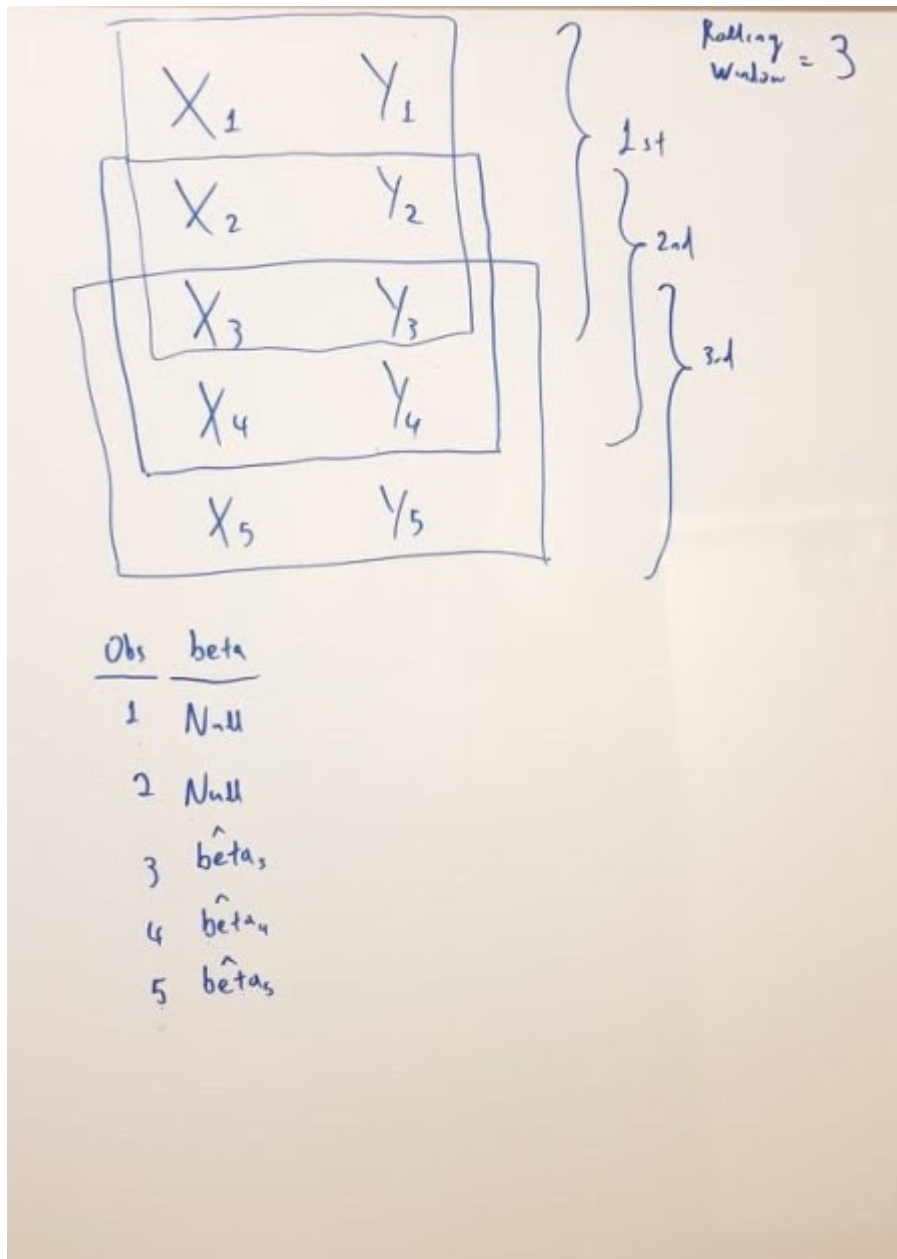# What is a Rolling Regression

The rolling regression is simply a dynamic regression within a rolling moving window. Assuming that we have 5 observations and a rolling window of 3 observations. Then we will run 3 regression models as we can see from my perfect picture below 🙂

Rolling Regression with Co-Integrated Pairs

In the previous post, we found that the NFLX and AMZN stocks are co-integrated for the period of **2020-01-01** to **2021-01-03**. Let's see how beta coefficient evolve across time by considering a rolling window of 30 observations.

```
library(rollRegres)
library(tidyverse)
library(tseries)
library(quantmod)
```

```
mySymbols <- c('AMZN', 'NFLX')

myStocks <-lapply(mySymbols, function(x) {getSymbols(x,
                                            from = "2020-01-01",
                                            to = "2021-01-03",
                                            periodicity = "daily",
                                            auto.assign=FALSE)} )



names(myStocks)<-mySymbols


closePrices <- lapply(myStocks, Cl)
closePrices <- do.call(merge, closePrices)

names(closePrices)<-sub("\\.Close", "", names(closePrices))

# get the logarithm of the prices
closePrices<-log(closePrices)
head(closePrices)
```

```
> head(closePrices)
                  AMZN       NFLX
2020-01-02  7.548561  5.798517
2020-01-03  7.536348  5.786591
2020-01-06  7.551124  5.816605
2020-01-07  7.553213  5.801363
2020-01-08  7.545374  5.826767
2020-01-09  7.550162  5.816099
```

Run the Rolling Regression with a moving window of 30 observations and get the intercept and the beta coefficient.

```
my_rollregression<-roll_regres(NFLX ~ AMZN, closePrices, width = 30,
          do_compute = c("sigmas", "r.squareds", "1_step_forecasts"))



tail(my_rollregression$coefs)
```

```
> tail(my_rollregression$coefs)
             (Intercept)       AMZN
2020-12-23   -8.321066 1.804152
2020-12-24   -8.339955 1.806603
2020-12-28   -6.713759 1.604702
2020-12-29   -5.449432 1.447871
2020-12-30   -4.723728 1.357959
2020-12-31   -4.957347 1.387201
```

Get the Rolling Betas in Chart

Let's have a look at the rolling betas.

```
my_coef<-as.data.frame(my_rollregression$coefs)
my_coef<-rownames_to_column(my_coef, "Date")%>%na.omit()
my_coef$Date<-as.Date(my_coef$Date)
my_coef%>%ggplot(aes(x=Date, y=AMZN))+
  geom_point()+geom_line()+ylab("Rolling Beta")+
  ggtitle("Rolling Beta of NFLX vs AMZN")
```
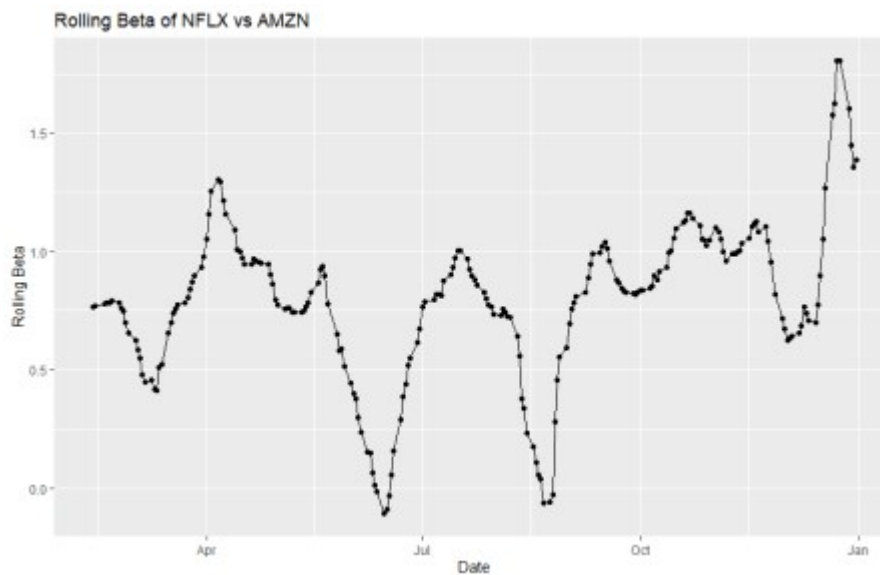

The Takeaway

When you want to do pairs trading, a good approach is to run rolling regressions so that to monitor dynamically the relationship of the pairs. Also, you can test if the pairs are indeed co-integrated in every rolling window.