

# Funds analysis

*Jack Ye*

*August 2, 2016*

## Contents

<b>Global Configuration</b>	<b>2</b>
<b>Analysis of funds tracking each provider</b>	<b>3</b>
Count bar chart . . . . .	3
AUM bar chart . . . . .	3
Count pie chart . . . . .	4
AUM pie chart . . . . .	4
<b>Analysis of funds tracking ESG indexes of each provider</b>	<b>5</b>
Count bar chart . . . . .	5
AUM bar comparison . . . . .	5
Count pie chart . . . . .	6
AUM pie chart . . . . .	6
<b>Percentage of funds tracking ESG indexes for each provider</b>	<b>7</b>
Count ratio for each provider . . . . .	7
AUM ratio for each provider . . . . .	7
<b>Analysis of funds tracking Environment indexes of each provider</b>	<b>8</b>
Count bar chart . . . . .	8
AUM bar chart . . . . .	8
Count pie chart . . . . .	9
AUM pie chart . . . . .	9
<b>Percentage of Environment funds tracking Environment indexes for each provider</b>	<b>10</b>
Count ratio for each provider . . . . .	10
AUM ratio for each provider . . . . .	10
<b>ESG &amp; Environment cross comparison</b>	<b>11</b>
ESG index count VS Environment index count . . . . .	11
Count of ESG index in use VS Count of Environment index in use . . . . .	11
Percentage of ESG index in use VS Percentage of Environment index in use . . . . .	12

<b>Function 1: get timeseries given any universe and keyword</b>	<b>13</b>
example: universe time series . . . . .	15
example: ESG vs ENV time series . . . . .	15
example: MSCI ESG vs ENV time series . . . . .	16
example: all provider time series . . . . .	16
<b>Function 2: check any keyword's distribution of index provider</b>	<b>17</b>
example: BlackRock . . . . .	17
Name . . . . .	18
Name . . . . .	18
Name . . . . .	18
example: BlackRock ESG . . . . .	19
example: ETF . . . . .	20
<b>Function 3: check any company's index choice provider popularity</b>	<b>21</b>
example: universe plot . . . . .	21
example: universe ESG plot . . . . .	22
example: universe ENV plot . . . . .	22
example: MSCI plot . . . . .	23
example: MSCI ESG plot . . . . .	23

## Golbal Configuration

```

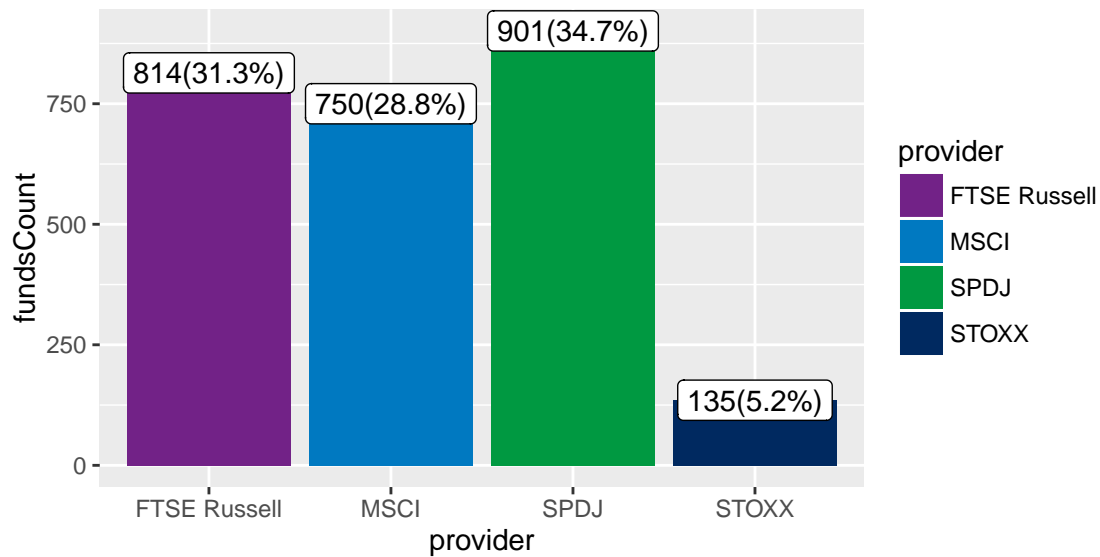
filePath <- "~/Desktop/morningstar.csv"
sysKeyword <- "(Summary|Percentile|Sum|Average|Count|Maximum|Minimum|Median|Deviation)"
msciKeyword <- "MSCI"
ftseKeyword <- "(FTSE|Russell)"
stoxxKeyword <- "STOXX"
spdjKeyword <- "(S&P|Dow|DJ)"
esgKeywords <- "(Sustain|ESG|esg|SRI|sri|Social|Governance|Catholic|Ethical)"
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)}
toP <- function(c,d) {paste(as.character(c), "(",as.character(round(d*100,digits=1)), "%)", sep="")}
"^" <- function(x,y) ifelse(y==0,0,base::"/"(x,y))
provider <- c("MSCI","FTSE Russell","STOXX","SPDJ")
esgIndexTotal <- c(82,5,35,67)
envIndexTotal <- c(7,34,5,11)
myPalette <- c("#722287","#0079C1","#009941","#002960")
fillTheme <- scale_fill_manual(values=myPalette)
colorTheme <- scale_color_manual(values=myPalette)

```

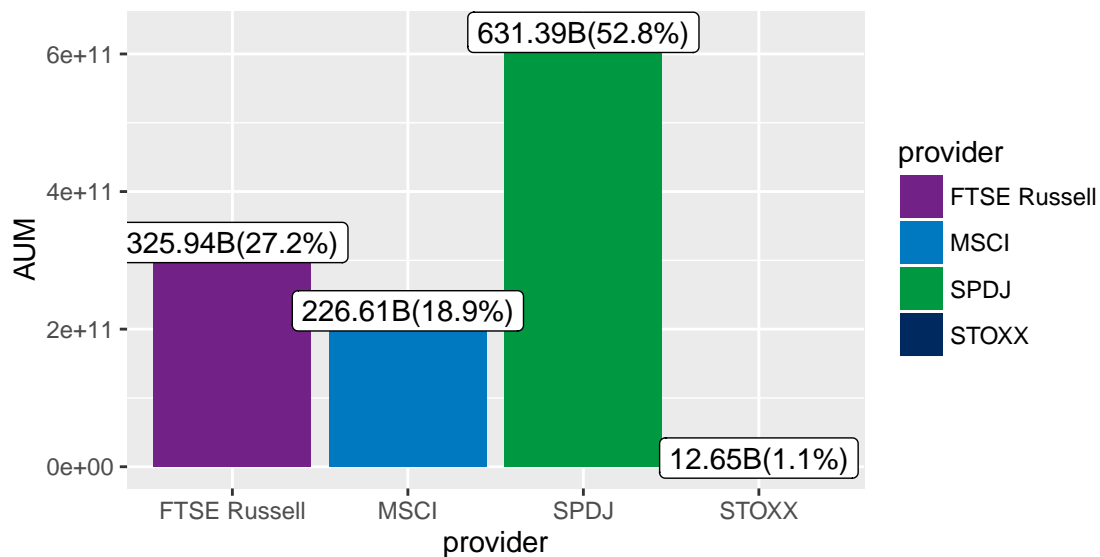
## Analysis of funds tracking each provider

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

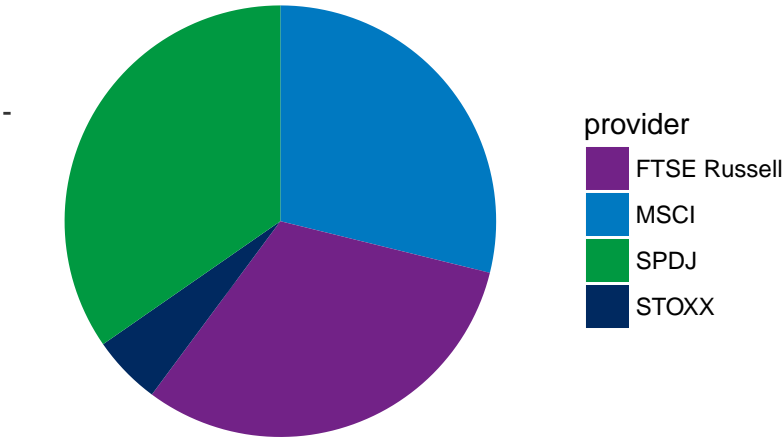
Count bar chart



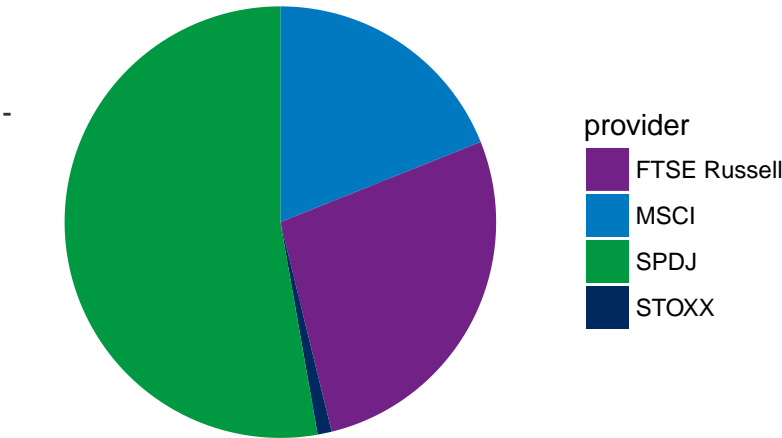
AUM bar chart



Count pie chart



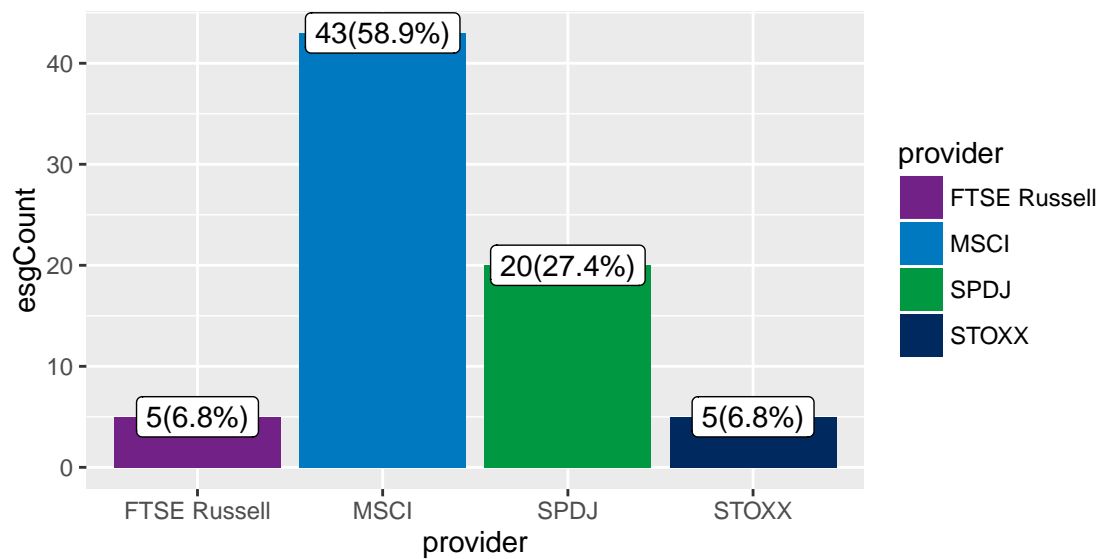
AUM pie chart



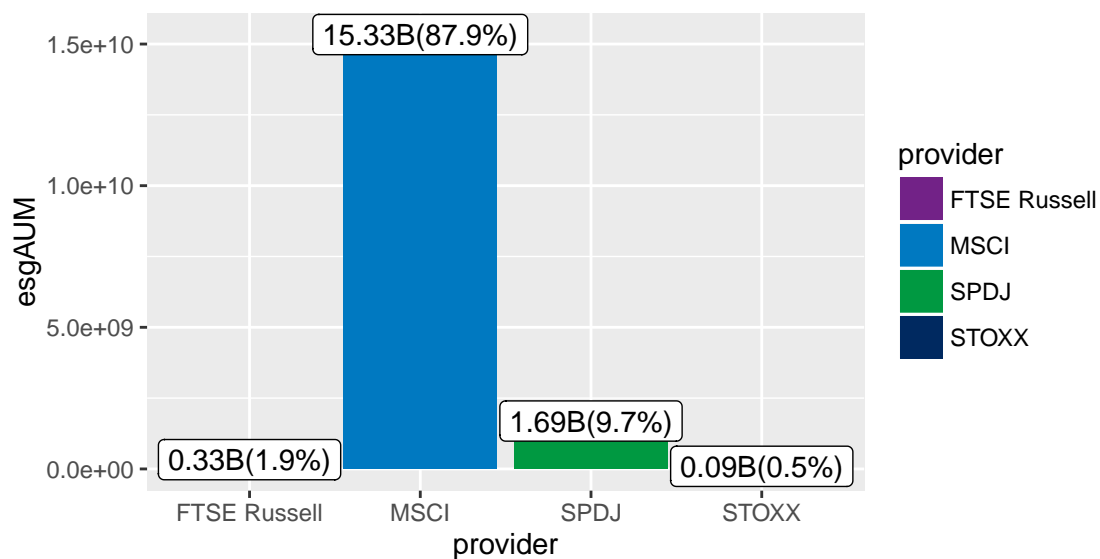
## Analysis of funds tracking ESG indexes of each provider

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

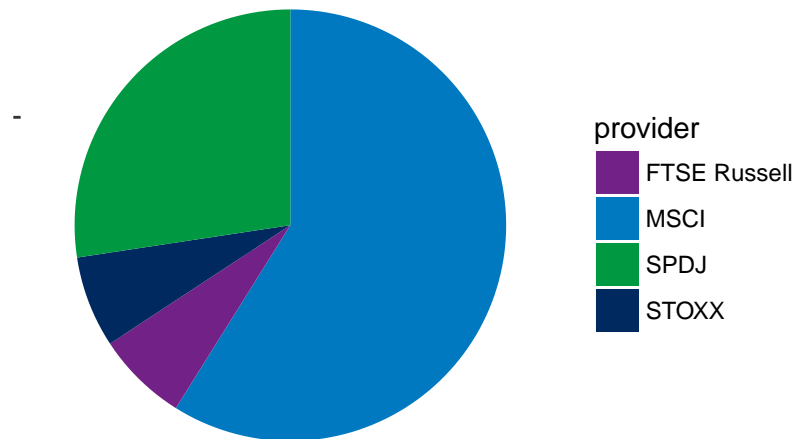
Count bar chart



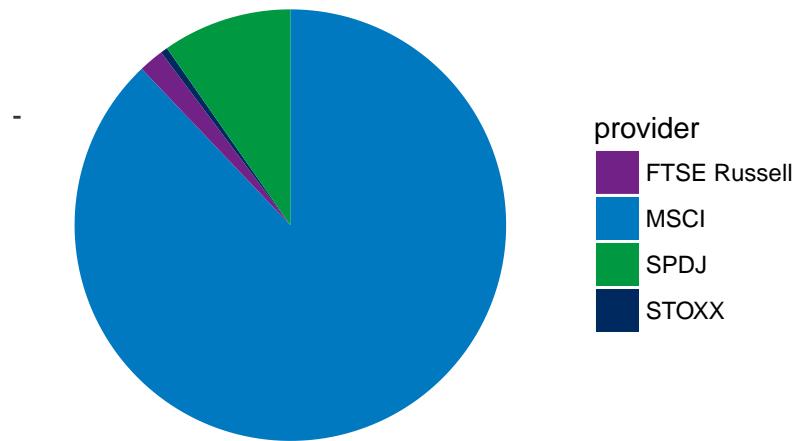
AUM bar comparison



Count pie chart



AUM pie chart



## Percentage of funds tracking ESG indexes for each provider

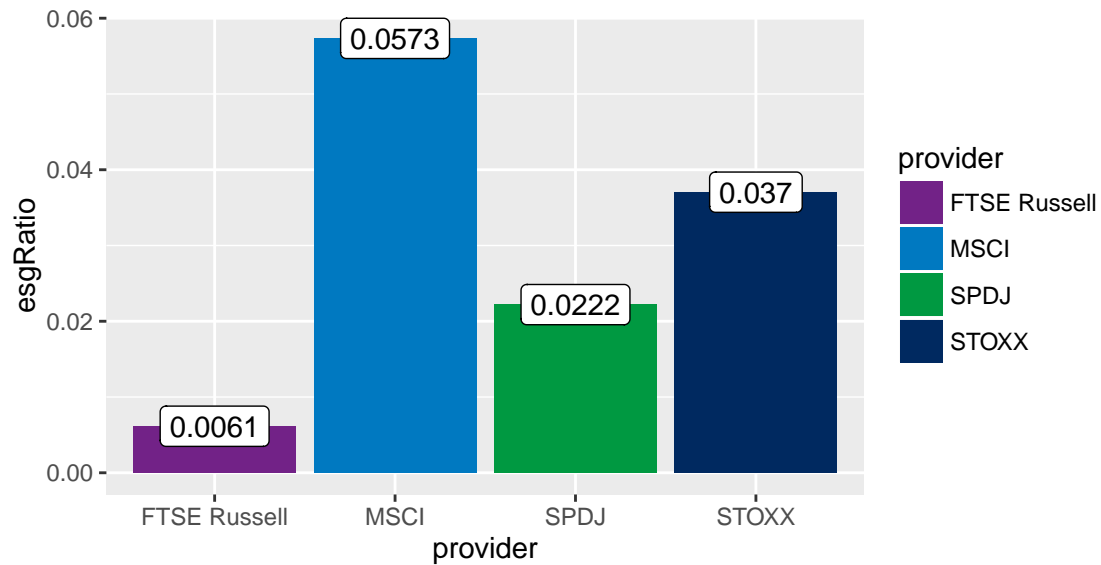
total tracking ESG count: 73

total funds count: 2600

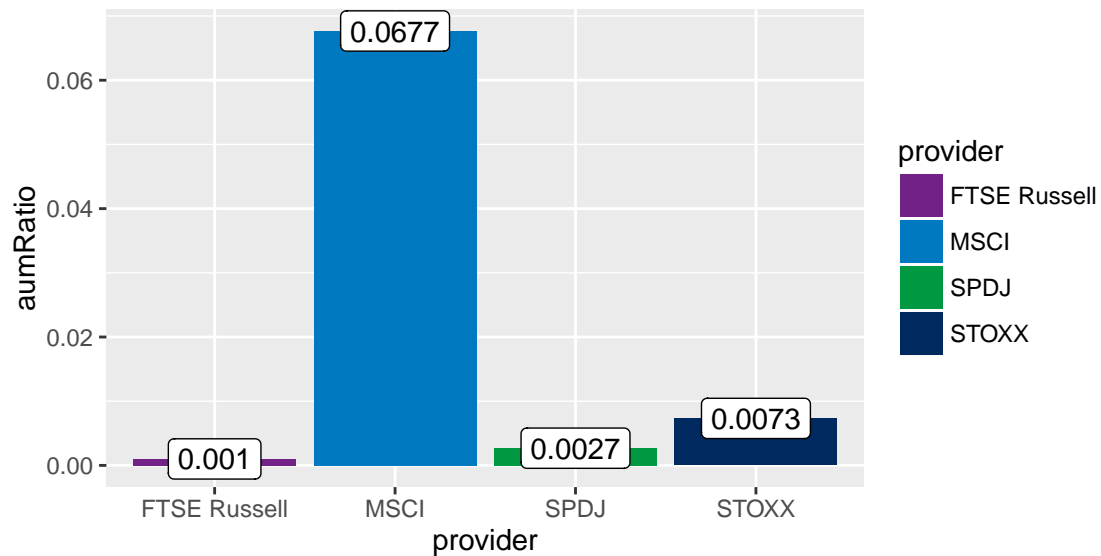
percentage count of total: 0.0280769

percentage AUM of total: 0.0145803

### Count ratio for each provider



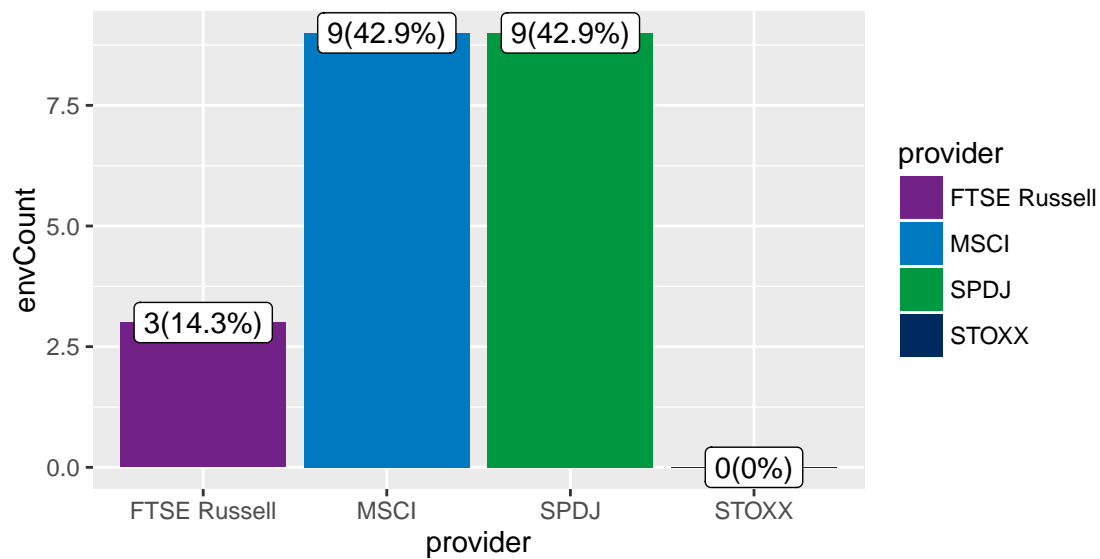
### AUM ratio for each provider



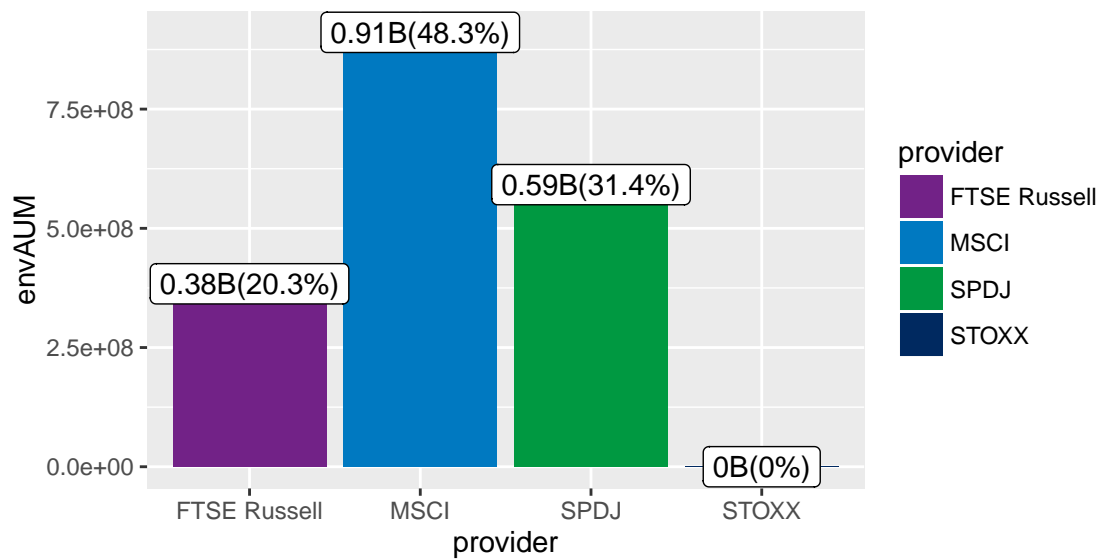
## Analysis of funds tracking Environment indexes of each provider

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

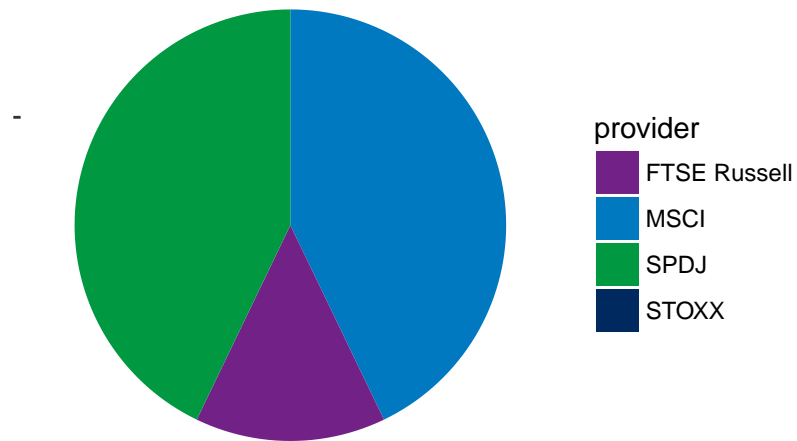


AUM bar chart

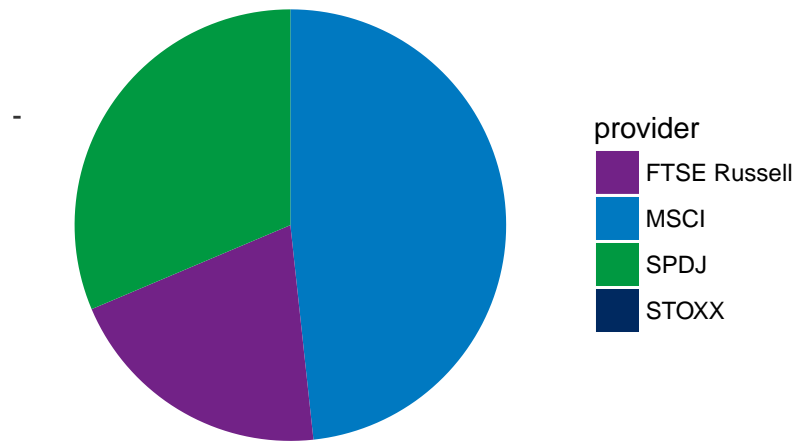




Count pie chart



AUM pie chart



## Percentage of Environment funds tracking Environment indexes for each provider

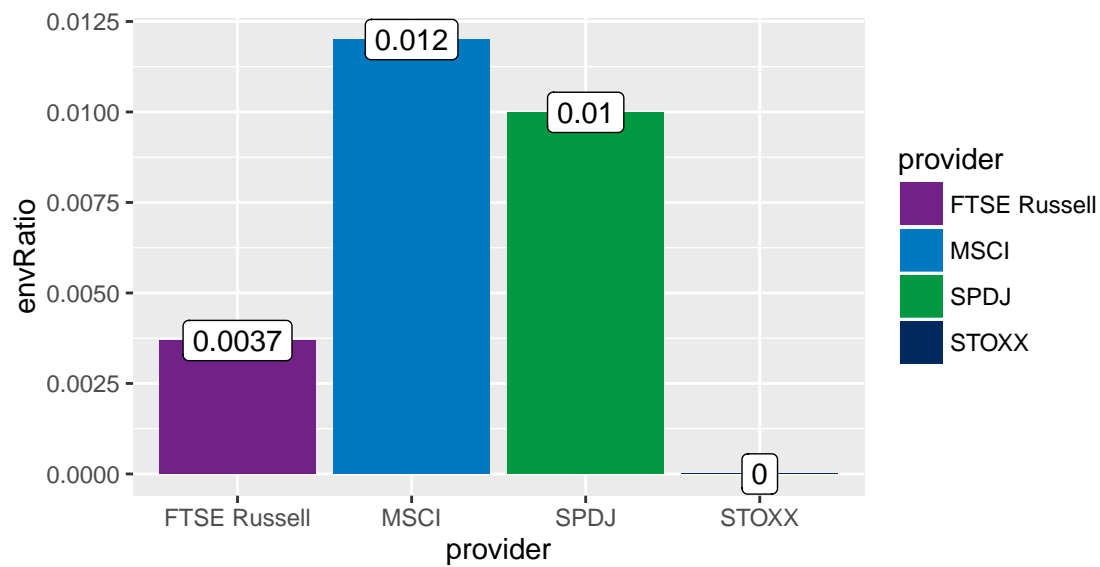
total tracking Environment count: 21

total funds count: 2600

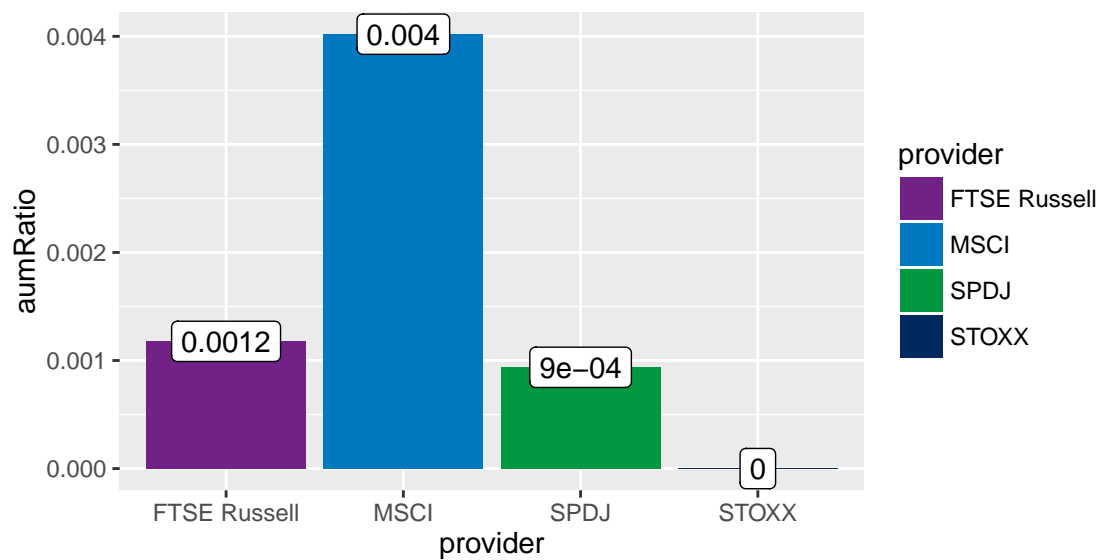
percentage count of total: 0.0080769

percentage AUM of total: 0.0015764

### Count ratio for each provider

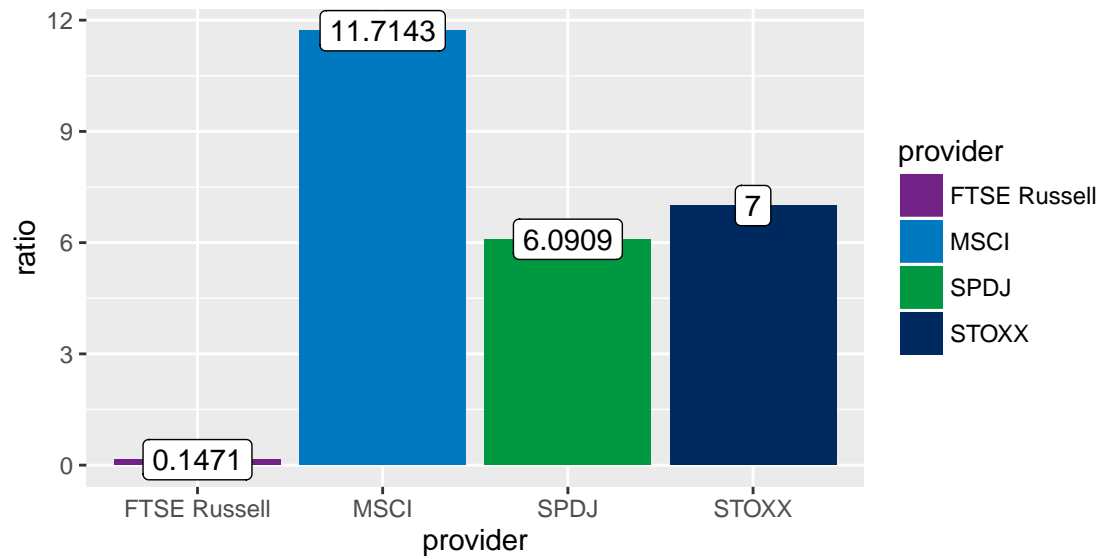


### AUM ratio for each provider

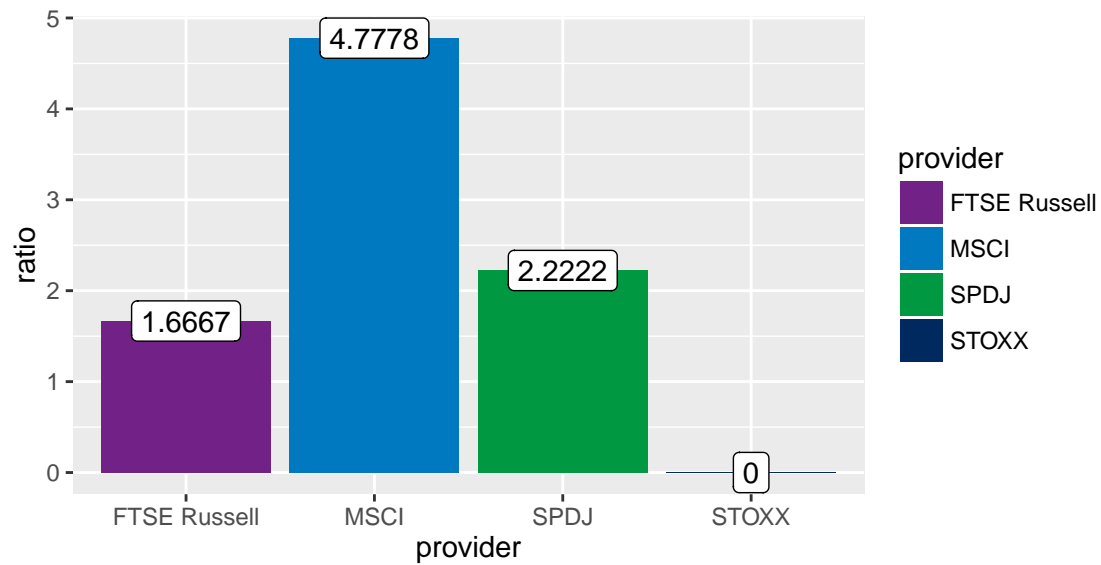


## ESG & Environment cross comparison

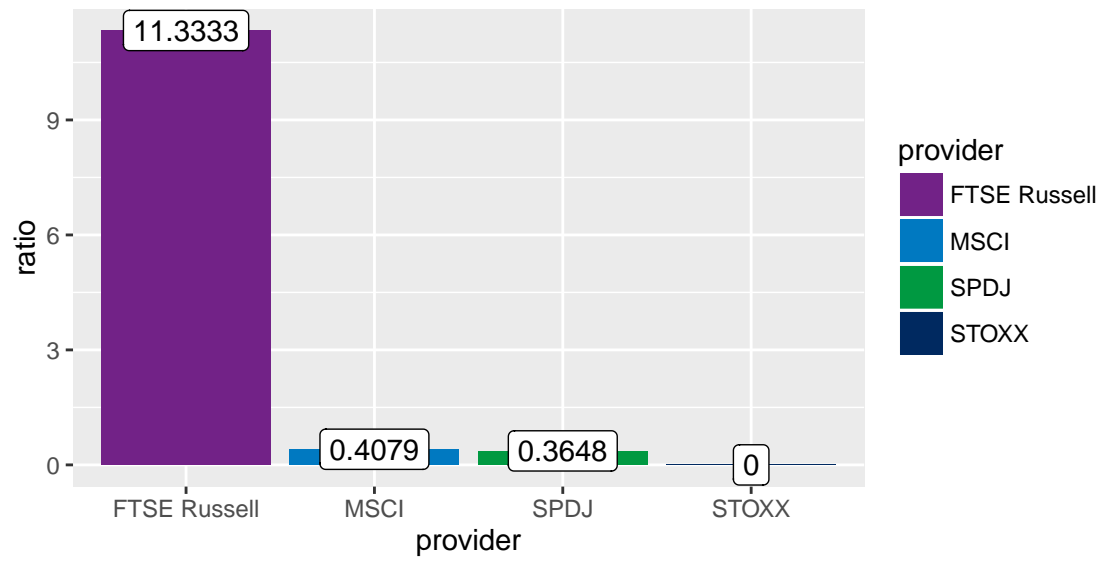
ESG index count VS Environment index count



Count of ESG index in use VS Count of Environment index in use



## 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)) +
    colorTheme
}

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() +
    colorTheme
}
```

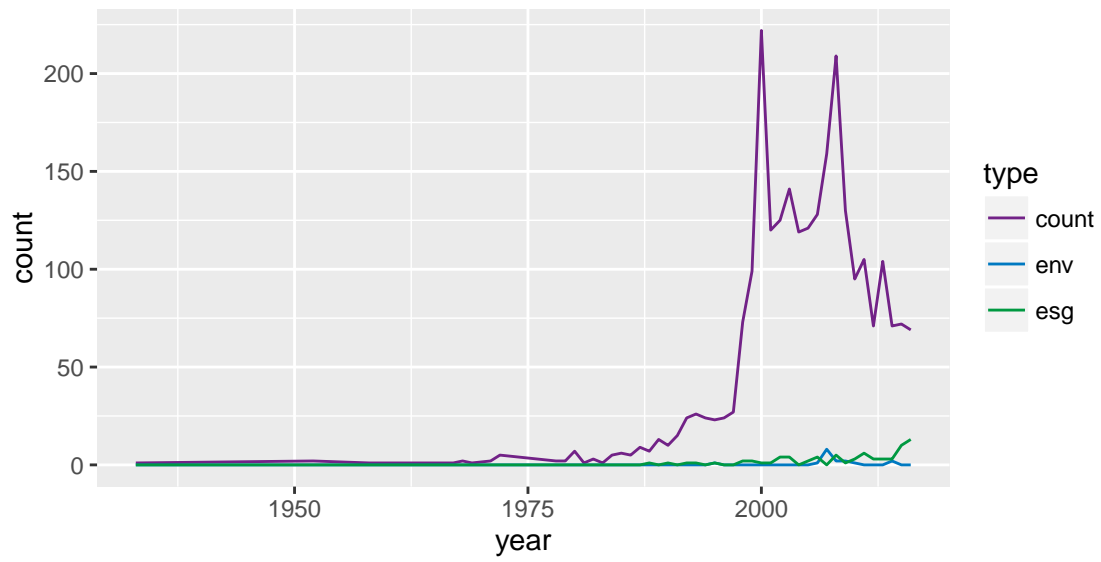
```

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() +
    colorTheme
}

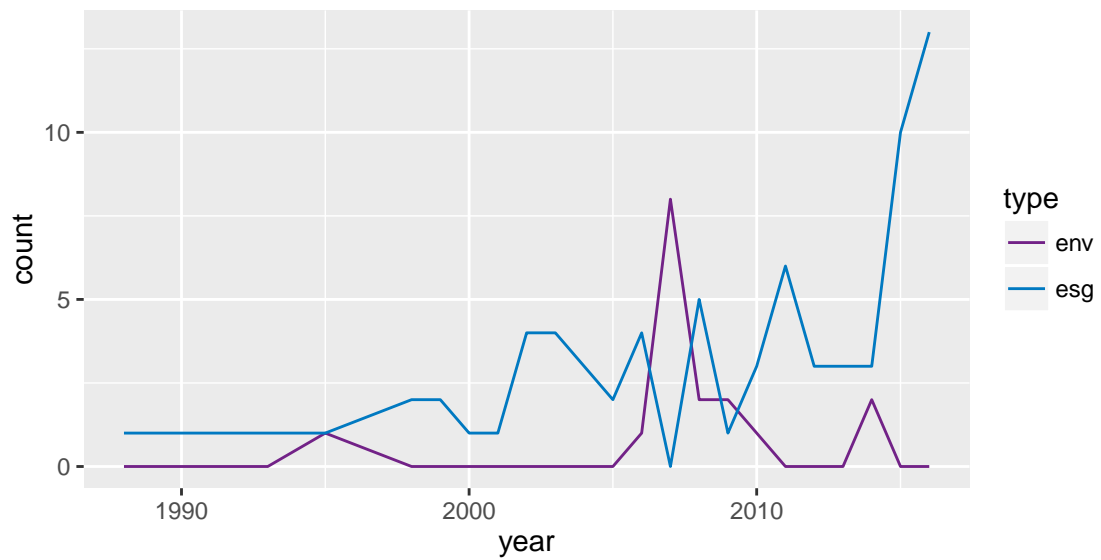
plotTimeSeriesForProviders <- function(MSCI, FTSE, SPDJ, STOXX, keyword="", yearLimit=1930) {
  msciDF <- getYearCountForUniverse(MSCI, keyword, yearLimit)
  ftseDF <- getYearCountForUniverse(FTSE, keyword, yearLimit)
  spdjDF <- getYearCountForUniverse(SPDJ, keyword, yearLimit)
  stoxxDF <- getYearCountForUniverse(STOXX, 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() +
    colorTheme
}

```

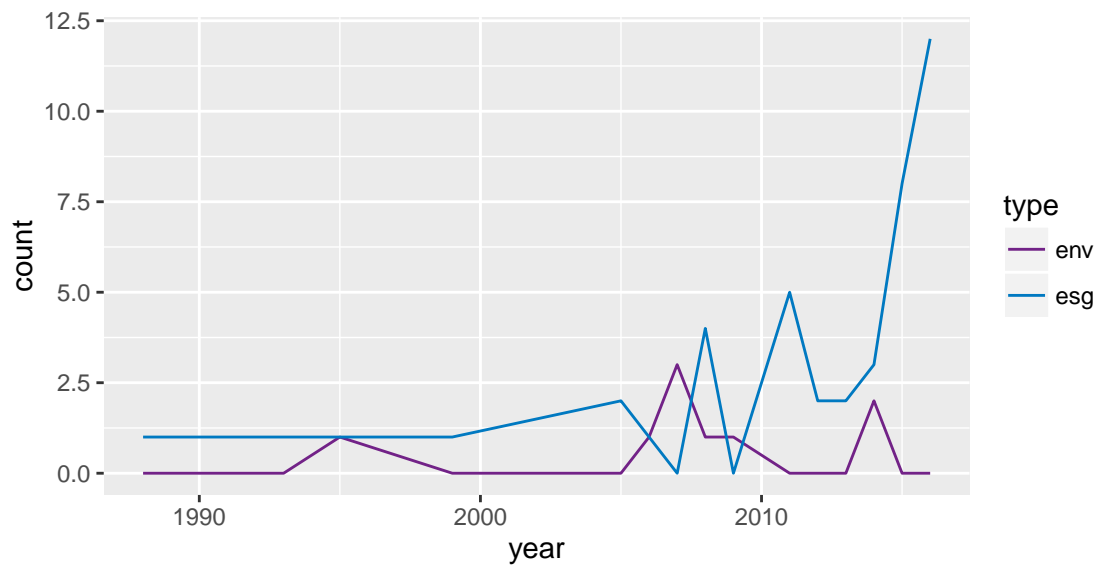
example: universe time series



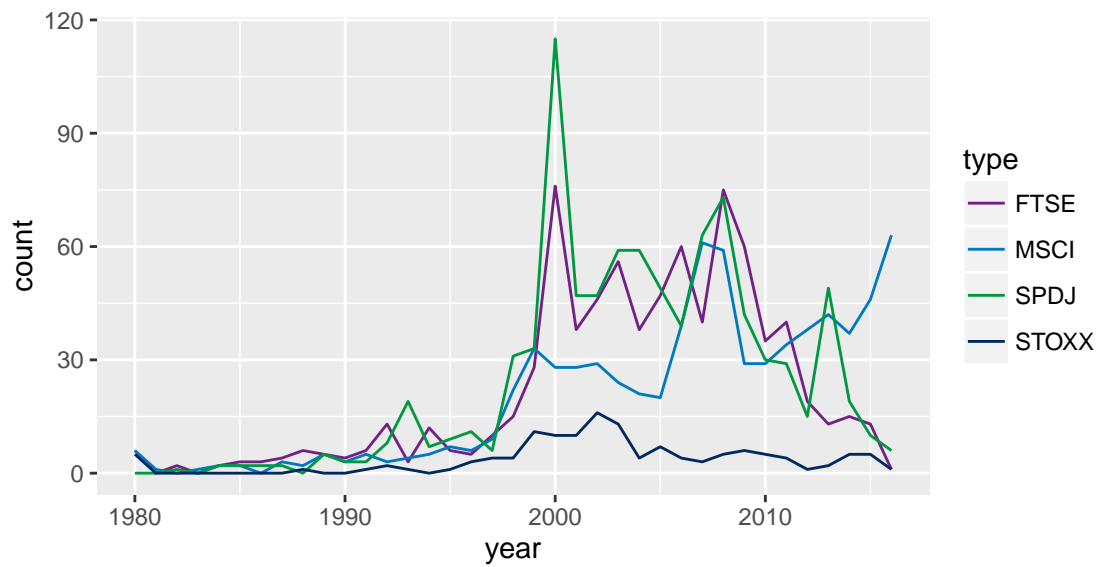
example: ESG vs ENV time series



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_label(fill='white',aes(label=toP(fundsCount, fundsPercent))) +
    fillTheme
}

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))
}
```

example: 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

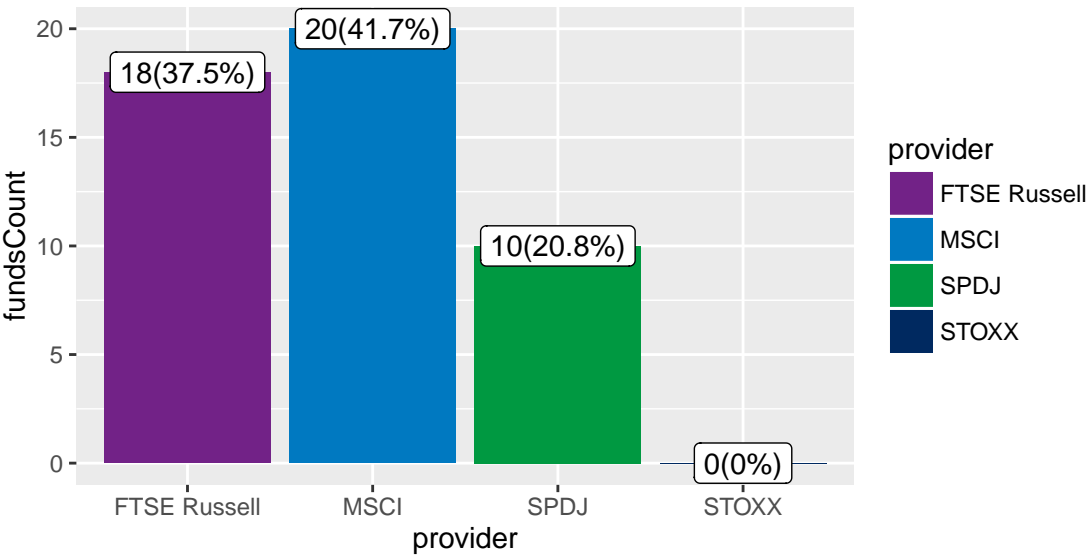
- FTSE:

## 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

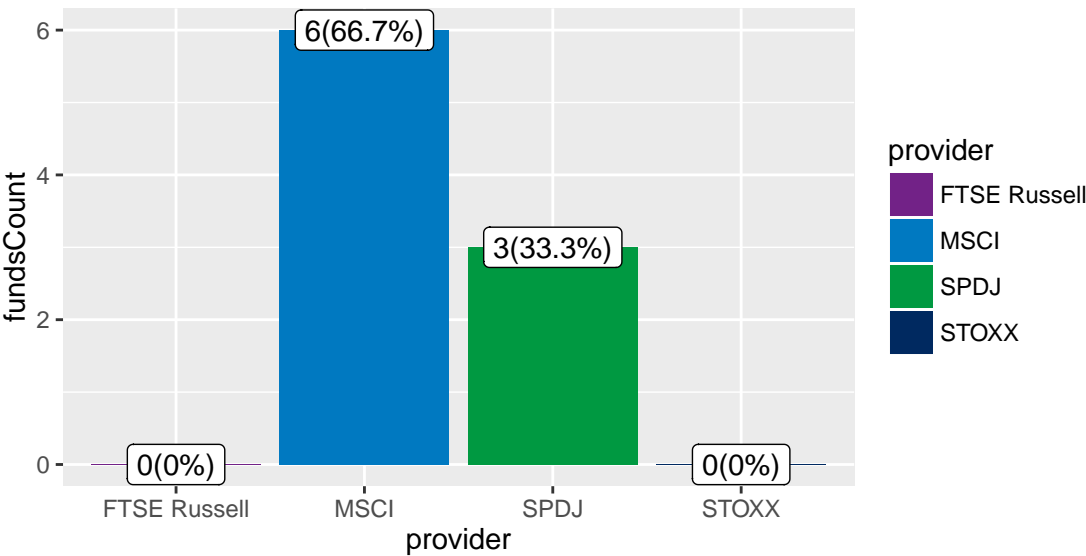
BlackRock/Kames Ethical O Pen  
BlackRock/Kames Ethical S Pen  
BlackRock/Kames Ethical B Pen  
BlackRock Armed Forces Common Invmt Inc BlackRock Impact US Equity Investor A

• Plot:



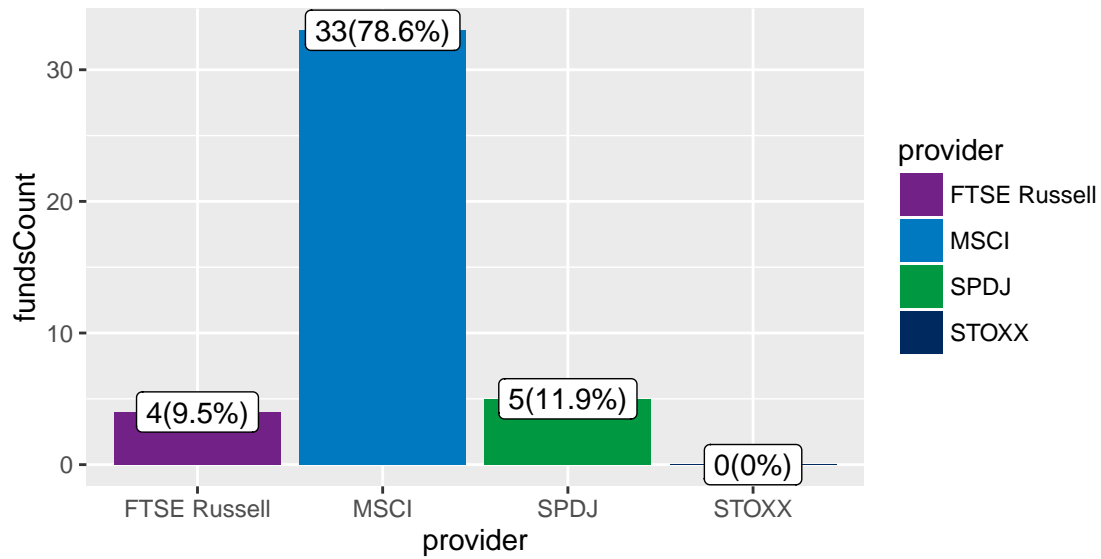
example: BlackRock ESG

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



## example: ETF

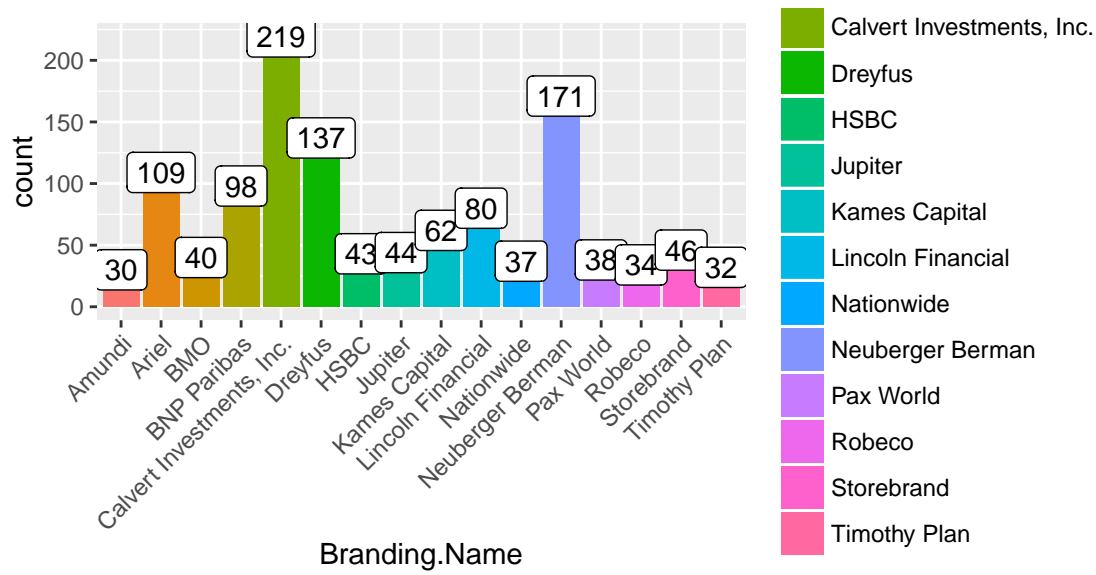
provider	fundsCount	fundsPercent
MSCI	33	0.7857143
FTSE Russell	4	0.0952381
STOXX	0	0.0000000
SPDJ	5	0.1190476



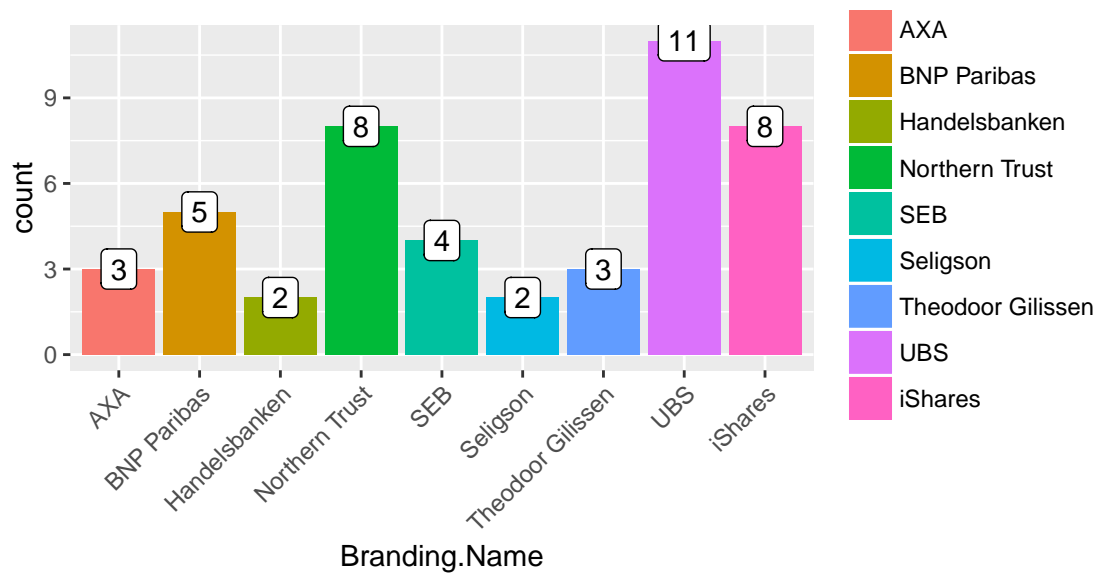
### Function 3: check any company's index choice provider popularity

```
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_label(fill='white', aes(label=count)) +  
    theme(axis.text.x = element_text(angle = 45, hjust = 1))  
}
```

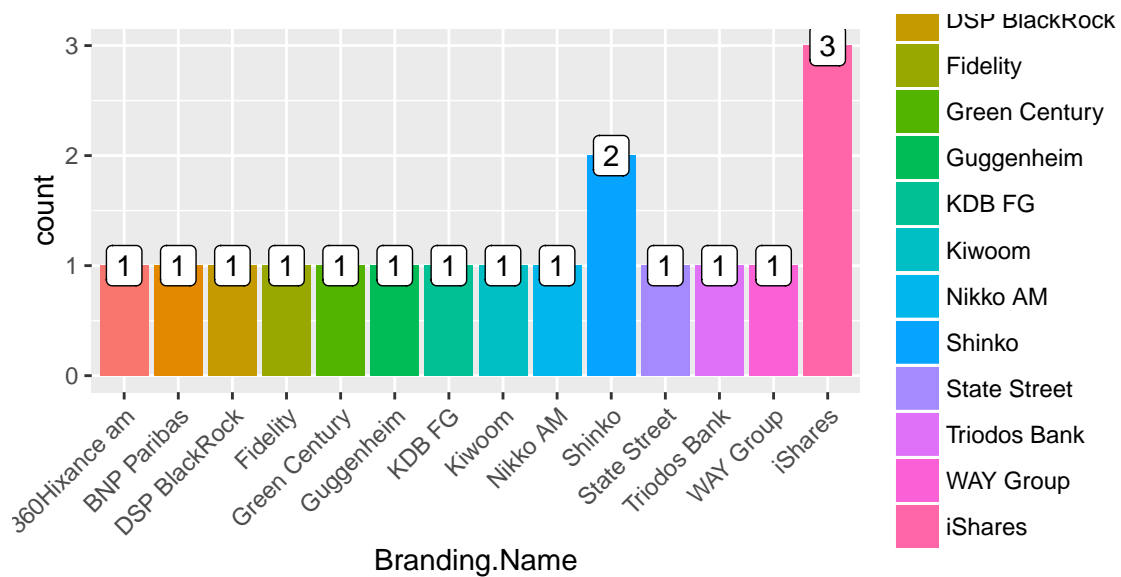
example: universe plot



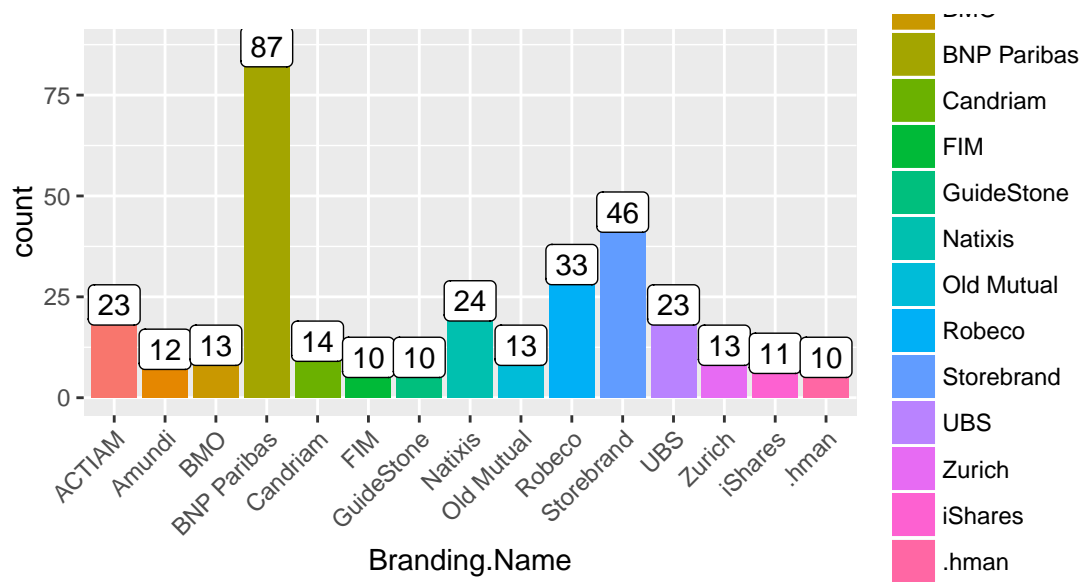
example: universe ESG plot



example: universe ENV plot



example: MSCI plot



example: MSCI ESG plot

