**Linear Time Trend:** A trend that is a linear function of time.

**Linear Unbiased Estimator:** In multiple regression analysis, an unbiased estimator that is a linear function of the outcomes on the dependent variable.

**Linearly Independent Vectors:** A set of vectors such that no vector can be written as a linear combination of the others in the set.

**Log Function:** A mathematical function, defined only for strictly positive arguments, with a positive but decreasing slope.

**Logarithmic Function:** A mathematical function defined for positive arguments that has a positive, but diminishing, slope.

**Logit Model:** A model for binary response where the response probability is the logit function evaluated at a linear function of the explanatory variables.

**Log-Level Model:** A regression model where the dependent variable is in logarithmic form and the independent variables are in level (or original) form.

**Log-Likelihood Function:** The sum of the log-likelihoods, where the log-likelihood for each observation is the log of the density of the dependent variable given the explanatory variables; the log-likelihood function is viewed as a function of the parameters to be estimated.

**Log-Log Model:** A regression model where the dependent variable and (at least some of) the explanatory variables are in logarithmic form.

**Longitudinal Data:** *See* panel data.

**Long-Run Elasticity:** The long-run propensity in a distributed lag model with the dependent and independent variables in logarithmic form; thus, the long-run elasticity is the eventual percentage increase in the explained variable, given a permanent 1% increase in the explanatory variable.

**Long-Run Multiplier:** *See* long-run propensity.

**Long-Run Propensity (LRP):** In a distributed lag model, the eventual change in the dependent variable given a permanent, one-unit increase in the independent variable.

**Loss Function:** A function that measures the loss when a forecast differs from the actual outcome; the most common examples are absolute value loss and squared loss.

## M

**Marginal Effect:** The effect on the dependent variable that results from changing an independent variable by a small amount.

**Martingale:** A time series process whose expected value, given all past outcomes on the series, simply equals the most recent value.

**Martingale Difference Sequence:** The first difference of a martingale. It is unpredictable (or has a zero mean), given past values of the sequence.

**Matched Pair Sample:** A sample where each observation is matched with another, as in a sample consisting of a husband and wife or a set of two siblings.

**Matrix:** An array of numbers.

**Matrix Multiplication:** An algorithm for multiplying together two conformable matrices.

**Matrix Notation:** A convenient mathematical notation, grounded in matrix algebra, for expressing and manipulating the multiple regression model.

**Maximum Likelihood Estimation (MLE):** A broadly applicable estimation method where the parameter estimates are chosen to maximize the log-likelihood function.

**Maximum Likelihood Estimator:** An estimator that maximizes the (log of the) likelihood function.

**Mean:** *See* expected value.

**Mean Absolute Error (MAE):** A performance measure in forecasting, computed as the average of the absolute values of the forecast errors.

**Mean Independent:** The key requirement in multiple regression analysis, which says the unobserved error has a mean that does not change across subsets of the population defined by different values of the explanatory variables.

**Mean Squared Error (MSE):** The expected squared distance that an estimator is from the population value; it equals the variance plus the square of any bias.

**Measurement Error:** The difference between an observed variable and the variable that belongs in a multiple regression equation.

**Median:** In a probability distribution, it is the value where there is a 50% chance of being below the value and a 50% chance of being above it. In a sample of numbers, it is the middle value after the numbers have been ordered.

**Method of Moments Estimator:** An estimator obtained by using the sample analog of population moments; ordinary least squares and two stage least squares are both method of moments estimators.

**Micronumerosity:** A term introduced by Arthur Goldberger to describe properties of econometric estimators with small sample sizes.

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