Calculating Statistical Significance of Trend Slopes

Calculation Method

The measure used is the coefficient of the slope of the regression line for the time period. This coefficient is derived using the least squares method from rates for each year and then compared to zero using the student's T test. If the t value is less than a T table value at the ninety five per cent level for the degrees of freedom, then the slope is considered to be zero and the coefficient is set to zero. Degrees of freedom is the number of years minus two. The zero value sets all non-significant coefficients between the increasing and decreasing values and with equal weight.

Why are single-year rates used instead of multi-year rates?

Multi-year rates are not used in the regression calculation due to the artificial reduction in the variance of the data points. 1,000 Monte Carlo random number simulations on a regression model using multi-year rates produces significant trends **almost 30%** of the time. This means we can only be about 70% confident that statistically significant trends calculated using multi-year rates are actually significant. The same Monte Carlo simulations run on single-year data produce significant trends **less than 5%** of the time. This allows us to say that these trends are significant at the 95% level.