Funds analysis

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Contents

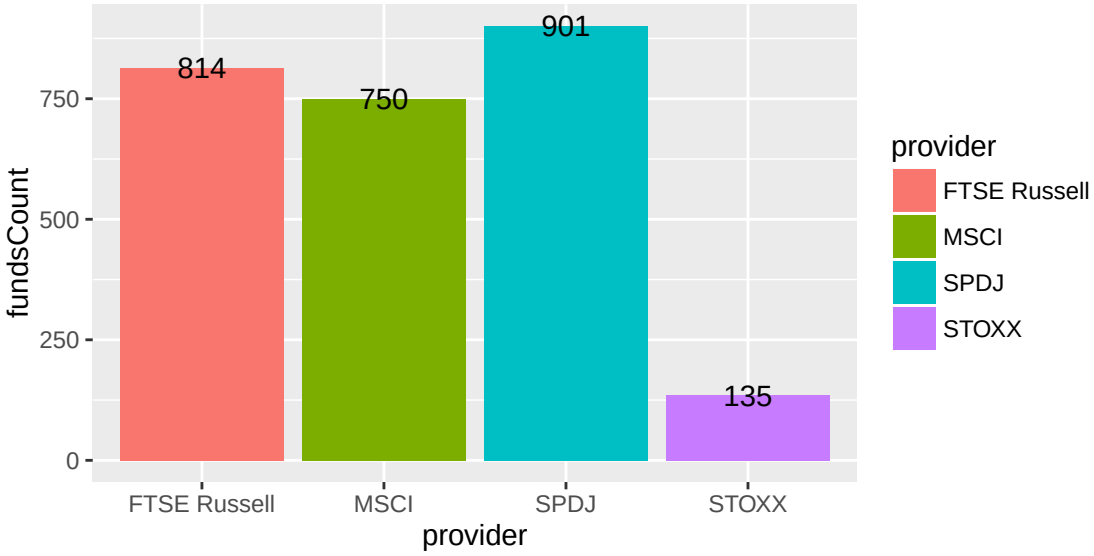
Golbal Configuration

```
filePath <- "~/Desktop/morningstar.csv"
sysKeyword <- "(Summary|Percentile|Sum|Average|Count|Maximum|Minimum|Median|Deviation)"
msciKeyword <-"MSCI"
ftseKeyword <-"(FTSE|Russell)"
stoxxKeyword <-"STOXX"
spdjKeyword <-"(S&P|Dow|DJ)"
esgKeywords <- '(Sustain|ESG|esg|SRI|sri|Social|Governance|Catholic|Ethical)'
envKeywords <-'(Water|Carbon|Climate|Enviro|Green|Energy|Renew|Tech|Fossil|Alternative|Clean|Fuel|Pollu
blackrockKeyword <- '(iShare|BlackRock|BLK|Blackrock)'
sumF <- function(vec) {sum(as.numeric(gsub(",", "", as.character(vec))), na.rm=TRUE)}
"^" <- function(x,y) ifelse(y==0,0,base:::"/"(x,y))
provider <- c("MSCI","FTSE Russell","STOXX","SPDJ")
esgIndexTotal <- c(5,35,82,67)
envIndexTotal <- c(20,20,20,20)
```

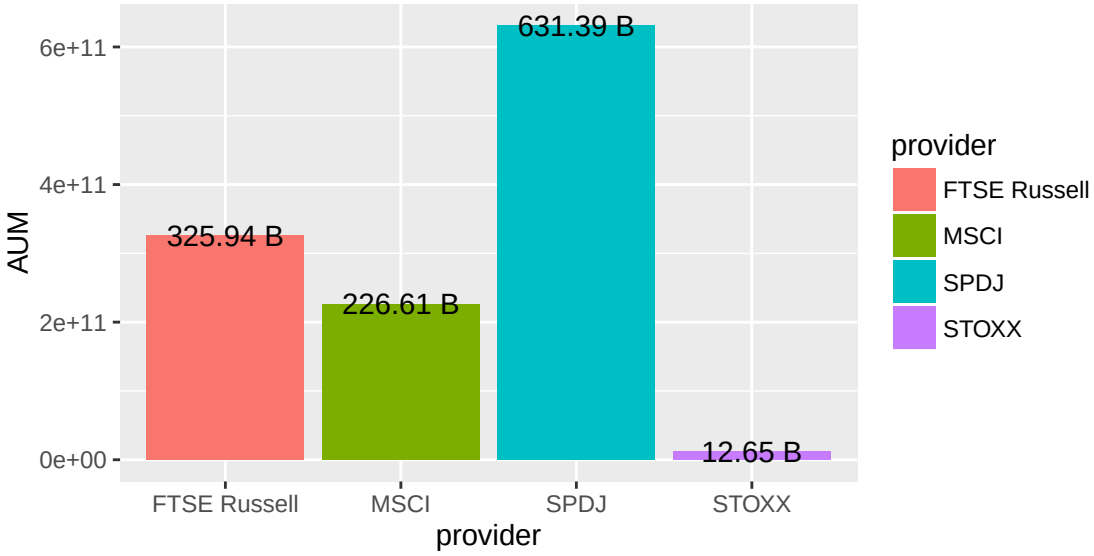
Analysis of funds tracking each provider

provider	fundsCount	fundsPercent	AUM
MSCI	750	0.2884615	226613780269
FTSE Russell	814	0.3130769	325942388219
STOXX	135	0.0519231	12645888332
SPDJ	901	0.3465385	631386740470

Count bar chart

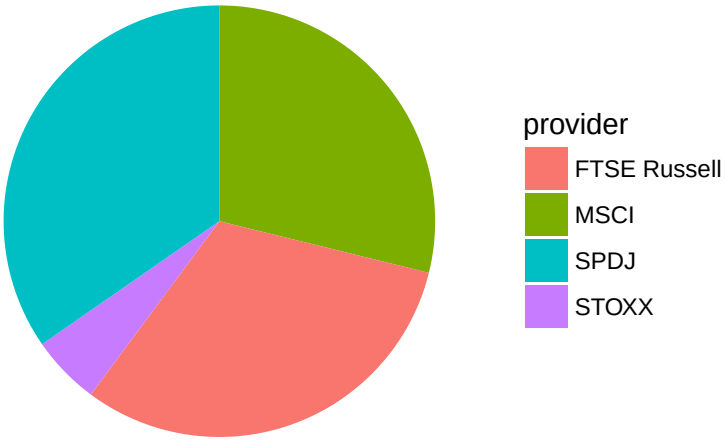


AUM bar chart



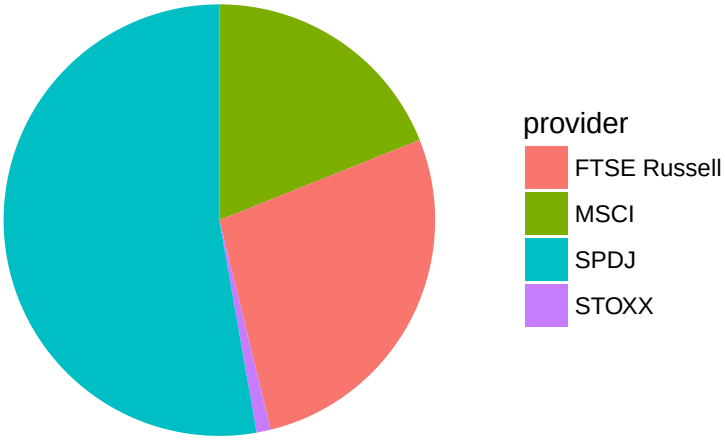
Count pie chart

-



AUM pie chart

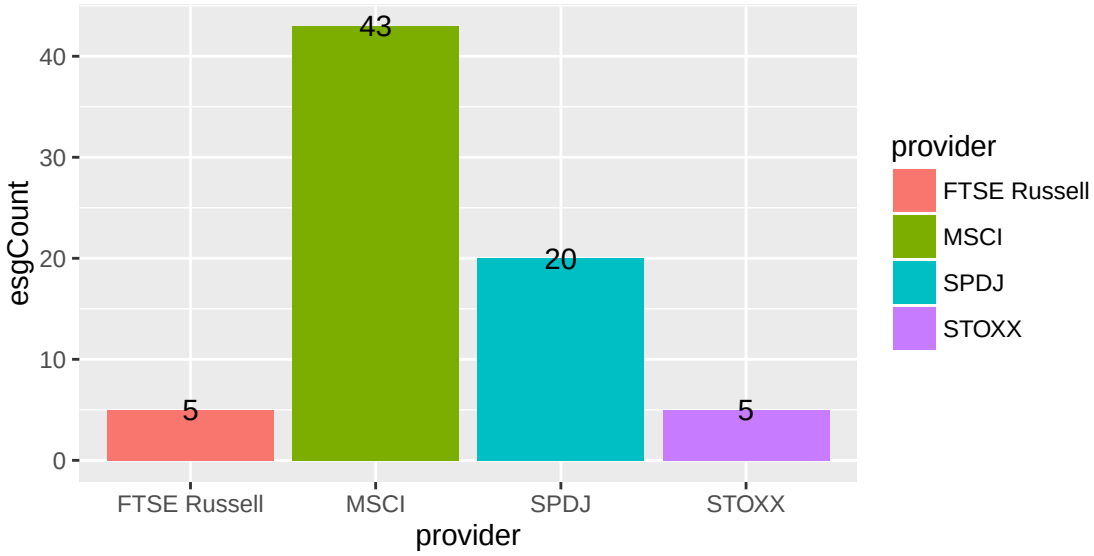
-



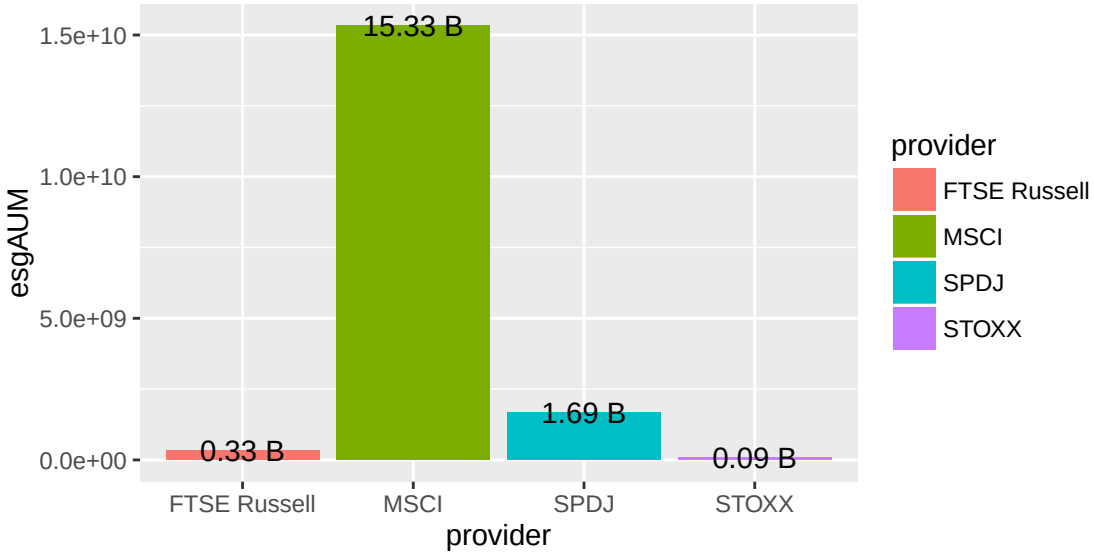
Analysis of funds tracking ESG indexes of each provider

provider	esgCount	esgPercent	esgAUM
MSCI	43	0.5890411	15334725344
FTSE Russell	5	0.0684932	328102278
STOXX	5	0.0684932	92539260
SPDJ	20	0.2739726	1691202927

Count bar chart

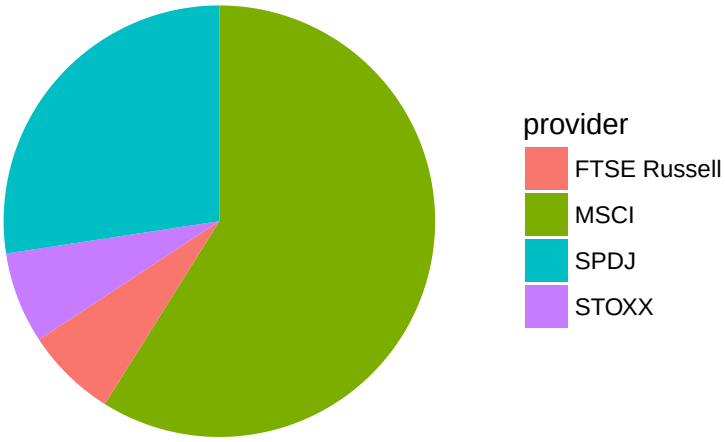


AUM bar comparison



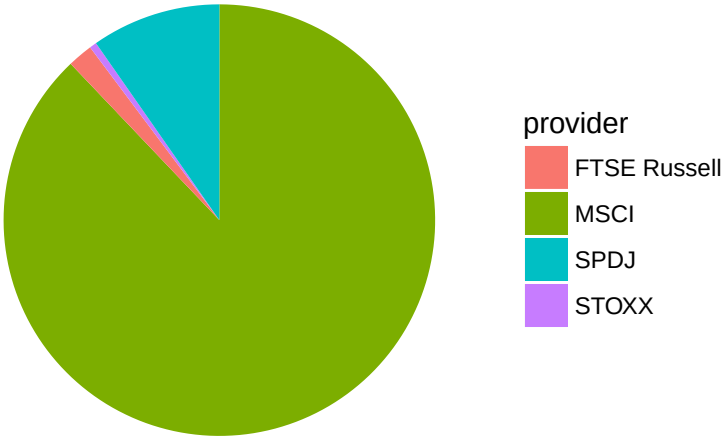
Count pie chart

-



AUM pie chart

-



Percentage of funds tracking ESG indexes for each provider

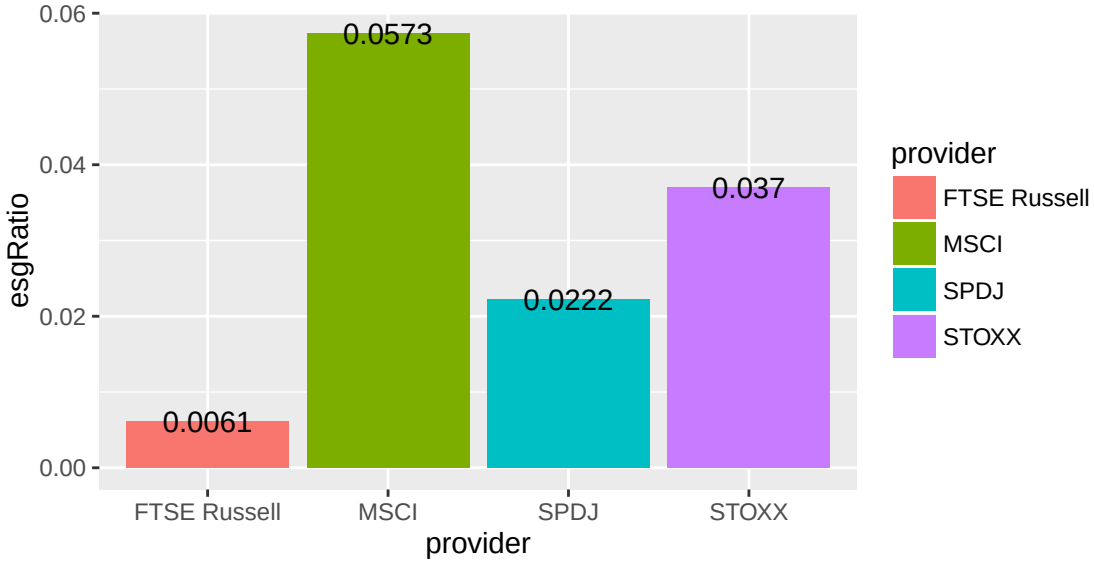
total tracking ESG count: 73

total funds count: 2600

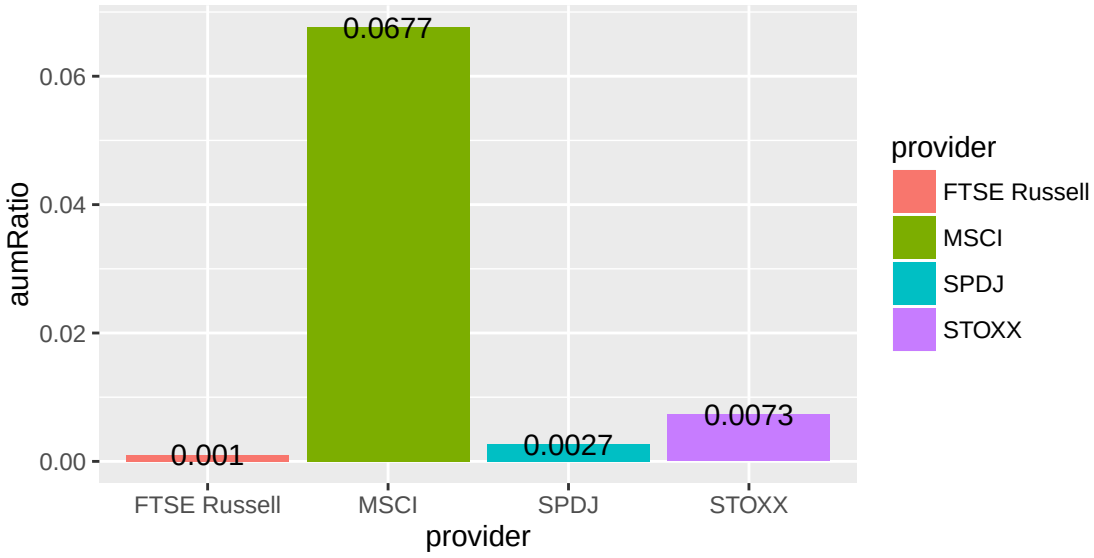
percentage count of total: 0.0280769

percentage AUM of total: 0.0145803

Count ratio for each provider



AUM ratio for each provider

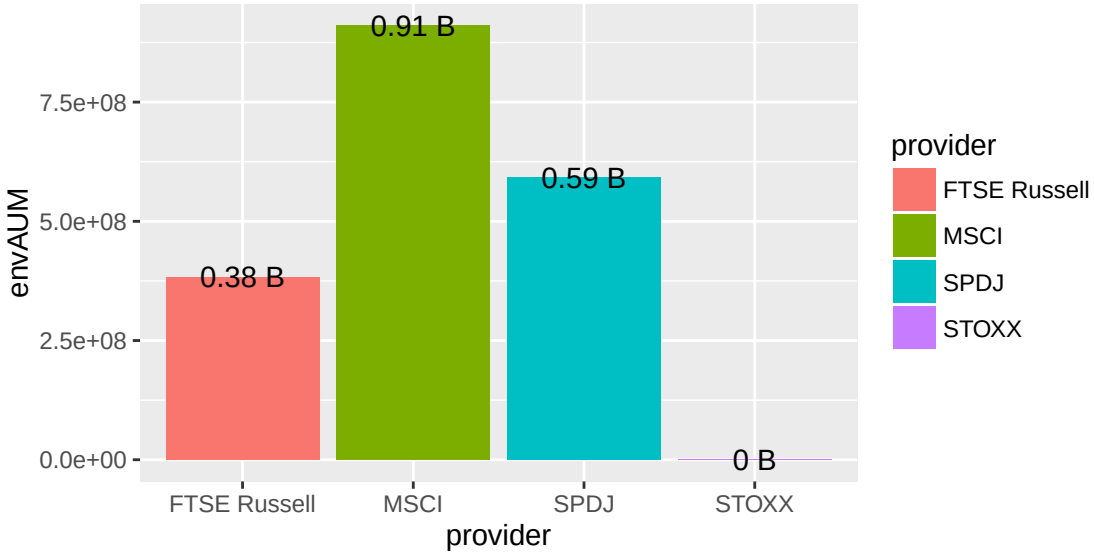


Analysis of funds tracking Environment indexes of each provider

provider	envCount	envPercent	envAUM
MSCI	9	0.4285714	910962321
FTSE Russell	3	0.1428571	383672454
STOXX	0	0.0000000	0
SPDJ	9	0.4285714	591649224

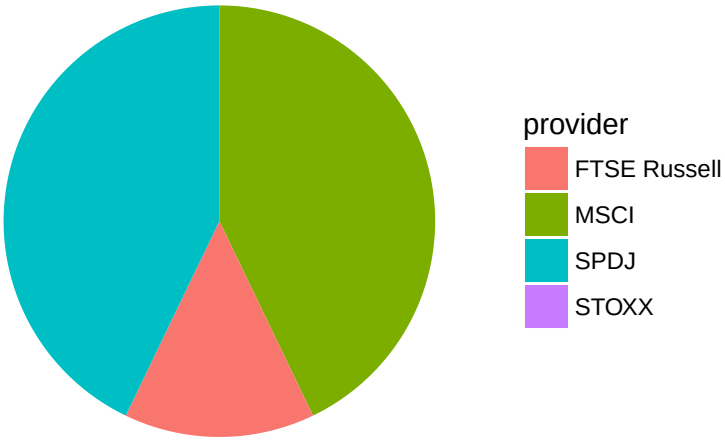
Count bar chart

AUM bar chart



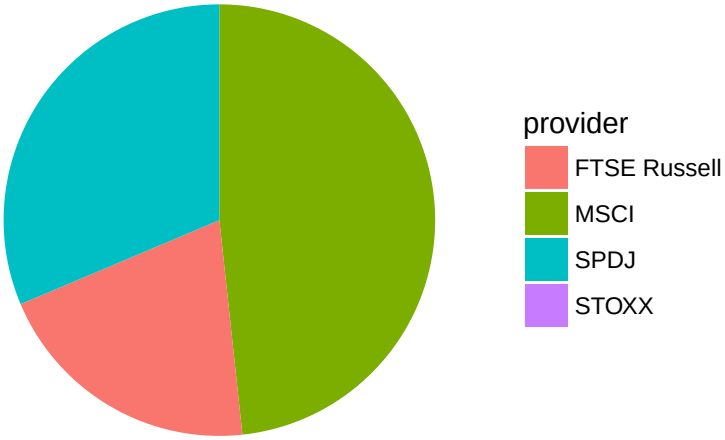
Count pie chart

-



AUM pie chart

-



Percentage of Environment funds tracking Environment indexes for each provider

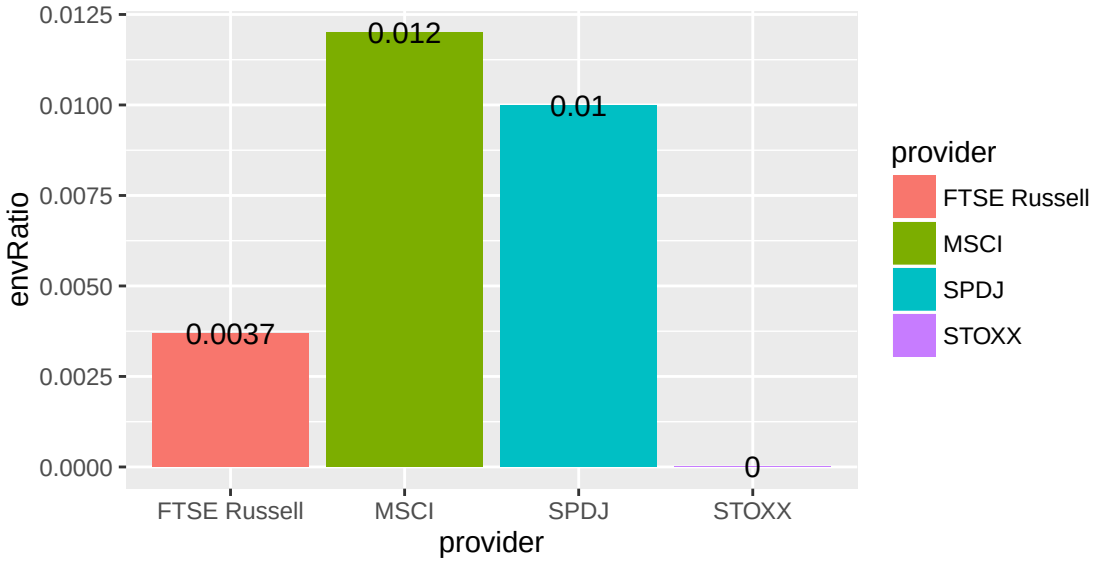
total tracking Environment count: 21

total funds count: 2600

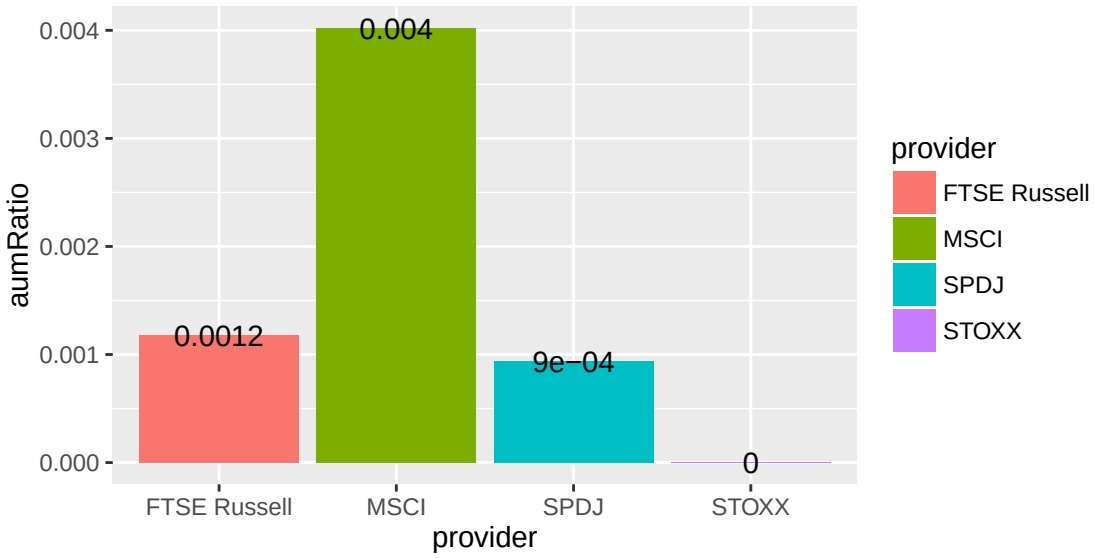
percentage count of total: 0.0080769

percentage AUM of total: 0.0015764

Count ratio for each provider

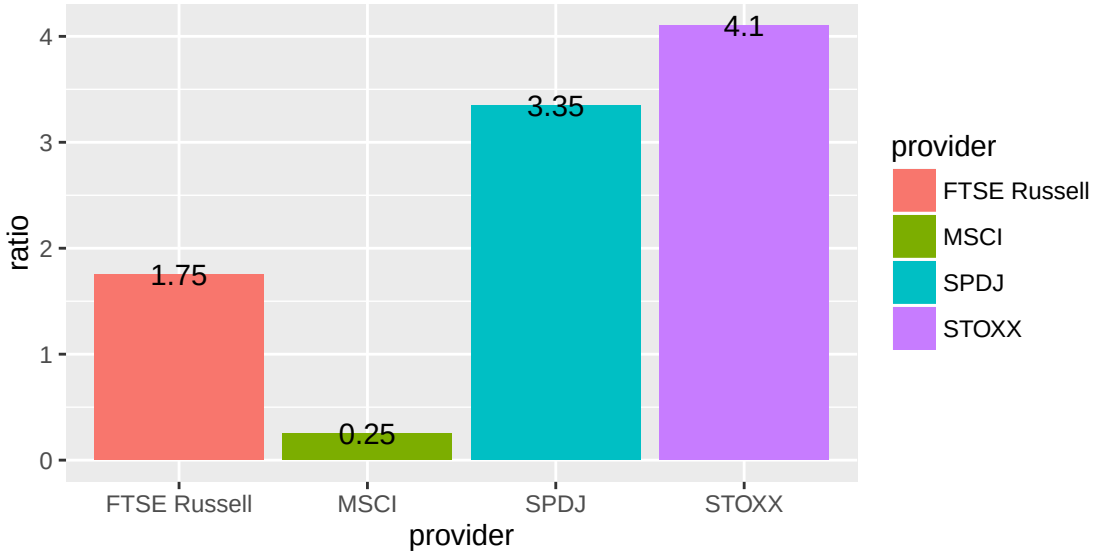


AUM ratio for each provider

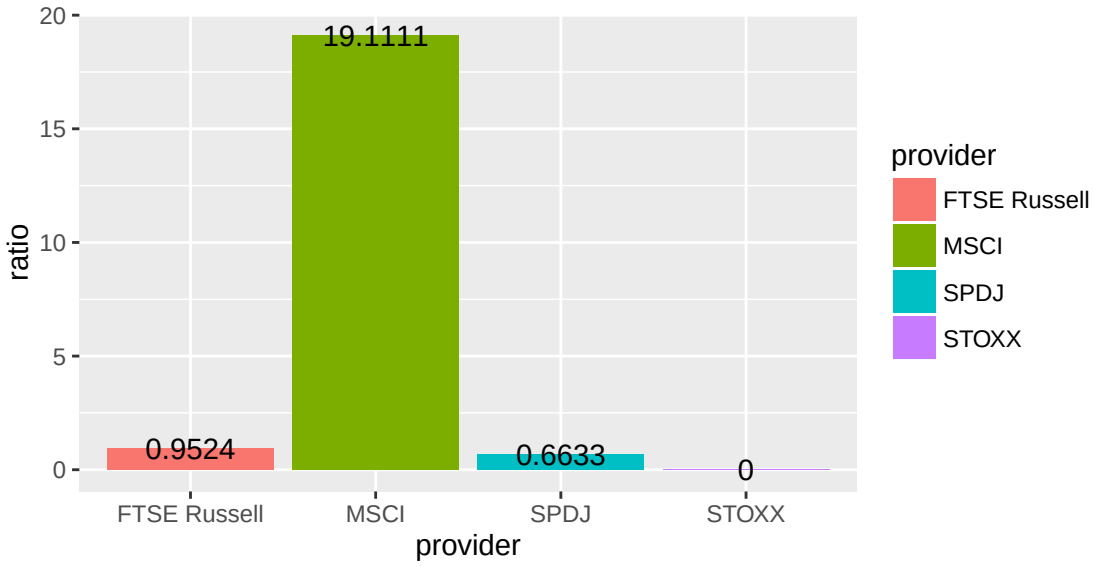


ESG & Environment cross comparison

ESG index count VS Environment index count



Percentage of ESG index in use VS Percentage of Environment index in use

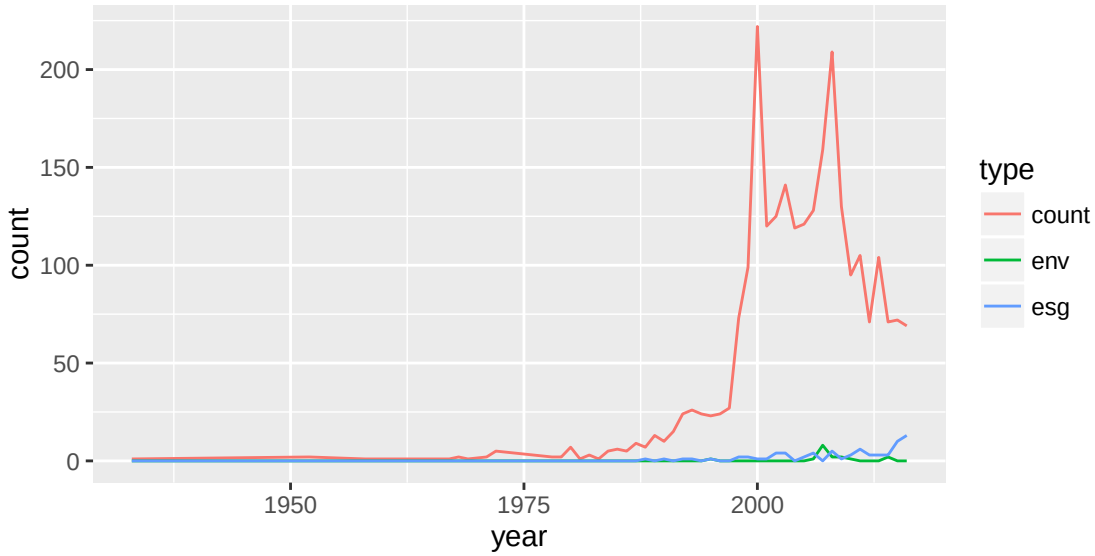


Function 1: get timeseries given any universe and keyword

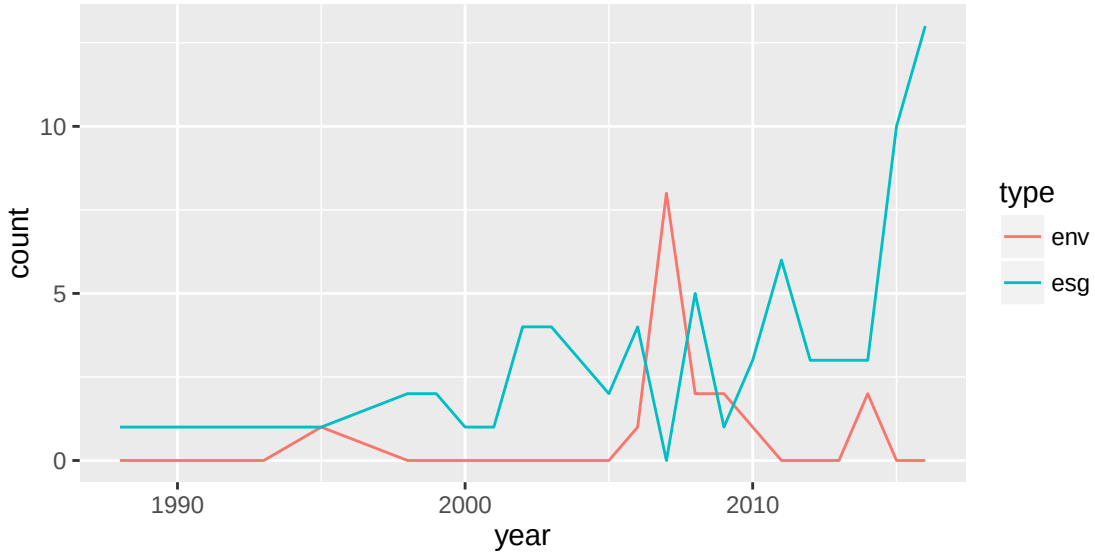
```
getYearCountForUniverse <- function(universe, keyword="", yearLimit=1930) {
  dateU <- universe %>%
    filter(grepl(keyword, Name)) %>%
    filter(grepl("/",as.character(Inception.Date))) %>%
    mutate(date=as.character(Inception.Date))
  yearVec <- dateU$date
  for (i in 1:length(yearVec)) {
    d <- yearVec[i]
    st <- substring(d, nchar(d)-1, nchar(d))
    if (as.numeric(st) < 17) {
      yearVec[i] <- as.numeric(paste("20", st, sep=""))
    } else {
      yearVec[i] <- as.numeric(paste("19", st, sep=""))
    }
  }
  yearVec <- as.numeric(yearVec)
  yearDF <- data.frame(year=yearVec) %>%
    group_by(year) %>%
    filter(year >= yearLimit) %>%
    summarize(count=n())
  return(yearDF)
}

plotTimeSeriesForUniverse <- function(universe, keyword="",  yearLimit=1930) {

  getYearCountForUniverse(universe, keyword, yearLimit) %>%
    ggplot(aes(x=year, y=count)) +
    geom_line() +
    scale_x_continuous(breaks=seq(yearLimit, 2016, 5))
}

plotTimeSeriesForAllScope <- function(universe, esgU, envU, keyword="",  yearLimit=1930) {
  yearDF <- getYearCountForUniverse(universe, keyword, yearLimit)
  esgDF <- getYearCountForUniverse(esgU, keyword, yearLimit)
  envDF <- getYearCountForUniverse(envU, keyword, yearLimit)
  colnames(esgDF) <- c('year', 'esg')
  colnames(envDF) <- c('year', 'env')
  fullYears <- yearDF %>%
    full_join(esgDF, by="year") %>%
    full_join(envDF, by="year")
  fullYears[is.na(fullYears)] <- 0
  fullYearsNarrow <- gather(fullYears, year)
  colnames(fullYearsNarrow) <- c("year", "type", "count")
  fullYearsNarrow %>%
    filter(year >= yearLimit) %>%
    ggplot(aes(x=year, y=count, group=type, col=type)) +
    geom_line()
}

plotTimeSeriesForEsgEnv <- function(esgU, envU, keyword="",  yearLimit=1930) {
  esgDF <- getYearCountForUniverse(esgU, keyword, yearLimit)
```

```
  envDF <- getYearCountForUniverse(envU, keyword, yearLimit)
  colnames(esgDF) <- c('year', 'esg')
  colnames(envDF) <- c('year', 'env')
  fullYears <- esgDF %>%
    full_join(envDF, by="year")
  fullYears[is.na(fullYears)] <- 0
  fullYearsNarrow <- gather(fullYears, year)
  colnames(fullYearsNarrow) <- c("year", "type", "count")
  fullYearsNarrow %>%
    filter(year >= yearLimit) %>%
    ggplot(aes(x=year, y=count, group=type, col=type)) +
    geom_line()
}

plotTimeSeriesForProviders <- function(MSCI, FTSE, SPDJ, STOXX, keyword="",  yearLimit=1930) {
  msciDF <- getYearCountForUniverse(MSCI, keyword, yearLimit)
  ftseDF <- getYearCountForUniverse(FTSE, keyword, yearLimit)
  spdjDF <- getYearCountForUniverse(SPDJ, keyword, yearLimit)
  stoxxDF <- getYearCountForUniverse(STOXX, keyword, yearLimit)
  colnames(msciDF) <- c('year', 'MSCI')
  colnames(ftseDF) <- c('year', 'FTSE')
  colnames(spdjDF) <- c('year', 'SPDJ')
  colnames(stoxxDF) <- c('year', 'STOXX')
  fullYears <- msciDF %>%
    full_join(ftseDF, by="year") %>%
    full_join(spdjDF, by="year") %>%
    full_join(stoxxDF, by="year")
  fullYears[is.na(fullYears)] <- 0
  fullYearsNarrow <- gather(fullYears, year)
  colnames(fullYearsNarrow) <- c("year", "type", "count")
  fullYearsNarrow %>%
    filter(year >= yearLimit) %>%
    ggplot(aes(x=year, y=count, group=type, col=type)) +
    geom_line()
}
```

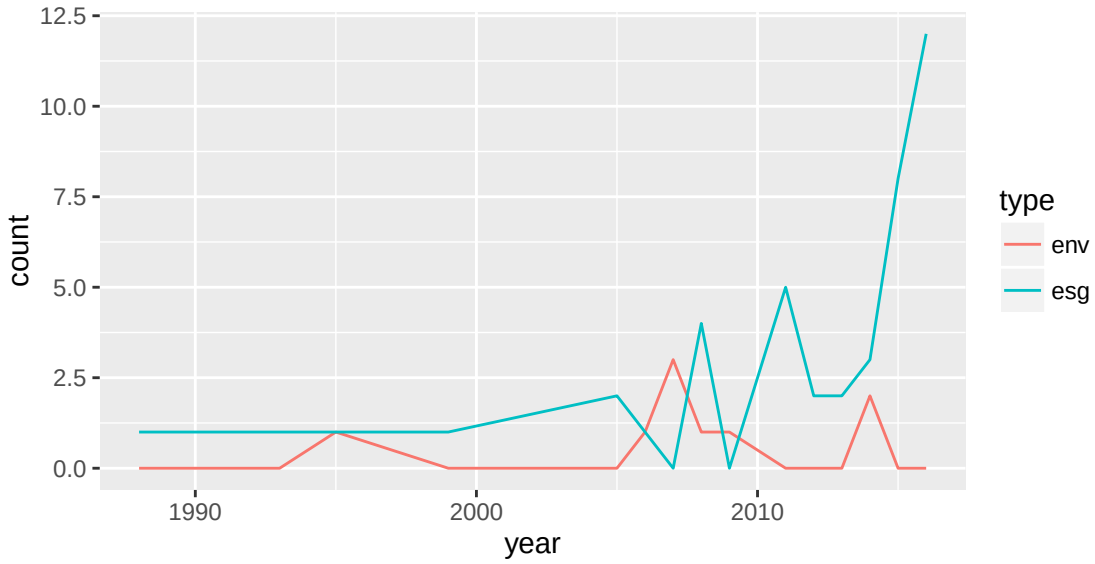
example: universe time series



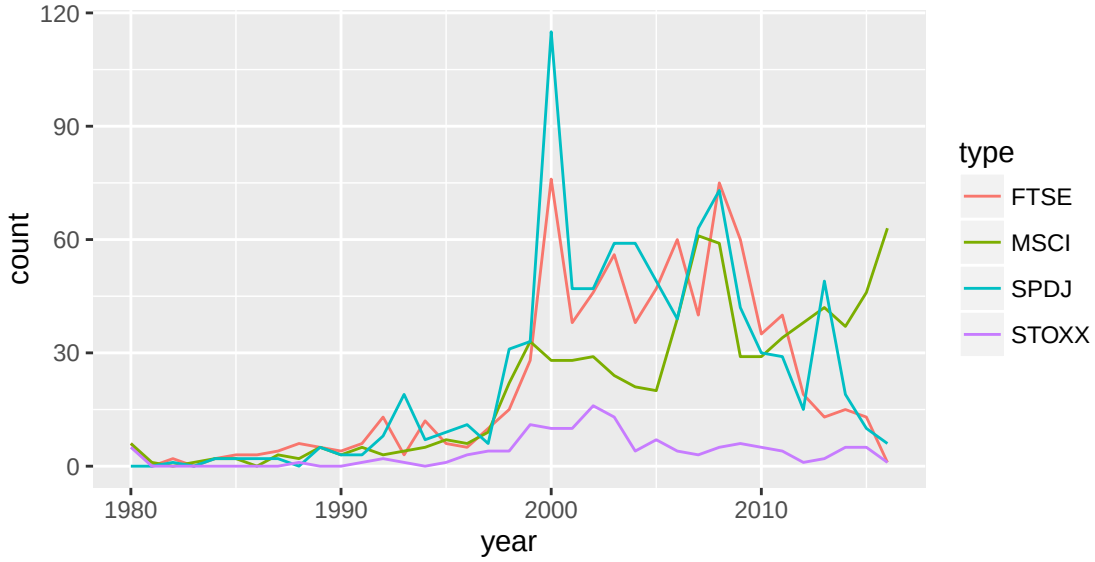
example: ESG vs ENV time series



example: MSCI ESG vs ENV time series



example: all provider time series



Function 2: check any keyword's distribution of index provider

```
institutionChoice <- function(keyword, universe) {
  companyUniverse <- universe %>% filter(grepl(keyword, Name))
  MSCI <- companyUniverse %>% filter(grepl(msciKeyword,Primary.Prospectus.Benchmark))
  FTSE <- companyUniverse %>% filter(grepl(ftseKeyword,Primary.Prospectus.Benchmark))
  STOXX <- companyUniverse %>% filter(grepl(stoxxKeyword,Primary.Prospectus.Benchmark))
  SPDJ <- companyUniverse %>% filter(grepl(spdjKeyword,Primary.Prospectus.Benchmark))
  fundsCount <- c(length(MSCI$Name),length(FTSE$Name),length(STOXX$Name),length(SPDJ$Name))
  fundsPercent <- fundsCount/sum(fundsCount)
  countTable <- data.frame(provider=provider, fundsCount=fundsCount, fundsPercent=fundsPercent)
  return(countTable)
}

plotInstitutionChoice <- function(keyword, universe) {
  companyUniverse <- universe %>% filter(grepl(keyword, Name))
  MSCI <- companyUniverse %>% filter(grepl(msciKeyword,Primary.Prospectus.Benchmark))
  FTSE <- companyUniverse %>% filter(grepl(ftseKeyword,Primary.Prospectus.Benchmark))
  STOXX <- companyUniverse %>% filter(grepl(stoxxKeyword,Primary.Prospectus.Benchmark))
  SPDJ <- companyUniverse %>% filter(grepl(spdjKeyword,Primary.Prospectus.Benchmark))
  fundsCount <- c(length(MSCI$Name),length(FTSE$Name),length(STOXX$Name),length(SPDJ$Name))
  fundsPercent <- fundsCount/sum(fundsCount)
  data.frame(provider=provider, fundsCount=fundsCount, fundsPercent=fundsPercent) %>%
    ggplot(aes(x=provider, y=fundsCount, fill=provider)) +
    geom_bar(stat="identity") +
    geom_text(aes(label=fundsCount))
}

getInstitutionChoice <- function(keyword, universe) {
  companyUniverse <- universe %>% filter(grepl(keyword, Name))
  MSCI <- companyUniverse %>% filter(grepl(msciKeyword,Primary.Prospectus.Benchmark))
  FTSE <- companyUniverse %>% filter(grepl(ftseKeyword,Primary.Prospectus.Benchmark))
  STOXX <- companyUniverse %>% filter(grepl(stoxxKeyword,Primary.Prospectus.Benchmark))
  SPDJ <- companyUniverse %>% filter(grepl(spdjKeyword,Primary.Prospectus.Benchmark))
  return(list(MSCI=MSCI, FTSE=FTSE, STOXX=STOXX, SPDJ=SPDJ))
}
```

exsample: BlackRock

provider	fundsCount	fundsPercent
MSCI	20	0.4166667
FTSE Russell	18	0.3750000
STOXX	0	0.0000000
SPDJ	10	0.2083333

- MSCI:

Name

iShares Euro Corp Bd Sstnbty Scrnd 0-3yr BlackRock Charifaith Com Inv Acc
BlackRock Armed Forces Common Invmt Inc
iShares MSCI ACWI Low Carbon Target
iShares Sustainable MSCI Global Impact
iShares MSCI EAFE ESG Select
iShares MSCI EM ESG Select
iShares MSCI Emerging Markets Islamic
iShares Sustainable MSCI Japan SRI EUR H iShares MSCI KLD 400 Social
iShares MSCI USA ESG Select
iShares MSCI USA Islamic
GW iShares MSCI World Islamic Acc
iShares MSCI World Islamic
FPI BlackRock New Energy
ZIL Blackrock Glbl New Energy USD
OMI IM USD BlackRock GF New Energy
ZIL Blackrock GF New Energy
FPIL BlackRock GF New Energy
DSP BlackRock Nat Res & New Engy Reg Gr

- SPDJ:

Name

BlackRock/HSBC Amanah D Pen
BlackRock/HSBC Amanah P Pen
iShares DJ Eurp Sustainability Screened
iShares DJ Glbl Sustainability Screened
GW iShares Dow Jones Glbl Sustainability iShares DJ Eurzne SustainbltyScrned (DE) DSP BlackRock Nat Res & New Engy Reg Gr
iShares Global Clean Energy
iShares Global Water Adv
BlackRock Concentrated Industrial

- FTSE:

Name

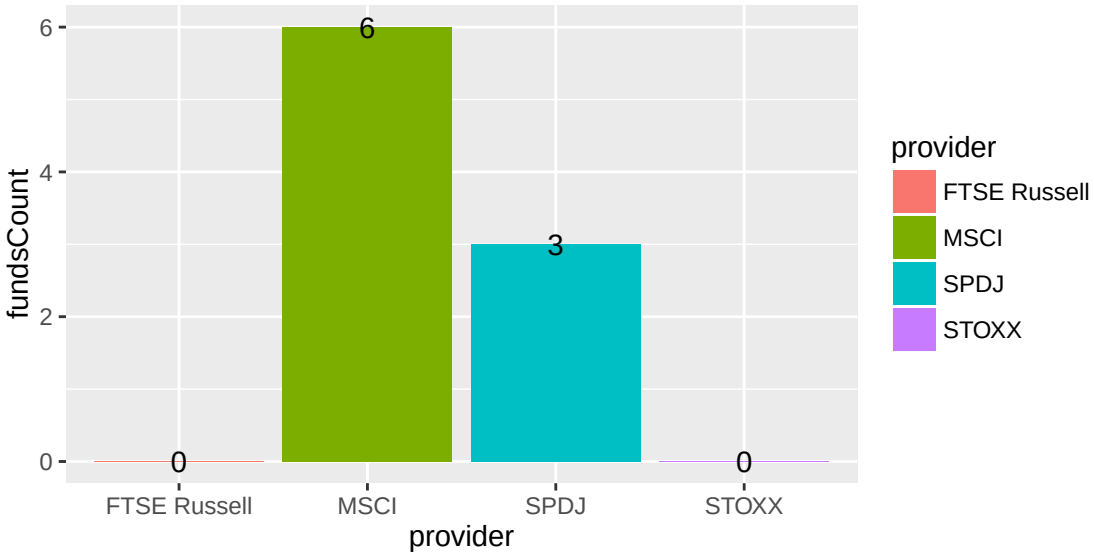
BlackRock Charifaith Com Inv Acc
BlackRock/Kames Ethical C Pen
BlackRock/Kames Ethical D Pen
BlackRock/Kames Ethical F Pen
BlackRock/Kames Ethical A Pen
BlackRock/Kames Ethical K Pen
BlackRock/Kames Ethical J Pen
BlackRock/Kames Ethical E Pen
BlackRock/Kames Ethical N Pen
BlackRock/Kames Ethical P Pen
Blackrock/Aedon Ethical K Pen
BlackRock/Kames Ethical T Pen
BlackRock/Kames Ethical H Pen

BlackRock/Kames Ethical O Pen
BlackRock/Kames Ethical S Pen
BlackRock/Kames Ethical B Pen
BlackRock Armed Forces Common Invmt Inc BlackRock Impact US Equity Investor A

- Plot:

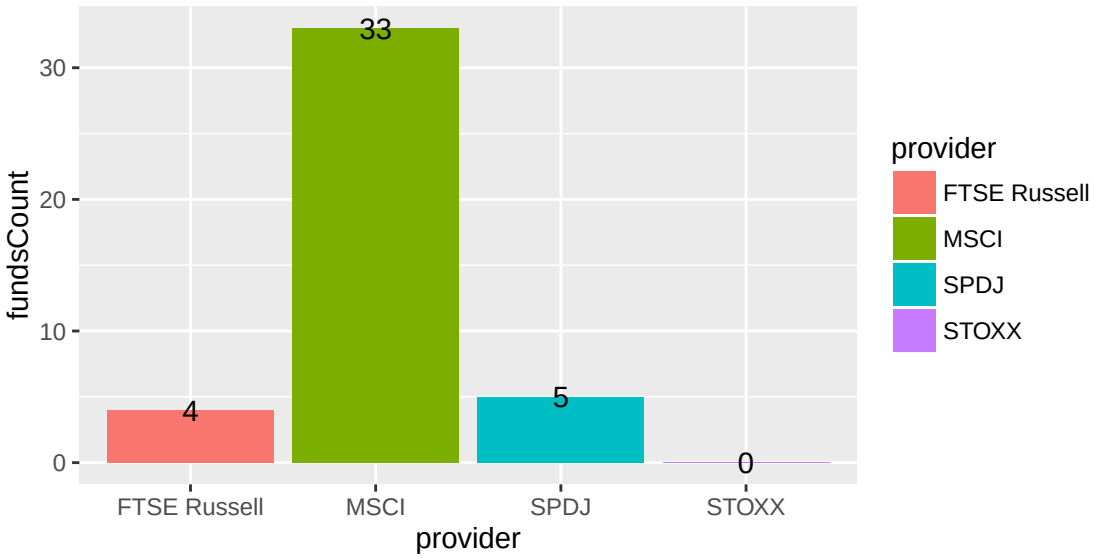
exsample: BlackRock ESG

provider	fundsCount	fundsPercent
MSCI	6	0.6666667
FTSE Russell	0	0.0000000
STOXX	0	0.0000000
SPDJ	3	0.3333333



exsample: ETF

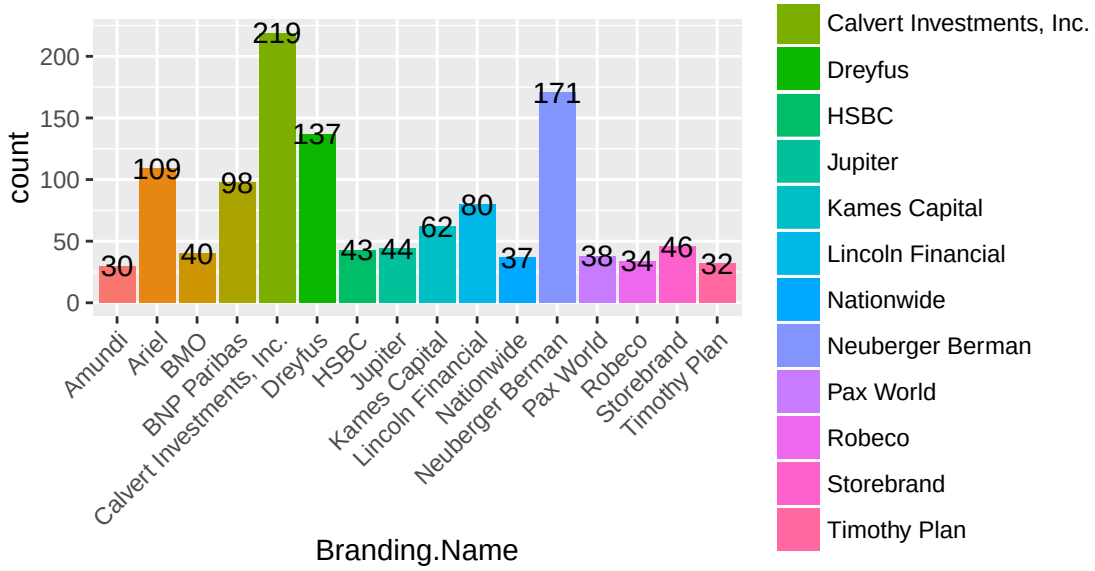
provider	fundsCount	fundsPercent
MSCI	33	0.7857143
FTSE Russell	4	0.0952381
STOXX	0	0.0000000
SPDJ	5	0.1190476



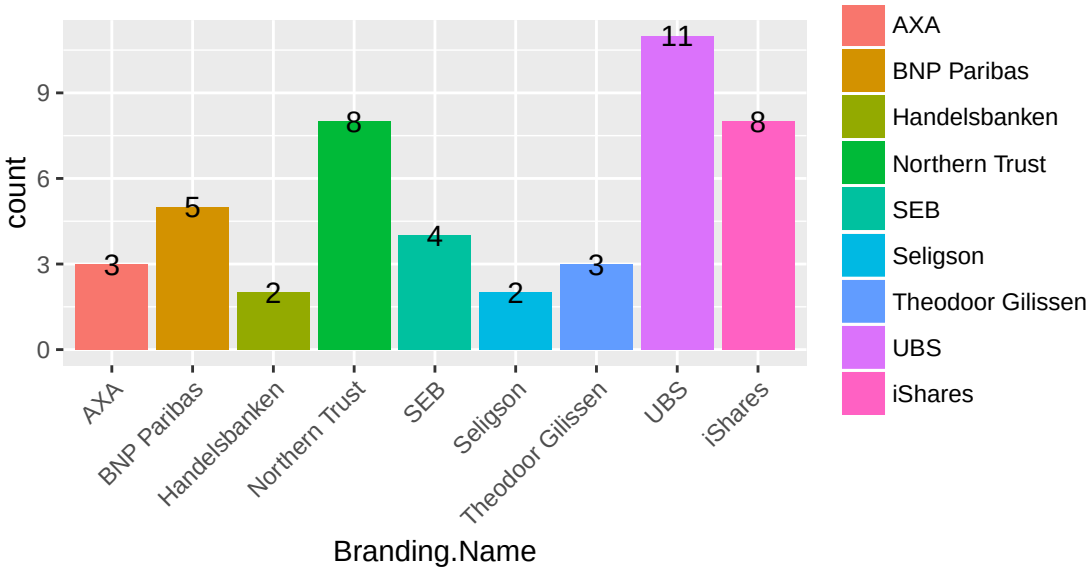
Function 3: check any company's index choice provider popularity

```
plotUniverseByBrandName <- function(universe, floor=5) {
  universe %>%
    group_by(Branding.Name) %>%
    summarize(count=n()) %>%
    filter(count >= floor) %>%
    ggplot(aes(x=Branding.Name, y=count, fill=Branding.Name)) +
    geom_bar(stat="identity") +
    geom_text(aes(label=count)) +
    theme(axis.text.x = element_text(angle = 45, hjust = 1))
}
```

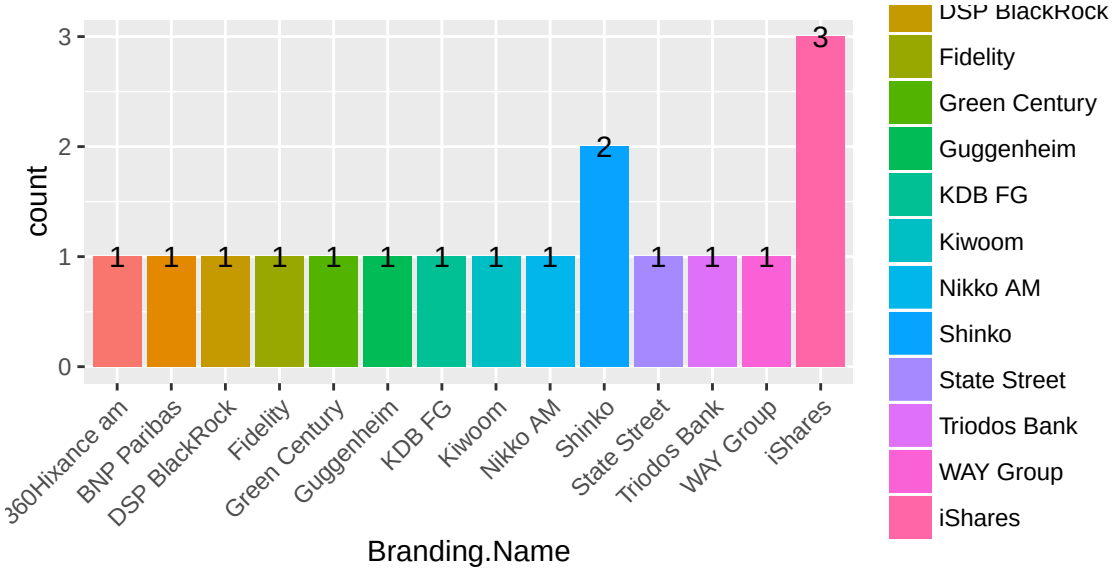
exsample: universe plot



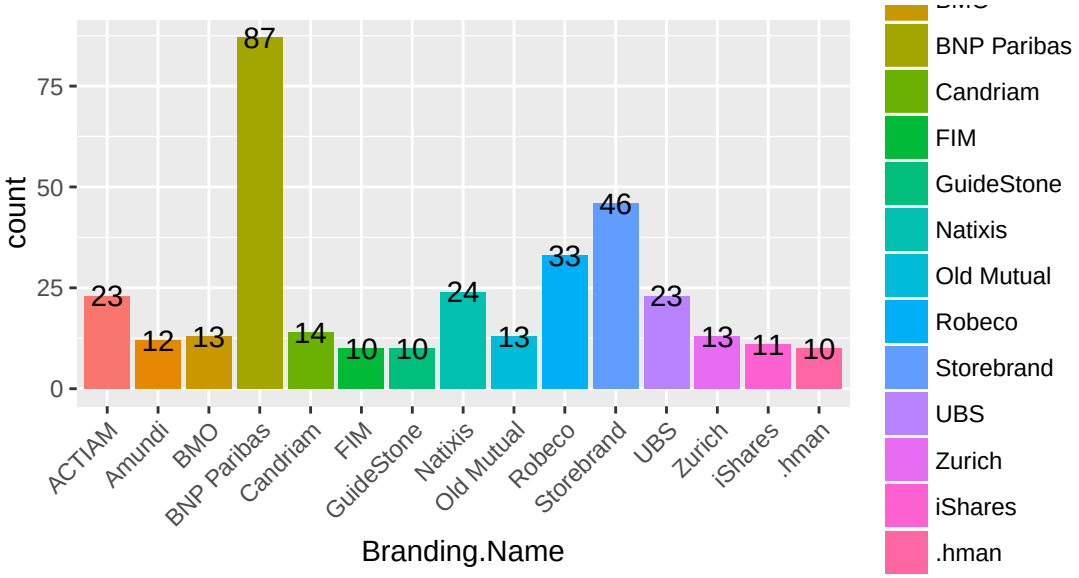
exsample: universe ESG plot



exsample: universe ENV plot



exsample: MSCI plot



exsample: MSCI ESG plot