**Business Statistics**

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**Similarities and Differences Between Regression and T-Test.**

Linear regression tests the correlation between the predictor and response variable and the extent to which one variable affects the other (Oteri, 2022). Conversely, the T-Test is used to identify whether there is a significant difference amid means in the two groups and the extent to which they are related. Again, linear regression is utilized to predict the value of the variables in the continuous data samples. At the same time, the T-Test is used when the data set has a normal distribution with unknown distribution (Oteri, 2022). the similarity between linear regression and the T-Test is that both permit for direct calculation of estimates between the variables used and the confidence intervals during hypothesis testing.

**Transforming Variables as A Way of Improving the Regression Model**

Transformation of variables in linear regression is used to achieve specific goals such as ensuring linearity, attaining normality, or stabilizing the variance. The modified variables must frequently be used instead of the original variables when fitting a linear regression model. This is a typical practice. The need to transform the linear regressions arises when the original variable or model regarding the original variable fails to fulfill one or more assumptions of linear regression. Model linearity is the most violated assumption, which calls for improved transformation for the linear regression. Therefore, linear regression can be improved through a polynomial, log, or square root transformation (Bowerman, O'Connell, & Murphree, 2016). The transformations ensure that the model coefficients in the regression are more interpretable and enhance the generalizability of the linear regression. Also, it ensures that all the assumptions are met for better outcomes.

**Distinguish Between Correlation and Causality**

Correlation means a statistical relationship exists between the variables and changing one variable does not directly mean changing the other variable within the regression model. In contrast, causation shows that changing one variable directly means changing the other variable. This means the variables have a cause-and-effect association (Verma & Pearl, 2022). Since correlation in regression models frequently has high levels of external validity, one can extrapolate the results to actual environments. However, occasionally the limited internal validity of the model makes it challenging to establish a link between changes within one variable and those in the other. For the casual, controlled tests in a regression model is the only way to show that two variables are causally related accurately. To establish causation in one path within a given period, the test evaluates the standard estimate, known as the hypothesis (Verma & Pearl, 2022). Since the tests have a great level of internal validity, the cause-and-effect association can be proven with some degree of certainty.

**Is The Presence of a Physical Bank Branch Creating the Demand for Checking Accounts?**

The presence of a physical bank branchwould significantly create demand for checking accounts from customers. This is because the accounts allow the customers to easily access their money in different ways at a low cost. Also, checking accounts allows potential and eligible credit borrowers locally residing within the area to acquire loans at a low-interest rate, lowering the default rate. This makes more customers to be attracted to checking accounts. Also, with these accounts, the customer can easily exchange their currencies depending on the country they are traveling to. Therefore, if Nils Baker’s bank creates a checking account, it is possible to attract more customers and increase their profit margin.

**References**

Bowerman, B. L., O'Connell, R. T., & Murphree, E. S. (2016). *Business Statistics in Practice: Using Data, Modeling, and Analytics*. McGraw-Hill Higher Education.

Oteir, A. (2022). Inferential Statistics: T-Tests, Regression Analysis and Adjustments (Mediation Versus Moderation). *Introducing, Designing and Conducting Research for Paramedics*, p. 124.

Verma, T. S., & Pearl, J. (2022). Equivalence and synthesis of causal models. In *Probabilistic and Causal Inference: The Works of Judea Pearl* (pp. 221–236).