Relationship between assets utilization and corporate profitability: A case study of food and beverage industry quoted on the Nigerian stock exchange

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This study examined the relationship between assets utilization and corporate efficiency: A case study of food and beverage industry on the Nigerian Stock Exchange. No matter the different of industry, scale, management mechanism and management level should have their own assets structure because without assets production cannot take place. The general objective of this study is to find out the relationship between assets utilization and corporate efficiency. In addition, six other objectives are to be achieved by the study. The population of the study is made up of all the firms in food and beverage industry quoted on the Nigerian stock Exchange. Stratified sampling method was used to select the sample selected. Out of 21 companies two-third of the company was selected for study. The study adopted ex-post facto research design method. Secondary data collected from the financial statement of the sampled companies from 2007-2011 using STATA12 to analyzed the data. Multiple regression was used to determine the magnitude and statistics of the coefficient of the independent variables using this model ROA=α+β1(DRTOS)+β2(INVTO)+β3(DEPASSET)+β4(DEPSALES)+β5(SALESPPLANT)+β6(PLANTASSET)+ε. The result of hypotheses showed that only hypothesis one which says that there is no significant relationship between return on asset and debtors' turnover was accepted.

Keywords: Assets utilization, corporate efficiency, returns on assets, management, production.

INTRODUCTION

Production is a function of sales. Hence what to be produced will be determined by what the marketing department can effectively pass to third party. This is why budget of every company starts with sales budget. The production department will now decide whether it is fully equipped to meet the target of the marketing department, and if not what equipments will be needed to meet the sales budget. The fixed capital needs of a manufacturing concern would vary with the scale of production, usually, the larger the scale, the heavier would be the investment in fixed assets. Therefore, the success of any enterprise is tied to its ability to manage and leverage its assets. Hefty sales and profits can hide any number of inefficiencies. By examining several relationships between sales and assets, asset utilization delivers a reasonably detailed picture of how well a company is being managed and led—certainly enough to call attention both to sources of trouble and to role-model operations.

Asset utilization is particularly useful to companies considering expansion or capital investment if production can be increased by improving the efficiency of existing resources, there is no need to spend the sums expansion would cost.
Statement of the problem

The main objective of a business organization is maximization of profit which will lead to maximization of shareholders wealth. However, there may be conflict between a firm’s competing objectives. For instance, the sales manager may want to have the highest growth possible, while the finance manager may want to maintain a certain credit rating to boost sales. As a result of growth in sales, production plan will be altered leading to procurement of more equipment to meet increase in sales. Higher sales growth could mean a wide variety of products is needed, which in turn calls for higher inventory. Higher inventory levels may mean less efficient use of assets (lower asset turnover). Hence, high growth may mean borrowing if this growth cannot be financed through fund generated from operation. More borrowing may mean a lower credit rating. This competing interest must be balanced to improve corporate efficiency through asset utilization.

Motivation (Gap) of the research

Corporate organization invested so much capital on acquisition of tangible assets as well as current assets to aid business execution and thereby generate revenue for the running of the business. To justify the enormous amount of money spent on these assets, the company must adequate return which is commensurate with the huge amount spent. Equally important there is no research on this topic in the literature addressing the issue of relationship between assets utilization and corporate efficiency using food and beverage industry sector of the companies quoted on the Nigerian Stock Exchange.

Objectives of the study

To be able to proffer solution to the problem enumerated above, the objectives of the study are divided into general objective and specific objective. The general objective of this study is to find out the relationship between assets utilization and corporate efficiency. The specific objectives on the other hands are to:

i. Examine the relationship between total assets turnover and debtor’s turnover.
ii. Examine the relationship between total assets turnover and inventory turnover.
iii. Examine the relationship between total assets turnover and depreciation/assets
iv. Examine the association between total assets turnover and depreciation/sales 
v. Examine the relationship between total assets turnover and sales/plant
vi. Examine the relationship between total assets turnover and plant/assets

Research questions

To achieve the above stated objectives the following questions are formulated

i. To what extent is the relationship between total assets turnover and debtors turnover?
ii. What is the relationship between total assets turnover and inventory turnover?
iii. What is the relationship between total assets turnover and depreciation/assets
iv. To what extent is the association between total assets turnover and depreciation/sales?
v. What extent is the relationship between total assets turnover and sales/plant?
vi. To what extent is the correlation between total assets turnover and plant/assets?

Statement of hypotheses

To realize the objectives of the study and provide answers to the questions raised above, the following hypotheses are formulated.

Hypothesis one

H₀₁: There is no significant relationship between total assets turnover and debtors turnover.
H₁₁: There is significant relationship between total assets turnover and debtors turnover.

Hypothesis two

H₀₂: There is no significant relationship between total assets turnover and stock turnover.
H₁₂: There is significant relationship between total assets turnover and stock turnover.

Hypothesis three

H₀₃: There is no significant association between total assets turnover and depreciation/assets.
H₁₃: There is significant association between total assets turnover and depreciation/assets.

Hypothesis four

H₀₄: There is no significant relationship between total assets turnover and plant/assets.
assets turnover and depreciation/sales.

**Hypothesis five**

H₀₅: There is no significant association between total assets turnover and depreciation to sales.

H₁₅: There is significant association between total assets turnover and sales/plant

**Hypothesis six**

H₀₆: There is no significant relationship between total assets turnover and plant/assets.

H₁₆: There is significant relationship between total assets turnover and sales/plant

**Rationale for the hypotheses**

Assets utilization ratios provide a measure of management effectiveness. It serves as guide to critical factors as regards the use of the firm’s assets. Assets utilization ratios are especially important for internal monitoring regarding performance over a number of years. This serves as a warning signals or yard stick to draw meaningful conclusion concerning operational issues.

**Model specification**

The model formulated for this study is stated below:

\[ Y = \alpha + \beta_1(X_1) + \beta_2(X_2) + \beta_3(X_3) + \beta_4(X_4) + \beta_5(X_5) + \beta_6(X_6) + \varepsilon \]

Where:

- \( Y \) = Total assets turnover
- \( X_1 \) = Debtors turnover
- \( X_2 \) = Inventory turnover
- \( X_3 \) = Depreciation/assets
- \( X_4 \) = Depreciation/sales
- \( X_5 \) = Sales/plant
- \( X_6 \) = Plant/assets

**METHODOLOGY**

The research instrument many a time dictates the research design to be adopted. This study therefore adopted an ex-post facto (cause and effect) research. This method is justified because events to be investigated had taken place and financial data for transactions are already in existence. In this instance, the independent variable or variables have already occurred, the study would start with the observation of dependent variable or variables. Independent variable or variables are then studied in retrospect for their possible relation to and effects on the dependent variable or variables. This method had been adopted in many previous research work (Dong and Su, 2010; Karaduman et al., 2011; Padachi, 2006; Uyar, 2009, and Wang, 2002).

Ex-post facto research was adopted to explain the relationship between variables. This method was adopted in this study as it is found appropriate for the purpose of achieving the research objectives of the study. Since the data input and the study exhibited the following characteristics:

a. The study depended grossly on secondary data collected from the annual report and account of companies under food and beverages industry.
<table>
<thead>
<tr>
<th>Name of author</th>
<th>Year</th>
<th>Title of the study</th>
<th>Methodology</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Okwo, I. M., Ugwunta D.O. and Nweze, A.U.</td>
<td>2012</td>
<td>Investment in fixed assets and firm profitability: Evidence from the Nigerian brewery industry</td>
<td>A cross sectional data was gathered from the annual report of the sampled brewery firms for a period of 1995-2009</td>
<td>Regression analysis was used to ascertain the relationship between level of investment in fixed assets and its impact on the operating profit. It was found that the relationship is positive but the result is not statistically significant. Therefore, the result did not suggest any strong positive impact of investment in fixed assets on the operating profit of brewery firms in Nigeria.</td>
</tr>
<tr>
<td>ZhengSheng, Xu and NuoZhi, Xu</td>
<td>2013</td>
<td>The research of the optimal allocation of assets structure and business performance</td>
<td>The paper used secondary data through the financial statement of the sample company.</td>
<td>The finding showed statistically significant relationship between assets structure and business performance.</td>
</tr>
<tr>
<td>Sayeed, M. A. and Hogue, M.S.</td>
<td>2009</td>
<td>Impact of assets and liability management on profitability: A study of public vs private commercial bank in Bangladesh.</td>
<td>Secondary method of data collection was used through published accounts and reports of the company concerned,</td>
<td>The result showed that the use of total income, the dependent variable for private and public banks showed evidence that all of the assets have significant contribution to total income of the private banks. Too, six of eleven independent variables have significant impact on total income to assets ratio of public sector banks.</td>
</tr>
<tr>
<td>Paradogonas, T.A.</td>
<td>2007</td>
<td>The financial performance of large and small firms: Evidence from Greece.</td>
<td>Secondary method of data collection was used. Data were collected from the financial statement of the sampled firms for 1995-1999. The analysis used regression models performed on a longitudinal sample of 3035 firms.</td>
<td>The finding reveals that size, managerial efficiency, debt structure, investment in fixed assets and sales affect significantly a firm’s profitability.</td>
</tr>
</tbody>
</table>
| Adelegen, O. J.         | 2008 | Tax investment and Q: Evidence from firm and industry level data in Nigeria.        | The study revealed that adjusted cash flow, debt shield and cost of capital have significant positive effects on investment, while at the same time marginal tax rates and interest expenses have significant effects on a firm’s fixed investment. | b. The study is non experimental and it investigated causal relationship between the relevant variables of the study.  
|                         |      |                                                                                     | c. The study also considered whether one or more pre-existing conditions could possibly have caused subsequent differences in group of subjects. |
d. Also the researcher attempted to discover whether differences between groups of the variables have resulted in an observed difference in the dependent variables.

**Population and sampling method**

The statistical population of the research is composed of firms in food and beverages industry listed in the Nigerian Stock Exchange. The statistical sample of this research has been selected using stratified sampling method. According to publication of the Nigerian Stock Exchange of 2012, there are 21 companies listed in the Nigerian Stock Exchange under food and beverages industry. It is distributed as follows: Beverages- Breweries/Distillers=7, Beverages- Non-Alcoholic=1, Food Product=11, Food Product-Diversified=2, making a total of 21 companies. Two-third of the population is selected using proportional sampling method coupled with simple random sampling method. The number selected is arrived at as follows: Beverages-Breweries/Distillers ⅔×7 = 4.6≈5, Beverages- Non-Alcoholic ⅔×1=0.67≈1, Food Product⅔×11=7.33≈7, Food Product- Diversified ⅔×2=1.33≈1. Therefore, the total number of data worked upon is 14×5=70.

The data utilized in this study is secondary extracted from the financial statements of the selected companies (Owolabi and Obida, 2012. The methodical reasons for using secondary data are as follows: Secondary data, if reliable and accurate, provides opportunity for replication. The availability of data over time enables the researcher to employ longitudinal research designs. It improves measurement by expanding the scope of independent variables employed in the operationalization of concepts. Finally, secondary data can be used for triangulation, that is increasing the validity of research findings obtained with primary data (Frankfort-Nachmias and Nachmias, 2009). On economic reason, it is cheaper to use existing data rather than to collect new data.

**Data analysis and interpretation**

The data is analyzed using multiple regression analysis. After this, the hypotheses were tested using STATA12.

**Multiple regression analysis**

**Parameter estimates**

**Coefficient**

These are the values of the regression equation for predicting the dependent variable from the independent variables. ROA= α + β₁ (DRTO) + β₂ (INVTO) + β₃ (DEPASSET) + β₄ (DEPSALES) + β₅ (SALESPLANT) + β₆ (PLANTASSET) + ε. The column for estimates provides the values for β₀, β₁, β₂, β₃, β₄, β₅ and β₆ as shown in this equation.

ROA=29.4995+β₁(.4149541)+β₂(-.1780128)+β₃(61.45258)+β₄(27.25945)+β₅(-123.6307)+β₆(-3.79724)+ε.

This is discussed under the following:

**Magnitude (the size of the effect)**

DRTO- The coefficient is .4149541. Therefore, for every unit increase in DRTO, a corresponding .4149541 in ROA is predicted holding all other variables constant. This showed that debtor turnover is positively correlated with return on asset.

INVTO- For every unit increase in INVTO, it is expected that a -.1780128 unit decrease in ROA, holding all other variables constant and vice versa.

DEPASSET-The coefficient for DEPASSET is 61.45258. So, for every unit increase in DEPASSET, it is expected that an approximately 61.45 point increase in ROA, holding all other variables constant.

DEPSALES-The coefficient for DEPSALES is 27.25945. So, for every unit increase in DEPSALES an approximately corresponding increase of 27.25945 in ROA is expected holding all other variables constant.

SALESPLANT-The coefficient is -123.6307. Therefore, for every unit decrease in SALESPLANT, a -123.6307 unit increase in ROA is expected holding all other variables constant.

PLANTASSET-The coefficient is -13.79724. This means that for every unit decrease in PLANTASSET, a -13.79724 unit increase in ROA is expected and vice versa, all other things being equal.

**Significance**

This is the statistical significance of the estimated coefficient. Significance is typically measured by t-statistic or p-value in the regression. These are the columns ‘t’ and ‘p>|t|’.

The t-statistic is used in testing whether a given coefficient is significantly different from zero. On the other hand p>|t| shows the 2-tailed p-value used in testing the null hypothesis that the coefficient (parameter) is 0.

Using an alpha of 0.05 the coefficient of DRTO which is .4149541 is significantly different from 0, because its p-value is 0.000, which is smaller than 0.05.

The coefficient for INTO (-.1780128) is not statistically significantly different from 0, because its p-value is larger than 0.05 that is (0.130).

The coefficient for DEPASSET (61.45258) is not sta-
Table 2. Multiple regression

```
. regress ROA DRTO INVTO DEPASSET DEPSALES SALEPLANT PLANTASSET
```

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>603.550661</td>
<td>6</td>
<td>100.591777</td>
<td>F( 6, 18) = 22.06</td>
</tr>
<tr>
<td>Residual</td>
<td>82.0735417</td>
<td>18</td>
<td>4.55964121</td>
<td>Prob &gt; F = 0.0000</td>
</tr>
<tr>
<td>Total</td>
<td>685.624203</td>
<td>24</td>
<td>28.5676751</td>
<td>R-squared = 0.8803</td>
</tr>
</tbody>
</table>

| Adj R-squared | 0.8404 | Root MSE = 2.1353 |

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| Adj R-squared | 0.8404 | Root MSE = 2.1353 |

### Table 3. Testing of hypothesis 1

Two-sample t test with unequal variances

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Err.</th>
<th>Std. Dev.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>25</td>
<td>20.8652</td>
<td>1.068975</td>
<td>5.344874</td>
<td>18.65894 - 23.07146</td>
</tr>
<tr>
<td>combined</td>
<td>50</td>
<td>20.299</td>
<td>1.237669</td>
<td>8.751641</td>
<td>17.81181 - 22.78619</td>
</tr>
</tbody>
</table>

| diff     | 1.1324 | 2.495643 | -3.937901 | 6.202701 |

| diff = mean(ROA) - mean(DRTO) | t = 0.4538 |
| Ho: diff = 0 | Satterthwaite's degrees of freedom = 34.2671 |
| Ha: diff < 0 | Pr(T < t) = 0.6736 |
| Ha: diff /= 0 | Pr(|T| > |t|) = 0.6529 |
| Ha: diff > 0 | Pr(T > t) = 0.3264 |

Source: Processed data

H₁: diff < 0 Pr(|T|>|t|)=0.6736
H₂: diff /= 0 Pr(|T|>|t|)=0.6529
H₃: diff > 0 Pr(|T|>|t|)=0.3264

Hypotheses testing

The value being tested is \( \text{diff} = \text{mean(ROA)} - \text{mean(DRTO)} \), that is the difference in the means of dependent variable (ROA) and independent variable. This is the test used to evaluate the hypothesis. It is the ratio of the mean to the standard error of the difference of the two groups. Satterthwaite’s degree of freedom is an alternative way to calculate the degree of freedom that takes into account that the variances are assumed to be unequal. It is more conservative approach than using the traditional degrees of freedom. This is the degrees of freedom under this calculation.

\[ \Pr(|T|>|t|) \] - This is the two-tailed p-value computed using the t distribution. It is the probability of observing a greater absolute value of ‘t’ under the null hypothesis. If p-value is less than the pre-specified alpha level usually 0.05 or 0.10 it is concluded that the difference in means

```
tastically significantly different from 0, because its p-value is larger than 0.05 that is (0.078).
The coefficient of DEPSALE (27.25945) is not statistically significantly different from 0, because its p-value is less than 0.05 that is 0.647.
The coefficient for SALEPLANT (-123.6307) is statistically significantly different from 0, because its p-value is less than 0.05 that is 0.029.
The coefficient for PLANTASSETS (-13.79724) is not statistically significantly different from 0, because its p-value is greater than 0.05 that is 0.057.

The value being tested is \( \text{diff} = \text{mean(ROA)} - \text{mean(DRTO)} \), that is the difference in the means of dependent variable (ROA) and independent variable. This is the test used to evaluate the hypothesis. It is the ratio of the mean to the standard error of the difference of the two groups. Satterthwaite’s degree of freedom is an alternative way to calculate the degree of freedom that takes into account that the variances are assumed to be unequal. It is more conservative approach than using the traditional degrees of freedom. This is the degrees of freedom under this calculation.

\[ \Pr(|T|>|t|) \] - This is the two-tailed p-value computed using the t distribution. It is the probability of observing a greater absolute value of ‘t’ under the null hypothesis. If p-value is less than the pre-specified alpha level usually 0.05 or 0.10 it is concluded that the difference in means
Table 4. Testing of hypothesis Two

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Err.</th>
<th>Std. Dev.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>25</td>
<td>20.8652</td>
<td>1.068975</td>
<td>5.344874</td>
<td>18.65894 - 23.07146</td>
</tr>
<tr>
<td>INVTO</td>
<td>25</td>
<td>33.3616</td>
<td>0.9698709</td>
<td>4.849354</td>
<td>31.35989 - 35.36332</td>
</tr>
<tr>
<td>combined</td>
<td>50</td>
<td>27.1134</td>
<td>1.143217</td>
<td>8.083763</td>
<td>24.81602 - 29.41078</td>
</tr>
<tr>
<td>diff</td>
<td></td>
<td>-12.4964</td>
<td>1.443384</td>
<td>-15.39922</td>
<td>-9.593577</td>
</tr>
</tbody>
</table>

\[ \text{diff} = \text{mean(ROA)} - \text{mean(INVTO)} \]

Source: Processed data

\[ H_0: \text{diff} = 0 \quad \text{Pr}(|T|<t) = 0.0000 \]
\[ H_1: \text{diff} \neq 0 \quad \text{Pr}(|T|>|t|) = 0.0000 \]
\[ H_1: \text{diff} > 0 \quad \text{Pr}(T>t) = 1.0000 \]

is statistically significantly different from zero, therefore the null hypotheses is rejected.

\[ \text{Pr}(T<t), \text{Pr}(|T|>|t|) \text{- These are the one-tailed p-value for the alternative hypotheses(difference < 0 and difference > 0), respectively. As usual if p-value is less than the pre-specified alpha level usually 0.05 or 0.10, it is concluded that the mean is statistically significantly greater or less than zero. The decision rule is stated below:} \]

\[ \text{Diff} = \text{mean(ROA)} - \text{mean(INVTO)} \]

Table 5. Testing of hypothesis three

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Err.</th>
<th>Std. Dev.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>25</td>
<td>20.8652</td>
<td>1.068975</td>
<td>5.344874</td>
<td>18.65894 - 23.07146</td>
</tr>
<tr>
<td>DEPASSET</td>
<td>25</td>
<td>.0472</td>
<td>.0033921</td>
<td>.0169607</td>
<td>.040199 - .054201</td>
</tr>
<tr>
<td>combined</td>
<td>50</td>
<td>10.4562</td>
<td>1.578296</td>
<td>11.16024</td>
<td>7.28495 - 13.6279</td>
</tr>
<tr>
<td>diff</td>
<td></td>
<td>20.818</td>
<td>1.06898</td>
<td>18.61174</td>
<td>23.02426</td>
</tr>
</tbody>
</table>

\[ \text{diff} = \text{mean(ROA)} - \text{mean(DEPASSET)} \]

Source: Processed data

\[ H_0: \text{diff} = 0 \quad \text{Pr}(T<t) = 1.0000 \]
\[ H_1: \text{diff} \neq 0 \quad \text{Pr}(|T|>|t|) = 0.0000 \]
\[ H_1: \text{diff} > 0 \quad \text{Pr}(T>t) = 0.0000 \]

Since the p-value for the alternative of interest equal 0.6529 which is greater than 0.05 or 0.10, the null hypothesis is accepted which says that there is no significant relationship between total assets turnover and debtors turnover, the alternative hypothesis is therefore
rejected. Although this is contrary to expectation, the goodwill of the company as regards the quality of its product may make the customer to be indifferent to the credit policy of the companies.

The relationship between return on asset (ROA) and inventory turnover (INVTO) is tested based on the 2 sided p-value of 0.0000 which is lower than 0.05 or 0.10, the null hypothesis is therefore rejected which states that there is no significant relationship between total assets turnover and stock turnover. This means that there is significant relationship between return on asset and inventory turnover. The higher this number the better.

From the decision rule above, since the p-value for the alternative hypothesis equals 0.0000 which is less than 0.05 or 0.10, the null hypothesis is rejected. This means that there is significant relationship between return on asset and depreciation asset ratio. This measures the percentage of assets being depreciated to gauge how quickly product plants are aging and assets are being consumed.
From the decision rule above, since the p-value for the alternative hypothesis equals 0.0000 which is less than 0.05 or 0.10, the null hypothesis is rejected. This means that there is significant relationship between return on asset and depreciation sales ratio. This measures the percentage of sales that is tied up covering the wear and tear of the physical plant.

The p-value for the alternative hypothesis equals 0.0000 which is less than 0.05, the null hypothesis is therefore rejected. This measures how effectively a company uses its investment in fixed assets to generate sales.

This expresses the percentage of total assets that is tied up in land, buildings and equipment. This hypothesis is to test whether or not there is significant relationship between return on asset and plant asset ratio. From the decision rule above, because the p-value for the alternative hypothesis equals 0.0000 which is less than 0.05, therefore the null hypothesis is rejected while the alternative hypothesis is upheld.

CONCLUSION

An asset is an economic resource controlled by the specified entity and assets structure is to allocate the resource diversely. Assets management is very crucial in the management of manufacturing outfit. The production pattern which is a function of demand for the product will dictate what type of assets that are needed to produce the product needed by the customers. The study set out to achieve six objectives. To achieve these objectives, six questions were raised which culminates into formulation of six hypotheses to answer the question raised and to achieve the stated objectives. Asset utilization is particularly useful to companies considering expansion or capital investment. If production can be increased by improving the efficiency of existing resources, then there is no need to spend the sums expansion would cost.

REFERENCES


**Table 8. Testing of hypothesis six**

<table>
<thead>
<tr>
<th>Source: Processed data</th>
</tr>
</thead>
<tbody>
<tr>
<td>H\textsubscript{1}: diff &lt; 0  Pr (</td>
</tr>
<tr>
<td>H\textsubscript{0}: diff = 0   Satterthwaite's degrees of freedom = 24.0086</td>
</tr>
<tr>
<td>H\textsubscript{1}: diff != 0  Pr (</td>
</tr>
<tr>
<td>H\textsubscript{1}: diff &gt; 0   Pr (T &gt; t) = 0.0000</td>
</tr>
</tbody>
</table>

\[ t = \frac{\text{diff}}{\text{std. err.}} \]

\[ \text{std. err.} = \frac{\text{std. dev.}}{\sqrt{n}} \]

\[ |t| = |t| \]

\[ |t| > |t| = 0.0000 \]

\[ Pr(T < t) = 1.0000 \]

\[ Pr(|T| > |t|) = 0.0000 \]

\[ Pr(T > t) = 0.0000 \]