Gold Prices and Seasonal behaviour

XXXXXXXXXXXXX

Today

Gold Data

Diwali inflates the gold prices - Really ?

Here we studied the gold prices how they behaved 'N' days prior to the big Indian festive event - Diwali, the usual period where everyone buys the gold. So, if the demand for gold increases during festive season, so should be the prices. A comparision of prices from past 'N' days till diwali is studied. Unfortunately, the prices around 75% of the time are less than 60 percentile when it nears diwali. So, is it not Diwali that is causing the price fluctuations. Then who ?

Another study done comparing the prices with international prices & correlation. The Indian gold price behaviour is almost inclined (90% of the time) to the international behaviour(where Diwali demand doesn't exist) rather than local demand - supply.

Its demand that definitely reason behind price action, but the local demand is a miniscule when compared to the factors like interest rates, volatility in the world markets, US Dollar strength, hedging, inflation & interest rate cycles.

For Study - 1. Two Gold ETF prices (one from India and one from US) are taken from 2008.
a. GLD - Managed by SPDR Trust in US
b. GOLDBEES - Managed by reliance in India
2. The prices prevN (60 days,30 days) of each year are considered as subset
3. To see if prices are increasing towards Diwali, close of price (percentile/quartile) with respect to the High-low price is measured. More the percentile, the prices are inclined towards Highs.
4. To see if prices are correlated with international prices (GLD), statistical correlation is considered

Diwali Days

```
cat(format(d,"%Y %B %d"),sep = "#  \n")
```

```
## 2008 October 28#
## 2009 October 17#
## 2010 November 05#
## 2011 October 26#
## 2012 November 13#
## 2013 November 03#
## 2014 October 23#
## 2015 November 11#
## 2016 October 30#
## 2017 October 19
```

Goldbees price during Diwali for '60' previous days

```r
par(mfrow = c(2,5))
plot(yearlyData[[1]]$Close,main = "",sub = "")
plot(yearlyData[[2]]$Close,main = "",sub = "")
plot(yearlyData[[3]]$Close,main = "",sub = "")
plot(yearlyData[[4]]$Close,main = "",sub = "")
plot(yearlyData[[5]]$Close,main = "",sub = "")

plot(yearlyData[[6]]$Close,main = "",sub = "")
plot(yearlyData[[7]]$Close,main = "",sub = "")
plot(yearlyData[[8]]$Close,main = "",sub = "")
plot(yearlyData[[9]]$Close,main = "",sub = "")
plot(yearlyData[[10]]$Close,main = "",sub = "")
```
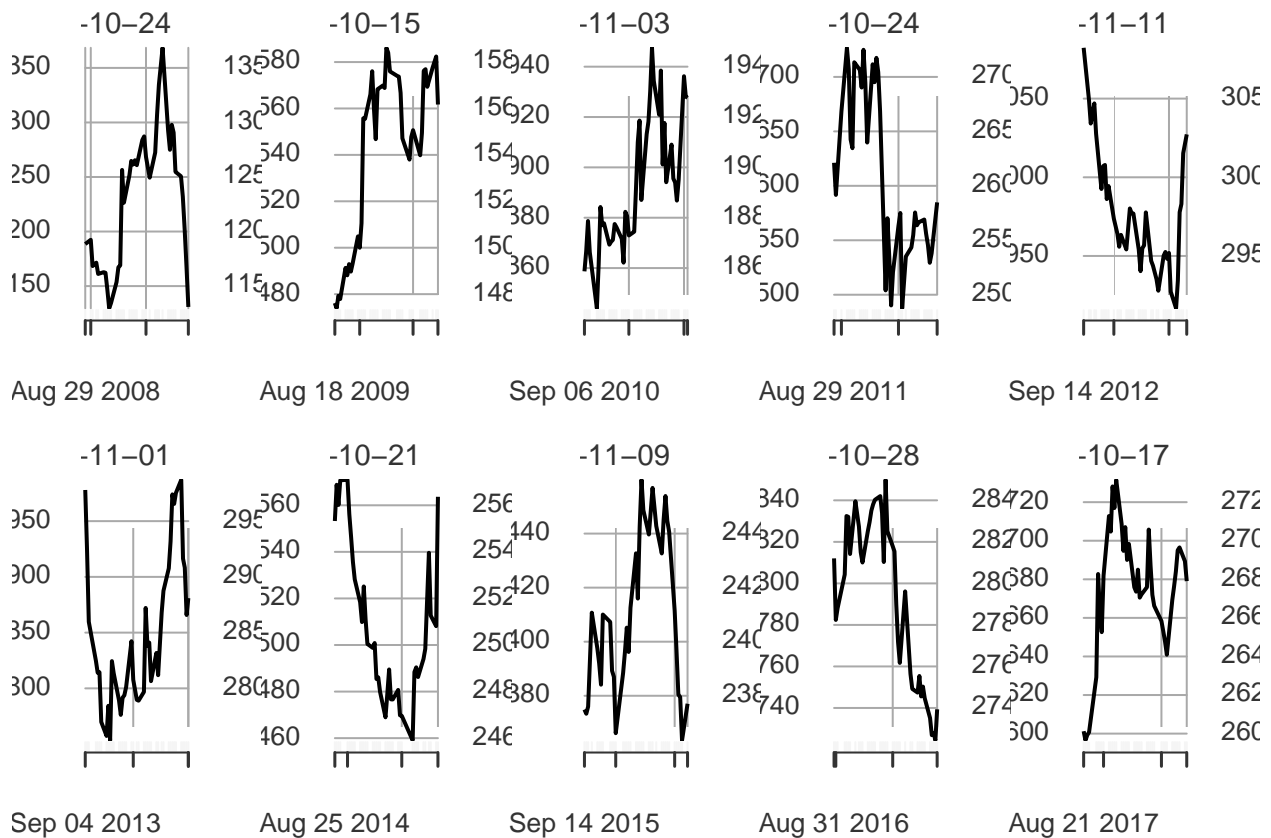

Calculate the percentile of close with respect to 60 days previous prices.

```r
subDays    <- lapply(d,FUN = function(x){return( (x-prevN):(x-2) ) })
subDays    <- as.Date(unlist(subDays))

dummyXts <- xts(order.by = subDays)
gb    <- gbXts[index(dummyXts)]

#Make High,Low,Close for each year
res <- to.yearly(gb)
colnames(res) <- colnames(gbXts)
res$percentile <- (res$Close - res$Low) / (res$High - res$Low)
res$percentile <- round(res$percentile, digits = 2)
```

```
cat(sprintf("Year = %d # percentile = %0.2f",year(index(res)),res$percentile),sep = "#  \n  ")
```

Year = 2008 # percentile = 0.16#
Year = 2009 # percentile = 0.73#
Year = 2010 # percentile = 0.77#
Year = 2011 # percentile = 0.35#
Year = 2012 # percentile = 0.59#
Year = 2013 # percentile = 0.45#
Year = 2014 # percentile = 0.81#
Year = 2015 # percentile = 0.20#
Year = 2016 # percentile = 0.11#
Year = 2017 # percentile = 0.49

How many years the percentile is less than 60 (Meaning closer to the lows)? 7
How many years the percentile is less than 50 (Meaning closer to the lows)? 6
Total number of years : 10

Compare with international prices

```
#Since international markets revolve mostly around US, the US price effect of today (say 02nd) is refle
#So, lag the prices by 1 day to compare apples to apples
gld   <- lag.xts(GLD[index(dummyXts)])
a <- merge.xts(gld$Close,gb$Close,join = "inner")
a <- na.trim(a)
colnames(a) <- c("intlClose","indiaClose")
cor(a$intlClose,a$indiaClose)
```

```
##           indiaClose
## intlClose  0.7260683
```

How many times the prise rise in US reflected the price rise in India ? 0.7260683

60 Days Conclusion

This concludes that almost 70 percent of times the diwali prices drifted lower than 60 percentile and 72.6068318 percent times is closely correlated with international prices.

30 Days Evaluation

====================

Graph the 30 days previous prices

```
par(mfrow = c(2,5))
plot(yearlyData[[1]]$Close,main = "",sub = "")
plot(yearlyData[[2]]$Close,main = "",sub = "")
plot(yearlyData[[3]]$Close,main = "",sub = "")
```

```r
plot(yearlyData[[4]]$Close,main = "",sub = "")
plot(yearlyData[[5]]$Close,main = "",sub = "")

plot(yearlyData[[6]]$Close,main = "",sub = "")
plot(yearlyData[[7]]$Close,main = "",sub = "")
plot(yearlyData[[8]]$Close,main = "",sub = "")
plot(yearlyData[[9]]$Close,main = "",sub = "")
plot(yearlyData[[10]]$Close,main = "",sub = "")
```
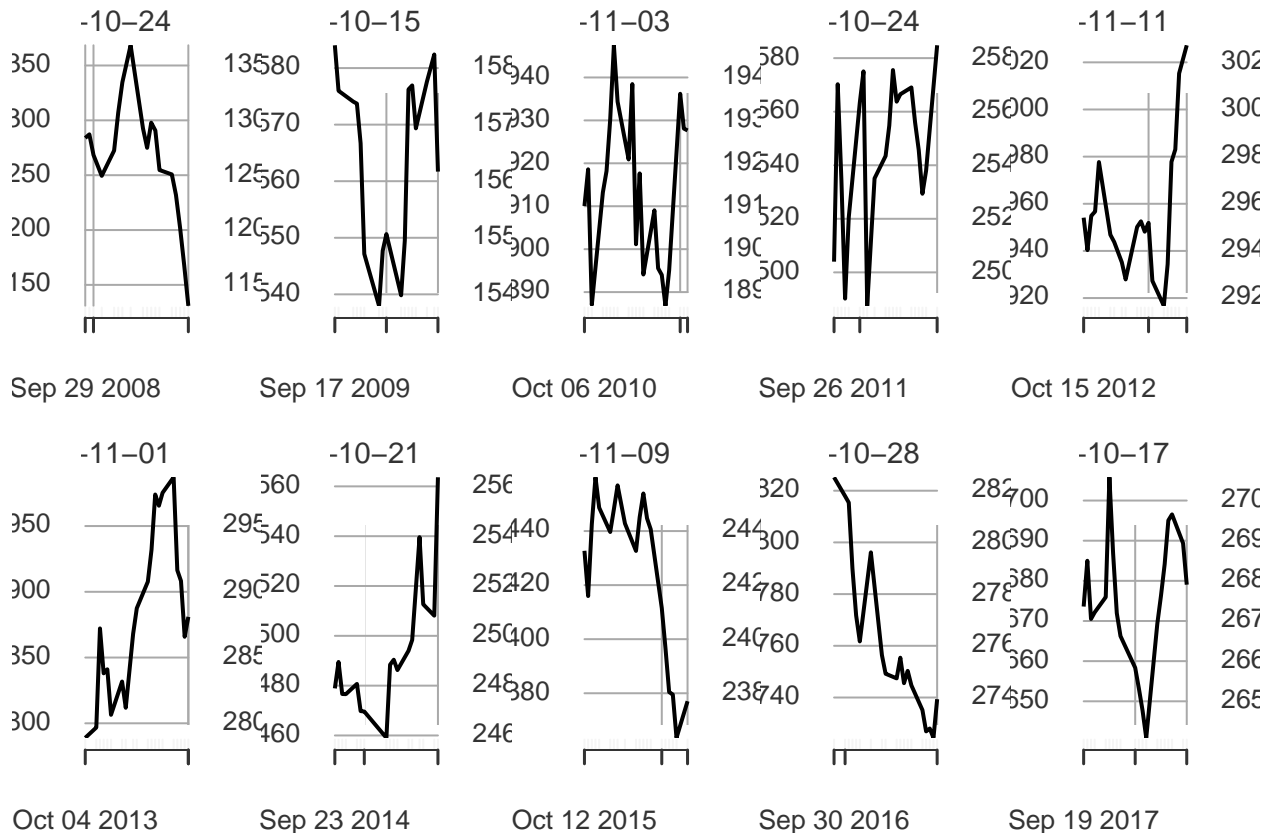
Calculate the percentile of close with respect to 30 days previous prices.

```r
subDays    <- lapply(d,FUN = function(x){return( (x-prevN):(x-2) ) })
subDays    <- as.Date(unlist(subDays))

dummyXts <- xts(order.by = subDays)
gb     <- gbXts[index(dummyXts)]

#Make High,Low,Close for each year
res <- to.yearly(gb)
colnames(res) <- colnames(gbXts)
res$percentile <- (res$Close - res$Low) / (res$High - res$Low)
res$percentile <- round(res$percentile, digits = 2)
cat(sprintf("Year = %d # percentile = %0.2f",year(index(res)),res$percentile),sep = "#  \n  ")
```

Year = 2008 # percentile = 0.01#
Year = 2009 # percentile = 0.44#
Year = 2010 # percentile = 0.56#

Year = 2011 # percentile = 0.72#
Year = 2012 # percentile = 0.91#
Year = 2013 # percentile = 0.46#
Year = 2014 # percentile = 0.99#
Year = 2015 # percentile = 0.20#
Year = 2016 # percentile = 0.11#
Year = 2017 # percentile = 0.47

How many years the percentile is less than 60 (Meaning closer to the lows)? 7
How many years the percentile is less than 50 (Meaning closer to the lows)? 6
Total number of years : 10

Compare with international prices

```
#Since international markets revolve mostly around US, the US price effect of today (say 02nd) is refle
#So, lag the prices by 1 day to compare apples to apples
gld   <- lag.xts(GLD[index(dummyXts)])
a <- merge.xts(gld$Close,gb$Close,join = "inner")
a <- na.trim(a)
colnames(a) <- c("intlClose","indiaClose")
cor(a$intlClose,a$indiaClose)
```

```
##           indiaClose
## intlClose  0.6788581
```

How many times the prise rise in US reflected the price rise in India ? 0.6788581

30 Days Conclusion

This concludes that almost 70 percent of times the diwali prices drifted lower than 60 percentile and 67.8858135 percent times is closely correlated with international prices.