwo_2008$INTWO1 <- ifelse(intwo_2008$aarsrs.x < 0, 1 ,0)
intwo_2009$INTWO1 <- ifelse(intwo_2009$aarsrs.x < 0, 1 ,0)
intwo_2010$INTWO1 <- ifelse(intwo_2010$aarsrs.x < 0, 1 ,0)
intwo_2011$INTWO1 <- ifelse(intwo_2011$aarsrs.x < 0, 1 ,0)
intwo_2012$INTWO1 <- ifelse(intwo_2012$aarsrs.x < 0, 1 ,0)
intwo_2013$INTWO1 <- ifelse(intwo_2013$aarsrs.x < 0, 1 ,0)
intwo_2014$INTWO1 <- ifelse(intwo_2014$aarsrs.x < 0, 1 ,0)
intwo_2015$INTWO1 <- ifelse(intwo_2015$aarsrs.x < 0, 1 ,0)
intwo_2016$INTWO1 <- ifelse(intwo_2016$aarsrs.x < 0, 1 ,0)
intwo_2017$INTWO1 <- ifelse(intwo_2017$aarsrs.x < 0, 1 ,0)
intwo_2018$INTWO1 <- ifelse(intwo_2018$aarsrs.x < 0, 1 ,0)
intwo_2019$INTWO1 <- ifelse(intwo_2019$aarsrs.x < 0, 1 ,0)
intwo_2020$INTWO1 <- ifelse(intwo_2020$aarsrs.x < 0, 1 ,0)

intwo_2000$INTWO2 <- ifelse(intwo_2000$aarsrs.y < 0, 1 ,0)
intwo_2001$INTWO2 <- ifelse(intwo_2001$aarsrs.y < 0, 1 ,0)
intwo_2002$INTWO2 <- ifelse(intwo_2002$aarsrs.y < 0, 1 ,0)
intwo_2003$INTWO2 <- ifelse(intwo_2003$aarsrs.y < 0, 1 ,0)
intwo_2004$INTWO2 <- ifelse(intwo_2004$aarsrs.y < 0, 1 ,0)
intwo_2005$INTWO2 <- ifelse(intwo_2005$aarsrs.y < 0, 1 ,0)
intwo_2006$INTWO2 <- ifelse(intwo_2006$aarsrs.y < 0, 1 ,0)
intwo_2007$INTWO2 <- ifelse(intwo_2007$aarsrs.y < 0, 1 ,0)
intwo_2008$INTWO2 <- ifelse(intwo_2008$aarsrs.y < 0, 1 ,0)
intwo_2009$INTWO2 <- ifelse(intwo_2009$aarsrs.y < 0, 1 ,0)
intwo_2010$INTWO2 <- ifelse(intwo_2010$aarsrs.y < 0, 1 ,0)
intwo_2011$INTWO2 <- ifelse(intwo_2011$aarsrs.y < 0, 1 ,0)
intwo_2012$INTWO2 <- ifelse(intwo_2012$aarsrs.y < 0, 1 ,0)
intwo_2013$INTWO2 <- ifelse(intwo_2013$aarsrs.y < 0, 1 ,0)
intwo_2014$INTWO2 <- ifelse(intwo_2014$aarsrs.y < 0, 1 ,0)
intwo_2015$INTWO2 <- ifelse(intwo_2015$aarsrs.y < 0, 1 ,0)
intwo_2016$INTWO2 <- ifelse(intwo_2016$aarsrs.y < 0, 1 ,0)
intwo_2017$INTWO2 <- ifelse(intwo_2017$aarsrs.y < 0, 1 ,0)
intwo_2018$INTWO2 <- ifelse(intwo_2018$aarsrs.y < 0, 1 ,0)
intwo_2019$INTWO2 <- ifelse(intwo_2019$aarsrs.y < 0, 1 ,0)
intwo_2020$INTWO2 <- ifelse(intwo_2020$aarsrs.y < 0, 1 ,0)

intwo_2000$INTWO <- ifelse((intwo_2000$INTWO1 + intwo_2000$INTWO2) > 0, 1 ,0)
intwo_2001$INTWO <- ifelse((intwo_2001$INTWO1 + intwo_2001$INTWO2) > 0, 1 ,0)
intwo_2002$INTWO <- ifelse((intwo_2002$INTWO1 + intwo_2002$INTWO2) > 0, 1 ,0)
```

```r
intwo_2002$INTWO <- ifelse((intwo_2002$INTWO1 + intwo_2002$INTWO2) > 0, 1 ,0)
intwo_2003$INTWO <- ifelse((intwo_2003$INTWO1 + intwo_2003$INTWO2) > 0, 1 ,0)
intwo_2004$INTWO <- ifelse((intwo_2004$INTWO1 + intwo_2004$INTWO2) > 0, 1 ,0)
intwo_2005$INTWO <- ifelse((intwo_2005$INTWO1 + intwo_2005$INTWO2) > 0, 1 ,0)
intwo_2006$INTWO <- ifelse((intwo_2006$INTWO1 + intwo_2006$INTWO2) > 0, 1 ,0)
intwo_2007$INTWO <- ifelse((intwo_2007$INTWO1 + intwo_2007$INTWO2) > 0, 1 ,0)
intwo_2008$INTWO <- ifelse((intwo_2008$INTWO1 + intwo_2008$INTWO2) > 0, 1 ,0)
intwo_2009$INTWO <- ifelse((intwo_2009$INTWO1 + intwo_2009$INTWO2) > 0, 1 ,0)
intwo_2010$INTWO <- ifelse((intwo_2010$INTWO1 + intwo_2010$INTWO2) > 0, 1 ,0)
intwo_2011$INTWO <- ifelse((intwo_2011$INTWO1 + intwo_2011$INTWO2) > 0, 1 ,0)
intwo_2012$INTWO <- ifelse((intwo_2012$INTWO1 + intwo_2012$INTWO2) > 0, 1 ,0)
intwo_2013$INTWO <- ifelse((intwo_2013$INTWO1 + intwo_2013$INTWO2) > 0, 1 ,0)
intwo_2014$INTWO <- ifelse((intwo_2014$INTWO1 + intwo_2014$INTWO2) > 0, 1 ,0)
intwo_2015$INTWO <- ifelse((intwo_2015$INTWO1 + intwo_2015$INTWO2) > 0, 1 ,0)
intwo_2016$INTWO <- ifelse((intwo_2016$INTWO1 + intwo_2016$INTWO2) > 0, 1 ,0)
intwo_2017$INTWO <- ifelse((intwo_2017$INTWO1 + intwo_2017$INTWO2) > 0, 1 ,0)
intwo_2018$INTWO <- ifelse((intwo_2018$INTWO1 + intwo_2018$INTWO2) > 0, 1 ,0)
intwo_2019$INTWO <- ifelse((intwo_2019$INTWO1 + intwo_2019$INTWO2) > 0, 1 ,0)
intwo_2020$INTWO <- ifelse((intwo_2020$INTWO1 + intwo_2020$INTWO2) > 0, 1 ,0)


r_2000 <- merge(r_2000, intwo_2000[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2001 <- merge(r_2001, intwo_2001[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2002 <- merge(r_2002, intwo_2002[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2003 <- merge(r_2003, intwo_2003[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2004 <- merge(r_2004, intwo_2004[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2005 <- merge(r_2005, intwo_2005[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2006 <- merge(r_2006, intwo_2006[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2007 <- merge(r_2007, intwo_2007[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2008 <- merge(r_2008, intwo_2008[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2009 <- merge(r_2009, intwo_2009[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2010 <- merge(r_2010, intwo_2010[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2011 <- merge(r_2011, intwo_2011[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2012 <- merge(r_2012, intwo_2012[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2013 <- merge(r_2013, intwo_2013[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2014 <- merge(r_2014, intwo_2014[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2015 <- merge(r_2015, intwo_2015[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2016 <- merge(r_2016, intwo_2016[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2017 <- merge(r_2017, intwo_2017[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2018 <- merge(r_2018, intwo_2018[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
```

```
r_2019 <- merge(r_2019, intwo_2019[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)
r_2020 <- merge(r_2020, intwo_2020[ , c("orgnr","INTWO")], by = "orgnr", all.x=T)


### Chin variabelen ##

chin_2000 <- r_2000
chin_2001 <- r_2001
chin_2002 <- r_2002
chin_2003 <- r_2003
chin_2004 <- r_2004
chin_2005 <- r_2005
chin_2006 <- r_2006
chin_2007 <- r_2007
chin_2008 <- r_2008
chin_2009 <- r_2009
chin_2010 <- r_2010
chin_2011 <- r_2011
chin_2012 <- r_2012
chin_2013 <- r_2013
chin_2014 <- r_2014
chin_2015 <- r_2015
chin_2016 <- r_2016
chin_2017 <- r_2017
chin_2018 <- r_2018
chin_2019 <- r_2019
chin_2020 <- r_2020


## endring AK og kvm ##
## Lager et-årige variabler ##

ru_2001 <- inner_join(r_2001, r_2000, by = "orgnr",  all.x=T)
ru_2002 <- inner_join(r_2002, r_2001, by = "orgnr",  all.x=T)
ru_2003 <- inner_join(r_2003, r_2002, by = "orgnr",  all.x=T)
ru_2004 <- inner_join(r_2004, r_2003, by = "orgnr",  all.x=T)
ru_2005 <- inner_join(r_2005, r_2004, by = "orgnr",  all.x=T)
ru_2006 <- inner_join(r_2006, r_2005, by = "orgnr",  all.x=T)
ru_2007 <- inner_join(r_2007, r_2006, by = "orgnr",  all.x=T)
```

```
ru_2008 <- inner_join(r_2008, r_2007, by = "orgnr",  all.x=T)
ru_2009 <- inner_join(r_2009, r_2008, by = "orgnr",  all.x=T)
ru_2010 <- inner_join(r_2010, r_2009, by = "orgnr",  all.x=T)
ru_2011 <- inner_join(r_2011, r_2010, by = "orgnr",  all.x=T)
ru_2012 <- inner_join(r_2012, r_2011, by = "orgnr",  all.x=T)
ru_2013 <- inner_join(r_2013, r_2012, by = "orgnr",  all.x=T)
ru_2014 <- inner_join(r_2014, r_2013, by = "orgnr",  all.x=T)
ru_2015 <- inner_join(r_2015, r_2014, by = "orgnr",  all.x=T)
ru_2016 <- inner_join(r_2016, r_2015, by = "orgnr",  all.x=T)
ru_2017 <- inner_join(r_2017, r_2016, by = "orgnr",  all.x=T)
ru_2018 <- inner_join(r_2018, r_2017, by = "orgnr",  all.x=T)
ru_2019 <- inner_join(r_2019, r_2018, by = "orgnr",  all.x=T)
ru_2020 <- inner_join(r_2020, r_2019, by = "orgnr",  all.x=T)

ru_2000 <- transform(ru_2000, deltaAK =  (ru_2000$oml.x - ru_2000$kgjeld.x - ru_2000$cash.x) - (ru_2000$oml.y - ru_2000$kgjeld.y - ru_2000$cash.y))
ru_2001 <- transform(ru_2001, deltaAK =  (ru_2001$oml.x - ru_2001$kgjeld.x - ru_2001$cash.x) - (ru_2001$oml.y - ru_2001$kgjeld.y - ru_2001$cash.y))
ru_2002 <- transform(ru_2002, deltaAK =  (ru_2002$oml.x - ru_2002$kgjeld.x - ru_2002$cash.x) - (ru_2002$oml.y - ru_2002$kgjeld.y - ru_2002$cash.y))
ru_2003 <- transform(ru_2003, deltaAK =  (ru_2003$oml.x - ru_2003$kgjeld.x - ru_2003$cash.x) - (ru_2003$oml.y - ru_2003$kgjeld.y - ru_2003$cash.y))
ru_2004 <- transform(ru_2004, deltaAK =  (ru_2004$oml.x - ru_2004$kgjeld.x - ru_2004$cash.x) - (ru_2004$oml.y - ru_2004$kgjeld.y - ru_2004$cash.y))
ru_2005 <- transform(ru_2005, deltaAK =  (ru_2005$oml.x - ru_2005$kgjeld.x - ru_2005$cash.x) - (ru_2005$oml.y - ru_2005$kgjeld.y - ru_2005$cash.y))
ru_2006 <- transform(ru_2006, deltaAK =  (ru_2006$oml.x - ru_2006$kgjeld.x - ru_2006$cash.x) - (ru_2006$oml.y - ru_2006$kgjeld.y - ru_2006$cash.y))
ru_2007 <- transform(ru_2007, deltaAK =  (ru_2007$oml.x - ru_2007$kgjeld.x - ru_2007$cash.x) - (ru_2007$oml.y - ru_2007$kgjeld.y - ru_2007$cash.y))
ru_2008 <- transform(ru_2008, deltaAK =  (ru_2008$oml.x - ru_2008$kgjeld.x - ru_2008$cash.x) - (ru_2008$oml.y - ru_2008$kgjeld.y - ru_2008$cash.y))
ru_2009 <- transform(ru_2009, deltaAK =  (ru_2009$oml.x - ru_2009$kgjeld.x - ru_2009$cash.x) - (ru_2009$oml.y - ru_2009$kgjeld.y - ru_2009$cash.y))
ru_2010 <- transform(ru_2010, deltaAK =  (ru_2010$oml.x - ru_2010$kgjeld.x - ru_2010$cash.x) - (ru_2010$oml.y - ru_2010$kgjeld.y - ru_2010$cash.y))
ru_2011 <- transform(ru_2011, deltaAK =  (ru_2011$oml.x - ru_2011$kgjeld.x - ru_2011$cash.x) - (ru_2011$oml.y - ru_2011$kgjeld.y - ru_2011$cash.y))
ru_2012 <- transform(ru_2012, deltaAK =  (ru_2012$oml.x - ru_2012$kgjeld.x - ru_2012$cash.x) - (ru_2012$oml.y - ru_2012$kgjeld.y - ru_2012$cash.y))
ru_2013 <- transform(ru_2013, deltaAK =  (ru_2013$oml.x - ru_2013$kgjeld.x - ru_2013$cash.x) - (ru_2013$oml.y - ru_2013$kgjeld.y - ru_2013$cash.y))
ru_2014 <- transform(ru_2014, deltaAK =  (ru_2014$oml.x - ru_2014$kgjeld.x - ru_2014$cash.x) - (ru_2014$oml.y - ru_2014$kgjeld.y - ru_2014$cash.y))
ru_2015 <- transform(ru_2015, deltaAK =  (ru_2015$oml.x - ru_2015$kgjeld.x - ru_2015$cash.x) - (ru_2015$oml.y - ru_2015$kgjeld.y - ru_2015$cash.y))
ru_2016 <- transform(ru_2016, deltaAK =  (ru_2016$oml.x - ru_2016$kgjeld.x - ru_2016$cash.x) - (ru_2016$oml.y - ru_2016$kgjeld.y - ru_2016$cash.y))
ru_2017 <- transform(ru_2017, deltaAK =  (ru_2017$oml.x - ru_2017$kgjeld.x - ru_2017$cash.x) - (ru_2017$oml.y - ru_2017$kgjeld.y - ru_2017$cash.y))
ru_2018 <- transform(ru_2018, deltaAK =  (ru_2018$oml.x - ru_2018$kgjeld.x - ru_2018$cash.x) - (ru_2018$oml.y - ru_2018$kgjeld.y - ru_2018$cash.y))
ru_2019 <- transform(ru_2019, deltaAK =  (ru_2019$oml.x - ru_2019$kgjeld.x - ru_2019$cash.x) - (ru_2019$oml.y - ru_2019$kgjeld.y - ru_2019$cash.y))
ru_2020 <- transform(ru_2020, deltaAK =  (ru_2020$oml.x - ru_2020$kgjeld.x - ru_2020$cash.x) - (ru_2020$oml.y - ru_2020$kgjeld.y - ru_2020$cash.y))

ru_2000 <- transform(ru_2000, CAPX = (ru_2000$anl.x - ru_2000$anl.y + ru_2000$avskr.x))
ru_2001 <- transform(ru_2001, CAPX = (ru_2001$anl.x - ru_2001$anl.y + ru_2001$avskr.x))
ru_2002 <- transform(ru_2002, CAPX = (ru_2002$anl.x - ru_2002$anl.y + ru_2002$avskr.x))
ru_2003 <- transform(ru_2003, CAPX = (ru_2003$anl.x - ru_2003$anl.y + ru_2003$avskr.x))
ru_2004 <- transform(ru_2004, CAPX = (ru_2004$anl.x - ru_2004$anl.y + ru_2004$avskr.x))
ru_2005 <- transform(ru_2005, CAPX = (ru_2005$anl.x - ru_2005$anl.y + ru_2005$avskr.x))
```

```
ru_2005 <- transform(ru_2005, CAPX = (ru_2005$anl.x - ru_2005$anl.y + ru_2005$avskr.x))
ru_2006 <- transform(ru_2006, CAPX = (ru_2006$anl.x - ru_2006$anl.y + ru_2006$avskr.x))
ru_2007 <- transform(ru_2007, CAPX = (ru_2007$anl.x - ru_2007$anl.y + ru_2007$avskr.x))
ru_2008 <- transform(ru_2008, CAPX = (ru_2008$anl.x - ru_2008$anl.y + ru_2008$avskr.x))
ru_2009 <- transform(ru_2009, CAPX = (ru_2009$anl.x - ru_2009$anl.y + ru_2009$avskr.x))
ru_2010 <- transform(ru_2010, CAPX = (ru_2010$anl.x - ru_2010$anl.y + ru_2010$avskr.x))
ru_2011 <- transform(ru_2011, CAPX = (ru_2011$anl.x - ru_2011$anl.y + ru_2011$avskr.x))
ru_2012 <- transform(ru_2012, CAPX = (ru_2012$anl.x - ru_2012$anl.y + ru_2012$avskr.x))
ru_2013 <- transform(ru_2013, CAPX = (ru_2013$anl.x - ru_2013$anl.y + ru_2013$avskr.x))
ru_2014 <- transform(ru_2014, CAPX = (ru_2014$anl.x - ru_2014$anl.y + ru_2014$avskr.x))
ru_2015 <- transform(ru_2015, CAPX = (ru_2015$anl.x - ru_2015$anl.y + ru_2015$avskr.x))
ru_2016 <- transform(ru_2016, CAPX = (ru_2016$anl.x - ru_2016$anl.y + ru_2016$avskr.x))
ru_2017 <- transform(ru_2017, CAPX = (ru_2017$anl.x - ru_2017$anl.y + ru_2017$avskr.x))
ru_2018 <- transform(ru_2018, CAPX = (ru_2018$anl.x - ru_2018$anl.y + ru_2018$avskr.x))
ru_2019 <- transform(ru_2019, CAPX = (ru_2019$anl.x - ru_2019$anl.y + ru_2019$avskr.x))
ru_2020 <- transform(ru_2020, CAPX = (ru_2020$anl.x - ru_2020$anl.y + ru_2020$avskr.x))

r_2000 <- merge(r_2000, ru_2000[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2001 <- merge(r_2001, ru_2001[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2002 <- merge(r_2002, ru_2002[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2003 <- merge(r_2003, ru_2003[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2004 <- merge(r_2004, ru_2004[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2005 <- merge(r_2005, ru_2005[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2006 <- merge(r_2006, ru_2006[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2007 <- merge(r_2007, ru_2007[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2008 <- merge(r_2008, ru_2008[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2009 <- merge(r_2009, ru_2009[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2010 <- merge(r_2010, ru_2010[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2011 <- merge(r_2011, ru_2011[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2012 <- merge(r_2012, ru_2012[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2013 <- merge(r_2013, ru_2013[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2014 <- merge(r_2014, ru_2014[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2015 <- merge(r_2015, ru_2015[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2016 <- merge(r_2016, ru_2016[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2017 <- merge(r_2017, ru_2017[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2018 <- merge(r_2018, ru_2018[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2019 <- merge(r_2019, ru_2019[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
r_2020 <- merge(r_2020, ru_2020[, c("orgnr", "deltaAK", "CAPX")], by = "orgnr", all.x=T)
```

```r
##  Quality minus junk fakren ##

## Beregning av de individuelle kvalitetsmålene på lønnsomhet  ######
## GPOA ##

r_2000 <- transform(r_2000, GPOA = (r_2000$salgsinn - (r_2000$varefor + r_2000$behend)) / r_2000$sumeiend)
r_2001 <- transform(r_2001, GPOA = (r_2001$salgsinn - (r_2001$varefor + r_2001$behend)) / r_2001$sumeiend)
r_2002 <- transform(r_2002, GPOA = (r_2002$salgsinn - (r_2002$varefor + r_2002$behend)) / r_2002$sumeiend)
r_2003 <- transform(r_2003, GPOA = (r_2003$salgsinn - (r_2003$varefor + r_2003$behend)) / r_2003$sumeiend)
r_2004 <- transform(r_2004, GPOA = (r_2004$salgsinn - (r_2004$varefor + r_2004$behend)) / r_2004$sumeiend)
r_2005 <- transform(r_2005, GPOA = (r_2005$salgsinn - (r_2005$varefor + r_2005$behend)) / r_2005$sumeiend)
r_2006 <- transform(r_2006, GPOA = (r_2006$salgsinn - (r_2006$varefor + r_2006$behend)) / r_2006$sumeiend)
r_2007 <- transform(r_2007, GPOA = (r_2007$salgsinn - (r_2007$varefor + r_2007$behend)) / r_2007$sumeiend)
r_2008 <- transform(r_2008, GPOA = (r_2008$salgsinn - (r_2008$varefor + r_2008$behend)) / r_2008$sumeiend)
r_2009 <- transform(r_2009, GPOA = (r_2009$salgsinn - (r_2009$varefor + r_2009$behend)) / r_2009$sumeiend)
r_2010 <- transform(r_2010, GPOA = (r_2010$salgsinn - (r_2010$varefor + r_2010$behend)) / r_2010$sumeiend)
r_2011 <- transform(r_2011, GPOA = (r_2011$salgsinn - (r_2011$varefor + r_2011$behend)) / r_2011$sumeiend)
r_2012 <- transform(r_2012, GPOA = (r_2012$salgsinn - (r_2012$varefor + r_2012$behend)) / r_2012$sumeiend)
r_2013 <- transform(r_2013, GPOA = (r_2013$salgsinn - (r_2013$varefor + r_2013$behend)) / r_2013$sumeiend)
r_2014 <- transform(r_2014, GPOA = (r_2014$salgsinn - (r_2014$varefor + r_2014$behend)) / r_2014$sumeiend)
r_2015 <- transform(r_2015, GPOA = (r_2015$salgsinn - (r_2015$varefor + r_2015$behend)) / r_2015$sumeiend)
r_2016 <- transform(r_2016, GPOA = (r_2016$salgsinn - (r_2016$varefor + r_2016$behend)) / r_2016$sumeiend)
r_2017 <- transform(r_2017, GPOA = (r_2017$salgsinn - (r_2017$varefor + r_2017$behend)) / r_2017$sumeiend)
r_2018 <- transform(r_2018, GPOA = (r_2018$salgsinn - (r_2018$varefor + r_2018$behend)) / r_2018$sumeiend)
r_2019 <- transform(r_2019, GPOA = (r_2019$salgsinn - (r_2019$varefor + r_2019$behend)) / r_2019$sumeiend)
r_2020 <- transform(r_2020, GPOA = (r_2020$salgsinn - (r_2020$varefor + r_2020$behend)) / r_2020$sumeiend)


## gjør dette med enkelte individuelle kvalitetsmål ettersom noen inneholder verdier betegnet som inf+/inf- som ødelegger beregning senere ##

r_2000$GPOA[!is.finite(r_2000$GPOA)] <- NA
r_2001$GPOA[!is.finite(r_2001$GPOA)] <- NA
r_2002$GPOA[!is.finite(r_2002$GPOA)] <- NA
r_2003$GPOA[!is.finite(r_2003$GPOA)] <- NA
r_2004$GPOA[!is.finite(r_2004$GPOA)] <- NA
r_2005$GPOA[!is.finite(r_2005$GPOA)] <- NA
r_2006$GPOA[!is.finite(r_2006$GPOA)] <- NA
r_2007$GPOA[!is.finite(r_2007$GPOA)] <- NA
r_2008$GPOA[!is.finite(r_2008$GPOA)] <- NA
r_2009$GPOA[!is.finite(r_2009$GPOA)] <- NA
r_2010$GPOA[!is.finite(r_2010$GPOA)] <- NA
r_2011$GPOA[!is.finite(r_2011$GPOA)] <- NA
```

```
r_2012$GPOA[!is.finite(r_2012$GPOA)] <- NA
r_2013$GPOA[!is.finite(r_2013$GPOA)] <- NA
r_2014$GPOA[!is.finite(r_2014$GPOA)] <- NA
r_2015$GPOA[!is.finite(r_2015$GPOA)] <- NA
r_2016$GPOA[!is.finite(r_2016$GPOA)] <- NA
r_2017$GPOA[!is.finite(r_2017$GPOA)] <- NA
r_2018$GPOA[!is.finite(r_2018$GPOA)] <- NA
r_2019$GPOA[!is.finite(r_2019$GPOA)] <- NA
r_2020$GPOA[!is.finite(r_2020$GPOA)] <- NA

## ROE ## #


r_2000 <- transform(r_2000, ROE = r_2000$aarsrs / (r_2000$ek))
r_2001 <- transform(r_2001, ROE = r_2001$aarsrs / (r_2001$ek))
r_2002 <- transform(r_2002, ROE = r_2002$aarsrs / (r_2002$ek))
r_2003 <- transform(r_2003, ROE = r_2003$aarsrs / (r_2003$ek))
r_2004 <- transform(r_2004, ROE = r_2004$aarsrs / (r_2004$ek))
r_2005 <- transform(r_2005, ROE = r_2005$aarsrs / (r_2005$ek))
r_2006 <- transform(r_2006, ROE = r_2006$aarsrs / (r_2006$ek))
r_2007 <- transform(r_2007, ROE = r_2007$aarsrs / (r_2007$ek))
r_2008 <- transform(r_2008, ROE = r_2008$aarsrs / (r_2008$ek))
r_2009 <- transform(r_2009, ROE = r_2009$aarsrs / (r_2009$ek))
r_2010 <- transform(r_2010, ROE = r_2010$aarsrs / (r_2010$ek))
r_2011 <- transform(r_2011, ROE = r_2011$aarsrs / (r_2011$ek))
r_2012 <- transform(r_2012, ROE = r_2012$aarsrs / (r_2012$ek))
r_2013 <- transform(r_2013, ROE = r_2013$aarsrs / (r_2013$ek))
r_2014 <- transform(r_2014, ROE = r_2014$aarsrs / (r_2014$ek))
r_2015 <- transform(r_2015, ROE = r_2015$aarsrs / (r_2015$ek))
r_2016 <- transform(r_2016, ROE = r_2016$aarsrs / (r_2016$ek))
r_2017 <- transform(r_2017, ROE = r_2017$aarsrs / (r_2017$ek))
r_2018 <- transform(r_2018, ROE = r_2018$aarsrs / (r_2018$ek))
r_2019 <- transform(r_2019, ROE = r_2019$aarsrs / (r_2019$ek))
r_2020 <- transform(r_2020, ROE = r_2020$aarsrs / (r_2020$ek))

r_2000$ROE[!is.finite(r_2000$ROE)] <- NA
r_2001$ROE[!is.finite(r_2001$ROE)] <- NA
r_2002$ROE[!is.finite(r_2002$ROE)] <- NA
r_2003$ROE[!is.finite(r_2003$ROE)] <- NA
```

```r
r_2004$ROE[!is.finite(r_2004$ROE)] <- NA
r_2005$ROE[!is.finite(r_2005$ROE)] <- NA
r_2006$ROE[!is.finite(r_2006$ROE)] <- NA
r_2007$ROE[!is.finite(r_2007$ROE)] <- NA
r_2008$ROE[!is.finite(r_2008$ROE)] <- NA
r_2009$ROE[!is.finite(r_2009$ROE)] <- NA
r_2010$ROE[!is.finite(r_2010$ROE)] <- NA
r_2011$ROE[!is.finite(r_2011$ROE)] <- NA
r_2012$ROE[!is.finite(r_2012$ROE)] <- NA
r_2013$ROE[!is.finite(r_2013$ROE)] <- NA
r_2014$ROE[!is.finite(r_2014$ROE)] <- NA
r_2015$ROE[!is.finite(r_2015$ROE)] <- NA
r_2016$ROE[!is.finite(r_2016$ROE)] <- NA
r_2017$ROE[!is.finite(r_2017$ROE)] <- NA
r_2018$ROE[!is.finite(r_2018$ROE)] <- NA
r_2019$ROE[!is.finite(r_2019$ROE)] <- NA
r_2020$ROE[!is.finite(r_2020$ROE)] <- NA


## ROA ##

r_2000 <- transform(r_2000, ROA = r_2000$aarsrs / r_2000$sumeiend)
r_2001 <- transform(r_2001, ROA = r_2001$aarsrs / r_2001$sumeiend)
r_2002 <- transform(r_2002, ROA = r_2002$aarsrs / r_2002$sumeiend)
r_2003 <- transform(r_2003, ROA = r_2003$aarsrs / r_2003$sumeiend)
r_2004 <- transform(r_2004, ROA = r_2004$aarsrs / r_2004$sumeiend)
r_2005 <- transform(r_2005, ROA = r_2005$aarsrs / r_2005$sumeiend)
r_2006 <- transform(r_2006, ROA = r_2006$aarsrs / r_2006$sumeiend)
r_2007 <- transform(r_2007, ROA = r_2007$aarsrs / r_2007$sumeiend)
r_2008 <- transform(r_2008, ROA = r_2008$aarsrs / r_2008$sumeiend)
r_2009 <- transform(r_2009, ROA = r_2009$aarsrs / r_2009$sumeiend)
r_2010 <- transform(r_2010, ROA = r_2010$aarsrs / r_2010$sumeiend)
r_2011 <- transform(r_2011, ROA = r_2011$aarsrs / r_2011$sumeiend)
r_2012 <- transform(r_2012, ROA = r_2012$aarsrs / r_2012$sumeiend)
r_2013 <- transform(r_2013, ROA = r_2013$aarsrs / r_2013$sumeiend)
r_2014 <- transform(r_2014, ROA = r_2014$aarsrs / r_2014$sumeiend)
r_2015 <- transform(r_2015, ROA = r_2015$aarsrs / r_2015$sumeiend)
r_2016 <- transform(r_2016, ROA = r_2016$aarsrs / r_2016$sumeiend)
r_2017 <- transform(r_2017, ROA = r_2017$aarsrs / r_2017$sumeiend)
r_2018 <- transform(r_2018, ROA = r_2018$aarsrs / r_2018$sumeiend)
r_2019 <- transform(r_2019, ROA = r_2019$aarsrs / r_2019$sumeiend)
r_2020 <- transform(r_2020, ROA = r_2020$aarsrs / r_2020$sumeiend)
```

```r
r_2000$ROA[!is.finite(r_2000$ROA)] <- NA
r_2001$ROA[!is.finite(r_2001$ROA)] <- NA
r_2002$ROA[!is.finite(r_2002$ROA)] <- NA
r_2003$ROA[!is.finite(r_2003$ROA)] <- NA
r_2004$ROA[!is.finite(r_2004$ROA)] <- NA
r_2005$ROA[!is.finite(r_2005$ROA)] <- NA
r_2006$ROA[!is.finite(r_2006$ROA)] <- NA
r_2007$ROA[!is.finite(r_2007$ROA)] <- NA
r_2008$ROA[!is.finite(r_2008$ROA)] <- NA
r_2009$ROA[!is.finite(r_2009$ROA)] <- NA
r_2010$ROA[!is.finite(r_2010$ROA)] <- NA
r_2011$ROA[!is.finite(r_2011$ROA)] <- NA
r_2012$ROA[!is.finite(r_2012$ROA)] <- NA
r_2013$ROA[!is.finite(r_2013$ROA)] <- NA
r_2014$ROA[!is.finite(r_2014$ROA)] <- NA
r_2015$ROA[!is.finite(r_2015$ROA)] <- NA
r_2016$ROA[!is.finite(r_2016$ROA)] <- NA
r_2017$ROA[!is.finite(r_2017$ROA)] <- NA
r_2018$ROA[!is.finite(r_2018$ROA)] <- NA
r_2019$ROA[!is.finite(r_2019$ROA)] <- NA
r_2020$ROA[!is.finite(r_2020$ROA)] <- NA



## CFOA ##

r_2000 <- transform(r_2000, CFOA = (r_2000$aarsrs + r_2000$avskr - r_2000$deltaAK - r_2000$CAPX) / r_2000$sumeiend)
r_2001 <- transform(r_2001, CFOA = (r_2001$aarsrs + r_2001$avskr - r_2001$deltaAK - r_2001$CAPX) / r_2001$sumeiend)
r_2002 <- transform(r_2002, CFOA = (r_2002$aarsrs + r_2002$avskr - r_2002$deltaAK - r_2002$CAPX) / r_2002$sumeiend)
r_2003 <- transform(r_2003, CFOA = (r_2003$aarsrs + r_2003$avskr - r_2003$deltaAK - r_2003$CAPX) / r_2003$sumeiend)
r_2004 <- transform(r_2004, CFOA = (r_2004$aarsrs + r_2004$avskr - r_2004$deltaAK - r_2004$CAPX) / r_2004$sumeiend)
r_2005 <- transform(r_2005, CFOA = (r_2005$aarsrs + r_2005$avskr - r_2005$deltaAK - r_2005$CAPX) / r_2005$sumeiend)
r_2006 <- transform(r_2006, CFOA = (r_2006$aarsrs + r_2006$avskr - r_2006$deltaAK - r_2006$CAPX) / r_2006$sumeiend)
r_2007 <- transform(r_2007, CFOA = (r_2007$aarsrs + r_2007$avskr - r_2007$deltaAK - r_2007$CAPX) / r_2007$sumeiend)
r_2008 <- transform(r_2008, CFOA = (r_2008$aarsrs + r_2008$avskr - r_2008$deltaAK - r_2008$CAPX) / r_2008$sumeiend)
r_2009 <- transform(r_2009, CFOA = (r_2009$aarsrs + r_2009$avskr - r_2009$deltaAK - r_2009$CAPX) / r_2009$sumeiend)
r_2010 <- transform(r_2010, CFOA = (r_2010$aarsrs + r_2010$avskr - r_2010$deltaAK - r_2010$CAPX) / r_2010$sumeiend)
r_2011 <- transform(r_2011, CFOA = (r_2011$aarsrs + r_2011$avskr - r_2011$deltaAK - r_2011$CAPX) / r_2011$sumeiend)
r_2012 <- transform(r_2012, CFOA = (r_2012$aarsrs + r_2012$avskr - r_2012$deltaAK - r_2012$CAPX) / r_2012$sumeiend)
r_2013 <- transform(r_2013, CFOA = (r_2013$aarsrs + r_2013$avskr - r_2013$deltaAK - r_2013$CAPX) / r_2013$sumeiend)
r_2014 <- transform(r_2014, CFOA = (r_2014$aarsrs + r_2014$avskr - r_2014$deltaAK - r_2014$CAPX) / r_2014$sumeiend)
```

```
r_2014 <- transform(r_2014, CFOA = (r_2014$aarsrs + r_2014$avskr - r_2014$deltaAK - r_2014$CAPX) / r_2014$sumeiend)
r_2015 <- transform(r_2015, CFOA = (r_2015$aarsrs + r_2015$avskr - r_2015$deltaAK - r_2015$CAPX) / r_2015$sumeiend)
r_2016 <- transform(r_2016, CFOA = (r_2016$aarsrs + r_2016$avskr - r_2016$deltaAK - r_2016$CAPX) / r_2016$sumeiend)
r_2017 <- transform(r_2017, CFOA = (r_2017$aarsrs + r_2017$avskr - r_2017$deltaAK - r_2017$CAPX) / r_2017$sumeiend)
r_2019 <- transform(r_2019, CFOA = (r_2019$aarsrs + r_2019$avskr - r_2019$deltaAK - r_2019$CAPX) / r_2019$sumeiend)
r_2020 <- transform(r_2020, CFOA = (r_2020$aarsrs + r_2020$avskr - r_2020$deltaAK - r_2020$CAPX) / r_2020$sumeiend)

r_2000$CFOA[!is.finite(r_2000$CFOA)] <- NA
r_2001$CFOA[!is.finite(r_2001$CFOA)] <- NA
r_2002$CFOA[!is.finite(r_2002$CFOA)] <- NA
r_2003$CFOA[!is.finite(r_2003$CFOA)] <- NA
r_2004$CFOA[!is.finite(r_2004$CFOA)] <- NA
r_2005$CFOA[!is.finite(r_2005$CFOA)] <- NA
r_2006$CFOA[!is.finite(r_2006$CFOA)] <- NA
r_2007$CFOA[!is.finite(r_2007$CFOA)] <- NA
r_2008$CFOA[!is.finite(r_2008$CFOA)] <- NA
r_2009$CFOA[!is.finite(r_2009$CFOA)] <- NA
r_2010$CFOA[!is.finite(r_2010$CFOA)] <- NA
r_2011$CFOA[!is.finite(r_2011$CFOA)] <- NA
r_2012$CFOA[!is.finite(r_2012$CFOA)] <- NA
r_2013$CFOA[!is.finite(r_2013$CFOA)] <- NA
r_2014$CFOA[!is.finite(r_2014$CFOA)] <- NA
r_2015$CFOA[!is.finite(r_2015$CFOA)] <- NA
r_2016$CFOA[!is.finite(r_2016$CFOA)] <- NA
r_2017$CFOA[!is.finite(r_2017$CFOA)] <- NA
r_2018$CFOA[!is.finite(r_2018$CFOA)] <- NA
r_2019$CFOA[!is.finite(r_2019$CFOA)] <- NA
r_2020$CFOA[!is.finite(r_2020$CFOA)] <- NA


## GMAR ##
r_2000 <- transform(r_2000, GMAR = (r_2000$salgsinn - (r_2000$varefor + r_2000$behend)) / r_2000$totinn)
r_2001 <- transform(r_2001, GMAR = (r_2001$salgsinn - (r_2001$varefor + r_2001$behend)) / r_2001$totinn)
r_2002 <- transform(r_2002, GMAR = (r_2002$salgsinn - (r_2002$varefor + r_2002$behend)) / r_2002$totinn)
r_2003 <- transform(r_2003, GMAR = (r_2003$salgsinn - (r_2003$varefor + r_2003$behend)) / r_2003$totinn)
r_2004 <- transform(r_2004, GMAR = (r_2004$salgsinn - (r_2004$varefor + r_2004$behend)) / r_2004$totinn)
r_2005 <- transform(r_2005, GMAR = (r_2005$salgsinn - (r_2005$varefor + r_2005$behend)) / r_2005$totinn)
r_2006 <- transform(r_2006, GMAR = (r_2006$salgsinn - (r_2006$varefor + r_2006$behend)) / r_2006$totinn)
r_2007 <- transform(r_2007, GMAR = (r_2007$salgsinn - (r_2007$varefor + r_2007$behend)) / r_2007$totinn)
```

```
r_2008 <- transform(r_2008, GMAR = (r_2008$salgsinn - (r_2008$varefor + r_2008$behend)) / r_2008$totinn)
r_2009 <- transform(r_2009, GMAR = (r_2009$salgsinn - (r_2009$varefor + r_2009$behend)) / r_2009$totinn)
r_2010 <- transform(r_2010, GMAR = (r_2010$salgsinn - (r_2010$varefor + r_2010$behend)) / r_2010$totinn)
r_2011 <- transform(r_2011, GMAR = (r_2011$salgsinn - (r_2011$varefor + r_2011$behend)) / r_2011$totinn)
r_2012 <- transform(r_2012, GMAR = (r_2012$salgsinn - (r_2012$varefor + r_2012$behend)) / r_2012$totinn)
r_2013 <- transform(r_2013, GMAR = (r_2013$salgsinn - (r_2013$varefor + r_2013$behend)) / r_2013$totinn)
r_2014 <- transform(r_2014, GMAR = (r_2014$salgsinn - (r_2014$varefor + r_2014$behend)) / r_2014$totinn)
r_2015 <- transform(r_2015, GMAR = (r_2015$salgsinn - (r_2015$varefor + r_2015$behend)) / r_2015$totinn)
r_2016 <- transform(r_2016, GMAR = (r_2016$salgsinn - (r_2016$varefor + r_2016$behend)) / r_2016$totinn)
r_2017 <- transform(r_2017, GMAR = (r_2017$salgsinn - (r_2017$varefor + r_2017$behend)) / r_2017$totinn)
r_2018 <- transform(r_2018, GMAR = (r_2018$salgsinn - (r_2018$varefor + r_2018$behend)) / r_2018$totinn)
r_2019 <- transform(r_2019, GMAR = (r_2019$salgsinn - (r_2019$varefor + r_2019$behend)) / r_2019$totinn)
r_2020 <- transform(r_2020, GMAR = (r_2020$salgsinn - (r_2020$varefor + r_2020$behend)) / r_2020$totinn)

r_2000$GMAR[!is.finite(r_2000$GMAR)] <- NA
r_2001$GMAR[!is.finite(r_2001$GMAR)] <- NA
r_2002$GMAR[!is.finite(r_2002$GMAR)] <- NA
r_2003$GMAR[!is.finite(r_2003$GMAR)] <- NA
r_2004$GMAR[!is.finite(r_2004$GMAR)] <- NA
r_2005$GMAR[!is.finite(r_2005$GMAR)] <- NA
r_2006$GMAR[!is.finite(r_2006$GMAR)] <- NA
r_2007$GMAR[!is.finite(r_2007$GMAR)] <- NA
r_2008$GMAR[!is.finite(r_2008$GMAR)] <- NA
r_2009$GMAR[!is.finite(r_2009$GMAR)] <- NA
r_2010$GMAR[!is.finite(r_2010$GMAR)] <- NA
r_2011$GMAR[!is.finite(r_2011$GMAR)] <- NA
r_2012$GMAR[!is.finite(r_2012$GMAR)] <- NA
r_2013$GMAR[!is.finite(r_2013$GMAR)] <- NA
r_2014$GMAR[!is.finite(r_2014$GMAR)] <- NA
r_2015$GMAR[!is.finite(r_2015$GMAR)] <- NA
r_2016$GMAR[!is.finite(r_2016$GMAR)] <- NA
r_2017$GMAR[!is.finite(r_2017$GMAR)] <- NA
r_2018$GMAR[!is.finite(r_2018$GMAR)] <- NA
r_2019$GMAR[!is.finite(r_2019$GMAR)] <- NA
r_2020$GMAR[!is.finite(r_2020$GMAR)] <- NA

## ACC ##
r_2000 <- transform(r_2000, ACC = (r_2000$avskr - r_2000$deltaAK) / r_2000$sumeiend)
r_2001 <- transform(r_2001, ACC = (r_2001$avskr - r_2001$deltaAK) / r_2001$sumeiend)
```

```r
## ACC ##
r_2000 <- transform(r_2000, ACC = (r_2000$avskr - r_2000$deltaAK) / r_2000$sumeiend)
r_2001 <- transform(r_2001, ACC = (r_2001$avskr - r_2001$deltaAK) / r_2001$sumeiend)
r_2002 <- transform(r_2002, ACC = (r_2002$avskr - r_2002$deltaAK) / r_2002$sumeiend)
r_2003 <- transform(r_2003, ACC = (r_2003$avskr - r_2003$deltaAK) / r_2003$sumeiend)
r_2004 <- transform(r_2004, ACC = (r_2004$avskr - r_2004$deltaAK) / r_2004$sumeiend)
r_2005 <- transform(r_2005, ACC = (r_2005$avskr - r_2005$deltaAK) / r_2005$sumeiend)
r_2006 <- transform(r_2006, ACC = (r_2006$avskr - r_2006$deltaAK) / r_2006$sumeiend)
r_2007 <- transform(r_2007, ACC = (r_2007$avskr - r_2007$deltaAK) / r_2007$sumeiend)
r_2008 <- transform(r_2008, ACC = (r_2008$avskr - r_2008$deltaAK) / r_2008$sumeiend)
r_2009 <- transform(r_2009, ACC = (r_2009$avskr - r_2009$deltaAK) / r_2009$sumeiend)
r_2010 <- transform(r_2010, ACC = (r_2010$avskr - r_2010$deltaAK) / r_2010$sumeiend)
r_2011 <- transform(r_2011, ACC = (r_2011$avskr - r_2011$deltaAK) / r_2011$sumeiend)
r_2012 <- transform(r_2012, ACC = (r_2012$avskr - r_2012$deltaAK) / r_2012$sumeiend)
r_2013 <- transform(r_2013, ACC = (r_2013$avskr - r_2013$deltaAK) / r_2013$sumeiend)
r_2014 <- transform(r_2014, ACC = (r_2014$avskr - r_2014$deltaAK) / r_2014$sumeiend)
r_2015 <- transform(r_2015, ACC = (r_2015$avskr - r_2015$deltaAK) / r_2015$sumeiend)
r_2016 <- transform(r_2016, ACC = (r_2016$avskr - r_2016$deltaAK) / r_2016$sumeiend)
r_2017 <- transform(r_2017, ACC = (r_2017$avskr - r_2017$deltaAK) / r_2017$sumeiend)
r_2018 <- transform(r_2018, ACC = (r_2018$avskr - r_2018$deltaAK) / r_2018$sumeiend)
r_2019 <- transform(r_2019, ACC = (r_2019$avskr - r_2019$deltaAK) / r_2019$sumeiend)
r_2020 <- transform(r_2020, ACC = (r_2020$avskr - r_2020$deltaAK) / r_2020$sumeiend)


r_2000$ACC[!is.finite(r_2000$ACC)] <- NA
r_2001$ACC[!is.finite(r_2001$ACC)] <- NA
r_2002$ACC[!is.finite(r_2002$ACC)] <- NA
r_2003$ACC[!is.finite(r_2003$ACC)] <- NA
r_2004$ACC[!is.finite(r_2004$ACC)] <- NA
r_2005$ACC[!is.finite(r_2005$ACC)] <- NA
r_2006$ACC[!is.finite(r_2006$ACC)] <- NA
r_2007$ACC[!is.finite(r_2007$ACC)] <- NA
r_2008$ACC[!is.finite(r_2008$ACC)] <- NA
r_2009$ACC[!is.finite(r_2009$ACC)] <- NA
r_2010$ACC[!is.finite(r_2010$ACC)] <- NA
r_2011$ACC[!is.finite(r_2011$ACC)] <- NA
r_2012$ACC[!is.finite(r_2012$ACC)] <- NA
r_2013$ACC[!is.finite(r_2013$ACC)] <- NA
r_2014$ACC[!is.finite(r_2014$ACC)] <- NA
```

```
r_2014$ACC[!is.finite(r_2014$ACC)] <- NA
r_2015$ACC[!is.finite(r_2015$ACC)] <- NA
r_2016$ACC[!is.finite(r_2016$ACC)] <- NA
r_2017$ACC[!is.finite(r_2017$ACC)] <- NA
r_2018$ACC[!is.finite(r_2018$ACC)] <- NA
r_2019$ACC[!is.finite(r_2019$ACC)] <- NA
r_2020$ACC[!is.finite(r_2020$ACC)] <- NA



#### Vekst - 5 mål ####

## lager dataframe som inneholder regnskapsdata for respektiv år og for 5 år siden ##

rd_2000 <- inner_join(r_1995,r_2000, by = "orgnr")
rd_2001 <- inner_join(r_1996,r_2001, by = "orgnr")
rd_2002 <- inner_join(r_1997,r_2002, by = "orgnr")
rd_2003 <- inner_join(r_1998,r_2003, by = "orgnr")
rd_2004 <- inner_join(r_1999,r_2004, by = "orgnr")
rd_2005 <- inner_join(r_2000,r_2005, by = "orgnr")
rd_2006 <- inner_join(r_2001,r_2006, by = "orgnr")
rd_2007 <- inner_join(r_2002,r_2007, by = "orgnr")
rd_2008 <- inner_join(r_2003,r_2008, by = "orgnr")
rd_2009 <- inner_join(r_2004,r_2009, by = "orgnr")
rd_2010 <- inner_join(r_2005,r_2010, by = "orgnr")
rd_2011 <- inner_join(r_2006,r_2011, by = "orgnr")
rd_2012 <- inner_join(r_2007,r_2012, by = "orgnr")
rd_2013 <- inner_join(r_2008,r_2013, by = "orgnr")
rd_2014 <- inner_join(r_2009,r_2014, by = "orgnr")
rd_2015 <- inner_join(r_2010,r_2015, by = "orgnr")
rd_2016 <- inner_join(r_2011,r_2016, by = "orgnr")
rd_2017 <- inner_join(r_2012,r_2017, by = "orgnr")
rd_2018 <- inner_join(r_2013,r_2018, by = "orgnr")
rd_2019 <- inner_join(r_2014,r_2019, by = "orgnr")
rd_2020 <- inner_join(r_2015,r_2020, by = "orgnr")


```

```r

## d-GPOA ##

rd_2000 <- transform(rd_2000, dGPOA = (((rd_2000$salgsinn.y-(rd_2000$varefor.y + rd_2000$behend.y))-(rd_2000$salgsinn.x-(rd_2000$varefor.x + rd_2000$behend.x))) / rd_2000$sumeiend.x))
rd_2001 <- transform(rd_2001, dGPOA = (((rd_2001$salgsinn.y-(rd_2001$varefor.y + rd_2001$behend.y))-(rd_2001$salgsinn.x-(rd_2001$varefor.x + rd_2001$behend.x))) / rd_2001$sumeiend.x))
rd_2002 <- transform(rd_2002, dGPOA = (((rd_2002$salgsinn.y-(rd_2002$varefor.y + rd_2002$behend.y))-(rd_2002$salgsinn.x-(rd_2002$varefor.x + rd_2002$behend.x))) / rd_2002$sumeiend.x))
rd_2003 <- transform(rd_2003, dGPOA = (((rd_2003$salgsinn.y-(rd_2003$varefor.y + rd_2003$behend.y))-(rd_2003$salgsinn.x-(rd_2003$varefor.x + rd_2003$behend.x))) / rd_2003$sumeiend.x))
rd_2004 <- transform(rd_2004, dGPOA = (((rd_2004$salgsinn.y-(rd_2004$varefor.y + rd_2004$behend.y))-(rd_2004$salgsinn.x-(rd_2004$varefor.x + rd_2004$behend.x))) / rd_2004$sumeiend.x))
rd_2005 <- transform(rd_2005, dGPOA = (((rd_2005$salgsinn.y-(rd_2005$varefor.y + rd_2005$behend.y))-(rd_2005$salgsinn.x-(rd_2005$varefor.x + rd_2005$behend.x))) / rd_2005$sumeiend.x))
rd_2006 <- transform(rd_2006, dGPOA = (((rd_2006$salgsinn.y-(rd_2006$varefor.y + rd_2006$behend.y))-(rd_2006$salgsinn.x-(rd_2006$varefor.x + rd_2006$behend.x))) / rd_2006$sumeiend.x))
rd_2007 <- transform(rd_2007, dGPOA = (((rd_2007$salgsinn.y-(rd_2007$varefor.y + rd_2007$behend.y))-(rd_2007$salgsinn.x-(rd_2007$varefor.x + rd_2007$behend.x))) / rd_2007$sumeiend.x))
rd_2008 <- transform(rd_2008, dGPOA = (((rd_2008$salgsinn.y-(rd_2008$varefor.y + rd_2008$behend.y))-(rd_2008$salgsinn.x-(rd_2008$varefor.x + rd_2008$behend.x))) / rd_2008$sumeiend.x))
rd_2009 <- transform(rd_2009, dGPOA = (((rd_2009$salgsinn.y-(rd_2009$varefor.y + rd_2009$behend.y))-(rd_2009$salgsinn.x-(rd_2009$varefor.x + rd_2009$behend.x))) / rd_2009$sumeiend.x))
rd_2010 <- transform(rd_2010, dGPOA = (((rd_2010$salgsinn.y-(rd_2010$varefor.y + rd_2010$behend.y))-(rd_2010$salgsinn.x-(rd_2010$varefor.x + rd_2010$behend.x))) / rd_2010$sumeiend.x))
rd_2011 <- transform(rd_2011, dGPOA = (((rd_2011$salgsinn.y-(rd_2011$varefor.y + rd_2011$behend.y))-(rd_2011$salgsinn.x-(rd_2011$varefor.x + rd_2011$behend.x))) / rd_2011$sumeiend.x))
rd_2012 <- transform(rd_2012, dGPOA = (((rd_2012$salgsinn.y-(rd_2012$varefor.y + rd_2012$behend.y))-(rd_2012$salgsinn.x-(rd_2012$varefor.x + rd_2012$behend.x))) / rd_2012$sumeiend.x))
rd_2013 <- transform(rd_2013, dGPOA = (((rd_2013$salgsinn.y-(rd_2013$varefor.y + rd_2013$behend.y))-(rd_2013$salgsinn.x-(rd_2013$varefor.x + rd_2013$behend.x))) / rd_2013$sumeiend.x))
rd_2014 <- transform(rd_2014, dGPOA = (((rd_2014$salgsinn.y-(rd_2014$varefor.y + rd_2014$behend.y))-(rd_2014$salgsinn.x-(rd_2014$varefor.x + rd_2014$behend.x))) / rd_2014$sumeiend.x))
rd_2015 <- transform(rd_2015, dGPOA = (((rd_2015$salgsinn.y-(rd_2015$varefor.y + rd_2015$behend.y))-(rd_2015$salgsinn.x-(rd_2015$varefor.x + rd_2015$behend.x))) / rd_2015$sumeiend.x))
rd_2016 <- transform(rd_2016, dGPOA = (((rd_2016$salgsinn.y-(rd_2016$varefor.y + rd_2016$behend.y))-(rd_2016$salgsinn.x-(rd_2016$varefor.x + rd_2016$behend.x))) / rd_2016$sumeiend.x))
rd_2017 <- transform(rd_2017, dGPOA = (((rd_2017$salgsinn.y-(rd_2017$varefor.y + rd_2017$behend.y))-(rd_2017$salgsinn.x-(rd_2017$varefor.x + rd_2017$behend.x))) / rd_2017$sumeiend.x))
rd_2018 <- transform(rd_2018, dGPOA = (((rd_2018$salgsinn.y-(rd_2018$varefor.y + rd_2018$behend.y))-(rd_2018$salgsinn.x-(rd_2018$varefor.x + rd_2018$behend.x))) / rd_2018$sumeiend.x))
rd_2019 <- transform(rd_2019, dGPOA = (((rd_2019$salgsinn.y-(rd_2019$varefor.y + rd_2019$behend.y))-(rd_2019$salgsinn.x-(rd_2019$varefor.x + rd_2019$behend.x))) / rd_2019$sumeiend.x))
rd_2020 <- transform(rd_2020, dGPOA = (((rd_2020$salgsinn.y-(rd_2020$varefor.y + rd_2020$behend.y))-(rd_2020$salgsinn.x-(rd_2020$varefor.x + rd_2020$behend.x))) / rd_2020$sumeiend.x))

rd_2000$dGPOA[!is.finite(rd_2000$dGPOA)] <- NA
rd_2001$dGPOA[!is.finite(rd_2001$dGPOA)] <- NA
rd_2002$dGPOA[!is.finite(rd_2002$dGPOA)] <- NA
rd_2003$dGPOA[!is.finite(rd_2003$dGPOA)] <- NA
rd_2004$dGPOA[!is.finite(rd_2004$dGPOA)] <- NA
rd_2005$dGPOA[!is.finite(rd_2005$dGPOA)] <- NA
rd_2006$dGPOA[!is.finite(rd_2006$dGPOA)] <- NA
rd_2007$dGPOA[!is.finite(rd_2007$dGPOA)] <- NA
rd_2008$dGPOA[!is.finite(rd_2008$dGPOA)] <- NA
rd_2009$dGPOA[!is.finite(rd_2009$dGPOA)] <- NA
rd_2010$dGPOA[!is.finite(rd_2010$dGPOA)] <- NA
rd_2011$dGPOA[!is.finite(rd_2011$dGPOA)] <- NA
rd_2012$dGPOA[!is.finite(rd_2012$dGPOA)] <- NA
rd_2013$dGPOA[!is.finite(rd_2013$dGPOA)] <- NA
rd_2014$dGPOA[!is.finite(rd_2014$dGPOA)] <- NA
rd_2015$dGPOA[!is.finite(rd_2015$dGPOA)] <- NA
rd_2016$dGPOA[!is.finite(rd_2016$dGPOA)] <- NA
```

```r
rd_2017$dGPOA[!is.finite(rd_2017$dGPOA)] <- NA
rd_2018$dGPOA[!is.finite(rd_2018$dGPOA)] <- NA
rd_2019$dGPOA[!is.finite(rd_2019$dGPOA)] <- NA
rd_2020$dGPOA[!is.finite(rd_2020$dGPOA)] <- NA


## d-ROE ##

rd_2000 <- transform(rd_2000, dROE = (rd_2000$aarsrs.y - rd_2000$aarsrs.x) / (rd_2000$ek.x))
rd_2001 <- transform(rd_2001, dROE = (rd_2001$aarsrs.y - rd_2001$aarsrs.x) / (rd_2001$ek.x))
rd_2002 <- transform(rd_2002, dROE = (rd_2002$aarsrs.y - rd_2002$aarsrs.x) / (rd_2002$ek.x))
rd_2003 <- transform(rd_2003, dROE = (rd_2003$aarsrs.y - rd_2003$aarsrs.x) / (rd_2003$ek.x))
rd_2004 <- transform(rd_2004, dROE = (rd_2004$aarsrs.y - rd_2004$aarsrs.x) / (rd_2004$ek.x))
rd_2005 <- transform(rd_2005, dROE = (rd_2005$aarsrs.y - rd_2005$aarsrs.x) / (rd_2005$ek.x))
rd_2006 <- transform(rd_2006, dROE = (rd_2006$aarsrs.y - rd_2006$aarsrs.x) / (rd_2006$ek.x))
rd_2007 <- transform(rd_2007, dROE = (rd_2007$aarsrs.y - rd_2007$aarsrs.x) / (rd_2007$ek.x))
rd_2008 <- transform(rd_2008, dROE = (rd_2008$aarsrs.y - rd_2008$aarsrs.x) / (rd_2008$ek.x))
rd_2009 <- transform(rd_2009, dROE = (rd_2009$aarsrs.y - rd_2009$aarsrs.x) / (rd_2009$ek.x))
rd_2010 <- transform(rd_2010, dROE = (rd_2010$aarsrs.y - rd_2010$aarsrs.x) / (rd_2010$ek.x))
rd_2011 <- transform(rd_2011, dROE = (rd_2011$aarsrs.y - rd_2011$aarsrs.x) / (rd_2011$ek.x))
rd_2012 <- transform(rd_2012, dROE = (rd_2012$aarsrs.y - rd_2012$aarsrs.x) / (rd_2012$ek.x))
rd_2013 <- transform(rd_2013, dROE = (rd_2013$aarsrs.y - rd_2013$aarsrs.x) / (rd_2013$ek.x))
rd_2014 <- transform(rd_2014, dROE = (rd_2014$aarsrs.y - rd_2014$aarsrs.x) / (rd_2014$ek.x))
rd_2015 <- transform(rd_2015, dROE = (rd_2015$aarsrs.y - rd_2015$aarsrs.x) / (rd_2015$ek.x))
rd_2016 <- transform(rd_2016, dROE = (rd_2016$aarsrs.y - rd_2016$aarsrs.x) / (rd_2016$ek.x))
rd_2017 <- transform(rd_2017, dROE = (rd_2017$aarsrs.y - rd_2017$aarsrs.x) / (rd_2017$ek.x))
rd_2018 <- transform(rd_2018, dROE = (rd_2018$aarsrs.y - rd_2018$aarsrs.x) / (rd_2018$ek.x))
rd_2019 <- transform(rd_2019, dROE = (rd_2019$aarsrs.y - rd_2019$aarsrs.x) / (rd_2019$ek.x))
rd_2020 <- transform(rd_2020, dROE = (rd_2020$aarsrs.y - rd_2020$aarsrs.x) / (rd_2020$ek.x))

rd_2000$dROE[!is.finite(rd_2000$dROE)] <- NA
rd_2001$dROE[!is.finite(rd_2001$dROE)] <- NA
rd_2002$dROE[!is.finite(rd_2002$dROE)] <- NA
rd_2003$dROE[!is.finite(rd_2003$dROE)] <- NA
rd_2004$dROE[!is.finite(rd_2004$dROE)] <- NA
rd_2005$dROE[!is.finite(rd_2005$dROE)] <- NA
rd_2006$dROE[!is.finite(rd_2006$dROE)] <- NA
rd_2007$dROE[!is.finite(rd_2007$dROE)] <- NA
rd_2008$dROE[!is.finite(rd_2008$dROE)] <- NA
```

```r
rd_2008$dROE[!is.finite(rd_2008$dROE)] <- NA
rd_2009$dROE[!is.finite(rd_2009$dROE)] <- NA
rd_2010$dROE[!is.finite(rd_2010$dROE)] <- NA
rd_2011$dROE[!is.finite(rd_2011$dROE)] <- NA
rd_2012$dROE[!is.finite(rd_2012$dROE)] <- NA
rd_2013$dROE[!is.finite(rd_2013$dROE)] <- NA
rd_2014$dROE[!is.finite(rd_2014$dROE)] <- NA
rd_2015$dROE[!is.finite(rd_2015$dROE)] <- NA
rd_2016$dROE[!is.finite(rd_2016$dROE)] <- NA
rd_2017$dROE[!is.finite(rd_2017$dROE)] <- NA
rd_2018$dROE[!is.finite(rd_2018$dROE)] <- NA
rd_2019$dROE[!is.finite(rd_2019$dROE)] <- NA
rd_2020$dROE[!is.finite(rd_2020$dROE)] <- NA


## d-ROA ##

rd_2000 <- transform(rd_2000, dROA = (rd_2000$aarsrs.y - rd_2000$aarsrs.x) / rd_2000$sumeiend.x)
rd_2001 <- transform(rd_2001, dROA = (rd_2001$aarsrs.y - rd_2001$aarsrs.x) / rd_2001$sumeiend.x)
rd_2002 <- transform(rd_2002, dROA = (rd_2002$aarsrs.y - rd_2002$aarsrs.x) / rd_2002$sumeiend.x)
rd_2003 <- transform(rd_2003, dROA = (rd_2003$aarsrs.y - rd_2003$aarsrs.x) / rd_2003$sumeiend.x)
rd_2004 <- transform(rd_2004, dROA = (rd_2004$aarsrs.y - rd_2004$aarsrs.x) / rd_2004$sumeiend.x)
rd_2005 <- transform(rd_2005, dROA = (rd_2005$aarsrs.y - rd_2005$aarsrs.x) / rd_2005$sumeiend.x)
rd_2006 <- transform(rd_2006, dROA = (rd_2006$aarsrs.y - rd_2006$aarsrs.x) / rd_2006$sumeiend.x)
rd_2007 <- transform(rd_2007, dROA = (rd_2007$aarsrs.y - rd_2007$aarsrs.x) / rd_2007$sumeiend.x)
rd_2008 <- transform(rd_2008, dROA = (rd_2008$aarsrs.y - rd_2008$aarsrs.x) / rd_2008$sumeiend.x)
rd_2009 <- transform(rd_2009, dROA = (rd_2009$aarsrs.y - rd_2009$aarsrs.x) / rd_2009$sumeiend.x)
rd_2010 <- transform(rd_2010, dROA = (rd_2010$aarsrs.y - rd_2010$aarsrs.x) / rd_2010$sumeiend.x)
rd_2011 <- transform(rd_2011, dROA = (rd_2011$aarsrs.y - rd_2011$aarsrs.x) / rd_2011$sumeiend.x)
rd_2012 <- transform(rd_2012, dROA = (rd_2012$aarsrs.y - rd_2012$aarsrs.x) / rd_2012$sumeiend.x)
rd_2013 <- transform(rd_2013, dROA = (rd_2013$aarsrs.y - rd_2013$aarsrs.x) / rd_2013$sumeiend.x)
rd_2014 <- transform(rd_2014, dROA = (rd_2014$aarsrs.y - rd_2014$aarsrs.x) / rd_2014$sumeiend.x)
rd_2015 <- transform(rd_2015, dROA = (rd_2015$aarsrs.y - rd_2015$aarsrs.x) / rd_2015$sumeiend.x)
rd_2016 <- transform(rd_2016, dROA = (rd_2016$aarsrs.y - rd_2016$aarsrs.x) / rd_2016$sumeiend.x)
rd_2017 <- transform(rd_2017, dROA = (rd_2017$aarsrs.y - rd_2017$aarsrs.x) / rd_2017$sumeiend.x)
rd_2018 <- transform(rd_2018, dROA = (rd_2018$aarsrs.y - rd_2018$aarsrs.x) / rd_2018$sumeiend.x)
rd_2019 <- transform(rd_2019, dROA = (rd_2019$aarsrs.y - rd_2019$aarsrs.x) / rd_2019$sumeiend.x)
rd_2020 <- transform(rd_2020, dROA = (rd_2020$aarsrs.y - rd_2020$aarsrs.x) / rd_2020$sumeiend.x)

rd_2000$dROA[!is.finite(rd_2000$dROA)] <- NA
```

```r
rd_2001$dROA[!is.finite(rd_2001$dROA)] <- NA
rd_2002$dROA[!is.finite(rd_2002$dROA)] <- NA
rd_2003$dROA[!is.finite(rd_2003$dROA)] <- NA
rd_2004$dROA[!is.finite(rd_2004$dROA)] <- NA
rd_2005$dROA[!is.finite(rd_2005$dROA)] <- NA
rd_2006$dROA[!is.finite(rd_2006$dROA)] <- NA
rd_2007$dROA[!is.finite(rd_2007$dROA)] <- NA
rd_2008$dROA[!is.finite(rd_2008$dROA)] <- NA
rd_2009$dROA[!is.finite(rd_2009$dROA)] <- NA
rd_2010$dROA[!is.finite(rd_2010$dROA)] <- NA
rd_2011$dROA[!is.finite(rd_2011$dROA)] <- NA
rd_2012$dROA[!is.finite(rd_2012$dROA)] <- NA
rd_2013$dROA[!is.finite(rd_2013$dROA)] <- NA
rd_2014$dROA[!is.finite(rd_2014$dROA)] <- NA
rd_2015$dROA[!is.finite(rd_2015$dROA)] <- NA
rd_2016$dROA[!is.finite(rd_2016$dROA)] <- NA
rd_2017$dROA[!is.finite(rd_2017$dROA)] <- NA
rd_2018$dROA[!is.finite(rd_2018$dROA)] <- NA
rd_2019$dROA[!is.finite(rd_2019$dROA)] <- NA
rd_2020$dROA[!is.finite(rd_2020$dROA)] <- NA


## d-CFOA ##

rd_2000 <- transform(rd_2000, dCFOA = ((rd_2000$aarsrs.y + rd_2000$avskr.y - rd_2000$deltaAK.y - rd_2000$CAPX.y) - (rd_2000$aarsrs.x + rd_2000$avskr.x - rd_2000$deltaAK.x - rd_2000$CAPX.x)) / rd_2000$sumeiend.x)
rd_2001 <- transform(rd_2001, dCFOA = ((rd_2001$aarsrs.y + rd_2001$avskr.y - rd_2001$deltaAK.y - rd_2001$CAPX.y) - (rd_2001$aarsrs.x + rd_2001$avskr.x - rd_2001$deltaAK.x - rd_2001$CAPX.x)) / rd_2001$sumeiend.x)
rd_2002 <- transform(rd_2002, dCFOA = ((rd_2002$aarsrs.y + rd_2002$avskr.y - rd_2002$deltaAK.y - rd_2002$CAPX.y) - (rd_2002$aarsrs.x + rd_2002$avskr.x - rd_2002$deltaAK.x - rd_2002$CAPX.x)) / rd_2002$sumeiend.x)
rd_2003 <- transform(rd_2003, dCFOA = ((rd_2003$aarsrs.y + rd_2003$avskr.y - rd_2003$deltaAK.y - rd_2003$CAPX.y) - (rd_2003$aarsrs.x + rd_2003$avskr.x - rd_2003$deltaAK.x - rd_2003$CAPX.x)) / rd_2003$sumeiend.x)
rd_2004 <- transform(rd_2004, dCFOA = ((rd_2004$aarsrs.y + rd_2004$avskr.y - rd_2004$deltaAK.y - rd_2004$CAPX.y) - (rd_2004$aarsrs.x + rd_2004$avskr.x - rd_2004$deltaAK.x - rd_2004$CAPX.x)) / rd_2004$sumeiend.x)
rd_2005 <- transform(rd_2005, dCFOA = ((rd_2005$aarsrs.y + rd_2005$avskr.y - rd_2005$deltaAK.y - rd_2005$CAPX.y) - (rd_2005$aarsrs.x + rd_2005$avskr.x - rd_2005$deltaAK.x - rd_2005$CAPX.x)) / rd_2005$sumeiend.x)
rd_2006 <- transform(rd_2006, dCFOA = ((rd_2006$aarsrs.y + rd_2006$avskr.y - rd_2006$deltaAK.y - rd_2006$CAPX.y) - (rd_2006$aarsrs.x + rd_2006$avskr.x - rd_2006$deltaAK.x - rd_2006$CAPX.x)) / rd_2006$sumeiend.x)
rd_2007 <- transform(rd_2007, dCFOA = ((rd_2007$aarsrs.y + rd_2007$avskr.y - rd_2007$deltaAK.y - rd_2007$CAPX.y) - (rd_2007$aarsrs.x + rd_2007$avskr.x - rd_2007$deltaAK.x - rd_2007$CAPX.x)) / rd_2007$sumeiend.x)
rd_2008 <- transform(rd_2008, dCFOA = ((rd_2008$aarsrs.y + rd_2008$avskr.y - rd_2008$deltaAK.y - rd_2008$CAPX.y) - (rd_2008$aarsrs.x + rd_2008$avskr.x - rd_2008$deltaAK.x - rd_2008$CAPX.x)) / rd_2008$sumeiend.x)
rd_2009 <- transform(rd_2009, dCFOA = ((rd_2009$aarsrs.y + rd_2009$avskr.y - rd_2009$deltaAK.y - rd_2009$CAPX.y) - (rd_2009$aarsrs.x + rd_2009$avskr.x - rd_2009$deltaAK.x - rd_2009$CAPX.x)) / rd_2009$sumeiend.x)
rd_2010 <- transform(rd_2010, dCFOA = ((rd_2010$aarsrs.y + rd_2010$avskr.y - rd_2010$deltaAK.y - rd_2010$CAPX.y) - (rd_2010$aarsrs.x + rd_2010$avskr.x - rd_2010$deltaAK.x - rd_2010$CAPX.x)) / rd_2010$sumeiend.x)
rd_2011 <- transform(rd_2011, dCFOA = ((rd_2011$aarsrs.y + rd_2011$avskr.y - rd_2011$deltaAK.y - rd_2011$CAPX.y) - (rd_2011$aarsrs.x + rd_2011$avskr.x - rd_2011$deltaAK.x - rd_2011$CAPX.x)) / rd_2011$sumeiend.x)
rd_2012 <- transform(rd_2012, dCFOA = ((rd_2012$aarsrs.y + rd_2012$avskr.y - rd_2012$deltaAK.y - rd_2012$CAPX.y) - (rd_2012$aarsrs.x + rd_2012$avskr.x - rd_2012$deltaAK.x - rd_2012$CAPX.x)) / rd_2012$sumeiend.x)
rd_2013 <- transform(rd_2013, dCFOA = ((rd_2013$aarsrs.y + rd_2013$avskr.y - rd_2013$deltaAK.y - rd_2013$CAPX.y) - (rd_2013$aarsrs.x + rd_2013$avskr.x - rd_2013$deltaAK.x - rd_2013$CAPX.x)) / rd_2013$sumeiend.x)
rd_2014 <- transform(rd_2014, dCFOA = ((rd_2014$aarsrs.y + rd_2014$avskr.y - rd_2014$deltaAK.y - rd_2014$CAPX.y) - (rd_2014$aarsrs.x + rd_2014$avskr.x - rd_2014$deltaAK.x - rd_2014$CAPX.x)) / rd_2014$sumeiend.x)
rd_2015 <- transform(rd_2015, dCFOA = ((rd_2015$aarsrs.y + rd_2015$avskr.y - rd_2015$deltaAK.y - rd_2015$CAPX.y) - (rd_2015$aarsrs.x + rd_2015$avskr.x - rd_2015$deltaAK.x - rd_2015$CAPX.x)) / rd_2015$sumeiend.x)
rd_2016 <- transform(rd_2016, dCFOA = ((rd_2016$aarsrs.y + rd_2016$avskr.y - rd_2016$deltaAK.y - rd_2016$CAPX.y) - (rd_2016$aarsrs.x + rd_2016$avskr.x - rd_2016$deltaAK.x - rd_2016$CAPX.x)) / rd_2016$sumeiend.x)
rd_2017 <- transform(rd_2017, dCFOA = ((rd_2017$aarsrs.y + rd_2017$avskr.y - rd_2017$deltaAK.y - rd_2017$CAPX.y) - (rd_2017$aarsrs.x + rd_2017$avskr.x - rd_2017$deltaAK.x - rd_2017$CAPX.x)) / rd_2017$sumeiend.x)
```

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rd_2017 <- transform(rd_2017, dCFOA = ((rd_2017$aarsrs.y + rd_2017$avskr.y - rd_2017$deltaAK.y - rd_2017$CAPX.y) - (rd_2017$aarsrs.x + rd_2017$avskr.x - rd_2017$deltaAK.x - rd_2017$CAPX.x)) / rd_2017$sumeiend.x)
rd_2018 <- transform(rd_2018, dCFOA = ((rd_2018$aarsrs.y + rd_2018$avskr.y - rd_2018$deltaAK.y - rd_2018$CAPX.y) - (rd_2018$aarsrs.x + rd_2018$avskr.x - rd_2018$deltaAK.x - rd_2018$CAPX.x)) / rd_2018$sumeiend.x)
rd_2019 <- transform(rd_2019, dCFOA = ((rd_2019$aarsrs.y + rd_2019$avskr.y - rd_2019$deltaAK.y - rd_2019$CAPX.y) - (rd_2019$aarsrs.x + rd_2019$avskr.x - rd_2019$deltaAK.x - rd_2019$CAPX.x)) / rd_2019$sumeiend.x)
rd_2020 <- transform(rd_2020, dCFOA = ((rd_2020$aarsrs.y + rd_2020$avskr.y - rd_2020$deltaAK.y - rd_2020$CAPX.y) - (rd_2020$aarsrs.x + rd_2020$avskr.x - rd_2020$deltaAK.x - rd_2020$CAPX.x)) / rd_2020$sumeiend.x)

rd_2000$dCFOA[!is.finite(rd_2000$dCFOA)] <- NA
rd_2001$dCFOA[!is.finite(rd_2001$dCFOA)] <- NA
rd_2002$dCFOA[!is.finite(rd_2002$dCFOA)] <- NA
rd_2003$dCFOA[!is.finite(rd_2003$dCFOA)] <- NA
rd_2004$dCFOA[!is.finite(rd_2004$dCFOA)] <- NA
rd_2005$dCFOA[!is.finite(rd_2005$dCFOA)] <- NA
rd_2006$dCFOA[!is.finite(rd_2006$dCFOA)] <- NA
rd_2007$dCFOA[!is.finite(rd_2007$dCFOA)] <- NA
rd_2008$dCFOA[!is.finite(rd_2008$dCFOA)] <- NA
rd_2009$dCFOA[!is.finite(rd_2009$dCFOA)] <- NA
rd_2010$dCFOA[!is.finite(rd_2010$dCFOA)] <- NA
rd_2011$dCFOA[!is.finite(rd_2011$dCFOA)] <- NA
rd_2012$dCFOA[!is.finite(rd_2012$dCFOA)] <- NA
rd_2013$dCFOA[!is.finite(rd_2013$dCFOA)] <- NA
rd_2014$dCFOA[!is.finite(rd_2014$dCFOA)] <- NA
rd_2015$dCFOA[!is.finite(rd_2015$dCFOA)] <- NA
rd_2016$dCFOA[!is.finite(rd_2016$dCFOA)] <- NA
rd_2017$dCFOA[!is.finite(rd_2017$dCFOA)] <- NA
rd_2018$dCFOA[!is.finite(rd_2018$dCFOA)] <- NA
rd_2019$dCFOA[!is.finite(rd_2019$dCFOA)] <- NA
rd_2020$dCFOA[!is.finite(rd_2020$dCFOA)] <- NA

## d-GMAR ##

rd_2000 <- transform(rd_2000, dGMAR = (((rd_2000$salgsinn.y-(rd_2000$varefor.y + rd_2000$behend.y))-(rd_2000$salgsinn.x-(rd_2000$varefor.x + rd_2000$behend.x)))) / rd_2000$totinn.x))
rd_2001 <- transform(rd_2001, dGMAR = (((rd_2001$salgsinn.y-(rd_2001$varefor.y + rd_2001$behend.y))-(rd_2001$salgsinn.x-(rd_2001$varefor.x + rd_2001$behend.x)))) / rd_2001$totinn.x))
rd_2002 <- transform(rd_2002, dGMAR = (((rd_2002$salgsinn.y-(rd_2002$varefor.y + rd_2002$behend.y))-(rd_2002$salgsinn.x-(rd_2002$varefor.x + rd_2002$behend.x)))) / rd_2002$totinn.x))
rd_2003 <- transform(rd_2003, dGMAR = (((rd_2003$salgsinn.y-(rd_2003$varefor.y + rd_2003$behend.y))-(rd_2003$salgsinn.x-(rd_2003$varefor.x + rd_2003$behend.x)))) / rd_2003$totinn.x))
rd_2004 <- transform(rd_2004, dGMAR = (((rd_2004$salgsinn.y-(rd_2004$varefor.y + rd_2004$behend.y))-(rd_2004$salgsinn.x-(rd_2004$varefor.x + rd_2004$behend.x)))) / rd_2004$totinn.x))
rd_2005 <- transform(rd_2005, dGMAR = (((rd_2005$salgsinn.y-(rd_2005$varefor.y + rd_2005$behend.y))-(rd_2005$salgsinn.x-(rd_2005$varefor.x + rd_2005$behend.x)))) / rd_2005$totinn.x))
rd_2006 <- transform(rd_2006, dGMAR = (((rd_2006$salgsinn.y-(rd_2006$varefor.y + rd_2006$behend.y))-(rd_2006$salgsinn.x-(rd_2006$varefor.x + rd_2006$behend.x)))) / rd_2006$totinn.x))
rd_2007 <- transform(rd_2007, dGMAR = (((rd_2007$salgsinn.y-(rd_2007$varefor.y + rd_2007$behend.y))-(rd_2007$salgsinn.x-(rd_2007$varefor.x + rd_2007$behend.x)))) / rd_2007$totinn.x))
rd_2008 <- transform(rd_2008, dGMAR = (((rd_2008$salgsinn.y-(rd_2008$varefor.y + rd_2008$behend.y))-(rd_2008$salgsinn.x-(rd_2008$varefor.x + rd_2008$behend.x)))) / rd_2008$totinn.x))
rd_2009 <- transform(rd_2009, dGMAR = (((rd_2009$salgsinn.y-(rd_2009$varefor.y + rd_2009$behend.y))-(rd_2009$salgsinn.x-(rd_2009$varefor.x + rd_2009$behend.x)))) / rd_2009$totinn.x))
rd_2010 <- transform(rd_2010, dGMAR = (((rd_2010$salgsinn.y-(rd_2010$varefor.y + rd_2010$behend.y))-(rd_2010$salgsinn.x-(rd_2010$varefor.x + rd_2010$behend.x)))) / rd_2010$totinn.x))
```

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rd_2010 <- transform(rd_2010, dGMAR = (((rd_2010$salgsinn.y-(rd_2010$varefor.y + rd_2010$behend.y))-(rd_2010$salgsinn.x-(rd_2010$varefor.x + rd_2010$behend.x)))) / rd_2010$totinn.x))
rd_2011 <- transform(rd_2011, dGMAR = (((rd_2011$salgsinn.y-(rd_2011$varefor.y + rd_2011$behend.y))-(rd_2011$salgsinn.x-(rd_2011$varefor.x + rd_2011$behend.x)))) / rd_2011$totinn.x))
rd_2012 <- transform(rd_2012, dGMAR = (((rd_2012$salgsinn.y-(rd_2012$varefor.y + rd_2012$behend.y))-(rd_2012$salgsinn.x-(rd_2012$varefor.x + rd_2012$behend.x)))) / rd_2012$totinn.x))
rd_2013 <- transform(rd_2013, dGMAR = (((rd_2013$salgsinn.y-(rd_2013$varefor.y + rd_2013$behend.y))-(rd_2013$salgsinn.x-(rd_2013$varefor.x + rd_2013$behend.x)))) / rd_2013$totinn.x))
rd_2014 <- transform(rd_2014, dGMAR = (((rd_2014$salgsinn.y-(rd_2014$varefor.y + rd_2014$behend.y))-(rd_2014$salgsinn.x-(rd_2014$varefor.x + rd_2014$behend.x)))) / rd_2014$totinn.x))
rd_2015 <- transform(rd_2015, dGMAR = (((rd_2015$salgsinn.y-(rd_2015$varefor.y + rd_2015$behend.y))-(rd_2015$salgsinn.x-(rd_2015$varefor.x + rd_2015$behend.x)))) / rd_2015$totinn.x))
rd_2016 <- transform(rd_2016, dGMAR = (((rd_2016$salgsinn.y-(rd_2016$varefor.y + rd_2016$behend.y))-(rd_2016$salgsinn.x-(rd_2016$varefor.x + rd_2016$behend.x)))) / rd_2016$totinn.x))
rd_2017 <- transform(rd_2017, dGMAR = (((rd_2017$salgsinn.y-(rd_2017$varefor.y + rd_2017$behend.y))-(rd_2017$salgsinn.x-(rd_2017$varefor.x + rd_2017$behend.x)))) / rd_2017$totinn.x))
rd_2018 <- transform(rd_2018, dGMAR = (((rd_2018$salgsinn.y-(rd_2018$varefor.y + rd_2018$behend.y))-(rd_2018$salgsinn.x-(rd_2018$varefor.x + rd_2018$behend.x)))) / rd_2018$totinn.x))
rd_2019 <- transform(rd_2019, dGMAR = (((rd_2019$salgsinn.y-(rd_2019$varefor.y + rd_2019$behend.y))-(rd_2019$salgsinn.x-(rd_2019$varefor.x + rd_2019$behend.x)))) / rd_2019$totinn.x))
rd_2020 <- transform(rd_2020, dGMAR = (((rd_2020$salgsinn.y-(rd_2020$varefor.y + rd_2020$behend.y))-(rd_2020$salgsinn.x-(rd_2020$varefor.x + rd_2020$behend.x)))) / rd_2020$totinn.x))

rd_2000$dGMAR[!is.finite(rd_2000$dGMAR)] <- NA
rd_2001$dGMAR[!is.finite(rd_2001$dGMAR)] <- NA
rd_2002$dGMAR[!is.finite(rd_2002$dGMAR)] <- NA
rd_2003$dGMAR[!is.finite(rd_2003$dGMAR)] <- NA
rd_2004$dGMAR[!is.finite(rd_2004$dGMAR)] <- NA
rd_2005$dGMAR[!is.finite(rd_2005$dGMAR)] <- NA
rd_2006$dGMAR[!is.finite(rd_2006$dGMAR)] <- NA
rd_2007$dGMAR[!is.finite(rd_2007$dGMAR)] <- NA
rd_2008$dGMAR[!is.finite(rd_2008$dGMAR)] <- NA
rd_2009$dGMAR[!is.finite(rd_2009$dGMAR)] <- NA
rd_2010$dGMAR[!is.finite(rd_2010$dGMAR)] <- NA
rd_2011$dGMAR[!is.finite(rd_2011$dGMAR)] <- NA
rd_2012$dGMAR[!is.finite(rd_2012$dGMAR)] <- NA
rd_2013$dGMAR[!is.finite(rd_2013$dGMAR)] <- NA
rd_2014$dGMAR[!is.finite(rd_2014$dGMAR)] <- NA
rd_2015$dGMAR[!is.finite(rd_2015$dGMAR)] <- NA
rd_2016$dGMAR[!is.finite(rd_2016$dGMAR)] <- NA
rd_2017$dGMAR[!is.finite(rd_2017$dGMAR)] <- NA
rd_2018$dGMAR[!is.finite(rd_2018$dGMAR)] <- NA
rd_2019$dGMAR[!is.finite(rd_2019$dGMAR)] <- NA
rd_2020$dGMAR[!is.finite(rd_2020$dGMAR)] <- NA
```
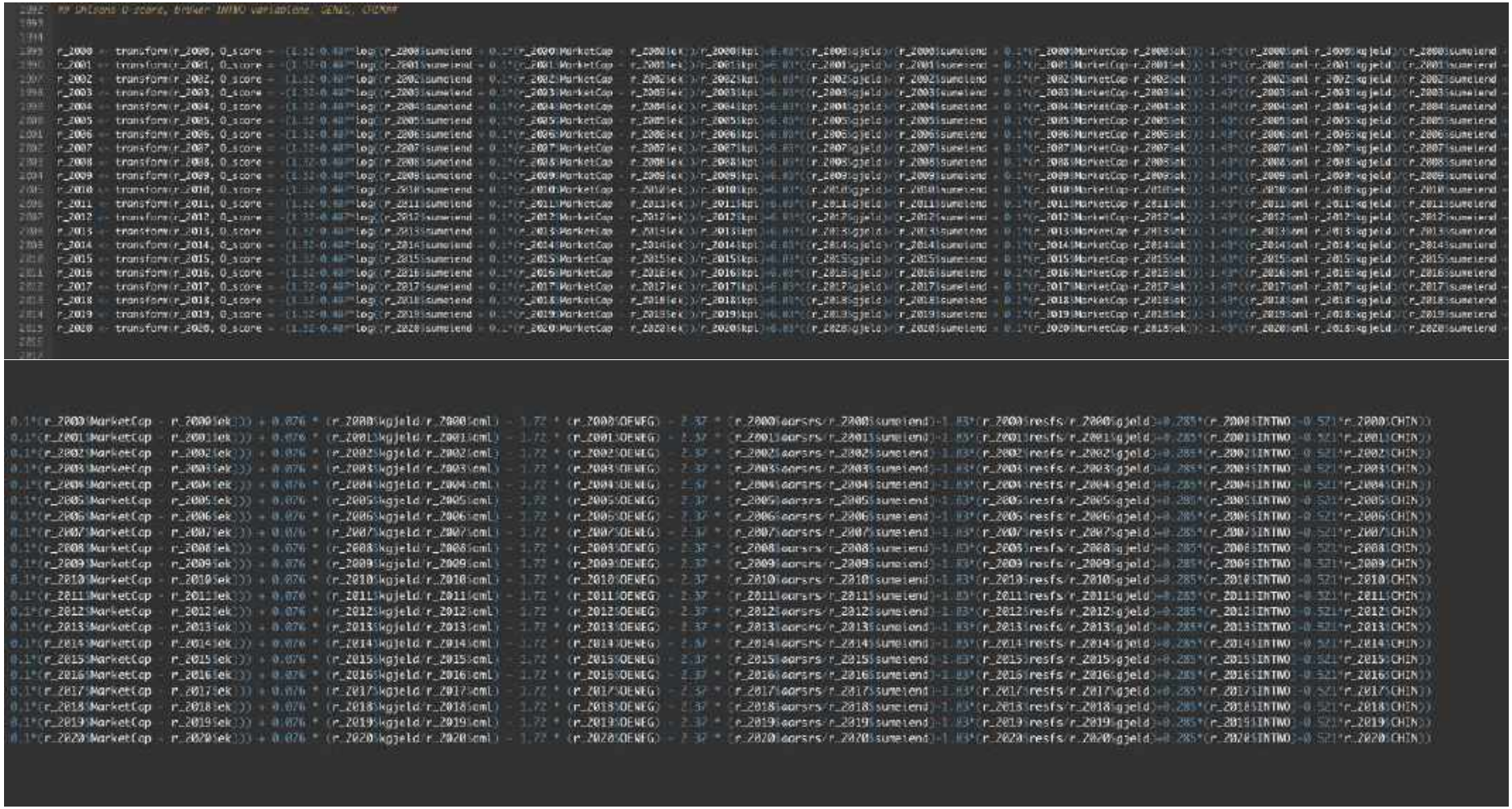

```r
#### Sikkerhet - 5 mål ####

## BAB ##

## dette er allerede beregnet - og lagt inn i dataframene ##

## LEV ##

r_2000 <- transform(r_2000, LEV = - (r_2000$kgjeld + r_2000$lgjeld) / r_2000$sumeiend )
r_2001 <- transform(r_2001, LEV = - (r_2001$kgjeld + r_2001$lgjeld) / r_2001$sumeiend )
r_2002 <- transform(r_2002, LEV = - (r_2002$kgjeld + r_2002$lgjeld) / r_2002$sumeiend )
r_2003 <- transform(r_2003, LEV = - (r_2003$kgjeld + r_2003$lgjeld) / r_2003$sumeiend )
r_2004 <- transform(r_2004, LEV = - (r_2004$kgjeld + r_2004$lgjeld) / r_2004$sumeiend )
r_2005 <- transform(r_2005, LEV = - (r_2005$kgjeld + r_2005$lgjeld) / r_2005$sumeiend )
r_2006 <- transform(r_2006, LEV = - (r_2006$kgjeld + r_2006$lgjeld) / r_2006$sumeiend )
r_2007 <- transform(r_2007, LEV = - (r_2007$kgjeld + r_2007$lgjeld) / r_2007$sumeiend )
r_2008 <- transform(r_2008, LEV = - (r_2008$kgjeld + r_2008$lgjeld) / r_2008$sumeiend )
r_2009 <- transform(r_2009, LEV = - (r_2009$kgjeld + r_2009$lgjeld) / r_2009$sumeiend )
r_2010 <- transform(r_2010, LEV = - (r_2010$kgjeld + r_2010$lgjeld) / r_2010$sumeiend )
r_2011 <- transform(r_2011, LEV = - (r_2011$kgjeld + r_2011$lgjeld) / r_2011$sumeiend )
r_2012 <- transform(r_2012, LEV = - (r_2012$kgjeld + r_2012$lgjeld) / r_2012$sumeiend )
r_2013 <- transform(r_2013, LEV = - (r_2013$kgjeld + r_2013$lgjeld) / r_2013$sumeiend )
r_2014 <- transform(r_2014, LEV = - (r_2014$kgjeld + r_2014$lgjeld) / r_2014$sumeiend )
r_2015 <- transform(r_2015, LEV = - (r_2015$kgjeld + r_2015$lgjeld) / r_2015$sumeiend )
r_2016 <- transform(r_2016, LEV = - (r_2016$kgjeld + r_2016$lgjeld) / r_2016$sumeiend )
r_2017 <- transform(r_2017, LEV = - (r_2017$kgjeld + r_2017$lgjeld) / r_2017$sumeiend )
r_2018 <- transform(r_2018, LEV = - (r_2018$kgjeld + r_2018$lgjeld) / r_2018$sumeiend )
r_2019 <- transform(r_2019, LEV = - (r_2018$kgjeld + r_2019$lgjeld) / r_2019$sumeiend )
r_2020 <- transform(r_2020, LEV = - (r_2018$kgjeld + r_2020$lgjeld) / r_2020$sumeiend )

```



Disse kodene henger sammen

```
r_2000$O_score[!is.finite(r_2000$O_score)] <- NA
r_2001$O_score[!is.finite(r_2001$O_score)] <- NA
r_2002$O_score[!is.finite(r_2002$O_score)] <- NA
r_2003$O_score[!is.finite(r_2003$O_score)] <- NA
r_2004$O_score[!is.finite(r_2004$O_score)] <- NA
r_2005$O_score[!is.finite(r_2005$O_score)] <- NA
r_2006$O_score[!is.finite(r_2006$O_score)] <- NA
r_2007$O_score[!is.finite(r_2007$O_score)] <- NA
r_2008$O_score[!is.finite(r_2008$O_score)] <- NA
r_2009$O_score[!is.finite(r_2009$O_score)] <- NA
r_2010$O_score[!is.finite(r_2010$O_score)] <- NA
r_2011$O_score[!is.finite(r_2011$O_score)] <- NA
r_2012$O_score[!is.finite(r_2012$O_score)] <- NA
r_2013$O_score[!is.finite(r_2013$O_score)] <- NA
r_2014$O_score[!is.finite(r_2014$O_score)] <- NA
r_2015$O_score[!is.finite(r_2015$O_score)] <- NA
r_2016$O_score[!is.finite(r_2016$O_score)] <- NA
r_2017$O_score[!is.finite(r_2017$O_score)] <- NA
r_2018$O_score[!is.finite(r_2018$O_score)] <- NA
r_2019$O_score[!is.finite(r_2019$O_score)] <- NA
r_2020$O_score[!is.finite(r_2020$O_score)] <- NA
```

```r
## Altmans Z-score ##

r_2000 <- transform(r_2000, AltmanZ = (1.2 * (r_2000$oml - r_2000$kgjeld - r_2000$cash) + 1.4 * (r_2000$aarsrs - r_2000$utb) + 3.3 * r_2000$driftsrs + 0.6 * r_2000$MarketCap + r_2000$totinn) / r_2000$sumeiend)
r_2001 <- transform(r_2001, AltmanZ = (1.2 * (r_2001$oml - r_2001$kgjeld - r_2001$cash) + 1.4 * (r_2001$aarsrs - r_2001$utb) + 3.3 * r_2001$driftsrs + 0.6 * r_2001$MarketCap + r_2001$totinn) / r_2001$sumeiend)
r_2002 <- transform(r_2002, AltmanZ = (1.2 * (r_2002$oml - r_2002$kgjeld - r_2002$cash) + 1.4 * (r_2002$aarsrs - r_2002$utb) + 3.3 * r_2002$driftsrs + 0.6 * r_2002$MarketCap + r_2002$totinn) / r_2002$sumeiend)
r_2003 <- transform(r_2003, AltmanZ = (1.2 * (r_2003$oml - r_2003$kgjeld - r_2003$cash) + 1.4 * (r_2003$aarsrs - r_2003$utb) + 3.3 * r_2003$driftsrs + 0.6 * r_2003$MarketCap + r_2003$totinn) / r_2003$sumeiend)
r_2004 <- transform(r_2004, AltmanZ = (1.2 * (r_2004$oml - r_2004$kgjeld - r_2004$cash) + 1.4 * (r_2004$aarsrs - r_2004$utb) + 3.3 * r_2004$driftsrs + 0.6 * r_2004$MarketCap + r_2004$totinn) / r_2004$sumeiend)
r_2005 <- transform(r_2005, AltmanZ = (1.2 * (r_2005$oml - r_2005$kgjeld - r_2005$cash) + 1.4 * (r_2005$aarsrs - r_2005$utb) + 3.3 * r_2005$driftsrs + 0.6 * r_2005$MarketCap + r_2005$totinn) / r_2005$sumeiend)
r_2006 <- transform(r_2006, AltmanZ = (1.2 * (r_2006$oml - r_2006$kgjeld - r_2006$cash) + 1.4 * (r_2006$aarsrs - r_2006$utb) + 3.3 * r_2006$driftsrs + 0.6 * r_2006$MarketCap + r_2006$totinn) / r_2006$sumeiend)
r_2007 <- transform(r_2007, AltmanZ = (1.2 * (r_2007$oml - r_2007$kgjeld - r_2007$cash) + 1.4 * (r_2007$aarsrs - r_2007$utb) + 3.3 * r_2007$driftsrs + 0.6 * r_2007$MarketCap + r_2007$totinn) / r_2007$sumeiend)
r_2008 <- transform(r_2008, AltmanZ = (1.2 * (r_2008$oml - r_2008$kgjeld - r_2008$cash) + 1.4 * (r_2008$aarsrs - r_2008$utb) + 3.3 * r_2008$driftsrs + 0.6 * r_2008$MarketCap + r_2008$totinn) / r_2008$sumeiend)
r_2009 <- transform(r_2009, AltmanZ = (1.2 * (r_2009$oml - r_2009$kgjeld - r_2009$cash) + 1.4 * (r_2009$aarsrs - r_2009$utb) + 3.3 * r_2009$driftsrs + 0.6 * r_2009$MarketCap + r_2009$totinn) / r_2009$sumeiend)
r_2010 <- transform(r_2010, AltmanZ = (1.2 * (r_2010$oml - r_2010$kgjeld - r_2010$cash) + 1.4 * (r_2010$aarsrs - r_2010$utb) + 3.3 * r_2010$driftsrs + 0.6 * r_2010$MarketCap + r_2010$totinn) / r_2010$sumeiend)
r_2011 <- transform(r_2011, AltmanZ = (1.2 * (r_2011$oml - r_2011$kgjeld - r_2011$cash) + 1.4 * (r_2011$aarsrs - r_2011$utb) + 3.3 * r_2011$driftsrs + 0.6 * r_2011$MarketCap + r_2011$totinn) / r_2011$sumeiend)
r_2012 <- transform(r_2012, AltmanZ = (1.2 * (r_2012$oml - r_2012$kgjeld - r_2012$cash) + 1.4 * (r_2012$aarsrs - r_2012$utb) + 3.3 * r_2012$driftsrs + 0.6 * r_2012$MarketCap + r_2012$totinn) / r_2012$sumeiend)
r_2013 <- transform(r_2013, AltmanZ = (1.2 * (r_2013$oml - r_2013$kgjeld - r_2013$cash) + 1.4 * (r_2013$aarsrs - r_2013$utb) + 3.3 * r_2013$driftsrs + 0.6 * r_2013$MarketCap + r_2013$totinn) / r_2013$sumeiend)
r_2014 <- transform(r_2014, AltmanZ = (1.2 * (r_2014$oml - r_2014$kgjeld - r_2014$cash) + 1.4 * (r_2014$aarsrs - r_2014$utb) + 3.3 * r_2014$driftsrs + 0.6 * r_2014$MarketCap + r_2014$totinn) / r_2014$sumeiend)
r_2015 <- transform(r_2015, AltmanZ = (1.2 * (r_2015$oml - r_2015$kgjeld - r_2015$cash) + 1.4 * (r_2015$aarsrs - r_2015$utb) + 3.3 * r_2015$driftsrs + 0.6 * r_2015$MarketCap + r_2015$totinn) / r_2015$sumeiend)
r_2016 <- transform(r_2016, AltmanZ = (1.2 * (r_2016$oml - r_2016$kgjeld - r_2016$cash) + 1.4 * (r_2016$aarsrs - r_2016$utb) + 3.3 * r_2016$driftsrs + 0.6 * r_2016$MarketCap + r_2016$totinn) / r_2016$sumeiend)
r_2017 <- transform(r_2017, AltmanZ = (1.2 * (r_2017$oml - r_2017$kgjeld - r_2017$cash) + 1.4 * (r_2017$aarsrs - r_2017$utb) + 3.3 * r_2017$driftsrs + 0.6 * r_2017$MarketCap + r_2017$totinn) / r_2017$sumeiend)
r_2018 <- transform(r_2018, AltmanZ = (1.2 * (r_2018$oml - r_2018$kgjeld - r_2018$cash) + 1.4 * (r_2018$aarsrs - r_2018$utb) + 3.3 * r_2018$driftsrs + 0.6 * r_2018$MarketCap + r_2018$totinn) / r_2018$sumeiend)
r_2019 <- transform(r_2019, AltmanZ = (1.2 * (r_2019$oml - r_2019$kgjeld - r_2019$cash) + 1.4 * (r_2019$aarsrs - r_2019$utb) + 3.3 * r_2019$driftsrs + 0.6 * r_2019$MarketCap + r_2019$totinn) / r_2019$sumeiend)
r_2020 <- transform(r_2020, AltmanZ = (1.2 * (r_2020$oml - r_2020$kgjeld - r_2020$cash) + 1.4 * (r_2020$aarsrs - r_2020$utb) + 3.3 * r_2020$driftsrs + 0.6 * r_2020$MarketCap + r_2020$totinn) / r_2020$sumeiend)


r_2000$AltmanZ[ is.finite(r_2000$AltmanZ)] <- NA
r_2001$AltmanZ[ is.finite(r_2001$AltmanZ)] <- NA
r_2002$AltmanZ[ is.finite(r_2002$AltmanZ)] <- NA
r_2003$AltmanZ[ is.finite(r_2003$AltmanZ)] <- NA
r_2004$AltmanZ[ is.finite(r_2004$AltmanZ)] <- NA
r_2005$AltmanZ[ is.finite(r_2005$AltmanZ)] <- NA
r_2006$AltmanZ[ is.finite(r_2006$AltmanZ)] <- NA
r_2007$AltmanZ[ is.finite(r_2007$AltmanZ)] <- NA
r_2008$AltmanZ[ is.finite(r_2008$AltmanZ)] <- NA
r_2009$AltmanZ[ is.finite(r_2009$AltmanZ)] <- NA
r_2010$AltmanZ[ is.finite(r_2010$AltmanZ)] <- NA
r_2011$AltmanZ[ is.finite(r_2011$AltmanZ)] <- NA
r_2012$AltmanZ[ is.finite(r_2012$AltmanZ)] <- NA
```

```r
## EVOL ##

re_2000 <- r_2000[, c("orgnr", "navn", "ROE")]
re_2001 <- r_2001[, c("orgnr", "navn", "ROE")]
re_2002 <- r_2002[, c("orgnr", "navn", "ROE")]
re_2003 <- r_2003[, c("orgnr", "navn", "ROE")]
re_2004 <- r_2004[, c("orgnr", "navn", "ROE")]
re_2005 <- r_2005[, c("orgnr", "navn", "ROE")]
re_2006 <- r_2006[, c("orgnr", "navn", "ROE")]
re_2007 <- r_2007[, c("orgnr", "navn", "ROE")]
re_2008 <- r_2008[, c("orgnr", "navn", "ROE")]
re_2009 <- r_2009[, c("orgnr", "navn", "ROE")]
re_2010 <- r_2010[, c("orgnr", "navn", "ROE")]
re_2011 <- r_2011[, c("orgnr", "navn", "ROE")]
re_2012 <- r_2012[, c("orgnr", "navn", "ROE")]
re_2013 <- r_2013[, c("orgnr", "navn", "ROE")]
re_2014 <- r_2014[, c("orgnr", "navn", "ROE")]
re_2015 <- r_2015[, c("orgnr", "navn", "ROE")]
re_2016 <- r_2016[, c("orgnr", "navn", "ROE")]
re_2017 <- r_2017[, c("orgnr", "navn", "ROE")]
re_2019 <- r_2019[, c("orgnr", "navn", "ROE")]
re_2020 <- r_2020[, c("orgnr", "navn", "ROE")]



## standard div. for hver linje, som nå er et selskap med 5 år med ROE ##

re4_2000$EVOL = rowSds(as.matrix(re4_2000[,c(3,4,5,6,7)]))
re4_2001$EVOL = rowSds(as.matrix(re4_2001[,c(3,4,5,6,7)]))
re4_2002$EVOL = rowSds(as.matrix(re4_2002[,c(3,4,5,6,7)]))
re4_2003$EVOL = rowSds(as.matrix(re4_2003[,c(3,4,5,6,7)]))
re4_2004$EVOL = rowSds(as.matrix(re4_2004[,c(3,4,5,6,7)]))
re4_2005$EVOL = rowSds(as.matrix(re4_2005[,c(3,4,5,6,7)]))
re4_2006$EVOL = rowSds(as.matrix(re4_2006[,c(3,4,5,6,7)]))
re4_2007$EVOL = rowSds(as.matrix(re4_2007[,c(3,4,5,6,7)]))
re4_2008$EVOL = rowSds(as.matrix(re4_2008[,c(3,4,5,6,7)]))
re4_2009$EVOL = rowSds(as.matrix(re4_2009[,c(3,4,5,6,7)]))
```

```r
## standard div. for hver linje, som nå er et selskap med 5 år med ROE ##

re4_2000$EVOL = rowSds(as.matrix(re4_2000[,c(3,4,5,6,7)]))
re4_2001$EVOL = rowSds(as.matrix(re4_2001[,c(3,4,5,6,7)]))
re4_2002$EVOL = rowSds(as.matrix(re4_2002[,c(3,4,5,6,7)]))
re4_2003$EVOL = rowSds(as.matrix(re4_2003[,c(3,4,5,6,7)]))
re4_2004$EVOL = rowSds(as.matrix(re4_2004[,c(3,4,5,6,7)]))
re4_2005$EVOL = rowSds(as.matrix(re4_2005[,c(3,4,5,6,7)]))
re4_2006$EVOL = rowSds(as.matrix(re4_2006[,c(3,4,5,6,7)]))
re4_2007$EVOL = rowSds(as.matrix(re4_2007[,c(3,4,5,6,7)]))
re4_2008$EVOL = rowSds(as.matrix(re4_2008[,c(3,4,5,6,7)]))
re4_2009$EVOL = rowSds(as.matrix(re4_2009[,c(3,4,5,6,7)]))
re4_2010$EVOL = rowSds(as.matrix(re4_2010[,c(3,4,5,6,7)]))
re4_2011$EVOL = rowSds(as.matrix(re4_2011[,c(3,4,5,6,7)]))
re4_2012$EVOL = rowSds(as.matrix(re4_2012[,c(3,4,5,6,7)]))
re4_2013$EVOL = rowSds(as.matrix(re4_2013[,c(3,4,5,6,7)]))
re4_2014$EVOL = rowSds(as.matrix(re4_2014[,c(3,4,5,6,7)]))
re4_2015$EVOL = rowSds(as.matrix(re4_2015[,c(3,4,5,6,7)]))
re4_2016$EVOL = rowSds(as.matrix(re4_2016[,c(3,4,5,6,7)]))
re4_2017$EVOL = rowSds(as.matrix(re4_2017[,c(3,4,5,6,7)]))
re4_2018$EVOL = rowSds(as.matrix(re4_2018[,c(3,4,5,6,7)]))
re4_2019$EVOL = rowSds(as.matrix(re4_2019[,c(3,4,5,6,7)]))
re4_2020$EVOL = rowSds(as.matrix(re4_2020[,c(3,4,5,6,7)]))

## I likhet med beta skal EVOL rangeressynkende ##

re4_2000$EVOL <- -re4_2000$EVOL
re4_2001$EVOL <- -re4_2001$EVOL
re4_2002$EVOL <- -re4_2002$EVOL
re4_2003$EVOL <- -re4_2003$EVOL
re4_2004$EVOL <- -re4_2004$EVOL
re4_2005$EVOL <- -re4_2005$EVOL
re4_2006$EVOL <- -re4_2006$EVOL
re4_2007$EVOL <- -re4_2007$EVOL
re4_2008$EVOL <- -re4_2008$EVOL
re4_2009$EVOL <- -re4_2009$EVOL
re4_2010$EVOL <- -re4_2010$EVOL
re4_2011$EVOL <- -re4_2011$EVOL
re4_2012$EVOL <- -re4_2012$EVOL
re4_2013$EVOL <- -re4_2013$EVOL
```

```r
re4_2014$EVOL <- -re4_2014$EVOL
re4_2015$EVOL <- -re4_2015$EVOL
re4_2016$EVOL <- -re4_2016$EVOL
re4_2017$EVOL <- -re4_2017$EVOL
re4_2018$EVOL <- -re4_2018$EVOL
re4_2019$EVOL <- -re4_2019$EVOL
re4_2020$EVOL <- -re4_2020$EVOL

r_2000 <- merge(r_2000, re4_2000[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2001 <- merge(r_2001, re4_2001[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2002 <- merge(r_2002, re4_2002[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2003 <- merge(r_2003, re4_2003[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2004 <- merge(r_2004, re4_2004[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2005 <- merge(r_2005, re4_2005[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2006 <- merge(r_2006, re4_2006[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2007 <- merge(r_2007, re4_2007[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2008 <- merge(r_2008, re4_2008[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2009 <- merge(r_2009, re4_2009[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2010 <- merge(r_2010, re4_2010[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2011 <- merge(r_2011, re4_2011[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2012 <- merge(r_2012, re4_2012[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2013 <- merge(r_2013, re4_2013[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2014 <- merge(r_2014, re4_2014[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2015 <- merge(r_2015, re4_2015[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2016 <- merge(r_2016, re4_2016[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2017 <- merge(r_2017, re4_2017[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2018 <- merge(r_2018, re4_2018[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2019 <- merge(r_2019, re4_2019[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)
r_2020 <- merge(r_2020, re4_2020[ , c("orgnr","EVOL")], by = "orgnr", all.x=T)


r_2000$EVOL[!is.finite(r_2000$EVOL)] <- NA
r_2001$EVOL[!is.finite(r_2001$EVOL)] <- NA
r_2002$EVOL[!is.finite(r_2002$EVOL)] <- NA
r_2003$EVOL[!is.finite(r_2003$EVOL)] <- NA
r_2004$EVOL[!is.finite(r_2004$EVOL)] <- NA
r_2005$EVOL[!is.finite(r_2005$EVOL)] <- NA
r_2006$EVOL[!is.finite(r_2006$EVOL)] <- NA
r_2007$EVOL[!is.finite(r_2007$EVOL)] <- NA
```

```
r_2007$EVOL[!is.finite(r_2007$EVOL)] <- NA
r_2008$EVOL[!is.finite(r_2008$EVOL)] <- NA
r_2009$EVOL[!is.finite(r_2009$EVOL)] <- NA
r_2010$EVOL[!is.finite(r_2010$EVOL)] <- NA
r_2011$EVOL[!is.finite(r_2011$EVOL)] <- NA
r_2012$EVOL[!is.finite(r_2012$EVOL)] <- NA
r_2013$EVOL[!is.finite(r_2013$EVOL)] <- NA
r_2014$EVOL[!is.finite(r_2014$EVOL)] <- NA
r_2015$EVOL[!is.finite(r_2015$EVOL)] <- NA
r_2016$EVOL[!is.finite(r_2016$EVOL)] <- NA
r_2017$EVOL[!is.finite(r_2017$EVOL)] <- NA
r_2018$EVOL[!is.finite(r_2018$EVOL)] <- NA
r_2019$EVOL[!is.finite(r_2019$EVOL)] <- NA
r_2020$EVOL[!is.finite(r_2020$EVOL)] <- NA


## samler kvalitetsmålene ####
## inkluderer individuelle kvalitetsmål for vekst og sikkerhet i samlet dataframe ##

## VEKST VARIABLER ##
r_2000 <- merge(r_2000, rd_2000[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2001 <- merge(r_2001, rd_2001[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2002 <- merge(r_2002, rd_2002[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2003 <- merge(r_2003, rd_2003[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2004 <- merge(r_2004, rd_2004[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2005 <- merge(r_2005, rd_2005[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2006 <- merge(r_2006, rd_2006[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2007 <- merge(r_2007, rd_2007[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2008 <- merge(r_2008, rd_2008[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2009 <- merge(r_2009, rd_2009[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2010 <- merge(r_2010, rd_2010[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2011 <- merge(r_2011, rd_2011[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2012 <- merge(r_2012, rd_2012[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2013 <- merge(r_2013, rd_2013[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2014 <- merge(r_2014, rd_2014[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2015 <- merge(r_2015, rd_2015[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2016 <- merge(r_2016, rd_2016[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2017 <- merge(r_2017, rd_2017[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2018 <- merge(r_2018, rd_2018[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2019 <- merge(r_2019, rd_2019[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
```

```
r_2018 <- merge(r_2018, rd_2018[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2019 <- merge(r_2019, rd_2019[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)
r_2020 <- merge(r_2020, rd_2020[, c("orgnr", "dGPOA", "dROE", "dROA", "dCFOA", "dGMAR")], by = "orgnr", all.x=T)


## Fjerner selskap som mangler regnskapsdata i utvalget ##
aksjer <- left_join(aksjer, AksjedataMarketCap[ c("Date", "aar", "CompanyID")], by = c("Date" = "Date", "CompanyID" = "CompanyID"))
colnames(aksjer) <- c("Date", "SecurityID", "SecurityName", "CompanyID", "Last", "AdjLast", "SharesIssued", "R", "MarketCap1", "rf", "R2", "orgnr", "aar")

aksjer_2000 <- aksjer[aksjer$aar == "2000", ]
aksjer_2001 <- aksjer[aksjer$aar == "2001", ]
aksjer_2002 <- aksjer[aksjer$aar == "2002", ]
aksjer_2003 <- aksjer[aksjer$aar == "2003", ]
aksjer_2004 <- aksjer[aksjer$aar == "2004", ]
aksjer_2005 <- aksjer[aksjer$aar == "2005", ]
aksjer_2006 <- aksjer[aksjer$aar == "2006", ]
aksjer_2007 <- aksjer[aksjer$aar == "2007", ]
aksjer_2008 <- aksjer[aksjer$aar == "2008", ]
aksjer_2009 <- aksjer[aksjer$aar == "2009", ]
aksjer_2010 <- aksjer[aksjer$aar == "2010", ]
aksjer_2011 <- aksjer[aksjer$aar == "2011", ]
aksjer_2012 <- aksjer[aksjer$aar == "2012", ]
aksjer_2013 <- aksjer[aksjer$aar == "2013", ]
aksjer_2014 <- aksjer[aksjer$aar == "2014", ]
aksjer_2015 <- aksjer[aksjer$aar == "2015", ]
aksjer_2016 <- aksjer[aksjer$aar == "2016", ]
aksjer_2017 <- aksjer[aksjer$aar == "2017", ]
aksjer_2018 <- aksjer[aksjer$aar == "2018", ]
aksjer_2019 <- aksjer[aksjer$aar == "2019", ]
aksjer_2020 <- aksjer[aksjer$aar == "2020", ]


r_2000 <- left_join(r_2000, aksjer_2000[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2001 <- left_join(r_2001, aksjer_2001[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2002 <- left_join(r_2002, aksjer_2002[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2003 <- left_join(r_2003, aksjer_2003[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2004 <- left_join(r_2004, aksjer_2004[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2005 <- left_join(r_2005, aksjer_2005[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2006 <- left_join(r_2006, aksjer_2006[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2007 <- left_join(r_2007, aksjer_2007[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2008 <- left_join(r_2008, aksjer_2008[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
```

```
r_2009 <- left_join(r_2009, aksjer_2009[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2010 <- left_join(r_2010, aksjer_2010[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2011 <- left_join(r_2011, aksjer_2011[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2012 <- left_join(r_2012, aksjer_2012[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2013 <- left_join(r_2013, aksjer_2013[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2014 <- left_join(r_2014, aksjer_2014[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2015 <- left_join(r_2015, aksjer_2015[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2016 <- left_join(r_2016, aksjer_2016[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2017 <- left_join(r_2017, aksjer_2017[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2018 <- left_join(r_2018, aksjer_2018[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2019 <- left_join(r_2019, aksjer_2019[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))
r_2020 <- left_join(r_2020, aksjer_2020[c("orgnr", "aar", "R2", "MarketCap1")], by = c("orgnr" = "orgnr", "aar" = "aar"))

r_2000 <- r_2000[!is.na(r_2000$R2), ]
r_2001 <- r_2001[!is.na(r_2001$R2), ]
r_2002 <- r_2002[!is.na(r_2002$R2), ]
r_2003 <- r_2003[!is.na(r_2003$R2), ]
r_2004 <- r_2004[!is.na(r_2004$R2), ]
r_2005 <- r_2005[!is.na(r_2005$R2), ]
r_2006 <- r_2006[!is.na(r_2006$R2), ]
r_2007 <- r_2007[!is.na(r_2007$R2), ]
r_2008 <- r_2008[!is.na(r_2008$R2), ]
r_2009 <- r_2009[!is.na(r_2009$R2), ]
r_2010 <- r_2010[!is.na(r_2010$R2), ]
r_2011 <- r_2011[!is.na(r_2011$R2), ]
r_2012 <- r_2012[!is.na(r_2012$R2), ]
r_2013 <- r_2013[!is.na(r_2013$R2), ]
r_2014 <- r_2014[!is.na(r_2014$R2), ]
r_2015 <- r_2015[!is.na(r_2015$R2), ]
r_2016 <- r_2016[!is.na(r_2016$R2), ]
r_2017 <- r_2017[!is.na(r_2017$R2), ]
r_2018 <- r_2018[!is.na(r_2018$R2), ]
r_2019 <- r_2019[!is.na(r_2019$R2), ]
r_2020 <- r_2020[!is.na(r_2020$R2), ]

r_2000 <- r_2000[!duplicated(r_2000[c('aar', 'orgnr')]),]
r_2001 <- r_2001[!duplicated(r_2001[c('aar', 'orgnr')]),]
r_2002 <- r_2002[!duplicated(r_2002[c('aar', 'orgnr')]),]
r_2003 <- r_2003[!duplicated(r_2003[c('aar', 'orgnr')]),]
r_2004 <- r_2004[!duplicated(r_2004[c('aar', 'orgnr')]),]
r_2005 <- r_2005[!duplicated(r_2005[c('aar', 'orgnr')]),]
r_2006 <- r_2006[!duplicated(r_2006[c('aar', 'orgnr')]),]
```

```r
r_2007 <- r_2007[!duplicated(r_2007[c('aar', 'orgnr')]),]
r_2008 <- r_2008[!duplicated(r_2008[c('aar', 'orgnr')]),]
r_2009 <- r_2009[!duplicated(r_2009[c('aar', 'orgnr')]),]
r_2010 <- r_2010[!duplicated(r_2010[c('aar', 'orgnr')]),]
r_2011 <- r_2011[!duplicated(r_2011[c('aar', 'orgnr')]),]
r_2012 <- r_2012[!duplicated(r_2012[c('aar', 'orgnr')]),]
r_2013 <- r_2013[!duplicated(r_2013[c('aar', 'orgnr')]),]
r_2014 <- r_2014[!duplicated(r_2014[c('aar', 'orgnr')]),]
r_2015 <- r_2015[!duplicated(r_2015[c('aar', 'orgnr')]),]
r_2016 <- r_2016[!duplicated(r_2016[c('aar', 'orgnr')]),]
r_2017 <- r_2017[!duplicated(r_2017[c('aar', 'orgnr')]),]
r_2018 <- r_2018[!duplicated(r_2018[c('aar', 'orgnr')]),]
r_2019 <- r_2019[!duplicated(r_2019[c('aar', 'orgnr')]),]
r_2020 <- r_2020[!duplicated(r_2020[c('aar', 'orgnr')]),]



### Z-verdier ######
### regner ut z-verdiene først for de individuelle kvalitetsmålene med å skalere verdiene i henhold til orginale studiet ##

## Lønnsomhet Z-verdier ####

## Z-GPOA ##

r_2000 <- transform(r_2000, zGPOA = scale(r_2000$GPOA))
r_2001 <- transform(r_2001, zGPOA = scale(r_2001$GPOA))
r_2002 <- transform(r_2002, zGPOA = scale(r_2002$GPOA))
r_2003 <- transform(r_2003, zGPOA = scale(r_2003$GPOA))
r_2004 <- transform(r_2004, zGPOA = scale(r_2004$GPOA))
r_2005 <- transform(r_2005, zGPOA = scale(r_2005$GPOA))
r_2006 <- transform(r_2006, zGPOA = scale(r_2006$GPOA))
r_2007 <- transform(r_2007, zGPOA = scale(r_2007$GPOA))
r_2008 <- transform(r_2008, zGPOA = scale(r_2008$GPOA))
r_2009 <- transform(r_2009, zGPOA = scale(r_2009$GPOA))
r_2010 <- transform(r_2010, zGPOA = scale(r_2010$GPOA))
r_2011 <- transform(r_2011, zGPOA = scale(r_2011$GPOA))
r_2012 <- transform(r_2012, zGPOA = scale(r_2012$GPOA))
r_2013 <- transform(r_2013, zGPOA = scale(r_2013$GPOA))
r_2014 <- transform(r_2014, zGPOA = scale(r_2014$GPOA))
```

```r
r_2014 <- transform(r_2014, zGPOA = scale(r_2014$GPOA))
r_2015 <- transform(r_2015, zGPOA = scale(r_2015$GPOA))
r_2016 <- transform(r_2016, zGPOA = scale(r_2016$GPOA))
r_2017 <- transform(r_2017, zGPOA = scale(r_2017$GPOA))
r_2018 <- transform(r_2018, zGPOA = scale(r_2018$GPOA))
r_2019 <- transform(r_2019, zGPOA = scale(r_2019$GPOA))
r_2020 <- transform(r_2020, zGPOA = scale(r_2020$GPOA))


## Z-Score ROE ##

r_2000 <- transform(r_2000, zROE = scale(r_2000$ROE))
r_2001 <- transform(r_2001, zROE = scale(r_2001$ROE))
r_2002 <- transform(r_2002, zROE = scale(r_2002$ROE))
r_2003 <- transform(r_2003, zROE = scale(r_2003$ROE))
r_2004 <- transform(r_2004, zROE = scale(r_2004$ROE))
r_2005 <- transform(r_2005, zROE = scale(r_2005$ROE))
r_2006 <- transform(r_2006, zROE = scale(r_2006$ROE))
r_2007 <- transform(r_2007, zROE = scale(r_2007$ROE))
r_2008 <- transform(r_2008, zROE = scale(r_2008$ROE))
r_2009 <- transform(r_2009, zROE = scale(r_2009$ROE))
r_2010 <- transform(r_2010, zROE = scale(r_2010$ROE))
r_2011 <- transform(r_2011, zROE = scale(r_2011$ROE))
r_2012 <- transform(r_2012, zROE = scale(r_2012$ROE))
r_2013 <- transform(r_2013, zROE = scale(r_2013$ROE))
r_2014 <- transform(r_2014, zROE = scale(r_2014$ROE))
r_2015 <- transform(r_2015, zROE = scale(r_2015$ROE))
r_2016 <- transform(r_2016, zROE = scale(r_2016$ROE))
r_2017 <- transform(r_2017, zROE = scale(r_2017$ROE))
r_2018 <- transform(r_2018, zROE = scale(r_2018$ROE))
r_2019 <- transform(r_2019, zROE = scale(r_2019$ROE))
r_2020 <- transform(r_2020, zROE = scale(r_2020$ROE))


## z-Score ROA ##

r_2000 <- transform(r_2000, zROA = scale(r_2000$ROA))
r_2001 <- transform(r_2001, zROA = scale(r_2001$ROA))
r_2002 <- transform(r_2002, zROA = scale(r_2002$ROA))
r_2003 <- transform(r_2003, zROA = scale(r_2003$ROA))
```

```
r_2004 <- transform(r_2004, zROA = scale(r_2004$ROA))
r_2005 <- transform(r_2005, zROA = scale(r_2005$ROA))
r_2006 <- transform(r_2006, zROA = scale(r_2006$ROA))
r_2007 <- transform(r_2007, zROA = scale(r_2007$ROA))
r_2008 <- transform(r_2008, zROA = scale(r_2008$ROA))
r_2009 <- transform(r_2009, zROA = scale(r_2009$ROA))
r_2010 <- transform(r_2010, zROA = scale(r_2010$ROA))
r_2011 <- transform(r_2011, zROA = scale(r_2011$ROA))
r_2012 <- transform(r_2012, zROA = scale(r_2012$ROA))
r_2013 <- transform(r_2013, zROA = scale(r_2013$ROA))
r_2014 <- transform(r_2014, zROA = scale(r_2014$ROA))
r_2015 <- transform(r_2015, zROA = scale(r_2015$ROA))
r_2016 <- transform(r_2016, zROA = scale(r_2016$ROA))
r_2017 <- transform(r_2017, zROA = scale(r_2017$ROA))
r_2018 <- transform(r_2018, zROA = scale(r_2018$ROA))
r_2019 <- transform(r_2019, zROA = scale(r_2019$ROA))
r_2020 <- transform(r_2020, zROA = scale(r_2020$ROA))

## z-Score CFOA ##

r_2000 <- transform(r_2000, zCFOA = scale(r_2000$CFOA))
r_2001 <- transform(r_2001, zCFOA = scale(r_2001$CFOA))
r_2002 <- transform(r_2002, zCFOA = scale(r_2002$CFOA))
r_2003 <- transform(r_2003, zCFOA = scale(r_2003$CFOA))
r_2004 <- transform(r_2004, zCFOA = scale(r_2004$CFOA))
r_2005 <- transform(r_2005, zCFOA = scale(r_2005$CFOA))
r_2006 <- transform(r_2006, zCFOA = scale(r_2006$CFOA))
r_2007 <- transform(r_2007, zCFOA = scale(r_2007$CFOA))
r_2008 <- transform(r_2008, zCFOA = scale(r_2008$CFOA))
r_2009 <- transform(r_2009, zCFOA = scale(r_2009$CFOA))
r_2010 <- transform(r_2010, zCFOA = scale(r_2010$CFOA))
r_2011 <- transform(r_2011, zCFOA = scale(r_2011$CFOA))
r_2012 <- transform(r_2012, zCFOA = scale(r_2012$CFOA))
r_2013 <- transform(r_2013, zCFOA = scale(r_2013$CFOA))
r_2014 <- transform(r_2014, zCFOA = scale(r_2014$CFOA))
r_2015 <- transform(r_2015, zCFOA = scale(r_2015$CFOA))
r_2016 <- transform(r_2016, zCFOA = scale(r_2016$CFOA))
r_2017 <- transform(r_2017, zCFOA = scale(r_2017$CFOA))
r_2018 <- transform(r_2018, zCFOA = scale(r_2018$CFOA))
```

```
r_2019 <- transform(r_2019, zCFOA = scale(r_2019$CFOA))
r_2020 <- transform(r_2020, zCFOA = scale(r_2020$CFOA))



## z-Score GMAR ##

r_2000 <- transform(r_2000, zGMAR = scale(r_2000$GMAR))
r_2001 <- transform(r_2001, zGMAR = scale(r_2001$GMAR))
r_2002 <- transform(r_2002, zGMAR = scale(r_2002$GMAR))
r_2003 <- transform(r_2003, zGMAR = scale(r_2003$GMAR))
r_2004 <- transform(r_2004, zGMAR = scale(r_2004$GMAR))
r_2005 <- transform(r_2005, zGMAR = scale(r_2005$GMAR))
r_2006 <- transform(r_2006, zGMAR = scale(r_2006$GMAR))
r_2007 <- transform(r_2007, zGMAR = scale(r_2007$GMAR))
r_2008 <- transform(r_2008, zGMAR = scale(r_2008$GMAR))
r_2009 <- transform(r_2009, zGMAR = scale(r_2009$GMAR))
r_2010 <- transform(r_2010, zGMAR = scale(r_2010$GMAR))
r_2011 <- transform(r_2011, zGMAR = scale(r_2011$GMAR))
r_2012 <- transform(r_2012, zGMAR = scale(r_2012$GMAR))
r_2013 <- transform(r_2013, zGMAR = scale(r_2013$GMAR))
r_2014 <- transform(r_2014, zGMAR = scale(r_2014$GMAR))
r_2015 <- transform(r_2015, zGMAR = scale(r_2015$GMAR))
r_2016 <- transform(r_2016, zGMAR = scale(r_2016$GMAR))
r_2017 <- transform(r_2017, zGMAR = scale(r_2017$GMAR))
r_2018 <- transform(r_2018, zGMAR = scale(r_2018$GMAR))
r_2019 <- transform(r_2019, zGMAR = scale(r_2019$GMAR))
r_2020 <- transform(r_2020, zGMAR = scale(r_2020$GMAR))



## ACC ##
r_2000 <- transform(r_2000, zACC = scale(r_2000$ACC))
r_2001 <- transform(r_2001, zACC = scale(r_2001$ACC))
r_2002 <- transform(r_2002, zACC = scale(r_2002$ACC))
r_2003 <- transform(r_2003, zACC = scale(r_2003$ACC))
r_2004 <- transform(r_2004, zACC = scale(r_2004$ACC))
r_2005 <- transform(r_2005, zACC = scale(r_2005$ACC))
r_2006 <- transform(r_2006, zACC = scale(r_2006$ACC))
r_2007 <- transform(r_2007, zACC = scale(r_2007$ACC))
r_2008 <- transform(r_2008, zACC = scale(r_2008$ACC))
r_2009 <- transform(r_2009, zACC = scale(r_2009$ACC))
```

```r
r_2009 <- transform(r_2009, zACC = scale(r_2009$ACC))
r_2010 <- transform(r_2010, zACC = scale(r_2010$ACC))
r_2011 <- transform(r_2011, zACC = scale(r_2011$ACC))
r_2012 <- transform(r_2012, zACC = scale(r_2012$ACC))
r_2013 <- transform(r_2013, zACC = scale(r_2013$ACC))
r_2014 <- transform(r_2014, zACC = scale(r_2014$ACC))
r_2015 <- transform(r_2015, zACC = scale(r_2015$ACC))
r_2016 <- transform(r_2016, zACC = scale(r_2016$ACC))
r_2017 <- transform(r_2017, zACC = scale(r_2017$ACC))
r_2018 <- transform(r_2018, zACC = scale(r_2018$ACC))
r_2019 <- transform(r_2019, zACC = scale(r_2019$ACC))
r_2020 <- transform(r_2020, zACC = scale(r_2020$ACC))



## z-Score for vekstmålene ####

## z-Score dGPOA ##

r_2000 <- transform(r_2000, zdGPOA = scale(r_2000$dGPOA))
r_2001 <- transform(r_2001, zdGPOA = scale(r_2001$dGPOA))
r_2002 <- transform(r_2002, zdGPOA = scale(r_2002$dGPOA))
r_2003 <- transform(r_2003, zdGPOA = scale(r_2003$dGPOA))
r_2004 <- transform(r_2004, zdGPOA = scale(r_2004$dGPOA))
r_2005 <- transform(r_2005, zdGPOA = scale(r_2005$dGPOA))
r_2006 <- transform(r_2006, zdGPOA = scale(r_2006$dGPOA))
r_2007 <- transform(r_2007, zdGPOA = scale(r_2007$dGPOA))
r_2008 <- transform(r_2008, zdGPOA = scale(r_2008$dGPOA))
r_2009 <- transform(r_2009, zdGPOA = scale(r_2009$dGPOA))
r_2010 <- transform(r_2010, zdGPOA = scale(r_2010$dGPOA))
r_2011 <- transform(r_2011, zdGPOA = scale(r_2011$dGPOA))
r_2012 <- transform(r_2012, zdGPOA = scale(r_2012$dGPOA))
r_2013 <- transform(r_2013, zdGPOA = scale(r_2013$dGPOA))
r_2014 <- transform(r_2014, zdGPOA = scale(r_2014$dGPOA))
r_2015 <- transform(r_2015, zdGPOA = scale(r_2015$dGPOA))
r_2016 <- transform(r_2016, zdGPOA = scale(r_2016$dGPOA))
r_2017 <- transform(r_2017, zdGPOA = scale(r_2017$dGPOA))
r_2018 <- transform(r_2018, zdGPOA = scale(r_2018$dGPOA))
r_2019 <- transform(r_2019, zdGPOA = scale(r_2019$dGPOA))
r_2020 <- transform(r_2020, zdGPOA = scale(r_2020$dGPOA))
```

```
r_2020 <- transform(r_2020, zdGPOA = scale(r_2020$dGPOA))


## Z-score dROE ##

r_2000 <- transform(r_2000, zdROE = scale(r_2000$dROE))
r_2001 <- transform(r_2001, zdROE = scale(r_2001$dROE))
r_2002 <- transform(r_2002, zdROE = scale(r_2002$dROE))
r_2003 <- transform(r_2003, zdROE = scale(r_2003$dROE))
r_2004 <- transform(r_2004, zdROE = scale(r_2004$dROE))
r_2005 <- transform(r_2005, zdROE = scale(r_2005$dROE))
r_2006 <- transform(r_2006, zdROE = scale(r_2006$dROE))
r_2007 <- transform(r_2007, zdROE = scale(r_2007$dROE))
r_2008 <- transform(r_2008, zdROE = scale(r_2008$dROE))
r_2009 <- transform(r_2009, zdROE = scale(r_2009$dROE))
r_2010 <- transform(r_2010, zdROE = scale(r_2010$dROE))
r_2011 <- transform(r_2011, zdROE = scale(r_2011$dROE))
r_2012 <- transform(r_2012, zdROE = scale(r_2012$dROE))
r_2013 <- transform(r_2013, zdROE = scale(r_2013$dROE))
r_2014 <- transform(r_2014, zdROE = scale(r_2014$dROE))
r_2015 <- transform(r_2015, zdROE = scale(r_2015$dROE))
r_2016 <- transform(r_2016, zdROE = scale(r_2016$dROE))
r_2017 <- transform(r_2017, zdROE = scale(r_2017$dROE))
r_2018 <- transform(r_2018, zdROE = scale(r_2018$dROE))
r_2019 <- transform(r_2019, zdROE = scale(r_2019$dROE))
r_2020 <- transform(r_2020, zdROE = scale(r_2020$dROE))


## Z-score dROA ##

r_2000 <- transform(r_2000, zdROA = scale(r_2000$dROA))
r_2001 <- transform(r_2001, zdROA = scale(r_2001$dROA))
r_2002 <- transform(r_2002, zdROA = scale(r_2002$dROA))
r_2003 <- transform(r_2003, zdROA = scale(r_2003$dROA))
r_2004 <- transform(r_2004, zdROA = scale(r_2004$dROA))
r_2005 <- transform(r_2005, zdROA = scale(r_2005$dROA))
r_2006 <- transform(r_2006, zdROA = scale(r_2006$dROA))
r_2007 <- transform(r_2007, zdROA = scale(r_2007$dROA))
r_2008 <- transform(r_2008, zdROA = scale(r_2008$dROA))
r_2009 <- transform(r_2009, zdROA = scale(r_2009$dROA))
```

```r
r_2009 <- transform(r_2009, zdROA = scale(r_2009$dROA))
r_2010 <- transform(r_2010, zdROA = scale(r_2010$dROA))
r_2011 <- transform(r_2011, zdROA = scale(r_2011$dROA))
r_2012 <- transform(r_2012, zdROA = scale(r_2012$dROA))
r_2013 <- transform(r_2013, zdROA = scale(r_2013$dROA))
r_2014 <- transform(r_2014, zdROA = scale(r_2014$dROA))
r_2015 <- transform(r_2015, zdROA = scale(r_2015$dROA))
r_2016 <- transform(r_2016, zdROA = scale(r_2016$dROA))
r_2017 <- transform(r_2017, zdROA = scale(r_2017$dROA))
r_2018 <- transform(r_2018, zdROA = scale(r_2018$dROA))
r_2019 <- transform(r_2019, zdROA = scale(r_2019$dROA))
r_2020 <- transform(r_2020, zdROA = scale(r_2020$dROA))


## z-score zdCFOA ##

r_2000 <- transform(r_2000, zdCFOA = scale(r_2000$dCFOA))
r_2001 <- transform(r_2001, zdCFOA = scale(r_2001$dCFOA))
r_2002 <- transform(r_2002, zdCFOA = scale(r_2002$dCFOA))
r_2003 <- transform(r_2003, zdCFOA = scale(r_2003$dCFOA))
r_2004 <- transform(r_2004, zdCFOA = scale(r_2004$dCFOA))
r_2005 <- transform(r_2005, zdCFOA = scale(r_2005$dCFOA))
r_2006 <- transform(r_2006, zdCFOA = scale(r_2006$dCFOA))
r_2007 <- transform(r_2007, zdCFOA = scale(r_2007$dCFOA))
r_2008 <- transform(r_2008, zdCFOA = scale(r_2008$dCFOA))
r_2009 <- transform(r_2009, zdCFOA = scale(r_2009$dCFOA))
r_2010 <- transform(r_2010, zdCFOA = scale(r_2010$dCFOA))
r_2011 <- transform(r_2011, zdCFOA = scale(r_2011$dCFOA))
r_2012 <- transform(r_2012, zdCFOA = scale(r_2012$dCFOA))
r_2013 <- transform(r_2013, zdCFOA = scale(r_2013$dCFOA))
r_2014 <- transform(r_2014, zdCFOA = scale(r_2014$dCFOA))
r_2015 <- transform(r_2015, zdCFOA = scale(r_2015$dCFOA))
r_2016 <- transform(r_2016, zdCFOA = scale(r_2016$dCFOA))
r_2017 <- transform(r_2017, zdCFOA = scale(r_2017$dCFOA))
r_2018 <- transform(r_2018, zdCFOA = scale(r_2018$dCFOA))
r_2019 <- transform(r_2019, zdCFOA = scale(r_2019$dCFOA))
r_2020 <- transform(r_2020, zdCFOA = scale(r_2020$dCFOA))
```

```r
r_2020 <- transform(r_2020, zdCFOA = scale(r_2020$dCFOA))


## z-Score dGMAR ##
r_2000 <- transform(r_2000, zdGMAR = scale(r_2000$dGMAR))
r_2001 <- transform(r_2001, zdGMAR = scale(r_2001$dGMAR))
r_2002 <- transform(r_2002, zdGMAR = scale(r_2002$dGMAR))
r_2003 <- transform(r_2003, zdGMAR = scale(r_2003$dGMAR))
r_2004 <- transform(r_2004, zdGMAR = scale(r_2004$dGMAR))
r_2005 <- transform(r_2005, zdGMAR = scale(r_2005$dGMAR))
r_2006 <- transform(r_2006, zdGMAR = scale(r_2006$dGMAR))
r_2007 <- transform(r_2007, zdGMAR = scale(r_2007$dGMAR))
r_2008 <- transform(r_2008, zdGMAR = scale(r_2008$dGMAR))
r_2009 <- transform(r_2009, zdGMAR = scale(r_2009$dGMAR))
r_2010 <- transform(r_2010, zdGMAR = scale(r_2010$dGMAR))
r_2011 <- transform(r_2011, zdGMAR = scale(r_2011$dGMAR))
r_2012 <- transform(r_2012, zdGMAR = scale(r_2012$dGMAR))
r_2013 <- transform(r_2013, zdGMAR = scale(r_2013$dGMAR))
r_2014 <- transform(r_2014, zdGMAR = scale(r_2014$dGMAR))
r_2015 <- transform(r_2015, zdGMAR = scale(r_2015$dGMAR))
r_2016 <- transform(r_2016, zdGMAR = scale(r_2016$dGMAR))
r_2017 <- transform(r_2017, zdGMAR = scale(r_2017$dGMAR))
r_2018 <- transform(r_2018, zdGMAR = scale(r_2018$dGMAR))
r_2019 <- transform(r_2019, zdGMAR = scale(r_2019$dGMAR))
r_2020 <- transform(r_2020, zdGMAR = scale(r_2020$dGMAR))


## Z-verdier for Sikkerhet ####

## Beta (BAB) ##

r_2000 <- transform(r_2000, zbeta = scale(r_2000$beta))
r_2001 <- transform(r_2001, zbeta = scale(r_2001$beta))
r_2002 <- transform(r_2002, zbeta = scale(r_2002$beta))
r_2003 <- transform(r_2003, zbeta = scale(r_2003$beta))
r_2004 <- transform(r_2004, zbeta = scale(r_2004$beta))
r_2005 <- transform(r_2005, zbeta = scale(r_2005$beta))
r_2006 <- transform(r_2006, zbeta = scale(r_2006$beta))
r_2007 <- transform(r_2007, zbeta = scale(r_2007$beta))
```

```
r_2007 <- transform(r_2007, zbeta = scale(r_2007$beta))
r_2008 <- transform(r_2008, zbeta = scale(r_2008$beta))
r_2009 <- transform(r_2009, zbeta = scale(r_2009$beta))
r_2010 <- transform(r_2010, zbeta = scale(r_2010$beta))
r_2011 <- transform(r_2011, zbeta = scale(r_2011$beta))
r_2012 <- transform(r_2012, zbeta = scale(r_2012$beta))
r_2013 <- transform(r_2013, zbeta = scale(r_2013$beta))
r_2014 <- transform(r_2014, zbeta = scale(r_2014$beta))
r_2015 <- transform(r_2015, zbeta = scale(r_2015$beta))
r_2016 <- transform(r_2016, zbeta = scale(r_2016$beta))
r_2017 <- transform(r_2017, zbeta = scale(r_2017$beta))
r_2018 <- transform(r_2018, zbeta = scale(r_2018$beta))
r_2019 <- transform(r_2019, zbeta = scale(r_2019$beta))
r_2020 <- transform(r_2020, zbeta = scale(r_2020$beta))

## LEV ##

r_2000 <- transform(r_2000, zLEV = scale(r_2000$LEV))
r_2001 <- transform(r_2001, zLEV = scale(r_2001$LEV))
r_2002 <- transform(r_2002, zLEV = scale(r_2002$LEV))
r_2003 <- transform(r_2003, zLEV = scale(r_2003$LEV))
r_2004 <- transform(r_2004, zLEV = scale(r_2004$LEV))
r_2005 <- transform(r_2005, zLEV = scale(r_2005$LEV))
r_2006 <- transform(r_2006, zLEV = scale(r_2006$LEV))
r_2007 <- transform(r_2007, zLEV = scale(r_2007$LEV))
r_2008 <- transform(r_2008, zLEV = scale(r_2008$LEV))
r_2009 <- transform(r_2009, zLEV = scale(r_2009$LEV))
r_2010 <- transform(r_2010, zLEV = scale(r_2010$LEV))
r_2011 <- transform(r_2011, zLEV = scale(r_2011$LEV))
r_2012 <- transform(r_2012, zLEV = scale(r_2012$LEV))
r_2013 <- transform(r_2013, zLEV = scale(r_2013$LEV))
r_2014 <- transform(r_2014, zLEV = scale(r_2014$LEV))
r_2015 <- transform(r_2015, zLEV = scale(r_2015$LEV))
r_2016 <- transform(r_2016, zLEV = scale(r_2016$LEV))
r_2017 <- transform(r_2017, zLEV = scale(r_2017$LEV))
r_2018 <- transform(r_2018, zLEV = scale(r_2018$LEV))
r_2019 <- transform(r_2019, zLEV = scale(r_2019$LEV))
r_2020 <- transform(r_2020, zLEV = scale(r_2020$LEV))
```

```r
## Ohlsons score ##

r_2000 <- transform(r_2000, zO_score = scale(r_2000$O_score))
r_2001 <- transform(r_2001, zO_score = scale(r_2001$O_score))
r_2002 <- transform(r_2002, zO_score = scale(r_2002$O_score))
r_2003 <- transform(r_2003, zO_score = scale(r_2003$O_score))
r_2004 <- transform(r_2004, zO_score = scale(r_2004$O_score))
r_2005 <- transform(r_2005, zO_score = scale(r_2005$O_score))
r_2006 <- transform(r_2006, zO_score = scale(r_2006$O_score))
r_2007 <- transform(r_2007, zO_score = scale(r_2007$O_score))
r_2008 <- transform(r_2008, zO_score = scale(r_2008$O_score))
r_2009 <- transform(r_2009, zO_score = scale(r_2009$O_score))
r_2010 <- transform(r_2010, zO_score = scale(r_2010$O_score))
r_2011 <- transform(r_2011, zO_score = scale(r_2011$O_score))
r_2012 <- transform(r_2012, zO_score = scale(r_2012$O_score))
r_2013 <- transform(r_2013, zO_score = scale(r_2013$O_score))
r_2014 <- transform(r_2014, zO_score = scale(r_2014$O_score))
r_2015 <- transform(r_2015, zO_score = scale(r_2015$O_score))
r_2016 <- transform(r_2016, zO_score = scale(r_2016$O_score))
r_2017 <- transform(r_2017, zO_score = scale(r_2017$O_score))
r_2018 <- transform(r_2018, zO_score = scale(r_2018$O_score))
r_2019 <- transform(r_2019, zO_score = scale(r_2019$O_score))
r_2020 <- transform(r_2020, zO_score = scale(r_2020$O_score))


## Altman Z-score ##

r_2000 <- transform(r_2000, zAltmanZ = scale(r_2000$AltmanZ))
r_2001 <- transform(r_2001, zAltmanZ = scale(r_2001$AltmanZ))
r_2002 <- transform(r_2002, zAltmanZ = scale(r_2002$AltmanZ))
r_2003 <- transform(r_2003, zAltmanZ = scale(r_2003$AltmanZ))
r_2004 <- transform(r_2004, zAltmanZ = scale(r_2004$AltmanZ))
r_2005 <- transform(r_2005, zAltmanZ = scale(r_2005$AltmanZ))
r_2006 <- transform(r_2006, zAltmanZ = scale(r_2006$AltmanZ))
r_2007 <- transform(r_2007, zAltmanZ = scale(r_2007$AltmanZ))
r_2008 <- transform(r_2008, zAltmanZ = scale(r_2008$AltmanZ))
r_2009 <- transform(r_2009, zAltmanZ = scale(r_2009$AltmanZ))
r_2010 <- transform(r_2010, zAltmanZ = scale(r_2010$AltmanZ))
r_2011 <- transform(r_2011, zAltmanZ = scale(r_2011$AltmanZ))
r_2012 <- transform(r_2012, zAltmanZ = scale(r_2012$AltmanZ))
r_2013 <- transform(r_2013, zAltmanZ = scale(r_2013$AltmanZ))
r_2014 <- transform(r_2014, zAltmanZ = scale(r_2014$AltmanZ))
```

```
r_2015 <- transform(r_2015, zAltmanZ = scale(r_2015$AltmanZ))
r_2016 <- transform(r_2016, zAltmanZ = scale(r_2016$AltmanZ))
r_2017 <- transform(r_2017, zAltmanZ = scale(r_2017$AltmanZ))
r_2018 <- transform(r_2018, zAltmanZ = scale(r_2018$AltmanZ))
r_2019 <- transform(r_2019, zAltmanZ = scale(r_2019$AltmanZ))
r_2020 <- transform(r_2020, zAltmanZ = scale(r_2020$AltmanZ))


## EVOL ##

r_2000 <- transform(r_2000, zEVOL = scale(r_2000$EVOL))
r_2001 <- transform(r_2001, zEVOL = scale(r_2001$EVOL))
r_2002 <- transform(r_2002, zEVOL = scale(r_2002$EVOL))
r_2003 <- transform(r_2003, zEVOL = scale(r_2003$EVOL))
r_2004 <- transform(r_2004, zEVOL = scale(r_2004$EVOL))
r_2005 <- transform(r_2005, zEVOL = scale(r_2005$EVOL))
r_2006 <- transform(r_2006, zEVOL = scale(r_2006$EVOL))
r_2007 <- transform(r_2007, zEVOL = scale(r_2007$EVOL))
r_2008 <- transform(r_2008, zEVOL = scale(r_2008$EVOL))
r_2009 <- transform(r_2009, zEVOL = scale(r_2009$EVOL))
r_2010 <- transform(r_2010, zEVOL = scale(r_2010$EVOL))
r_2011 <- transform(r_2011, zEVOL = scale(r_2011$EVOL))
r_2012 <- transform(r_2012, zEVOL = scale(r_2012$EVOL))
r_2013 <- transform(r_2013, zEVOL = scale(r_2013$EVOL))
r_2014 <- transform(r_2014, zEVOL = scale(r_2014$EVOL))
r_2015 <- transform(r_2015, zEVOL = scale(r_2015$EVOL))
r_2016 <- transform(r_2016, zEVOL = scale(r_2016$EVOL))
r_2017 <- transform(r_2017, zEVOL = scale(r_2017$EVOL))
r_2018 <- transform(r_2018, zEVOL = scale(r_2018$EVOL))
r_2019 <- transform(r_2019, zEVOL = scale(r_2019$EVOL))
r_2020 <- transform(r_2020, zEVOL = scale(r_2020$EVOL))


### Ferdigstilling av utvalg ####

## beregne P/B

## Beregne pris over bok (P/B) ##

```

```
## Beregne pris over bok (P/B) ##

r_2000 <- transform(r_2000, P_B = r_2000$MarketCap1/(r_2000$ek))
r_2001 <- transform(r_2001, P_B = r_2001$MarketCap1/(r_2001$ek))
r_2002 <- transform(r_2002, P_B = r_2002$MarketCap1/(r_2002$ek))
r_2003 <- transform(r_2003, P_B = r_2003$MarketCap1/(r_2003$ek))
r_2004 <- transform(r_2004, P_B = r_2004$MarketCap1/(r_2004$ek))
r_2005 <- transform(r_2005, P_B = r_2005$MarketCap1/(r_2005$ek))
r_2006 <- transform(r_2006, P_B = r_2006$MarketCap1/(r_2006$ek))
r_2007 <- transform(r_2007, P_B = r_2007$MarketCap1/(r_2007$ek))
r_2008 <- transform(r_2008, P_B = r_2008$MarketCap1/(r_2008$ek))
r_2009 <- transform(r_2009, P_B = r_2009$MarketCap1/(r_2009$ek))
r_2010 <- transform(r_2010, P_B = r_2010$MarketCap1/(r_2010$ek))
r_2011 <- transform(r_2011, P_B = r_2011$MarketCap1/(r_2011$ek))
r_2012 <- transform(r_2012, P_B = r_2012$MarketCap1/(r_2012$ek))
r_2013 <- transform(r_2013, P_B = r_2013$MarketCap1/(r_2013$ek))
r_2014 <- transform(r_2014, P_B = r_2014$MarketCap1/(r_2014$ek))
r_2015 <- transform(r_2015, P_B = r_2015$MarketCap1/(r_2015$ek))
r_2016 <- transform(r_2016, P_B = r_2016$MarketCap1/(r_2016$ek))
r_2017 <- transform(r_2017, P_B = r_2017$MarketCap1/(r_2017$ek))
r_2018 <- transform(r_2018, P_B = r_2018$MarketCap1/(r_2018$ek))
r_2019 <- transform(r_2019, P_B = r_2019$MarketCap1/(r_2019$ek))
r_2020 <- transform(r_2020, P_B = r_2020$MarketCap1/(r_2020$ek))


## Beregning av P/B ##

## Fjerner observasjoner med negativ P/B ##

r_2000 <- r_2000[c(r_2000$P_B > 0), ]
r_2001 <- r_2001[c(r_2001$P_B > 0), ]
r_2002 <- r_2002[c(r_2002$P_B > 0), ]
r_2003 <- r_2003[c(r_2003$P_B > 0), ]
r_2004 <- r_2004[c(r_2004$P_B > 0), ]
r_2005 <- r_2005[c(r_2005$P_B > 0), ]
r_2006 <- r_2006[c(r_2006$P_B > 0), ]
r_2007 <- r_2007[c(r_2007$P_B > 0), ]
r_2008 <- r_2008[c(r_2008$P_B > 0), ]
r_2009 <- r_2009[c(r_2009$P_B > 0), ]
r_2010 <- r_2010[c(r_2010$P_B > 0), ]
r_2011 <- r_2011[c(r_2011$P_B > 0), ]
```

```
r_2012 <- r_2012[c(r_2012$P_B > 0), ]
r_2013 <- r_2013[c(r_2013$P_B > 0), ]
r_2014 <- r_2014[c(r_2014$P_B > 0), ]
r_2015 <- r_2015[c(r_2015$P_B > 0), ]
r_2016 <- r_2016[c(r_2016$P_B > 0), ]
r_2017 <- r_2017[c(r_2017$P_B > 0), ]
r_2018 <- r_2018[c(r_2018$P_B > 0), ]
r_2019 <- r_2019[c(r_2019$P_B > 0), ]
r_2020 <- r_2020[c(r_2020$P_B > 0), ]


## Fjerner observasjoner som har P/B-verdier over 15 ##

r_2000 <- r_2000[c(r_2000$P_B < 15), ]
r_2001 <- r_2001[c(r_2001$P_B < 15), ]
r_2002 <- r_2002[c(r_2002$P_B < 15), ]
r_2003 <- r_2003[c(r_2003$P_B < 15), ]
r_2004 <- r_2004[c(r_2004$P_B < 15), ]
r_2005 <- r_2005[c(r_2005$P_B < 15), ]
r_2006 <- r_2006[c(r_2006$P_B < 15), ]
r_2007 <- r_2007[c(r_2007$P_B < 15), ]
r_2008 <- r_2008[c(r_2008$P_B < 15), ]
r_2009 <- r_2009[c(r_2009$P_B < 15), ]
r_2010 <- r_2010[c(r_2010$P_B < 15), ]
r_2011 <- r_2011[c(r_2011$P_B < 15), ]
r_2012 <- r_2012[c(r_2012$P_B < 15), ]
r_2013 <- r_2013[c(r_2013$P_B < 15), ]
r_2014 <- r_2014[c(r_2014$P_B < 15), ]
r_2015 <- r_2015[c(r_2015$P_B < 15), ]
r_2016 <- r_2016[c(r_2016$P_B < 15), ]
r_2017 <- r_2017[c(r_2017$P_B < 15), ]
r_2018 <- r_2018[c(r_2018$P_B < 15), ]
r_2019 <- r_2019[c(r_2019$P_B < 15), ]
r_2020 <- r_2020[c(r_2020$P_B < 15), ]


## Skalere P/B, sette Z-verdi på P/B ##

r_2000 <- transform(r_2000, zP_B = scale(r_2000$P_B))
r_2001 <- transform(r_2001, zP_B = scale(r_2001$P_B))
r_2002 <- transform(r_2002, zP_B = scale(r_2002$P_B))
r_2003 <- transform(r_2003, zP_B = scale(r_2003$P_B))
```

```
r_2003 <- transform(r_2003, zP_B = scale(r_2003$P_B))
r_2004 <- transform(r_2004, zP_B = scale(r_2004$P_B))
r_2005 <- transform(r_2005, zP_B = scale(r_2005$P_B))
r_2006 <- transform(r_2006, zP_B = scale(r_2006$P_B))
r_2007 <- transform(r_2007, zP_B = scale(r_2007$P_B))
r_2008 <- transform(r_2008, zP_B = scale(r_2008$P_B))
r_2009 <- transform(r_2009, zP_B = scale(r_2009$P_B))
r_2010 <- transform(r_2010, zP_B = scale(r_2010$P_B))
r_2011 <- transform(r_2011, zP_B = scale(r_2011$P_B))
r_2012 <- transform(r_2012, zP_B = scale(r_2012$P_B))
r_2013 <- transform(r_2013, zP_B = scale(r_2013$P_B))
r_2014 <- transform(r_2014, zP_B = scale(r_2014$P_B))
r_2015 <- transform(r_2015, zP_B = scale(r_2015$P_B))
r_2016 <- transform(r_2016, zP_B = scale(r_2016$P_B))
r_2017 <- transform(r_2017, zP_B = scale(r_2017$P_B))
r_2018 <- transform(r_2018, zP_B = scale(r_2018$P_B))
r_2019 <- transform(r_2019, zP_B = scale(r_2019$P_B))
r_2020 <- transform(r_2020, zP_B = scale(r_2020$P_B))


## Regner ut størrelse for forskningningsspørsmål 1 ##

r_2000 <- transform(r_2000, størrelse = scale(r_2000$MarketCap))
r_2001 <- transform(r_2001, størrelse = scale(r_2001$MarketCap))
r_2002 <- transform(r_2002, størrelse = scale(r_2002$MarketCap))
r_2003 <- transform(r_2003, størrelse = scale(r_2003$MarketCap))
r_2004 <- transform(r_2004, størrelse = scale(r_2004$MarketCap))
r_2005 <- transform(r_2005, størrelse = scale(r_2005$MarketCap))
r_2006 <- transform(r_2006, størrelse = scale(r_2006$MarketCap))
r_2007 <- transform(r_2007, størrelse = scale(r_2007$MarketCap))
r_2008 <- transform(r_2008, størrelse = scale(r_2008$MarketCap))
r_2009 <- transform(r_2009, størrelse = scale(r_2009$MarketCap))
r_2010 <- transform(r_2010, størrelse = scale(r_2010$MarketCap))
r_2011 <- transform(r_2011, størrelse = scale(r_2011$MarketCap))
r_2012 <- transform(r_2012, størrelse = scale(r_2012$MarketCap))
r_2013 <- transform(r_2013, størrelse = scale(r_2013$MarketCap))
r_2014 <- transform(r_2014, størrelse = scale(r_2014$MarketCap))
r_2015 <- transform(r_2015, størrelse = scale(r_2015$MarketCap))
r_2016 <- transform(r_2016, størrelse = scale(r_2016$MarketCap))
r_2017 <- transform(r_2017, størrelse = scale(r_2017$MarketCap))
```

```r
r_2017 <- transform(r_2017, størrelse = scale(r_2017$MarketCap))
r_2018 <- transform(r_2018, størrelse = scale(r_2018$MarketCap))
r_2019 <- transform(r_2019, størrelse = scale(r_2019$MarketCap))
r_2020 <- transform(r_2020, størrelse = scale(r_2020$MarketCap))

## Lager egen dataframe av fullstendig periode med relevante variabler for analysen ##

r1_2000 <- r_2000[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2001 <- r_2001[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2002 <- r_2002[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2003 <- r_2003[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2004 <- r_2004[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2005 <- r_2005[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2006 <- r_2006[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2007 <- r_2007[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2008 <- r_2008[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2009 <- r_2009[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2010 <- r_2010[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2011 <- r_2011[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2012 <- r_2012[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2013 <- r_2013[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2014 <- r_2014[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2015 <- r_2015[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2016 <- r_2016[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2017 <- r_2017[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2018 <- r_2018[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2019 <- r_2019[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]
r1_2020 <- r_2020[, c("orgnr","aar" ,"zP_B" , "zGPOA", "zROE", "zROA", "zCFOA", "zGMAR", "zACC", "zdGPOA", "zdROE", "zdROA", "zdCFOA", "zdGMAR", "zbeta", "zO_score", "zAltmanZ", "zEVOL", "zLEV", "RZ")]

## jeg lager en dataframe for hele perioden med relevante variabler ##
r_2000_2020 <- rbind( r1_2000, r1_2001, r1_2002, r1_2003, r1_2004, r1_2005, r1_2006
                     ,r1_2007, r1_2008, r1_2009, r1_2010, r1_2011, r1_2012, r1_2013, r1_2014, r1_2015
                     ,r1_2016, r1_2017, r1_2018, r1_2019, r1_2020,)
```

```r
## Lage excel-fil for å ta gjennomsnitt av kvalitetsfaktorene, selv med manglende observasjoner i enkelte av målene, ##
## og lager en ny variabel i dataframen, "lønnsomhet", "vekst", og "sikkerhet" basert på summen an de individuelle kvalitetsmålene ##

## skalerer variablene til "zlønnsomhet", "zvekst" og "zsikkerhet" i r for så å lage enda en excel sheet for å samle de tre skalerte ##
## kvalitetsmålene til en endelig samlet kvalitetsmål, "kvalitet". Skalerer så kvalitet i henhold til metoden, som gjøres under. ##
## Dataframen "utvalg41" inneholder tilslutt variablene "zlønnsomhet", "zvekst", "zsikkerhet" og "zkvalitet som det gjøres regresjon på ##

write_xlsx(r_2000_2020, path = "zscore.xlsx")
utvalg2 <- read_excel("zscore.xlsx")

utvalg2 <- transform(utvalg2, zlonnsomhet = scale(utvalg2$lonnsomhet))
utvalg2 <- transform(utvalg2, zvekst = scale(utvalg2$vekst))
utvalg2 <- transform(utvalg2, zsikkerhet = scale(utvalg2$sikkerhet))

## Laste inn bearbeidet excel-fil ##
write_xlsx(utvalg2, path = "samletkvalitet_zcore.xlsx")
utvalg41 <- read_excel("samletkvalitet_zcore_1.xlsx")

## identifiserer om variablene har korrekte "classes" ##
lapply(utvalg41, class)

## Gjør dato til korrekt format ##
utvalg41$Date <- as.Date(utvalg41$Date, formate = "%m/%d/%Y")

## Skalerer kvalitetvariabelen i henhold til metoden ##
utvalg41 <- transform(utvalg41, zkvalitet = scale(utvalg41$kvalitet))

## Regner ut avkastning t-12 ##
utvalg41$Ret12dato <- utvalg41$Date %m-% year(12)

## legger ved siste års avkastning i korrekt dato i henhold til dataframen ##
utvalg41 <- left_join(utvalg41, aksjer[ ,c("Date", "orgnr", "R2")], by = c("Ret12dato" = "Date", "orgnr" = "orgnr"))

colnames(utvalg41)[which(names(utvalg41) == "R2.y")] <- "Retlag12" ## siste års avkastning
colnames(utvalg41)[which(names(utvalg41) == "R2.x")] <- "R2" ## avkastning for respektiv dato

## Skalerer siste års avkastning ##
utvalg41 <- transform(utvalg41, zRetlag12 = scale(utvalg41$Retlag12))

```

```r

## Forskningsspørsmål 1 ####
## Regresjoner pris på kvalitet ##

pkreg1 <- pmg(utvalg41$zP_B ~ utvalg41$zkvalitet, data = utvalg41, index = c("Date", "orgnr"))
pkreg2 <- pmg(utvalg41$zP_B ~ utvalg41$zkvalitet + utvalg41$størrelse + utvalg41$zRetlag12, data = utvalg41, index = c("Date", "orgnr"))
pkreg3 <- pmg(utvalg41$zP_B ~ utvalg41$zlonnsomhet, data = utvalg41, index = c("Date", "orgnr"))
pkreg4 <- pmg(utvalg41$zP_B ~ utvalg41$zvekst, data = utvalg41, index = c("Date", "orgnr"))
pkreg5 <- pmg(utvalg41$zP_B ~ utvalg41$zsikkerhet, data = utvalg41, index = c("Date", "orgnr"))
pkreg6 <- pmg(utvalg41$zP_B ~ utvalg41$zlonnsomhet + utvalg41$zvekst + utvalg41$zsikkerhet + utvalg41$størrelse + utvalg41$zRetlag12, data = utvalg41, index = c("Date", "or

## Resultat av regresjonene ##
summary(pkreg1)
coeftest(pkreg1)
summary(pkreg1)
coeftest(pkreg1)
summary(pkreg1)
coeftest(pkreg1)
summary(pkreg1)
coeftest(pkreg1)
summary(pkreg1)
coeftest(pkreg1)
summary(pkreg1)
coeftest(pkreg1)


## forskningsspørsmål 2 ####


## første steg fordele i 2 porteføljer basert på marketcap hver måned - breakpoint på 80% av markedsverdien i henhold til orginale studiet ##

## QMJ-faktoren ####

total_port_1 <- total_port

tot_mark_cap <- aggregate(total_port_1$MarketCap1, list(total_port_1$Date), sum)
```

```r
tot_mark_cap <- aggregate(total_port_1$MarketCap1, list(total_port_1$Date), sum)
names(tot_mark_cap) <- c("Date", "TotMarketCap")

total_port_1 <- left_join(total_port_1, tot_mark_cap, by = c("Date" = "Date"))


## fordele i 2 porteføljer på størrelse ##

head(total_port_1)
total_port_1 <- total_port_1 %>% group_by(Date) %>%
  mutate(q = quantile(MarketCap1,0.8),
         pgtq8 = ifelse(MarketCap1 >= q,1,0))

summary(total_port_1$pgtq8)


##

port_big <- total_port_1[total_port_1$pgtq8 == "1", ]
port_small <- total_port_1[total_port_1$pgtq8 == "0", ]


## lager fordelingen 30% - 40% - 30% for store aksjer ##

port_big <- port_big %>% group_by(Date) %>%
  mutate(QJ = quantile(zkvalitet,0.3),
         BigJunk = ifelse(zkvalitet <= QJ,1,0))


port_big <- port_big %>% group_by(Date) %>%
  mutate(QQ = quantile(zkvalitet,0.7),
         bigQuality = ifelse(zkvalitet >= QQ,1,0))


port_big_junk <- port_big[port_big$BigJunk == "1", ]

port_big_quality <- port_big[port_big$bigQuality == "1", ]


## lager fordelignen 30% - 40% - 30% for små aksjer ##
```

```r
## lager fordelignen 30% - 40% - 30% for små aksjer ##


port_small <- port_small %>% group_by(Date) %>%
  mutate(QJ = quantile(zkvalitet,0.3),
         SmallJunk = ifelse(zkvalitet <= QJ,1,0))


port_small <- port_small %>% group_by(Date) %>%
  mutate(QQ = quantile(zkvalitet,0.7),
         SmallQuality = ifelse(zkvalitet >= QQ,1,0))


port_small_junk <- port_small[port_small$SmallJunk == "1", ]

port_small_quality <- port_small[port_small$SmallQuality == "1", ]


## VW de ulike porteføljene for å beregne avkastningstallene ##

## Beregner total markedscap for hver portefølje ##
res1_1 <- aggregate(port_big_quality$MarketCap1, list(port_big_quality$Date), sum)
names(res1_1) <- c("Date", "TotalMarketCap1_1")

res2_1 <- aggregate(port_big_junk$MarketCap1, list(port_big_junk$Date), sum)
names(res2_1) <- c("Date", "TotalMarketCap2_1")

res3_1 <- aggregate(port_small_quality$MarketCap1, list(port_small_quality$Date), sum)
names(res3_1) <- c("Date", "TotalMarketCap3_1")

res4_1 <- aggregate(port_small_junk$MarketCap1, list(port_small_junk$Date), sum)
names(res4_1) <- c("Date", "TotalMarketCap4_1")


## merger de sammen ##
port_big_quality <- merge(port_big_quality, res1_1, by = "Date")
port_big_junk <- merge(port_big_junk, res2_1, by = "Date")
port_small_quality <- merge(port_small_quality, res3_1, by = "Date")
port_small_junk <- merge(port_small_junk, res4_1, by = "Date")
```

```
3052
3053
3054  ## vekting av porteføljene ##
3055  port_big_quality$vekter    <- port_big_quality$MarketCap1 / port_big_quality$TotalMarketCap1_1
3056  port_big_junk$vekter       <- port_big_junk$MarketCap1 / port_big_junk$TotalMarketCap2_1
3057  port_small_quality$vekter <- port_small_quality$MarketCap1 / port_small_quality$TotalMarketCap3_1
3058  port_small_junk$vekter     <- port_small_junk$MarketCap1 / port_small_junk$TotalMarketCap4_1
3059
3060
3061  ## legge ved korrekt avkastning ##
3062  port_big_quality <- left_join(port_big_quality, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
3063  port_big_junk <- left_join(port_big_junk, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
3064  port_small_quality <- left_join(port_small_quality, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
3065  port_small_junk <- left_join(port_small_junk, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
3066
3067  ## beregner meravkastning på porteføljene ##
3068  port_big_quality$Returns1 <- port_big_quality$R2.y * port_big_quality$vekter
3069  port_big_junk$Returns2 <- port_big_junk$R2.y * port_big_junk$vekter
3070  port_small_quality$Returns3 <- port_small_quality$R2.y * port_small_quality$vekter
3071  port_small_junk$Returns4 <- port_small_junk$R2.y * port_small_junk$vekter
3072
3073
3074  ## aggregere porteføljeavkastningen så vi får samlet månendlige avkastningstall ##
3075  port_big_quality_1 <- aggregate(port_big_quality$Returns1, list(port_big_quality$Date), sum)
3076  names(port_big_quality_1) <- c("Date", "ReturnsBQ")
3077
3078  port_big_junk_1 <- aggregate(port_big_junk$Returns2, list(port_big_junk$Date), sum)
3079  names(port_big_junk_1) <- c("Date", "ReturnsBJ")
3080
3081  port_small_quality_1 <- aggregate(port_small_quality$Returns3, list(port_small_quality$Date), sum)
3082  names(port_small_quality_1) <- c("Date", "ReturnsSQ")
3083
3084  port_small_junk_1 <- aggregate(port_small_junk$Returns4, list(port_small_junk$Date), sum)
3085  names(port_small_junk_1) <- c("Date", "ReturnsSJ")
3086
3087
3088  ## Lage QMJ faktoren ##
3089  port_quality <- merge(port_big_quality_1, port_small_quality_1, by = "Date")
3090  port_junk <- merge(port_big_junk_1, port_small_junk_1, by = "Date")
```

```r
port_junk <- merge(port_big_junk_1, port_small_junk_1, by = "Date")

port_QMJ <- merge(port_quality, port_junk, by = "Date")


## QMJ faktoren ##
port_QMJ <- transform(port_QMJ, QMJ = 0.5*(port_QMJ$ReturnsSQ-port_QMJ$ReturnsSJ)+0.5*(port_QMJ$ReturnsBQ-port_QMJ$ReturnsBJ))

## QMJ faktoren ##
port_longQuality <- transform(port_QMJ, LongQuality = 0.5*(port_QMJ$ReturnsSQ)+0.5*(port_QMJ$ReturnsBQ))
port_ShortJunk <- transform(port_QMJ, ShortJunk = 0.5*(port_QMJ$ReturnsSJ)+0.5*(port_QMJ$ReturnsBJ))

## legge ved faktorer ##

port_QMJ <- left_join(port_QMJ, Faktorer[ ,c("SMB", "HML", "PR1YR", "UMD", "Date")], by = c("Date" = "Date"))
port_QMJ <- left_join(port_QMJ, Faktorer2[ ,c("MKT", "Date")], by = c("Date" = "Date"))

port_longQuality <- left_join(port_longQuality, Faktorer[ ,c("SMB", "HML", "PR1YR", "UMD", "Date")], by = c("Date" = "Date"))
port_longQuality <- left_join(port_longQuality, Faktorer2[ ,c("MKT", "Date")], by = c("Date" = "Date"))

port_ShortJunk <- left_join(port_ShortJunk, Faktorer[ ,c("SMB", "HML", "PR1YR", "UMD", "Date")], by = c("Date" = "Date"))
port_ShortJunk <- left_join(port_ShortJunk, Faktorer2[ ,c("MKT", "Date")], by = c("Date" = "Date"))


## Regresjon ... ##
## På market ##

fam30 <- lm(port_QMJ$QMJ ~ port_QMJ$MKT, data = port_QMJ)
summary(fam30)

fam40 <- lm(port_QMJ$QMJ ~ port_QMJ$MKT + port_QMJ$SMB + port_QMJ$HML, data = port_QMJ)
summary(fam40)

fam50 <- lm(port_QMJ$QMJ ~ port_QMJ$MKT + port_QMJ$SMB + port_QMJ$HML + port_QMJ$UMD, data = port_QMJ)
summary(fam50)

fam60 <- lm(port_longQuality$LongQuality ~ port_longQuality$MKT.x + port_longQuality$SMB.x + port_longQuality$HML.x + port_longQuality$UMD.x, data = port_longQuality)
summary(fam60)

fam70 <- lm(port_ShortJunk$ShortJunk ~ port_ShortJunk$MKT.x + port_ShortJunk$SMB.x + port_ShortJunk$HML.x + port_ShortJunk$UMD.x, data = port_ShortJunk)
summary(fam70)
```

```r
## På Excess returns ##
res30_1 <- mean(port_QMJ$QMJ)

## T-verdier
res_30_2 <- res30_1/(StdDev(port_QMJ$QMJ)/sqrt(length(port_QMJ$QMJ)))

## Sharpe verdier ##
res_30_3 <- res30_1/(StdDev(port_QMJ$QMJ))


## Regne ut Lønnsomhet-Faktoren, lik fremgangsmåte som i beregningen av QMJ-faktoren ####

port_big_lonnsomhet   <- total_port_1[total_port_1$pgtq8 == "1", ]
port_small_lonnsomhet <- total_port_1[total_port_1$pgtq8 == "0", ]

## lager quantiles 30% - 40% - 30% for store aksjer ##

port_big_lonnsomhet <- port_big_lonnsomhet %>% group_by(Date) %>%
  mutate(QJ = quantile(zlonnsomhet,0.3),
         BigJunk = ifelse(zlonnsomhet <= QJ,1,0))
port_big_lonnsomhet <- port_big_lonnsomhet %>% group_by(Date) %>%
  mutate(QQ = quantile(zlonnsomhet,0.7),
         bigQuality = ifelse(zlonnsomhet >= QQ,1,0))

port_big_junk_lonnsomhet <- port_big_lonnsomhet[port_big_lonnsomhet$BigJunk == "1", ]
port_big_quality_lonnsomhet <- port_big_lonnsomhet[port_big_lonnsomhet$bigQuality == "1", ]

## lager quantiles 30% - 40% - 30% for små aksjer ##

port_small_lonnsomhet <- port_small_lonnsomhet %>% group_by(Date) %>%
  mutate(QJ = quantile(zlonnsomhet,0.3),
         SmallJunk = ifelse(zlonnsomhet <= QJ,1,0))
port_small_lonnsomhet <- port_small_lonnsomhet %>% group_by(Date) %>%
  mutate(QQ = quantile(zlonnsomhet,0.7),
         SmallQuality = ifelse(zlonnsomhet >= QQ,1,0))

```

```r
port_small_junk_lonnsomhet <- port_small_lonnsomhet[port_small_lonnsomhet$SmallJunk == "1", ]
port_small_quality_lonnsomhet <- port_small_lonnsomhet[port_small_lonnsomhet$SmallQuality == "1", ]

## VW de ulike porteføljene for å beregne avkastningen ##

## Beregner total markedscap for hver portefølje ##
res1_1_lonnsomhet <- aggregate(port_big_quality_lonnsomhet$MarketCap1, list(port_big_quality_lonnsomhet$Date), sum)
names(res1_1_lonnsomhet) <- c("Date", "TotalMarketCap1_1")

res2_1_lonnsomhet <- aggregate(port_big_junk_lonnsomhet$MarketCap1, list(port_big_junk_lonnsomhet$Date), sum)
names(res2_1_lonnsomhet) <- c("Date", "TotalMarketCap2_1")

res3_1_lonnsomhet <- aggregate(port_small_quality_lonnsomhet$MarketCap1, list(port_small_quality_lonnsomhet$Date), sum)
names(res3_1_lonnsomhet) <- c("Date", "TotalMarketCap3_1")

res4_1_lonnsomhet <- aggregate(port_small_junk_lonnsomhet$MarketCap1, list(port_small_junk_lonnsomhet$Date), sum)
names(res4_1_lonnsomhet) <- c("Date", "TotalMarketCap4_1")

port_big_quality_lonnsomhet <- merge(port_big_quality_lonnsomhet, res1_1_lonnsomhet, by = "Date")
port_big_junk_lonnsomhet <- merge(port_big_junk_lonnsomhet, res2_1_lonnsomhet, by = "Date")
port_small_quality_lonnsomhet <- merge(port_small_quality_lonnsomhet, res3_1_lonnsomhet, by = "Date")
port_small_junk_lonnsomhet <- merge(port_small_junk_lonnsomhet, res4_1_lonnsomhet, by = "Date")


## vekting av porteføljene ##

port_big_quality_lonnsomhet$vekter    <- port_big_quality_lonnsomhet$MarketCap1 / port_big_quality_lonnsomhet$TotalMarketCap1_1
port_big_junk_lonnsomhet$vekter       <- port_big_junk_lonnsomhet$MarketCap1 / port_big_junk_lonnsomhet$TotalMarketCap2_1
port_small_quality_lonnsomhet$vekter <- port_small_quality_lonnsomhet$MarketCap1 / port_small_quality_lonnsomhet$TotalMarketCap3_1
port_small_junk_lonnsomhet$vekter     <- port_small_junk_lonnsomhet$MarketCap1 / port_small_junk_lonnsomhet$TotalMarketCap4_1

## legge ved korrekt avkastning ##

port_big_quality_lonnsomhet <- left_join(port_big_quality_lonnsomhet, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
port_big_junk_lonnsomhet <- left_join(port_big_junk_lonnsomhet, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
port_small_quality_lonnsomhet <- left_join(port_small_quality_lonnsomhet, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
port_small_junk_lonnsomhet <- left_join(port_small_junk_lonnsomhet, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))

## beregner merovkastning på porteføljene ##
```

```r
## Beregner total markedscap for hver portefølje ##
res1_1_vekst <- aggregate(port_big_quality_vekst$MarketCap1, list(port_big_quality_vekst$Date), sum)
names(res1_1_vekst) <- c("Date", "TotalMarketCap1_1")

res2_1_vekst <- aggregate(port_big_junk_vekst$MarketCap1, list(port_big_junk_vekst$Date), sum)
names(res2_1_vekst) <- c("Date", "TotalMarketCap2_1")

res3_1_vekst <- aggregate(port_small_quality_vekst$MarketCap1, list(port_small_quality_vekst$Date), sum)
names(res3_1_vekst) <- c("Date", "TotalMarketCap3_1")

res4_1_vekst <- aggregate(port_small_junk_vekst$MarketCap1, list(port_small_junk_vekst$Date), sum)
names(res4_1_vekst) <- c("Date", "TotalMarketCap4_1")

port_big_quality_vekst <- merge(port_big_quality_vekst, res1_1_vekst, by = "Date")
port_big_junk_vekst <- merge(port_big_junk_vekst, res2_1_vekst, by = "Date")
port_small_quality_vekst <- merge(port_small_quality_vekst, res3_1_vekst, by = "Date")
port_small_junk_vekst <- merge(port_small_junk_vekst, res4_1_vekst, by = "Date")

## vekting i porteføljene ##

port_big_quality_vekst$vekter   <- port_big_quality_vekst$MarketCap1 / port_big_quality_vekst$TotalMarketCap1_1
port_big_junk_vekst$vekter      <- port_big_junk_vekst$MarketCap1 / port_big_junk_vekst$TotalMarketCap2_1
port_small_quality_vekst$vekter <- port_small_quality_vekst$MarketCap1 / port_small_quality_vekst$TotalMarketCap3_1
port_small_junk_vekst$vekter    <- port_small_junk_vekst$MarketCap1 / port_small_junk_vekst$TotalMarketCap4_1


## legge ved korrekt avkastning ##

port_big_quality_vekst <- left_join(port_big_quality_vekst, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
port_big_junk_vekst <- left_join(port_big_junk_vekst, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
port_small_quality_vekst <- left_join(port_small_quality_vekst, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
port_small_junk_vekst <- left_join(port_small_junk_vekst, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))

## beregner meravkastning på porteføljene ##
port_big_quality_vekst$Returns1 <- port_big_quality_vekst$R2.y * port_big_quality_vekst$vekter
port_big_junk_vekst$Returns2 <- port_big_junk_vekst$R2.y * port_big_junk_vekst$vekter
port_small_quality_vekst$Returns3 <- port_small_quality_vekst$R2.y * port_small_quality_vekst$vekter
port_small_junk_vekst$Returns4 <- port_small_junk_vekst$R2.y * port_small_junk_vekst$vekter
```

```r
## aggregere porteføljeavkastningen så vi får samlet månendlige avkastningstall ##

port_big_quality_vekst1 <- aggregate(port_big_quality_lonnsomhet$Returns1, list(port_big_quality_lonnsomhet$Date), sum)
names(port_big_quality_vekst1) <- c("Date", "ReturnsBQ")

port_big_junk_vekst1 <- aggregate(port_big_junk_vekst$Returns2, list(port_big_junk_vekst$Date), sum)
names(port_big_junk_vekst1) <- c("Date", "ReturnsBJ")

port_small_quality_vekst1 <- aggregate(port_small_quality_vekst$Returns3, list(port_small_quality_vekst$Date), sum)
names(port_small_quality_vekst1) <- c("Date", "ReturnsSQ")

port_small_junk_vekst1 <- aggregate(port_small_junk_vekst$Returns4, list(port_small_junk_vekst$Date), sum)
names(port_small_junk_vekst1) <- c("Date", "ReturnsSJ")


## Lage Vekst-Faktoren ##

port_quality_vekst <- merge(port_big_quality_vekst1, port_small_quality_vekst1, by = "Date")
port_junk_vekst <- merge(port_big_junk_vekst1, port_small_junk_vekst1, by = "Date")

port_vekst <- merge(port_quality_vekst, port_junk_vekst, by = "Date")

## Vekst-Faktoren ##
port_vekst <- transform(port_vekst, vekst = 0.5*(port_vekst$ReturnsSQ-port_vekst$ReturnsSJ)+0.5*(port_vekst$ReturnsBQ-port_vekst$ReturnsBJ))

## legge ved faktorer ##

port_vekst <- left_join(port_vekst, Faktorer[ ,c("SMB", "HML", "PR1YR", "UMD", "Date")], by = c("Date" = "Date"))
port_vekst <- left_join(port_vekst, Faktorer2[ ,c("MKT", "Date")], by = c("Date" = "Date"))


## Regresjon på... ##
## På market ##
```

```r
## Regresjon på... ##
## På market ##

fam30_vekst <- lm(port_vekst$vekst ~ port_vekst$MKT, data = port_vekst)
summary(fam30_vekst)

fam40_vekst <- lm(port_vekst$vekst ~ port_vekst$MKT + port_vekst$SMB + port_vekst$HML, data = port_vekst)
summary(fam40_vekst)

fam50_vekst <- lm(port_vekst$vekst ~ port_vekst$MKT + port_vekst$SMB + port_vekst$HML + port_vekst$UMD, data = port_vekst)
summary(fam50_vekst)


## På Excess returns ##
res30_1vekst <- mean(port_vekst$vekst)

## T-verdier
res_30_2vekst <- res30_1vekst/(StdDev(port_vekst$vekst)/sqrt(length(port_vekst$vekst)))

## Sharpe verdier ##
res_30_3vekst <- res30_1vekst/(StdDev(port_vekst$vekst))



## Regne ut Sikkerhet-Faktoren ####

port_big_sikkerhet   <- total_port_1[total_port_1$pgtq8 == "1", ]
port_small_sikkerhet <- total_port_1[total_port_1$pgtq8 == "0", ]

## lager quantiles 30% - 40% - 30% for store aksjer ##

port_big_sikkerhet <- port_big_sikkerhet %>% group_by(Date) %>%
  mutate(QJ = quantile(zsikkerhet,0.3),
         BigJunk = ifelse(zsikkerhet <= QJ,1,0))
port_big_sikkerhet <- port_big_sikkerhet %>% group_by(Date) %>%
  mutate(QQ = quantile(zsikkerhet,0.7),
         bigQuality = ifelse(zsikkerhet >= QQ,1,0))

```

```r

port_big_junk_sikkerhet <- port_big_sikkerhet[port_big_sikkerhet$BigJunk == "1", ]
port_big_quality_sikkerhet <- port_big_sikkerhet[port_big_sikkerhet$bigQuality == "1", ]


## lager quantiles 30% - 40% - 30% for små aksjer ##


port_small_sikkerhet <- port_small_sikkerhet %>% group_by(Date) %>%
  mutate(QJ = quantile(zsikkerhet,0.3),
         SmallJunk = ifelse(zsikkerhet <= QJ,1,0))
port_small_sikkerhet <- port_small_sikkerhet %>% group_by(Date) %>%
  mutate(QQ = quantile(zsikkerhet,0.7),
         SmallQuality = ifelse(zsikkerhet >= QQ,1,0))

port_small_junk_sikkerhet <- port_small_sikkerhet[port_small_sikkerhet$SmallJunk == "1", ]
port_small_quality_sikkerhet <- port_small_sikkerhet[port_small_sikkerhet$SmallQuality == "1", ]


## VW de ulike porteføljene for å lage avkastningstallene ##

## Beregner total markedscap for hver portefølje ##
res1_1_sikkerhet <- aggregate(port_big_quality_sikkerhet$MarketCap1, list(port_big_quality_sikkerhet$Date), sum)
names(res1_1_sikkerhet) <- c("Date", "TotalMarketCap1_1")

res2_1_sikkerhet <- aggregate(port_big_junk_sikkerhet$MarketCap1, list(port_big_junk_sikkerhet$Date), sum)
names(res2_1_sikkerhet) <- c("Date", "TotalMarketCap2_1")

res3_1_sikkerhet <- aggregate(port_small_quality_sikkerhet$MarketCap1, list(port_small_quality_sikkerhet$Date), sum)
names(res3_1_sikkerhet) <- c("Date", "TotalMarketCap3_1")

res4_1_sikkerhet <- aggregate(port_small_junk_sikkerhet$MarketCap1, list(port_small_junk_sikkerhet$Date), sum)
names(res4_1_sikkerhet) <- c("Date", "TotalMarketCap4_1")


port_big_quality_sikkerhet <- merge(port_big_quality_sikkerhet, res1_1_sikkerhet, by = "Date")
port_big_junk_sikkerhet <- merge(port_big_junk_sikkerhet, res2_1_sikkerhet, by = "Date")
port_small_quality_sikkerhet <- merge(port_small_quality_sikkerhet, res3_1_sikkerhet, by = "Date")
port_small_junk_sikkerhet <- merge(port_small_junk_sikkerhet, res4_1_sikkerhet, by = "Date")


```

```r
## vekting i porteføljene ##
port_big_quality_sikkerhet$vekter   <- port_big_quality_sikkerhet$MarketCap1 / port_big_quality_sikkerhet$TotalMarketCap1_1
port_big_junk_sikkerhet$vekter      <- port_big_junk_sikkerhet$MarketCap1 / port_big_junk_sikkerhet$TotalMarketCap2_1
port_small_quality_sikkerhet$vekter <- port_small_quality_sikkerhet$MarketCap1 / port_small_quality_sikkerhet$TotalMarketCap3_1
port_small_junk_sikkerhet$vekter    <- port_small_junk_sikkerhet$MarketCap1 / port_small_junk_sikkerhet$TotalMarketCap4_1


## legge ved korrekt avkastning ##
port_big_quality_sikkerhet <- left_join(port_big_quality_sikkerhet, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
port_big_junk_sikkerhet <- left_join(port_big_junk_sikkerhet, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
port_small_quality_sikkerhet <- left_join(port_small_quality_sikkerhet, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))
port_small_junk_sikkerhet <- left_join(port_small_junk_sikkerhet, aksjer[, c("Date", "R2", "orgnr")], by = c("Date" = "Date", "orgnr" = "orgnr"))

## beregner meravkastning på porteføljene ##
port_big_quality_sikkerhet$Returns1 <- port_big_quality_sikkerhet$R2.y * port_big_quality_sikkerhet$vekter
port_big_junk_sikkerhet$Returns2 <- port_big_junk_sikkerhet$R2.y * port_big_junk_sikkerhet$vekter
port_small_quality_sikkerhet$Returns3 <- port_small_quality_sikkerhet$R2.y * port_small_quality_sikkerhet$vekter
port_small_junk_sikkerhet$Returns4 <- port_small_junk_sikkerhet$R2.y * port_small_junk_sikkerhet$vekter


## aggregere porteføljeavkastningen så vi får samlet månendlige avkastningstall ##
port_big_quality_sikkerhet1 <- aggregate(port_big_quality_sikkerhet$Returns1, list(port_big_quality_sikkerhet$Date), sum)
names(port_big_quality_sikkerhet1) <- c("Date", "ReturnsBQ")

port_big_junk_sikkerhet1 <- aggregate(port_big_junk_sikkerhet$Returns2, list(port_big_junk_sikkerhet$Date), sum)
names(port_big_junk_sikkerhet1) <- c("Date", "ReturnsBJ")

port_small_quality_sikkerhet1 <- aggregate(port_small_quality_sikkerhet$Returns3, list(port_small_quality_sikkerhet$Date), sum)
names(port_small_quality_sikkerhet1) <- c("Date", "ReturnsSQ")

port_small_junk_sikkerhet1 <- aggregate(port_small_junk_sikkerhet$Returns4, list(port_small_junk_sikkerhet$Date), sum)
names(port_small_junk_sikkerhet1) <- c("Date", "ReturnsSJ")


## Lage Sikkerhet-Faktoren ##

port_quality_sikkerhet <- merge(port_big_quality_sikkerhet1, port_small_quality_sikkerhet1, by = "Date")
port_junk_sikkerhet <- merge(port_big_junk_sikkerhet1, port_small_junk_sikkerhet1, by = "Date")

```

```r

port_sikkerhet <- merge(port_quality_sikkerhet, port_junk_sikkerhet, by = "Date")

## Sikkerhet-Faktorer ##
port_sikkerhet <- transform(port_sikkerhet, sikkerhet = 0.5*(port_sikkerhet$ReturnsSQ-port_sikkerhet$ReturnsSJ)+0.5*(port_sikkerhet$ReturnsBQ-port_sikkerhet$ReturnsBJ))

## legge ved faktorer ##
port_sikkerhet <- left_join(port_sikkerhet, Faktorer[ ,c("SMB", "HML", "PR1YR", "UMD", "Date")], by = c("Date" = "Date"))
port_sikkerhet <- left_join(port_sikkerhet, Faktorer2[ ,c("MKT", "Date")], by = c("Date" = "Date"))


## Regresjon på... ##
## På market ##

fam30_sikkerhet <- lm(port_sikkerhet$sikkerhet ~ port_sikkerhet$MKT, data = port_sikkerhet)
summary(fam30_sikkerhet)

fam40_sikkerhet <- lm(port_sikkerhet$sikkerhet ~ port_sikkerhet$MKT + port_sikkerhet$SMB + port_sikkerhet$HML, data = port_sikkerhet)
summary(fam40_sikkerhet)

fam50_sikkerhet <- lm(port_sikkerhet$sikkerhet ~ port_sikkerhet$MKT + port_sikkerhet$SMB + port_sikkerhet$HML + port_sikkerhet$UMD, data = port_sikkerhet)
summary(fam50_sikkerhet)

## På Excess returns ##
res30_1sikkerhet <- mean(port_sikkerhet$sikkerhet)

## T-verdier
res_30_2sikkerhet <- res30_1sikkerhet/(StdDev(port_sikkerhet$sikkerhet)/sqrt(length(port_sikkerhet$sikkerhet)))

## Sharpe verdier ##
res_30_3sikkerhet <- res30_1sikkerhet/(StdDev(port_sikkerhet$sikkerhet))

```

```r
## Faktoreksponering ####

## QMJ ##
famQMJ_MKT <- lm(port_QMJ$QMJ ~ port_QMJ$MKT, data = port_QMJ)
summary(famQMJ_MKT)

famQMJ_SMB <- lm(port_QMJ$QMJ ~ port_QMJ$SMB, data = port_QMJ)
summary(famQMJ_SMB)

famQMJ_HML <- lm(port_QMJ$QMJ ~ port_QMJ$HML, data = port_QMJ)
summary(famQMJ_HML)

famQMJ_UMD <- lm(port_QMJ$QMJ ~ port_QMJ$UMD, data = port_QMJ)
summary(famQMJ_UMD)

## lønnsomhet ##
famlonnsomhet_MKT <- lm(port_lonnsomhet$lonnsomhet ~ port_lonnsomhet$MKT, data = port_lonnsomhet)
summary(famlonnsomhet_MKT)

famlonnsomhet_SMB <- lm(port_lonnsomhet$lonnsomhet ~ port_lonnsomhet$SMB, data = port_lonnsomhet)
summary(famlonnsomhet_SMB)

famlonnsomhet_HML <- lm(port_lonnsomhet$lonnsomhet ~ port_lonnsomhet$HML, data = port_lonnsomhet)
summary(famlonnsomhet_HML)

famlonnsomhet_UMD <- lm(port_lonnsomhet$lonnsomhet ~ port_lonnsomhet$UMD, data = port_lonnsomhet)
summary(famlonnsomhet_UMD)

## vekst ##
famvekst_MKT <- lm(port_vekst$vekst ~ port_vekst$MKT, data = port_vekst)
summary(famvekst_MKT)

famvekst_SMB <- lm(port_vekst$vekst ~ port_vekst$SMB, data = port_vekst)
summary(famvekst_SMB)

famvekst_HML <- lm(port_vekst$vekst ~ port_vekst$HML, data = port_vekst)
summary(famvekst_HML)

famvekst_UMD <- lm(port_vekst$vekst ~ port_vekst$UMD, data = port_vekst)
summary(famvekst_UMD)
```

```r
## sikkerhet ##
famsikkerhet_MKT <- lm(port_sikkerhet$sikkerhet ~ port_sikkerhet$MKT, data = port_sikkerhet)
summary(famsikkerhet_MKT)

famsikkerhet_SMB <- lm(port_sikkerhet$sikkerhet ~ port_sikkerhet$SMB, data = port_sikkerhet)
summary(famsikkerhet_SMB)

famsikkerhet_HML <- lm(port_sikkerhet$sikkerhet ~ port_sikkerhet$HML, data = port_sikkerhet)
summary(famsikkerhet_HML)

famsikkerhet_UMD <- lm(port_sikkerhet$sikkerhet ~ port_sikkerhet$UMD, data = port_sikkerhet)
summary(famsikkerhet_UMD)

## korellasjonsmatrisen av Kvalitetsfaktorene ####

port_alle_faktorer <- port_QMJ
port_alle_faktorer <- left_join(port_alle_faktorer, port_lonnsomhet[ ,c("lonnsomhet", "Date")], by = c("Date" = "Date"))
port_alle_faktorer <- left_join(port_alle_faktorer, port_vekst[ ,c("vekst", "Date")], by = c("Date" = "Date"))
port_alle_faktorer <- left_join(port_alle_faktorer, port_sikkerhet[ ,c("sikkerhet", "Date")], by = c("Date" = "Date"))
port_alle_faktorer <- port_alle_faktorer[, c(6,13,14,15)]

korrelasjon <- cor(port_alle_faktorer)
korrelasjon



## Robusthetstester ####



## Robusthetstest på forskningsspørsmål 2 - QMJ-faktoren ##

## QMJ - 2000-2010 ##
port_QMJ_robust_2000_2010 <- port_QMJ[port_QMJ$Date < "2010-01-31", ]
## QMJ - 2011-2020 ##
```

```r
## QMJ - 2000-2010 ##
port_QMJ_robust_2000_2010 <- port_QMJ[port_QMJ$Date < "2010-01-31", ]
## QMJ - 2011-2020 ##
port_QMJ_robust_2011_2020 <- port_QMJ[port_QMJ$Date > "2011-01-01", ]

## Lønnsomhet - 2000-2010 ##
port_lonnsomhet_robust_2000_2010 <- port_lonnsomhet[port_lonnsomhet$Date < "2010-01-31", ]
## Lønnsomhet - 2011-2020 ##
port_lonnsomhet_robust_2009_2018 <- port_lonnsomhet[port_lonnsomhet$Date > "2011-01-01", ]

## vekst - 2000-2010 ##
port_vekst_robust_2000_2010 <- port_vekst[port_vekst$Date < "2010-01-31", ]
## vekst - 2011-2020 ##
port_vekst_robust_2009_2018 <- port_vekst[port_vekst$Date > "2011-01-01", ]

## sikkerhet - 2000-2010 ##
port_sikkerhet_robust_2000_2010 <- port_sikkerhet[port_sikkerhet$Date < "2010-01-31", ]
## sikkerhet - 2011-2020 ##
port_sikkerhet_robust_2011_2020 <- port_sikkerhet[port_sikkerhet$Date > "2011-01-01", ]




## regresjon 2000-2010 ##

## QMJ_1 ##

fam3000 <- lm(port_QMJ_robust_2000_2010$QMJ ~ port_QMJ_robust_2000_2010$MKT, data = port_QMJ_robust_2000_2010)
summary(fam3000)
fam4000 <- lm(port_QMJ_robust_2000_2010$QMJ ~ port_QMJ_robust_2000_2010$MKT + port_QMJ_robust_2000_2010$SMB + port_QMJ_robust_2000_2010$HML, data = port_QMJ_robust_2000_2010)
summary(fam4000)
fam5000 <- lm(port_QMJ_robust_2000_2010$QMJ ~ port_QMJ_robust_2000_2010$MKT + port_QMJ_robust_2000_2010$SMB + port_QMJ_robust_2000_2010$HML + port_QMJ_robust_2000_2010$UMD, data = port_QMJ_robust_2000_2010)
summary(fam5000)

## På Excess returns ##
ras3000_1 <- mean(port_QMJ_robust_2000_2010$QMJ)

## T-verdier
ras3000_2 <- ras3000_1/(stddev(port_QMJ_robust_2000_2010$QMJ)/sqrt(length(port_QMJ_robust_2000_2010$QMJ)))
```

```r
## Lønnsomhet 1 ##

fem3000_lonnsomhet <- lm(port_lonnsomhet_robust_2000_2010$lonnsomhet ~ port_lonnsomhet_robust_2000_2010$MKT, data = port_lonnsomhet_robust_2000_2010)
summary(fem3000_lonnsomhet)
fem4000_lonnsomhet <- lm(port_lonnsomhet_robust_2000_2010$lonnsomhet ~ port_lonnsomhet_robust_2000_2010$MKT + port_lonnsomhet_robust_2000_2010$SMB + port_lonnsomhet_robust_2000_2010$HML , data = port_lonnsomhet_robust_2000_2010)
summary(fem4000_lonnsomhet)
fem5000_lonnsomhet <- lm(port_lonnsomhet_robust_2000_2010$lonnsomhet ~ port_lonnsomhet_robust_2000_2010$MKT + port_lonnsomhet_robust_2000_2010$SMB + port_lonnsomhet_robust_2000_2010$HML + port_lonnsomhet_robust_2000_2010$UMD, data = port_lonnsomhet_ro
summary(fem5000_lonnsomhet)

## På Excess returns ##
res3000_1lonnsomhet <- mean(port_lonnsomhet_robust_2000_2010$lonnsomhet)

## Tversnitt
res_3000_2lonnsomhet <- res3000_1lonnsomhet/(StdDev(port_lonnsomhet_robust_2000_2010$lonnsomhet)/sqrt(length(port_lonnsomhet_robust_2000_2010$lonnsomhet)))

## Sharpe ventiles ##
res_3000_3lonnsomhet <- res3000_1lonnsomhet/(StdDev(port_lonnsomhet_robust_2000_2010$lonnsomhet))


## Vekst_1 ##

fem3000_vekst <- lm(port_vekst_robust_2000_2010$vekst ~ port_vekst_robust_2000_2010$MKT, data = port_vekst_robust_2000_2010)
summary(fem3000_vekst)
fem4000_vekst <- lm(port_vekst_robust_2000_2010$vekst ~ port_vekst_robust_2000_2010$MKT + port_vekst_robust_2000_2010$SMB + port_vekst_robust_2000_2010$HML , data = port_vekst_robust_2000_2010)
summary(fem4000_vekst)
fem5000_vekst <- lm(port_vekst_robust_2000_2010$vekst ~ port_vekst_robust_2000_2010$MKT + port_vekst_robust_2000_2010$SMB + port_vekst_robust_2000_2010$HML + port_vekst_robust_2000_2010$UMD, data = port_vekst_robust_2000_2010)
summary(fem5000_vekst)

## På Excess returns ##
res3000_1vekst <- mean(port_vekst_robust_2000_2010$vekst)

## I vendre
res_3000_2vekst <- res3000_1vekst/(StdDev(port_vekst_robust_2000_2010$vekst)/sqrt(length(port_vekst_robust_2000_2010$vekst)))

## Sharpe vendres ##
```

```r
## Sharpe vekst ##
res_3000_3vekst <- res3000_1vekst/(StdDev(port_vekst_robust_2000_2010)vekst)


## Sikkerhet_1 ##

fam3000_sikkerhet <- lm(port_sikkerhet_robust_2000_2010$sikkerhet ~ port_sikkerhet_robust_2000_2010$MKT, data = port_sikkerhet_robust_2000_2010)
summary(fam3000_sikkerhet)
fam4000_sikkerhet <- lm(port_sikkerhet_robust_2000_2010$sikkerhet ~ port_sikkerhet_robust_2000_2010$MKT + port_sikkerhet_robust_2000_2010$SMB + port_sikkerhet_robust_2000_2010$HML, data = port_sikkerhet_robust_2000_2010)
summary(fam4000_sikkerhet)
fam5000_sikkerhet <- lm(port_sikkerhet_robust_2000_2010$sikkerhet ~ port_sikkerhet_robust_2000_2010$MKT + port_sikkerhet_robust_2000_2010$SMB + port_sikkerhet_robust_2000_2010$HML + port_sikkerhet_robust_2000_2010$RMO, data = port_sikkerhet_robust_200
summary(fam5000_sikkerhet)

## Fa Excess returns ##
res3000_1sikkerhet <- mean(port_sikkerhet_robust_2000_2010$sikkerhet)

## Treynor ##
res_3000_2sikkerhet <- res3000_1sikkerhet/(StdDev(port_sikkerhet_robust_2000_2010$sikkerhet) * sqrt(length(port_sikkerhet_robust_2000_2010$sikkerhet)))

## Sharpe vanlig ##
res_3000_3sikkerhet <- res3000_1sikkerhet/(StdDev(port_sikkerhet_robust_2000_2010$sikkerhet))




## Regresjon 2011-2020 ##

## QMJ_1 ##

fam20000 <- lm(port_QMJ_robust_2011_2020$QMJ ~ port_QMJ_robust_2011_2020$MKT, data = port_QMJ_robust_2011_2020)
summary(fam20000)
fam40000 <- lm(port_QMJ_robust_2011_2020$QMJ ~ port_QMJ_robust_2011_2020$MKT + port_QMJ_robust_2011_2020$SMB + port_QMJ_robust_2011_2020$HML, data = port_QMJ_robust_2011_2020)
summary(fam40000)
fam50000 <- lm(port_QMJ_robust_2011_2020$QMJ ~ port_QMJ_robust_2011_2020$MKT + port_QMJ_robust_2011_2020$SMB + port_QMJ_robust_2011_2020$HML + port_QMJ_robust_2011_2020$UMD, data = port_QMJ_robust_2011_2020)
summary(fam50000)
```

```
## Regresjon 2011-2020 ##

## QMJ_1 ##

fam30000 <- lm(port_QMJ_robust_2011_2020$QMJ ~ port_QMJ_robust_2011_2020$MKT, data = port_QMJ_robust_2011_2020)
summary(fam30000)
fam40000 <- lm(port_QMJ_robust_2011_2020$QMJ ~ port_QMJ_robust_2011_2020$MKT + port_QMJ_robust_2011_2020$SMB + port_QMJ_robust_2011_2020$HML, data = port_QMJ_robust_2011_2020)
summary(fam40000)
fam50000 <- lm(port_QMJ_robust_2011_2020$QMJ ~ port_QMJ_robust_2011_2020$MKT + port_QMJ_robust_2011_2020$SMB + port_QMJ_robust_2011_2020$HML + port_QMJ_robust_2011_2020$UMD, data = port_QMJ_robust_2011_2020)
summary(fam50000)


## På Excess returns ##
res30000_1 <- mean(port_QMJ_robust_2011_2020$QMJ)

## T-verdier
res_30000_2 <- res30000_1/(StdDev(port_QMJ_robust_2011_2020$QMJ)/sqrt(length(port_QMJ_robust_2011_2020$QMJ)))

## Sharpe verdier ##
res_30000_3 <- res30000_1/(StdDev(port_QMJ_robust_2011_2020$QMJ))


## Lønnsomhet_1 ##

fam30000_lonnsomhet <- lm(port_lonnsomhet_robust_2011_2020$lonnsomhet ~ port_lonnsomhet_robust_2011_2020$MKT, data = port_lonnsomhet_robust_2011_2020)
summary(fam30000_lonnsomhet)
fam40000_lonnsomhet <- lm(port_lonnsomhet_robust_2011_2020$lonnsomhet ~ port_lonnsomhet_robust_2011_2020$MKT + port_lonnsomhet_robust_2011_2020$SMB + port_lonnsomhet_robust_2011_2020$HML, data = port_lonnsomhet_robust_2011_2020)
summary(fam40000_lonnsomhet)
fam50000_lonnsomhet <- lm(port_lonnsomhet_robust_2011_2020$lonnsomhet ~ port_lonnsomhet_robust_2011_2020$MKT + port_lonnsomhet_robust_2011_2020$SMB + port_lonnsomhet_robust_2011_2020$HML + port_lonnsomhet_robust_2011_2020$UMD, data = port_lonnsomhet_r
summary(fam50000_lonnsomhet)


## På Excess returns ##
res30000_1lonnsomhet <- mean(port_lonnsomhet_robust_2011_2020$lonnsomhet)

## T-verdier
res_30000_2lonnsomhet <- res30000_1lonnsomhet/(StdDev(port_lonnsomhet_robust_2011_2020$lonnsomhet)/sqrt(length(port_lonnsomhet_robust_2011_2020$lonnsomhet)))

## Sharpe verdier ##
```

```r
## Sharpe verdier ##
res_30000_lønnsomhet <- res30000_lønnsomhet/(StdDev(port_lønnsomhet_robust_2011_2020$lønnsomhet))



## Vekst_2 ##

fom30000_vekst <- lm(port_vekst_robust_2011_2020$vekst ~ port_vekst_robust_2011_2020$MKT, data = port_vekst_robust_2011_2020)
summary(fom30000_vekst)
fom40000_vekst <- lm(port_vekst_robust_2011_2020$vekst ~ port_vekst_robust_2011_2020$MKT + port_vekst_robust_2011_2020$SMB + port_vekst_robust_2011_2020$HML, data = port_vekst_robust_2011_2020)
summary(fom40000_vekst)
fom50000_vekst <- lm(port_vekst_robust_2011_2020$vekst ~ port_vekst_robust_2011_2020$MKT + port_vekst_robust_2011_2020$SMB + port_vekst_robust_2011_2020$HML + port_vekst_robust_2011_2020$UMD, data = port_vekst_robust_2011_2020)
summary(fom50000_vekst)

## På Excess returns ##
res30000_1vekst <- mean(port_vekst_robust_2011_2020$vekst)

## T-verdier
res_30000_2vekst <- res30000_1vekst/(StdDev(port_vekst_robust_2011_2020$vekst)/sqrt(length(port_vekst_robust_2011_2020$vekst)))

## Sharpe verdier ##
res_30000_3vekst <- res30000_1vekst/(StdDev(port_vekst_robust_2011_2020$vekst))



## Sikkerhet_2 ##

fom30000_sikkerhet <- lm(port_sikkerhet_robust_2011_2020$sikkerhet ~ port_sikkerhet_robust_2011_2020$MKT, data = port_sikkerhet_robust_2011_2020)
summary(fom30000_sikkerhet)
fom40000_sikkerhet <- lm(port_sikkerhet_robust_2011_2020$sikkerhet ~ port_sikkerhet_robust_2011_2020$MKT + port_sikkerhet_robust_2011_2020$SMB + port_sikkerhet_robust_2011_2020$HML, data = port_sikkerhet_robust_2011_2020)
summary(fom40000_sikkerhet)
fom50000_sikkerhet <- lm(port_sikkerhet_robust_2011_2020$sikkerhet ~ port_sikkerhet_robust_2011_2020$MKT + port_sikkerhet_robust_2011_2020$SMB + port_sikkerhet_robust_2011_2020$HML + port_sikkerhet_robust_2011_2020$UMD, data = port_sikkerhet_robust_201
summary(fom50000_sikkerhet)

## På Excess returns ##
res30000_1sikkerhet <- mean(port_sikkerhet_robust_2011_2020$sikkerhet)

## T-verdier
res_30000_2sikkerhet <- res30000_1sikkerhet/(StdDev(port_sikkerhet_robust_2011_2020$sikkerhet)/sqrt(length(port_sikkerhet_robust_2011_2020$sikkerhet)))
```