

Comparativo mercado cripto x mercado tradicional

Quarto

Criptmoeda

Taxa selic 0.1375

```
rfr = 0.1375

possibilities01375 = read.xlsx("outputData/Possibilities0.1-0.1375.xlsx") %>%
  mutate_all(~as.numeric(.x))

min_var01375 <- slice_min(possibilities01375, sd)
max_sr01375 <- slice_max(possibilities01375, sharpeRatePortfolio)
max_re01375 <- slice_max(possibilities01375, mean)

w = max_sr01375[1:Nsymbols] %>% unlist()

portfolio_return_opmitized01375 = Return.portfolio(asset_return,
  weights = w,
  rebalance_on = "months")

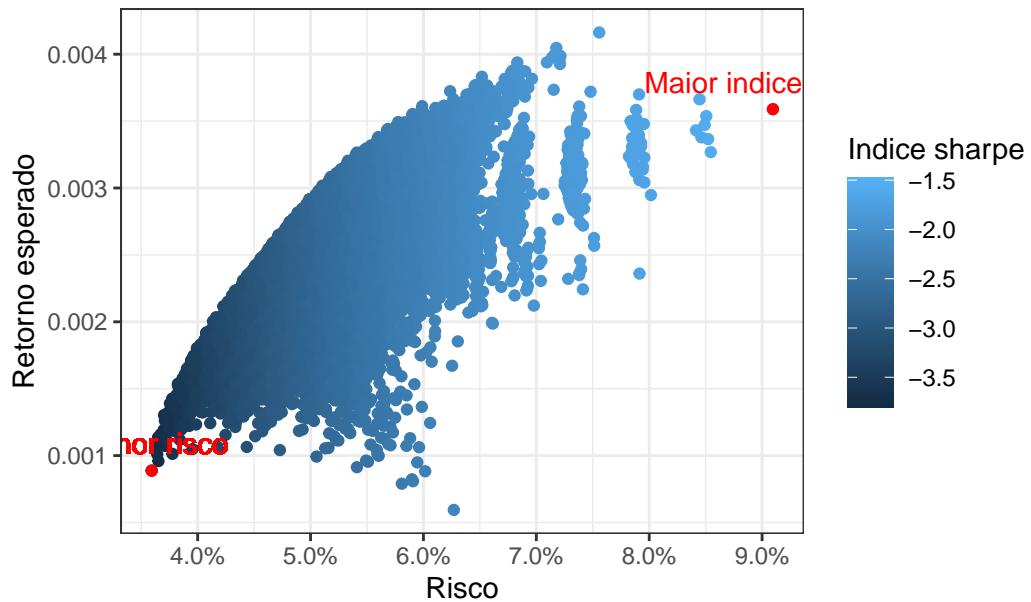
sd_portfolio_optimized01375 = sd(portfolio_return_opmitized01375$portfolio.returns)
mean_portfolio_optimized01375 = mean(portfolio_return_opmitized01375$portfolio.returns)
sr_portfolio_optimized01375 = max_sr01375$sharpeRatePortfolio
```

```

possibilities01375 %>%
  ggplot(aes(x = sd, y = mean, color = sharpeRatePortfolio)) +
  geom_point() +
  theme_classic() +
  #scale_y_continuous(labels = scales::percent) +
  scale_x_continuous(labels = scales::percent) +
  labs(x = 'Risco',
       y = 'Retorno esperado',
       title = "Criptomoeda: Optimização de portfolio & Fronteira eficiente taxa selic 0,1375",
       colour = "Indice sharpe") +
  geom_point(aes(x = sd,
                 y = mean), data = min_var01375, color = 'red') +
  geom_point(aes(x = sd,
                 y = mean), data = max_sr01375, color = 'red') +
  geom_text(x=min_var01375$sd, y = min_var01375$mean + .0002,label="Menor risco", color = 'red') +
  geom_text(x=max_sr01375$sd, y = max_sr01375$mean + .0002,label="Maior indice sharpe", color = 'red') +
  theme_bw() +
  theme( plot.title = element_text(hjust = .5))

```

Criptomoeda: Optimização de portfolio & Fronteira eficiente taxa selic 0,1375



```

# Rolamento
rolling_sd_portfolio_return_opmitized01375= rollapply(portfolio_return_opmitized01375,
                                                       FUN = sd,
                                                       width = window) %>%
na.omit() %>%
setNames("rolling_sd")

rolling_mean_portfolio_return_opmitized01375 = rollapply(portfolio_return_opmitized01375
                                                       FUN = mean,
                                                       width = window) %>%
na.omit() %>%
setNames("rolling_mean")

rolling_sr_portfolio_return_opmitized01375 = cbind(rolling_sd_portfolio_return_opmitized01375
                                                   rolling_mean_portfolio_return_opmitized01375) %>%
as.data.frame(row.names = index(.)) %>%
rownames_to_column("date") %>%
mutate(rolling_sr = (rolling_mean - rfr)/rolling_sd,
       date = as.Date(date))

```

Taxa selic 0

```

rfr = 0

possibilities0 = read.xlsx("outputData/Possibilities0.1-0.xlsx") %>%
  mutate_all(~as.numeric(.x))

min_var0 <- slice_min(possibilities0, sd)
max_sr0 <- slice_max(possibilities0, sharpeRatePortfolio)
max_re0 <- slice_max(possibilities0, mean)
w = max_sr0[1:Nsymbols] %>% unlist()

portfolio_return_opmitized0 = Return.portfolio(asset_return,
                                                weights = w,
                                                rebalance_on = "months")

sd_portfolio_optimized0 = sd(portfolio_return_opmitized0$portfolio.returns)
mean_portfolio_optimized0 = mean(portfolio_return_opmitized0$portfolio.returns)
sr_portfolio_optimized0 = max_sr0$sharpeRatePortfolio

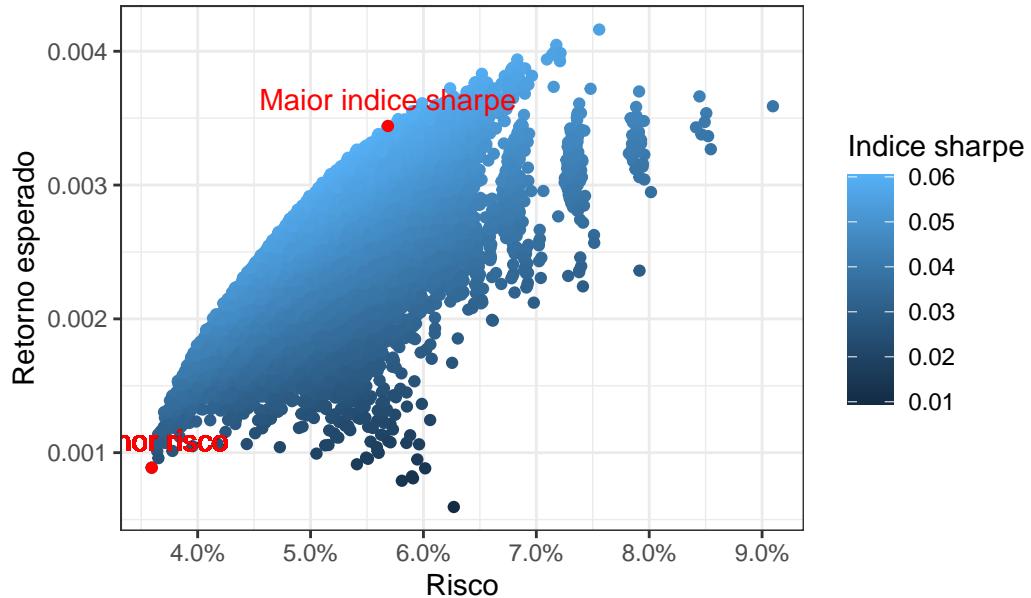
```

```

possibilities0 %>%
  ggplot(aes(x = sd, y = mean, color = sharpeRatePortfolio)) +
  geom_point() +
  theme_classic() +
  #scale_y_continuous(labels = scales::percent) +
  scale_x_continuous(labels = scales::percent) +
  labs(x = 'Risco',
       y = 'Retorno esperado',
       title = "Criptomoeda: Optimização de portfolio & Fronteira eficiente taxa selic 0",
       colour = "Indice sharpe") +
  geom_point(aes(x = sd,
                 y = mean), data = min_var0, color = 'red') +
  geom_point(aes(x = sd,
                 y = mean), data = max_sr0, color = 'red') +
  geom_text(x=min_var0$sd, y = min_var0$mean + .0002,label="Menor risco", color = "red") +
  geom_text(x=max_sr0$sd, y = max_sr0$mean + .0002,label="Maior indice sharpe", color = "red") +
  theme_bw() +
  theme( plot.title = element_text(hjust = .5))

```

Criptomoeda: Optimização de portfolio & Fronteira eficiente taxa selic 0



```

#Rolamento

rolling_sd_portfolio_return_opmitized0= rollapply(portfolio_return_opmitized0,
                                                 FUN = sd,
                                                 width = window) %>%
na.omit() %>%
setNames("rolling_sd")

rolling_mean_portfolio_return_opmitized0 = rollapply(portfolio_return_opmitized0 ,
                                                       FUN = mean,
                                                       width = window) %>%
na.omit() %>%
setNames("rolling_mean")

rolling_sr_portfolio_return_opmitized0 = cbind(rolling_sd_portfolio_return_opmitized0,
                                                rolling_mean_portfolio_return_opmitized0) %>%
as.data.frame(row.names = index(.)) %>%
rownames_to_column("date") %>%
mutate(rolling_sr = (rolling_mean - rfr)/rolling_sd,
       date = as.Date(date))

```

comparando

```

comparativoCriptmoeda = rbind(max_sr0,max_sr01375) %>%
  mutate(`Taxa Selic` = c(0,0.1375),
        tipo = "Criptomoeda") %>%
  relocate(`Taxa Selic`,tipo)

comparativoCriptmoeda %>% gt()

```

Taxa Selic	tipo	BTC-USD	ETH-USD	BNB-USD	XRP-USD	ADA-USD	DOGE-USD	S
0.0000	Criptomoeda	0	0	0.5	0	0	0.1	
0.1375	Criptomoeda	0	0	0.0	0	0	1.0	

StockMarket

Taxa selic 0.1375

```
rfr = 0.1375

possibilitiesStockMarket01375 = read.xlsx("outputData/PossibilitiesStockMarket0.1-0.1375.xlsx")
  mutate_all(~as.numeric(.x))

min_var01375 <- slice_min(possibilitiesStockMarket01375, sd)
max_sr01375 <- slice_max(possibilitiesStockMarket01375, sharpeRatePortfolio)
max_re01375 <- slice_max(possibilitiesStockMarket01375, mean)

w = max_sr01375[1:Nsymbols] %>% unlist()

portfolio_return_opmitizedStockMarket01375 = Return.portfolio(asset_returnStockMarket,
  weights = w,
  rebalance_on = "months")

sd_portfolio_optimized01375 = sd(portfolio_return_opmitizedStockMarket01375$portfolio.return)
mean_portfolio_optimized01375 = mean(portfolio_return_opmitizedStockMarket01375$portfolio.return)
sr_portfolio_optimized01375 = max_sr01375$sharpeRatePortfolio

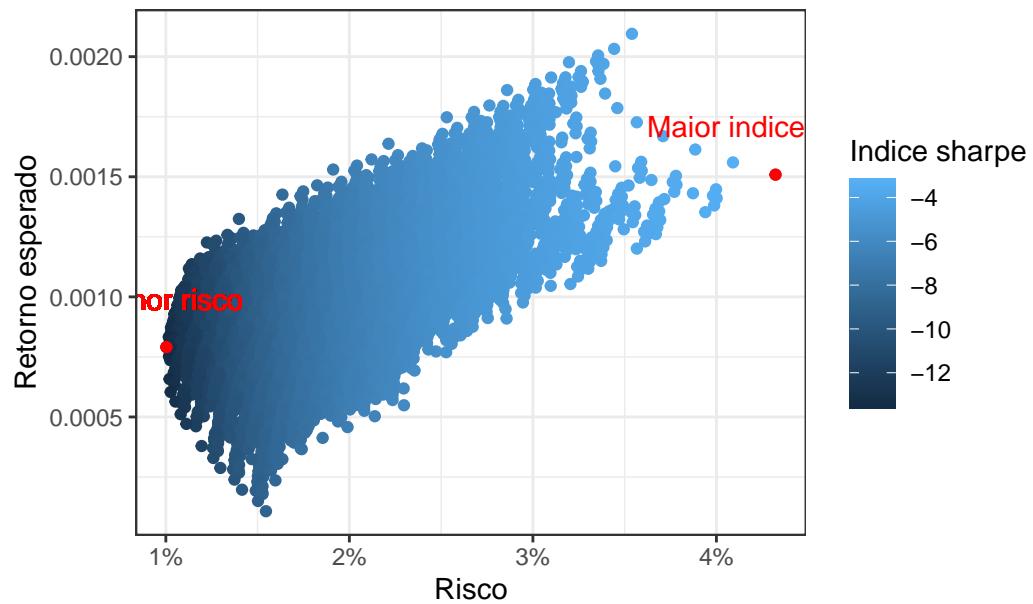
possibilitiesStockMarket01375 %>%
  ggplot(aes(x = sd, y = mean, color = sharpeRatePortfolio)) +
  geom_point() +
  theme_classic() +
  #scale_y_continuous(labels = scales::percent) +
  scale_x_continuous(labels = scales::percent) +
  labs(x = 'Risco',
       y = 'Retorno esperado',
       title = "StockMarket: Optimização de portfolio & Fronteira eficiente taxa selic 0,1375",
       colour = "Indice sharpe") +
  geom_point(aes(x = sd,
                 y = mean), data = min_var01375, color = 'red') +
  geom_point(aes(x = sd,
```

```

y = mean), data = max_sr01375, color = 'red') +
geom_text(x=min_var01375$sd, y = min_var01375$mean + .0002,label="Menor risco", color =
geom_text(x=max_sr01375$sd, y = max_sr01375$mean + .0002,label="Maior indice sharpe", co
theme_bw() +
theme( plot.title = element_text(hjust = .5))

```

arket: Optimização de portfolio & Fronteira eficiente taxa selic 0,1375



```

# Rolamento
rolling_sd_portfolio_return_opmitizedStockMarket01375= rollapply(portfolio_return_opmitize
                                         FUN = sd,
                                         width = window) %>%
na.omit() %>%
setNames("rolling_sd")

rolling_mean_portfolio_return_opmitizedStockMarket01375 = rollapply(portfolio_return_opmi
                                         FUN = mean,
                                         width = window) %>%
na.omit() %>%
setNames("rolling_mean")

rolling_sr_portfolio_return_opmitizedStockMarket01375 = cbind(rolling_sd_portfolio_return_rolling_mean_portfolio_return_opmitizedStockMarket01375) %>%

```

```

as.data.frame(row.names = index(.)) %>%
rownames_to_column("date") %>%
mutate(rolling_sr = (rolling_mean - rfr)/rolling_sd,
       date = as.Date(date))

```

Taxa selic 0

```

rfr = 0

possibilitiesStockMarket0 = read.xlsx("outputData/PossibilitiesStockMarket0.1-0.xlsx") %>%
  mutate_all(~as.numeric(.x))

min_var0 <- slice_min(possibilitiesStockMarket0, sd)
max_sr0 <- slice_max(possibilitiesStockMarket0, sharpeRatePortfolio)
max_re0 <- slice_max(possibilitiesStockMarket0, mean)
w = max_sr0[1:Nsymbols] %>% unlist()

portfolio_return_opmitizedStockMarket0 = Return.portfolio(asset_returnStoCkMarket,
                                                       weights = w,
                                                       rebalance_on = "months")

sd_portfolio_optimizedStockMarket0 = sd(portfolio_return_opmitizedStockMarket0$portfolio.r)
mean_portfolio_optimizedStockMarket0 = mean(portfolio_return_opmitizedStockMarket0$portfolio.r)
sr_portfolio_optimizedStockMarket0 = max_sr0$sharpeRatePortfolio

possibilitiesStockMarket0 %>%
  ggplot(aes(x = sd, y = mean, color = sharpeRatePortfolio)) +
  geom_point() +
  theme_classic() +
  #scale_y_continuous(labels = scales::percent) +
  scale_x_continuous(labels = scales::percent) +
  labs(x = 'Risco',
       y = 'Retorno esperado',
       title = "StockMarket: Optimização de portfolio & Fronteira eficiente taxa selic 0",
       colour = "Indice sharpe") +
  geom_point(aes(x = sd,
                 y = mean), data = min_var0, color = 'red') +
  geom_point(aes(x = sd,
                 y = mean), data = max_sr0, color = 'red') +
  geom_text(x=min_var0$sd, y = min_var0$mean + .0002, label="Menor risco", color = "red") +

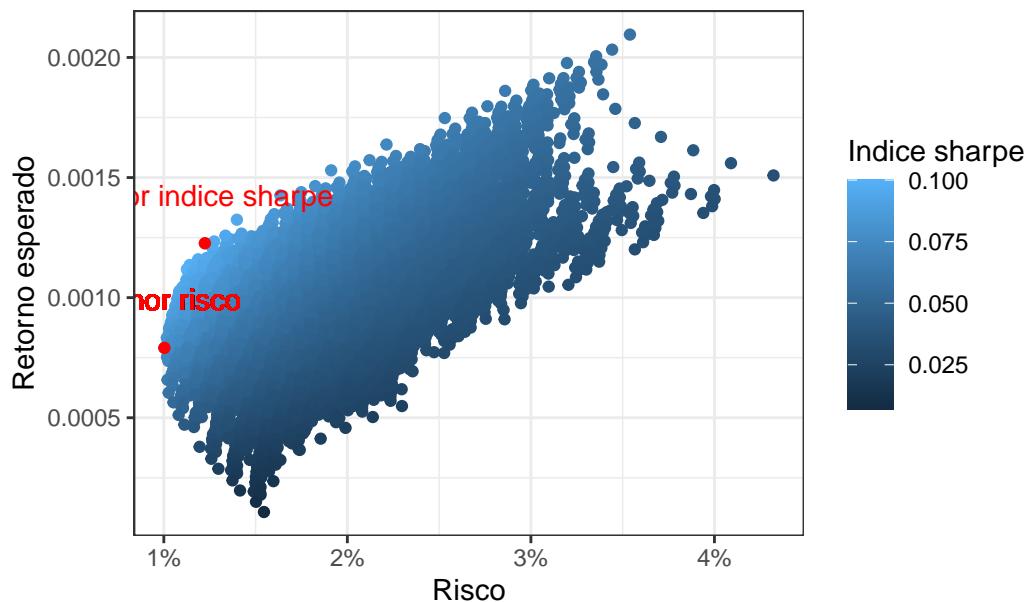
```

```

geom_text(x=max_sr0$sd, y = max_sr0$mean + .0002,label="Maior indice sharpe", color = "red")
theme_bw() +
theme( plot.title = element_text(hjust = .5))

```

kMarket: Optimização de portfolio & Fronteira eficiente taxa selic 0



```
#Rolamento
```

```

rolling_sd_portfolio_return_opmitizedStockMarket0= rollapply(portfolio_return_opmitizedStockMarket0,
FUN = sd,
width = window) %>%
na.omit() %>%
setNames("rolling_sd")

rolling_mean_portfolio_return_opmitizedStockMarket0 = rollapply(portfolio_return_opmitizedStockMarket0,
FUN = mean,
width = window) %>%
na.omit() %>%
setNames("rolling_mean")

rolling_sr_portfolio_return_opmitizedStockMarket0 = cbind(rolling_sd_portfolio_return_opmitizedStockMarket0,
rolling_mean_portfolio_return_opmitizedStockMarket0) %>%
as.data.frame(row.names = index(.)) %>%

```

```

rownames_to_column("date") %>%
mutate(rolling_sr = (rolling_mean - rfr)/rolling_sd,
      date = as.Date(date))

```

Comparando os melhores indices sharpe dentro de cada tabela

```

comparativoStockMarket = rbind(max_sr0,max_sr01375) %>%
  mutate(`Taxa Selic` = c(0,0.1375),
        tipo = "StockMarket") %>%
  relocate(`Taxa Selic`,tipo)

comparativoStockMarket %>% gt()

```

Taxa Selic	tipo	AAPL	MSFT	2222.SR	GOOG	AMZN	NVDA	TSLA	BRK-B	sharpe
0.0000	StockMarket	0	0	0.8	0	0	0.2	0	0	0
0.1375	StockMarket	0	0	0.0	0	0	0.0	1	0	0

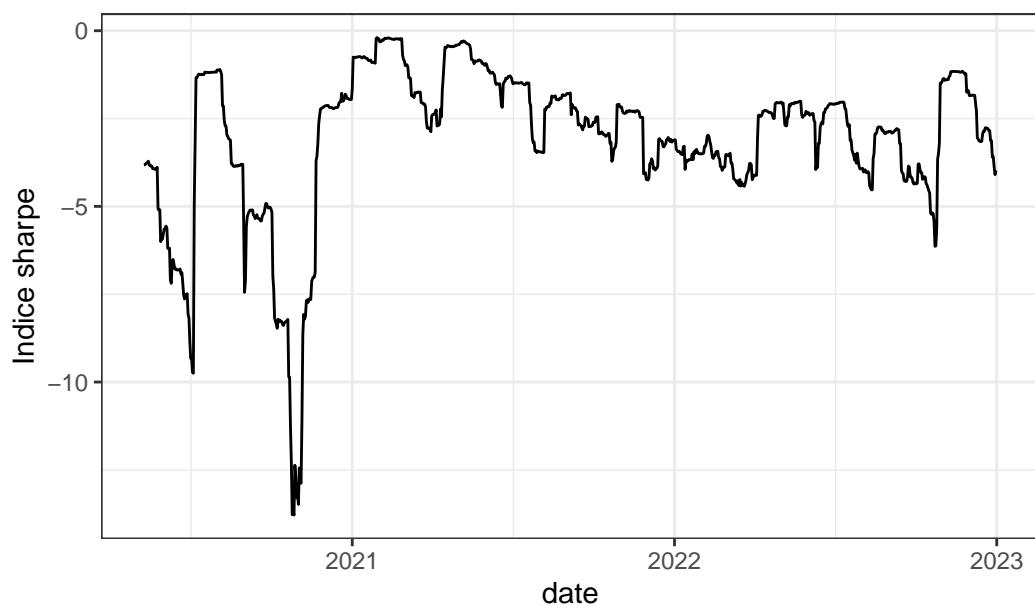
Grafico de rolamento, window 30

```

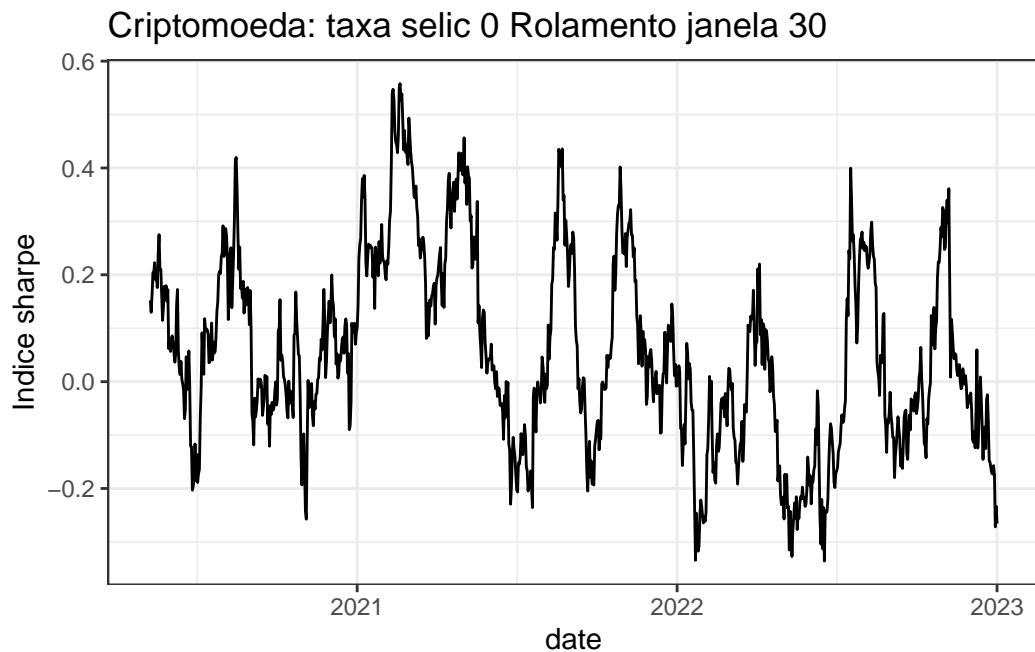
rolling_sr_portfolio_return_opmitized01375 %>%
  ggplot(aes(x=date,y=rolling_sr)) +
  geom_line() +
  labs(title = "Criptomoeda: taxa selic 0.1375 Rolamento janela 30", y="Indice sharpe", "Data"
       theme_bw()

```

Criptomoeda: taxa selic 0.1375 Rolamento janela 30

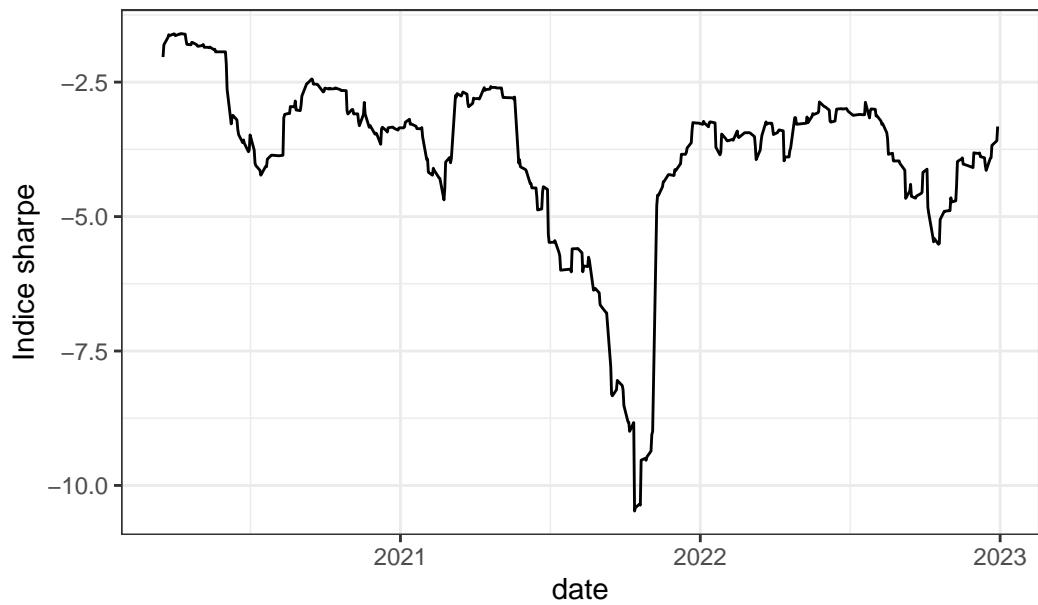


```
rolling_sr_portfolio_return_opmitized0 %>%
  ggplot(aes(x=date,y=rolling_sr)) +
  geom_line() +
  labs(title = "Criptomoeda: taxa selic 0 Rolamento janela 30", y="Indice sharpe","Data")
  theme_bw()
```



```
rolling_sr_portfolio_return_opmitizedStockMarket01375 %>%
  ggplot(aes(x=date,y=rolling_sr)) +
  geom_line() +
  labs(title = "StockMarket: taxa selic 0.1375 Rolamento janela 30", y="Indice sharpe", "Da
  theme_bw()
```

StockMarket: taxa selic 0.1375 Rolamento janela 30



```
rolling_sr_portfolio_return_opmitizedStockMarket0 %>%
  ggplot(aes(x=date,y=rolling_sr)) +
  geom_line() +
  labs(title = "StockMarket: taxa selic 0 Rolamento janela 30", y="Indice sharpe","Data")
  theme_bw()
```

StockMarket: taxa selic 0 Rolamento janela 30

