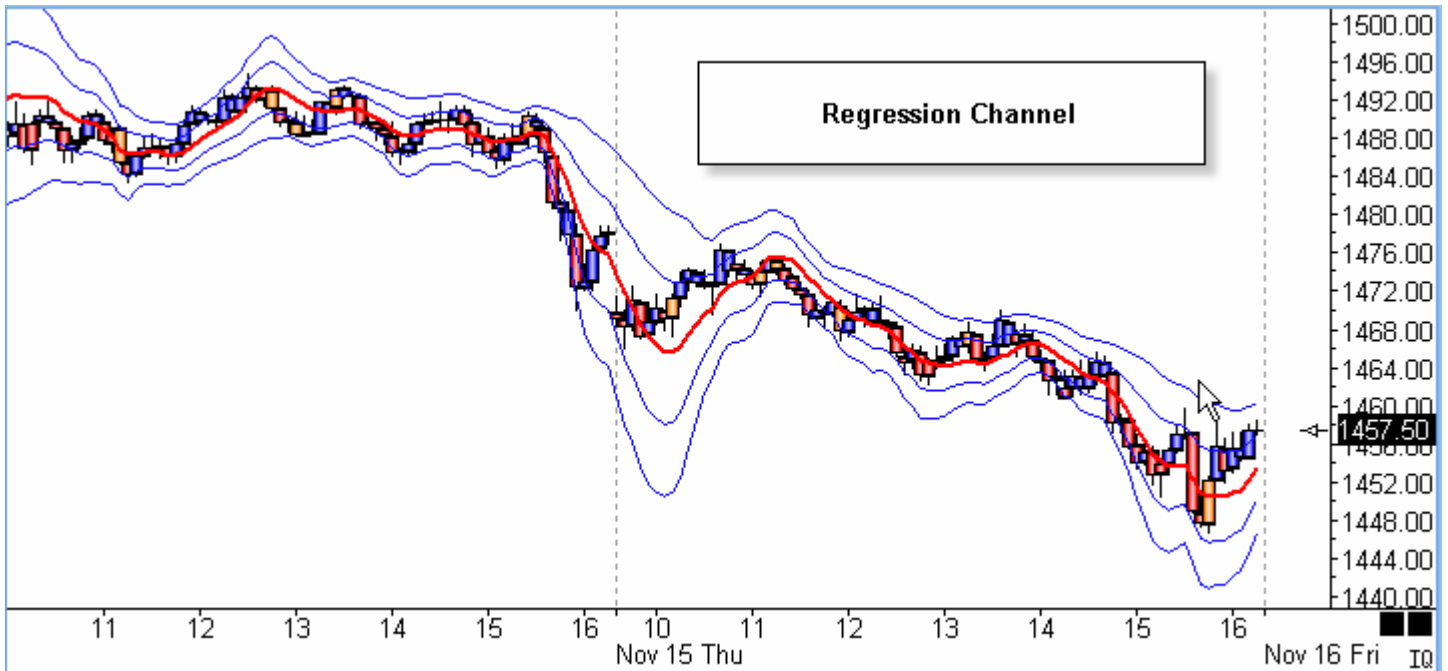# Regression Channel

The Regression Channel study calculates a regression point for each bar on the chart. The 'Least Squares' method is used to calculate the regression points. The regression points are connected and an optional channel is drawn on both sides of the regression line. The distance between the regression line and the channel lines can be a Percentage distance or a Standard Deviation distance. When the price penetrates the upper channel, the market will often continue in that direction. When the price penetrates the lower channel, the market will often continue in that direction. A move outside the bands calls for a continuation of the current trend. If the channel lines are not visible on the chart, then decrease the 'Percent' parameter entered. The channels will be drawn off the top and bottom of the chart if the Percent Parameter is too large for the chart time frame and price scale.

Properties

- **Percent** - Multiplied with the regression line to determine the channel distance. A value between .05 and 5 is normally used, depending on the chart time frame and price scale.

- **Bars** - Number of bars used in the regression line formula.

- **Plot % Band** - Place a check mark in the 'Plot % Band' check box to enable a %B Indicator. In this case, the 'Spread' study line will change to '% Band'. If you enable this Study Line then an indicator will be plotted that represents where the close price is in relation to the Upper and Lower Bands. For example, if the close is exactly in the middle of the Upper and Lower band range, then the %B Indicator will be 50.

- **2nd Band** - Place a check mark next to '2nd Band' to display a second band at twice the distance.
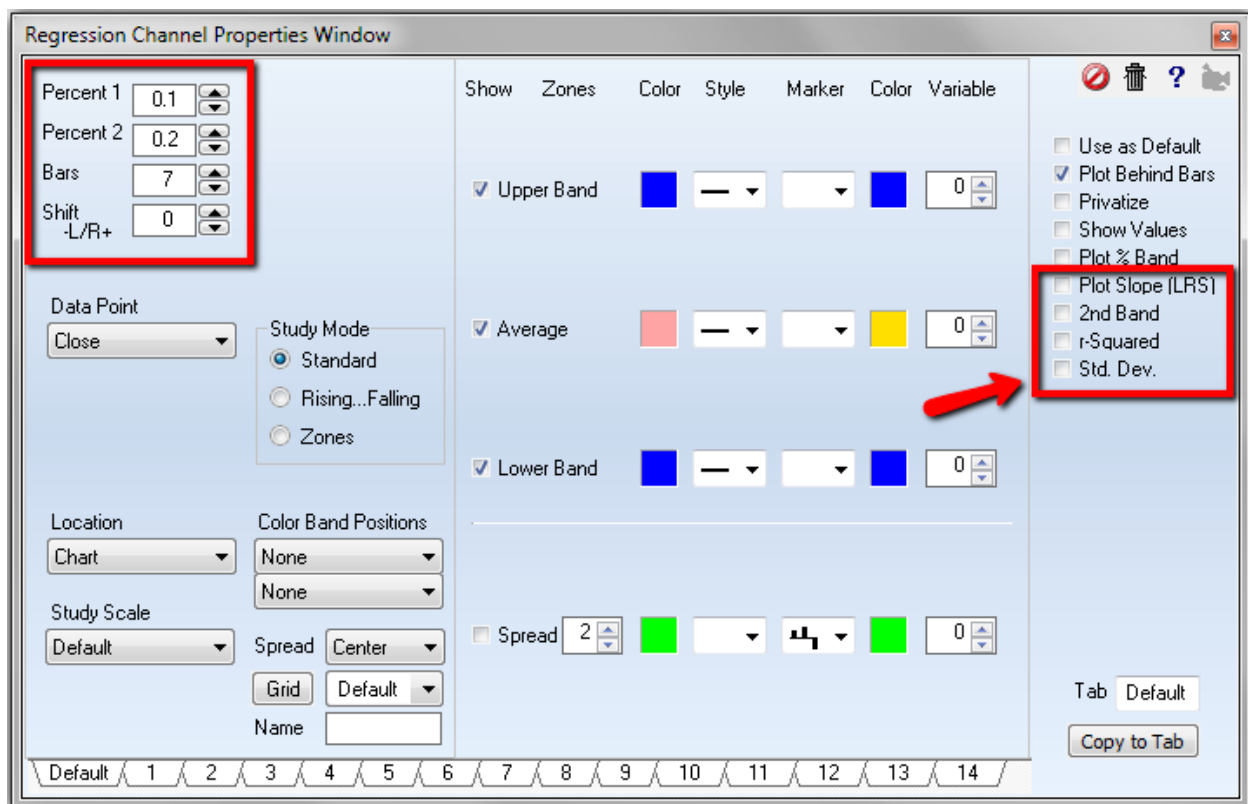
- **r-Squared** - Place a check mark next to 'r-Squared' to change the chart scale when the band exceeds range.

- **Plot Slope (LRS)** - Place a check mark in the 'Plot Slope (LRS)' box to plot the Linear Regression Slope instead of the actual Regression lines.

- **Standard Dev** - Place a check mark in the 'Std. Dev.' box to calculate the distance between the Regression line and the Channel lines based on the Standard Deviation. For example, an entry of 2 in the 'Multiplier' parameter box will draw channel lines at a distance of 2 Standard Deviations from the regression line.

Formula

The regression line uses the least squares method to calculate a data point for each bar.

N = Number of bars in each sample
X = Bar Index from 1 to N
Y = Data Point price at Bar(X)

Slope = $(N * Sum(X*Y) - Sum(X)*Sum(Y)) / (N*Sum(X^2) - Sum(X)^2)$

Regression Price = (Sum(Y) - slope * Sum(X)) / N

Upper Channel = Regression price + (Current Data Point Price * Percent entry)
Lower Channel = Regression price - (Current Data Point Price * Percent entry)

Linear Regression and r-Squared

The following example was created by applying three Linear Regression Channel studies to the chart, and configuring them as shown below in the images of the property forms. This illustrates the flexibility of this one study.
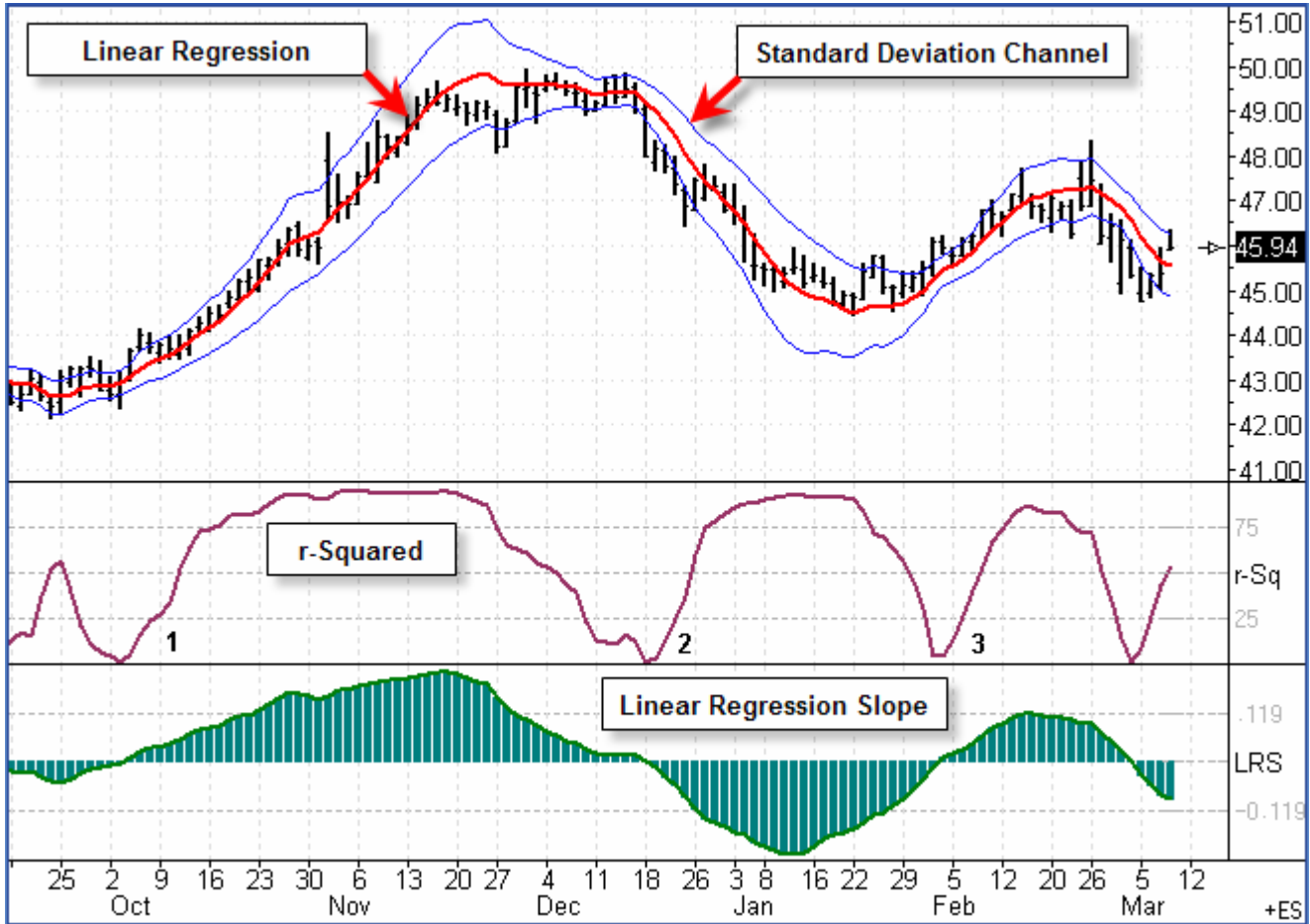
R-Squared is a measure of association between the linear regression and the underlying data. It identifies how closely the regression line matches the price movement. The higher the r-squared value, the greater the correlation with the trending price. Though r-squared is a value between zero and 1.0, it is rescaled in Ensign to plot on a percent scale from 0..100 to be similar to the Stochastic and the Relative Strength Index scaling.

A rising r-squared indicates the price is trending. A declining r-squared indicates the trend is weakening, or non-trending. Note the rising r-squared at points 1, 2 and 3, when the market began to trend, and the subsequent decay in r-squared when the top or bottom was formed by the market moving sideways.

Linear Regression Slope (LRS) is the 1st derivative of the Linear Regression Indicator. It can be used show the direction of the Linear Regression Indicator. LRS remains above the zero line during strong price climbs, and below zero during strong price declines. During sideways movements, the LRS remains near the zero line.

Regression Channel Properties Window

Percent 1 — 2
Percent 2 — 20
Bars — 7
Shift -L/R+ — 0

Data Point: Close

Study Mode
- ◉ Standard
- ○ Rising...Falling
- ○ Zones

Location: Sub Window 4
Study Scale: Default

Color Band Positions: None / None
Spread: Center
Grid: Default
Name:

Show | Zones | Color | Style | Marker | Color | Variable
- ☐ Upper Band — blue — ——▾ — ▾ — blue — 0
- ☑ Average — purple — ——▾ — ▾ — yellow — 0
- ☐ Lower Band — blue — ——▾ — ▾ — blue — 0

- ☐ Use as Default
- ☐ Plot Behind Bars
- ☐ Privatize
- ☐ Show Values
- ☐ Plot % Band
- ☐ Plot Slope (LRS)
- ☐ 2nd Band
- ☑ r-Squared
- ☐ Std. Dev.

Labels:
Location: None
Font Size: 10
Tab: Default
Copy to Tab

These parameters create the r-Squared plot

Tabs: Default 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Regression Channel Properties Window

Percent 1 — 2
Percent 2 — 20
Bars — 7
Shift -L/R+ — 0

Data Point: Close

Study Mode
- ◉ Standard
- ○ Rising...Falling
- ○ Zones

Location: Sub Window 5
Study Scale: Default

Color Band Positions: None / None
Spread: Center
Grid: 1
Name:

Show | Zones | Color | Style | Marker | Color | Variable
- ☐ Upper Band — blue — ——▾ — ▾ — blue — 0
- ☑ Average — green — ——▾ — ▪▾ — teal — 0
- ☐ Lower Band — blue — ——▾ — ▾ — blue — 0

- ☐ Use as Default
- ☐ Plot Behind Bars
- ☐ Privatize
- ☐ Show Values
- ☐ Plot % Band
- ☑ Plot Slope (LRS)
- ☐ 2nd Band
- ☐ r-Squared
- ☐ Std. Dev.

Labels:
Font Size: 10
Tab: Default
Copy to Tab

These parameters create the LRS plot

Tabs: Default 1 2 3 4 5 6 7 8 9 10 11 12 13 14