

## EURUSD weekly range statistical analysis

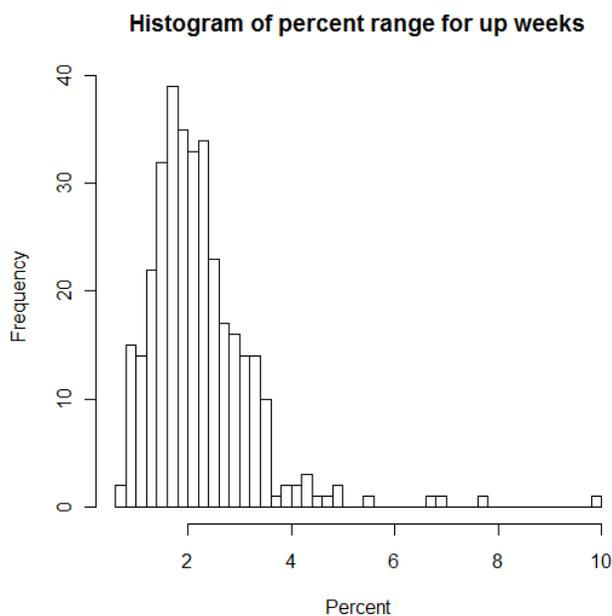
Analysis conducted 1/12/2012 by EZcurrency.

Just over 12 years of data was analyzed for EURUSD weekly data. The purpose of this analysis is to do a statistical analysis on the range of EURUSD, and also to see if there is any correlation to larger range weeks and the percent of the close near the high of the week for up weeks, or percent of the close near the low for down weeks. My hypothesis is that if there is a large move up and a large range week, the close will be closer to the high than if it was a low range week. Similarly I will test for down weeks (the close is closer to the low for large range down weeks). Additionally, statistics conducting weekly pivot points are analyzed.

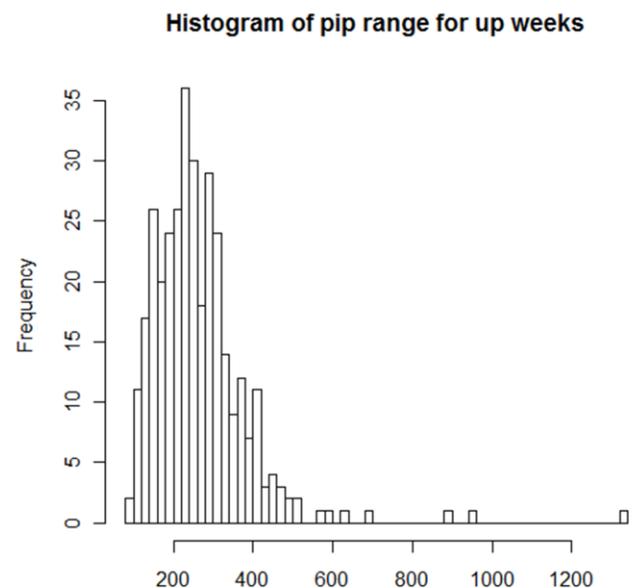
First, the data was broken into up and down weeks ...

### Up weeks

The graphs below show histograms for the percent range and pip range for up weeks:



<u>Min.</u>	<u>1st Qu.</u>	<u>Median</u>	<u>Mean</u>	<u>3rd Qu.</u>	<u>Max.</u>
0.6531	1.5990	2.0900	2.2290	2.6480	9.9250



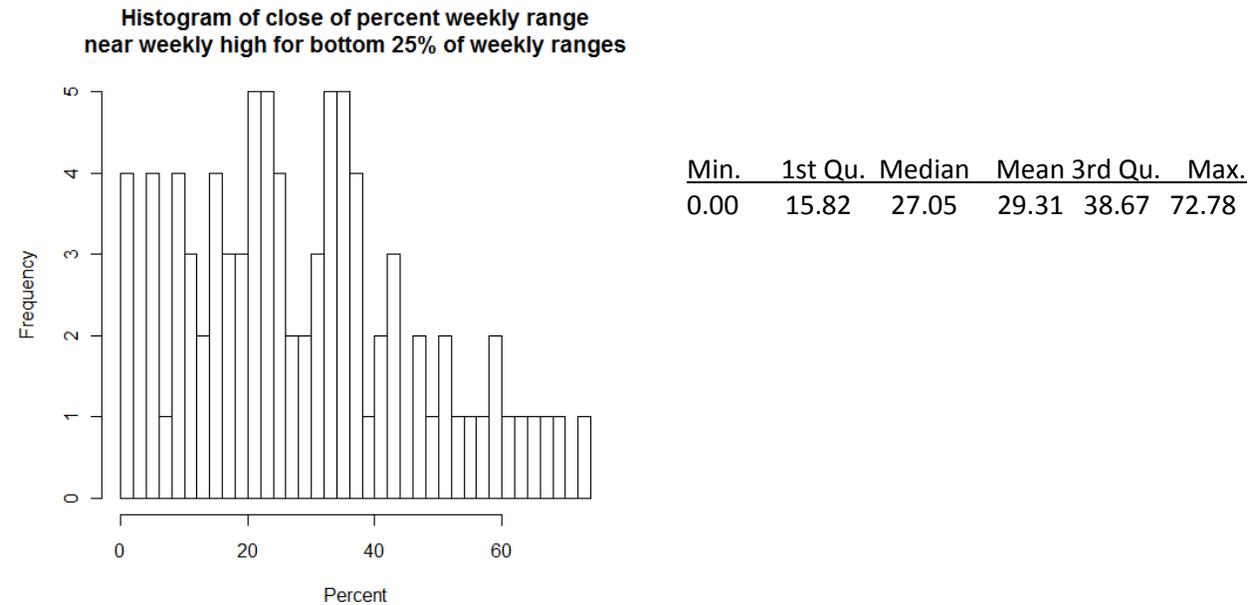
<u>Min.</u>	<u>1st Qu.</u>	<u>Median</u>	<u>Mean</u>	<u>3rd Qu.</u>	<u>Max.</u>
90.0	190.0	244.0	264.7	310.0	1329.0

The data was then broken into three categories: bottom 25%, middle 50%, and highest 25% according to the range. The mean for the middle 50% of the weekly up ranges is different than for all up weeks due to the data for all up weeks being skewed to the right due to a few very large ranges for up weeks.

Pip Range:

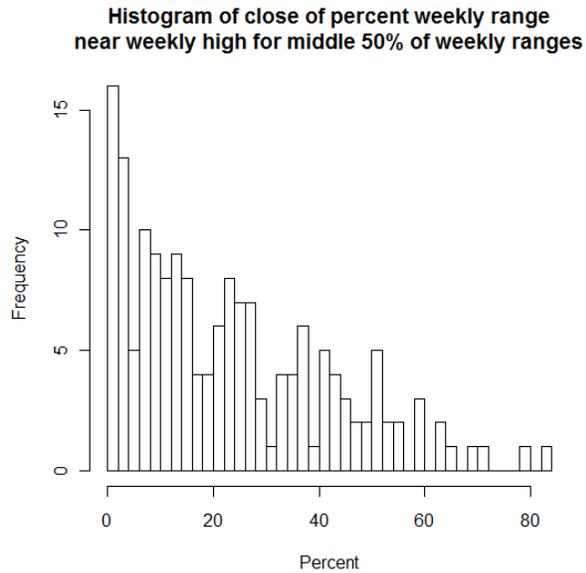
	<u>Min.</u>	<u>1st Qu.</u>	<u>Median</u>	<u>Mean</u>	<u>3rd Qu.</u>	<u>Max.</u>
Bottom 25%:	90.0	132.0	156.0	159.9	189.0	236.0
Middle 50%:	141.0	213.0	244.0	249.5	288.5	412.0
Top 25%:	245.0	307.0	372.5	401.1	420.2	1329.0

Looking at the bottom 25% of weekly UP ranges with a mean of 159.9 pips weekly range, I analyzed the percent of the weekly range close near the high. For example, if there was a 100 pip range and it closed 17 pips from the high of the week, the close was within 17% of the high.



So half of the time (the mean), the close was within 29.31% of the high, and 75% of the time the close was 38.67% of the high. The median (most occurring) was closing within 27% of the high. The histogram above shows no real preference of closing near the high for the low week ranges (for the bottom 25% of all weekly ranges).

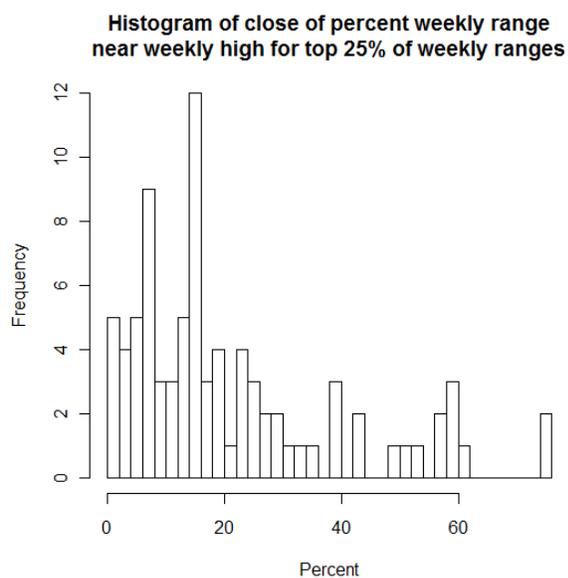
Now looking at the middle 50% of all ranges, the histogram shows a preference of closing near the high of the week:



Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
0.000	7.766	19.440	23.110	35.910	82.230

So half of the time (the mean), the close was within 23.11% of the high, and 75% of the time the close was 35.9% of the high. The median was 19.44%. The histogram above shows the preference of closing near the high for the middle week ranges (for the middle 50% of all weekly ranges).

The histogram and statistics are similar for the large range weeks which are the top 25% of all weekly ranges (a preference of closing near the high of the week).



Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
0.3654	7.7360	15.5400	21.3700	27.8300	75.4400

In summary, if we are in long positions in EURUSD and its mid week and we think its going to be an up week, chances are it will be not be a small range week (< 25% of all weekly ranges), and will be a mid range (25% to 75% of all weekly ranges) or large range week (> 75% of all weekly ranges), so it is statistically likely to close near the high of the week ... and thus we should hold till the end of the week.

The next analysis that was done for the up weeks was the analysis of weekly pivot points for EURUSD. I calculated the pivot points for each week based upon the data from the previous week, and analyzed the percent of time the low of the week was below S3, S2, S1 and pivot, and the high of the week was above R3, R2, R1, and pivot for all of the up weeks. This was broken into the bottom 25%, middle 50%, and highest 25% of all weekly ranges.

#### Up weeks weekly ranges

Percent of time	Bottom 25%	Middle 50%	Highest 25%
Low < S3	2.4 %	0 %	1.2 %
Low < S2	2.4 %	2.4 %	5.9 %
Low < S1	18.8 %	17.8 %	23.8 %
Low < Pivot	77.6 %	81 %	77.4 %
High > Pivot	90.6 %	100 %	98.8 %
High > R1	47.1 %	77.4 %	96.4 %
High > R2	8.2 %	32.7 %	91.7 %
High > R3	0 %	8.9 %	84.5 %

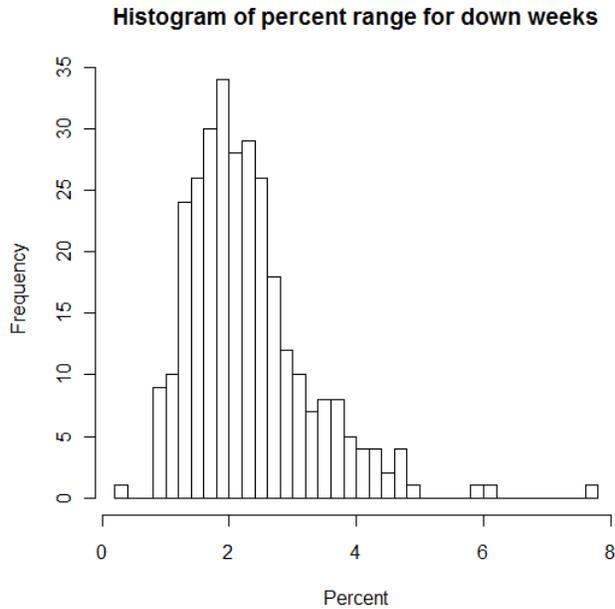
For all weekly ranges for up weeks, The S2 was rarely exceeded by the Low of the week. The S1 was only exceeded about 20% of the time by the low of the week, while the low was below the weekly pivot 3/4 of the time. If there one thinks that EURUSD will have an up week (if the overall weekly/monthly trend is up, or other indicators indicate), the weekly statistics indicate that the weekly low is below the pivot quite often but rarely goes below the weekly S1. Thus it would be good to buy sometime when the price is below the weekly pivot, with stop loss below the weekly S1.

For the middle 50% of all weekly ranges for up weeks, the high exceeded the R1 77.4% of the time, but only exceeded the R2 32.7% of the time.

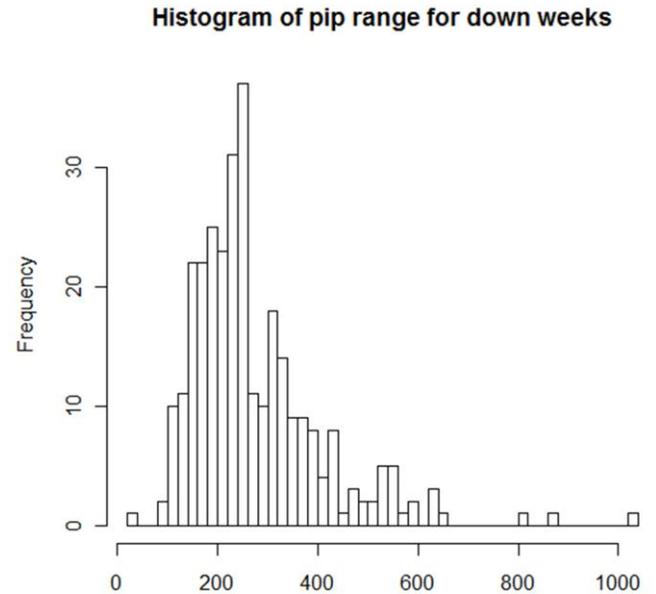
For the highest 25% of all weekly ranges, the price dips below the pivot about 77.4% of the time, but then closes near the high of the week and statistically above the R3 about 84.5% of the time.

## Down weeks

The graphs below show histograms for the percent range and pip range for down weeks:



<u>Min.</u>	<u>1st Qu.</u>	<u>Median</u>	<u>Mean</u>	<u>3rd Qu.</u>	<u>Max.</u>
0.2263	1.6120	2.1270	2.3000	2.7150	7.7060



<u>Min.</u>	<u>1st Qu.</u>	<u>Median</u>	<u>Mean</u>	<u>3rd Qu.</u>	<u>Max.</u>
30.3	187.0	243.0	273.4	326.4	1033.0

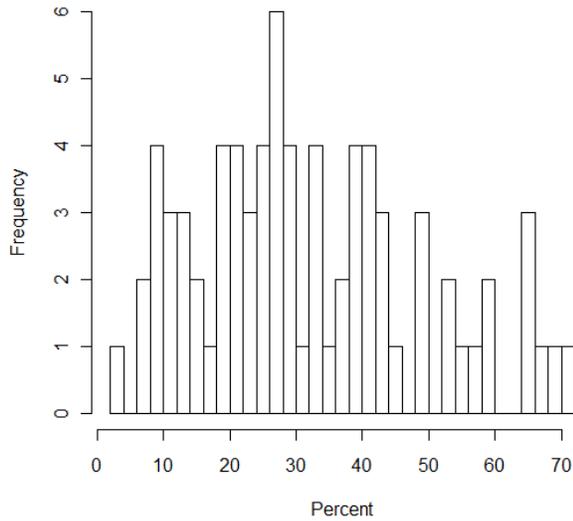
The data was then broken into three categories: bottom 25%, middle 50%, and highest 25% according to the range. The mean for the middle 50% of the weekly down ranges is different than for all down weeks due to the data for all down weeks being skewed to the right due to a few very large ranges for down weeks.

Pip Range:

	<u>Min.</u>	<u>1st Qu.</u>	<u>Median</u>	<u>Mean</u>	<u>3rd Qu.</u>	<u>Max.</u>
Bottom 25%:	30.3	131.7	155.3	160.4	191.0	255.0
Middle 50%	144.0	210.0	241.0	248.1	278.0	386.0
Top 25%:	240.0	341.5	407.0	434.6	524.7	1033.0

Looking at the bottom 25% of weekly DOWN ranges with a mean of 160.4 pips weekly range, I analyzed the percent of the weekly range close near the high.

**Histogram of close of percent weekly range  
near weekly low for bottom 25% of weekly ranges**

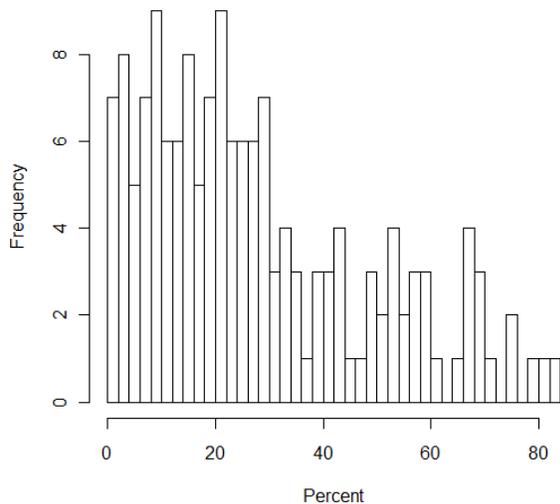


Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
3.00	19.25	28.24	32.00	41.67	70.59

So half of the time (the mean), the close was within 32% of the low, and 75% of the time the close was 41.67% of the low. The median (most occurring) was closing within 28.24% of the low. The histogram above shows no real preference of closing near the low for the low week ranges (for the bottom 25% of all weekly ranges).

Now looking at the middle 50% of all ranges, the histogram shows a preference of closing near the low of the week:

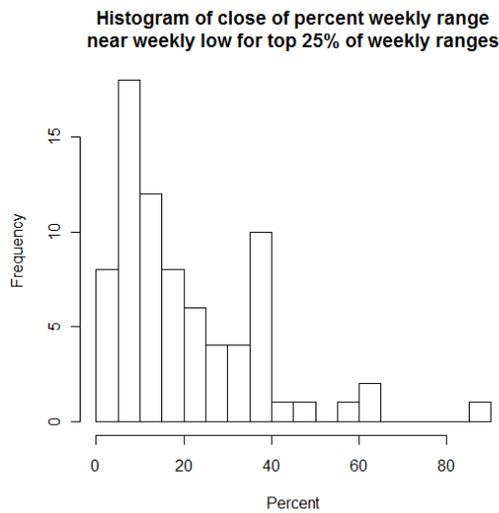
**Histogram of close of percent weekly range  
near weekly low for middle 50% of weekly ranges**



Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
0.00	11.31	22.32	27.78	41.24	82.21

So half of the time (the mean), the close was within 27.78% of the high, and 75% of the time the close was 41.24% of the high. The median was 22.32%. The histogram above shows the preference of closing near the high for the middle week ranges (for the middle 50% of all weekly ranges).

The histogram and statistics are similar for the large range weeks which are the top 25% of all weekly ranges (a preference of closing near the high of the week).



Min.   1st Qu.   Median   Mean   3rd Qu.   Max.  
 0.2274   7.7340   15.5100   20.6400   32.7800   89.6800

In summary, if we are in short positions in EURUSD and its mid week and we think its going to be a down week, chances are it will be not be a small range week (< 25% of all weekly ranges), and will be a mid range (25% to 75% of all weekly ranges) or large range week (> 75% of all weekly ranges), so it is statistically likely to close near the low of the week ... and thus we should hold till the end of the week.

The next analysis that was done for the down weeks was the analysis of weekly pivot points for EURUSD. I calculated the pivot points for each week based upon the data from the previous week, and analyzed the percent of time the low of the week was below S3, S2, S1 and pivot, and the high of the week was above R3, R2, R1, and pivot for all of the down weeks. This was broken into the bottom 25%, middle 50%, and highest 25% of all weekly ranges.

Down weeks weekly ranges

Percent of time	Bottom 25%	Middle 50%	Highest 25%
Low < S3	0 %	5.7 %	25 %
Low < S2	2.6 %	19.7 %	53.9 %
Low < S1	44.7 %	73.9 %	88.2 %
Low < Pivot	93.4 %	98.7 %	48.4 %
High > Pivot	72.4 %	83.4 %	83.4 %
High > R1	13.2 %	16.5 %	16.5 %
High > R2	0 %	4.5 %	4.4 %
High > R3	0 %	0 %	0 %

For all weekly ranges for up weeks, The R2 was rarely exceeded by the high of the week. The R1 was only exceeded about 15% of the time by the high of the week, while the high was above the weekly

pivot 80% of the time. If there one thinks that EURUSD will have a down week (if the overall weekly/monthly trend is down, or other indicators indicate), the weekly statistics indicate that the weekly high is above the pivot quite often but rarely goes above the weekly R1. Thus it would be good to short sometime when the price is above the weekly pivot, with stop loss above the weekly R1.

For the middle 50% of all weekly ranges for up weeks, the low exceeded the S1 73.9% of the time, but only exceeded the S2 19.7% of the time.

For the highest 25% of all weekly ranges, the price dips above the pivot about 83.4% of the time, but then closes near the low of the week and below the S1 about 88.2% of the time, but below the S2 only about 53.9% of the time.

## Additional Analysis

Additional analysis should be done for all weeks to see if Monday's close is below the open for the week, what is the probability of closing up for the week. This should be repeated for Tues, Wed, Th, Fri ... and also the same analysis should be done for down weeks.

## R-code

This code can be used with R (an open source statistical program) to analyze different pairs ... just import a different dataset and analyze.

```
#read in file of weekly data (headers added before in .csv and pivots calculated from previous week of data before importing)
```

```
eu <- read.csv("EURUSD10080.csv")
```

```
dim(eu) # check length of data file
```

```
names(eu) # check header names
```

```
# up weeks
```

```
up <- subset(eu, eu$C > eu$O)
```

```
# up range in percent move
```

```
upRange <- 100*(up$H-up$L)/up$O
```

```
summary(upRange)
```

```
hist(upRange, breaks=40, main="Histogram of percent range for up weeks", xlab="Percent")
```

```
upRangePips <- 10000*(up$H-up$L)
```

```
summary(upRangePips)
```

```
hist(upRangePips, breaks=60, main="Histogram of pip range for up weeks", xlab="Pips")
```

```
# break range for up weeks into three categories: bottom 25%
```

```
# middle 50%, and highest 25%
```

```
upBot <- subset(up,upRange<1.6)
```

```
upHigh <- subset(up,upRange>2.648)
```

```
upMidTemp <- subset(up,upRange<2.648)
```

```
upRangeTemp <- 100*(upMidTemp$H-upMidTemp$L)/upMidTemp$O
```

```
upMid <- subset(upMidTemp,upRangeTemp >1.6)
```

```
# ranges for each category
```

```
upBotRange <- 100*(upBot$H-upBot$L)/upBot$O
```

```
summary(upBotRange)
```

```
upBotRangePips <- 10000*(upBot$H-upBot$L)
```

```
summary(upBotRangePips)
```

```
upMidRange <- 100*(upMid$H-upMid$L)/upMid$O
```

```
summary(upMidRange)
```

```
upMidRangePips <- 10000*(upMid$H-upMid$L)
```

```
summary(upMidRangePips)
```

```
upHighRange <- 100*(upHigh$H-upHigh$L)/upHigh$O
```

```
summary(upHighRange)
```

```
upHighRangePips <- 10000*(upHigh$H-upHigh$L)
```

```
summary(upHighRangePips)
```

```
# % close near high of range if up week for each category
```

```
upBotClose <- 100*(upBot$H-upBot$C)/(upBot$H-upBot$L)
```

```
summary(upBotClose)
```

```
hist(upBotClose, breaks=30, main="Histogram of close of percent weekly range\nnear weekly high for  
bottom 25% of weekly ranges", xlab="Percent")
```

```
upMidClose <- 100*(upMid$H-upMid$C)/(upMid$H-upMid$L)
```

```
summary(upMidClose)
```

```
hist(upMidClose, breaks=30, main="Histogram of close of percent weekly range\nnear weekly high for  
middle 50% of weekly ranges", xlab="Percent")
```

```
upHighClose <- 100*(upHigh$H-upHigh$C)/(upHigh$H-upHigh$L)
```

```
summary(upHighClose)
```

```
hist(upHighClose, breaks=30, main="Histogram of close of percent weekly range\nnear weekly high for  
top 25% of weekly ranges", xlab="Percent")
```

```
# pivot point statistics for bottom 25% of all ranges
```

```
length(upBot$C) # number of up weeks for bottom 25% of all ranges
```

```
length(upBot$C[upBot$L<upBot$S3]) / length(upBot$C)
```

```
length(upBot$C[upBot$L<upBot$S2]) / length(upBot$C)
```

```
length(upBot$C[upBot$L<upBot$S1]) / length(upBot$C)
```

```
length(upBot$C[upBot$L<upBot$Pivot]) / length(upBot$C)
```

```
length(upBot$C[upBot$H>upBot$Pivot]) / length(upBot$C)
```

```
length(upBot$C[upBot$H>upBot$R1]) / length(upBot$C)
```

```
length(upBot$C[upBot$H>upBot$R2]) / length(upBot$C)
```

$\text{length}(\text{upBot}\$C[\text{upBot}\$H > \text{upBot}\$R3]) / \text{length}(\text{upBot}\$C)$

# pivot point statistics for middle 50% of all ranges

$\text{length}(\text{upMid}\$C)$  # number of up weeks for bottom 25% of all ranges

$\text{length}(\text{upMid}\$C[\text{upMid}\$L < \text{upMid}\$S3]) / \text{length}(\text{upMid}\$C)$

$\text{length}(\text{upMid}\$C[\text{upMid}\$L < \text{upMid}\$S2]) / \text{length}(\text{upMid}\$C)$

$\text{length}(\text{upMid}\$C[\text{upMid}\$L < \text{upMid}\$S1]) / \text{length}(\text{upMid}\$C)$

$\text{length}(\text{upMid}\$C[\text{upMid}\$L < \text{upMid}\$Pivot]) / \text{length}(\text{upMid}\$C)$

$\text{length}(\text{upMid}\$C[\text{upMid}\$H > \text{upMid}\$Pivot]) / \text{length}(\text{upMid}\$C)$

$\text{length}(\text{upMid}\$C[\text{upMid}\$H > \text{upMid}\$R1]) / \text{length}(\text{upMid}\$C)$

$\text{length}(\text{upMid}\$C[\text{upMid}\$H > \text{upMid}\$R2]) / \text{length}(\text{upMid}\$C)$

$\text{length}(\text{upMid}\$C[\text{upMid}\$H > \text{upMid}\$R3]) / \text{length}(\text{upMid}\$C)$

# pivot point statistics for top 25% of all ranges

$\text{length}(\text{upHigh}\$C)$  # number of up weeks for top 25% of all ranges

$\text{length}(\text{upHigh}\$C[\text{upHigh}\$L < \text{upHigh}\$S3]) / \text{length}(\text{upHigh}\$C)$

$\text{length}(\text{upHigh}\$C[\text{upHigh}\$L < \text{upHigh}\$S2]) / \text{length}(\text{upHigh}\$C)$

$\text{length}(\text{upHigh}\$C[\text{upHigh}\$L < \text{upHigh}\$S1]) / \text{length}(\text{upHigh}\$C)$

$\text{length}(\text{upHigh}\$C[\text{upHigh}\$L < \text{upHigh}\$Pivot]) / \text{length}(\text{upHigh}\$C)$

$\text{length}(\text{upMid}\$C[\text{upHigh}\$H > \text{upMid}\$Pivot]) / \text{length}(\text{upHigh}\$C)$

$\text{length}(\text{upMid}\$C[\text{upHigh}\$H > \text{upMid}\$R1]) / \text{length}(\text{upHigh}\$C)$

$\text{length}(\text{upMid}\$C[\text{upHigh}\$H > \text{upMid}\$R2]) / \text{length}(\text{upHigh}\$C)$

$\text{length}(\text{upMid}\$C[\text{upHigh}\$H > \text{upMid}\$R3]) / \text{length}(\text{upHigh}\$C)$

```

# -----

# down weeks

down <- subset(eu,eu$C < eu$O)

# up range in percent move

downRange <- 100*(down$H-down$L)/down$O

summary(downRange)

hist(downRange, breaks=40, main="Histogram of percent range for down weeks", xlab="Percent")

downRangePips <- 10000*(down$H-down$L)

summary(downRangePips)

hist(downRangePips, breaks=60, main="Histogram of pip range for down weeks", xlab="Pips")

# break range for up weeks into three categories: bottom 25%

# middle 50%, and highest 25%

downBot <- subset(down,downRange<1.612)

downHigh <- subset(down,downRange>2.715)

downMidTemp <- subset(down,downRange<2.715)

downRangeTemp <- 100*(downMidTemp$H-downMidTemp$L)/downMidTemp$O

downMid <- subset(downMidTemp,downRangeTemp >1.6)

# ranges for each category

downBotRange <- 100*(downBot$H-downBot$L)/downBot$O

```

```
summary(downBotRange)
```

```
downBotRangePips <- 10000*(downBot$H-downBot$L)
```

```
summary(downBotRangePips)
```

```
downMidRange <- 100*(downMid$H-downMid$L)/downMid$O
```

```
summary(downMidRange)
```

```
downMidRangePips <- 10000*(downMid$H-downMid$L)
```

```
summary(downMidRangePips)
```

```
downHighRange <- 100*(downHigh$H-downHigh$L)/downHigh$O
```

```
summary(downHighRange)
```

```
downHighRangePips <- 10000*(downHigh$H-downHigh$L)
```

```
summary(downHighRangePips)
```

```
# % close near low of range if down week for each category
```

```
downBotClose <- 100*(downBot$C-downBot$L)/(downBot$H-downBot$L)
```

```
summary(downBotClose)
```

```
hist(downBotClose, breaks=30, main="Histogram of close of percent weekly range\nnear weekly low for  
bottom 25% of weekly ranges", xlab="Percent")
```

```
downMidClose <- 100*(downMid$C-downMid$L)/(downMid$H-downMid$L)
```

```
summary(downMidClose)
```

```
hist(downMidClose, breaks=30, main="Histogram of close of percent weekly range\nnear weekly low for  
middle 50% of weekly ranges", xlab="Percent")
```

```
downHighClose <- 100*(downHigh$C-downHigh$L)/(downHigh$H-downHigh$L)
```

summary(downHighClose)

hist(downHighClose, breaks=30, main="Histogram of close of percent weekly range\nnear weekly low for top 25% of weekly ranges", xlab="Percent")

# pivot point statistics for bottom 25% of all ranges

length(downBot\$C) # number of down weeks for bottom 25% of all ranges

length(downBot\$C[downBot\$L<downBot\$S3]) / length(downBot\$C)

length(downBot\$C[downBot\$L<downBot\$S2]) / length(downBot\$C)

length(downBot\$C[downBot\$L<downBot\$S1]) / length(downBot\$C)

length(downBot\$C[downBot\$L<downBot\$Pivot]) / length(downBot\$C)

length(downBot\$C[downBot\$H>downBot\$Pivot]) / length(downBot\$C)

length(downBot\$C[downBot\$H>downBot\$R1]) / length(downBot\$C)

length(downBot\$C[downBot\$H>downBot\$R2]) / length(downBot\$C)

length(downBot\$C[downBot\$H>downBot\$R3]) / length(downBot\$C)

# pivot point statistics for middle 50% of all ranges

length(downMid\$C) # number of down weeks for bottom 25% of all ranges

length(downMid\$C[downMid\$L<downMid\$S3]) / length(downMid\$C)

length(downMid\$C[downMid\$L<downMid\$S2]) / length(downMid\$C)

length(downMid\$C[downMid\$L<downMid\$S1]) / length(downMid\$C)

length(downMid\$C[downMid\$L<downMid\$Pivot]) / length(downMid\$C)

length(downMid\$C[downMid\$H>downMid\$Pivot]) / length(downMid\$C)

length(downMid\$C[downMid\$H>downMid\$R1]) / length(downMid\$C)

length(downMid\$C[downMid\$H>downMid\$R2]) / length(downMid\$C)

length(downMid\$C[downMid\$H>downMid\$R3]) / length(downMid\$C)

# pivot point statistics for top 25% of all ranges

length(downHigh\$C) # number of down weeks for top 25% of all ranges

length(downHigh\$C[downHigh\$L<downHigh\$S3]) / length(downHigh\$C)

length(downHigh\$C[downHigh\$L<downHigh\$S2]) / length(downHigh\$C)

length(downHigh\$C[downHigh\$L<downHigh\$S1]) / length(downHigh\$C)

length(downHigh\$C[downHigh\$L<downHigh\$Pivot]) / length(downMid\$C)

length(downMid\$C[downMid\$H>downMid\$Pivot]) / length(downMid\$C)

length(downMid\$C[downMid\$H>downMid\$R1]) / length(downMid\$C)

length(downMid\$C[downMid\$H>downMid\$R2]) / length(downMid\$C)

length(downMid\$C[downMid\$H>downMid\$R3]) / length(downMid\$C)