Females

Have Higher Early Life Earnings Expectations Than

Males

Our Team

Two students investigated this proposition:

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Methods

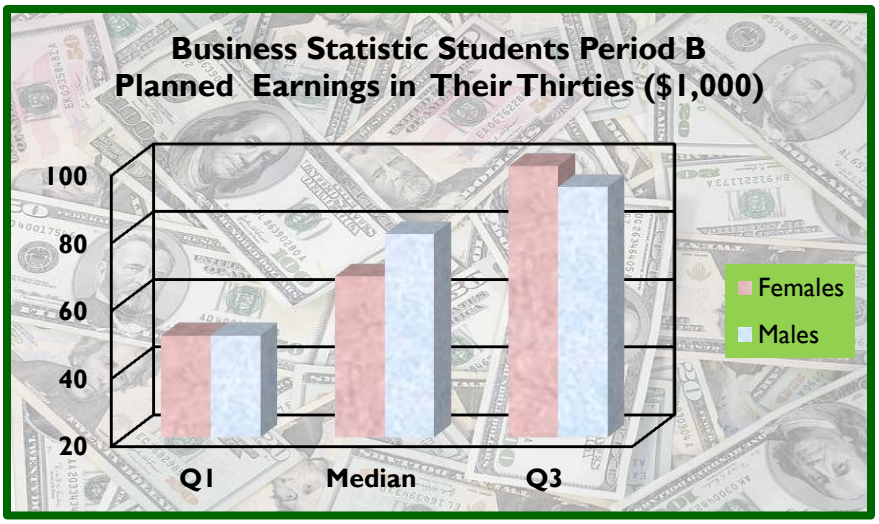
The data was gathered in a student survey administered to all Business Statistics students in the first week of the fall semester. Students completed the surveys at home, and were given assignment credit for their participation. No student was marked down for not answering individual questions. Our team used Excel's single variable data analysis functions and graphic displays to examine the data for patterns and relationships that would be most relevant to assessing the proposition. In the detailed distribution comparisons, hand-written parallel box plots were prepared to meet the remaining assignment requirements.

After completing our initial review of the data, we narrowed our investigations to the following two questions.

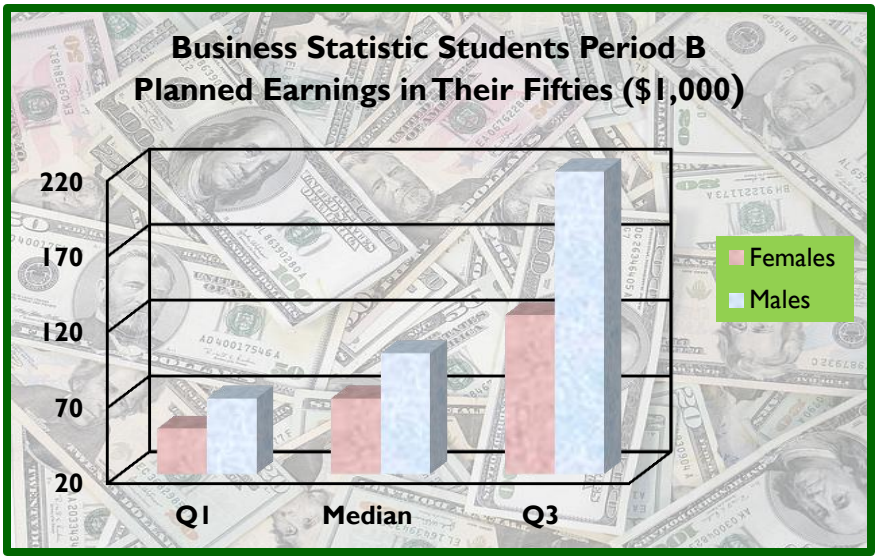
- #1 Did period B female business statistic students project higher planned earnings in their thirties than period B male business statistic students?
- #2 Did period B female business statistic students project higher planned earnings in their fifties than period B male business statistic students?

Summary of Findings

Question #1: Examination of planned earnings in their thirties for period B Business Statistic students reveals that the first quartile value of females was essentially the same as the first quartile value of males; the median value for males was $12,500 higher than the median value for females; and the third quartile value for females was $6,250 higher than the third quartile value for males.



Question #2: Examination of planned earnings in their fifties for period B Business Statistic students reveals that the first quartile value of males was $20,000 higher than the first quartile value of females; the median value for males was $30,000 higher than the median value for females; and the third quartile value for males was $100,000 higher than the third quartile value for females.



Conclusion

Based on these specific findings, we conclude the proposition is partially supported. Female students have higher earnings expectations for their early adult years, but male students project higher earnings expectations for their middle age years.

Detailed Findings

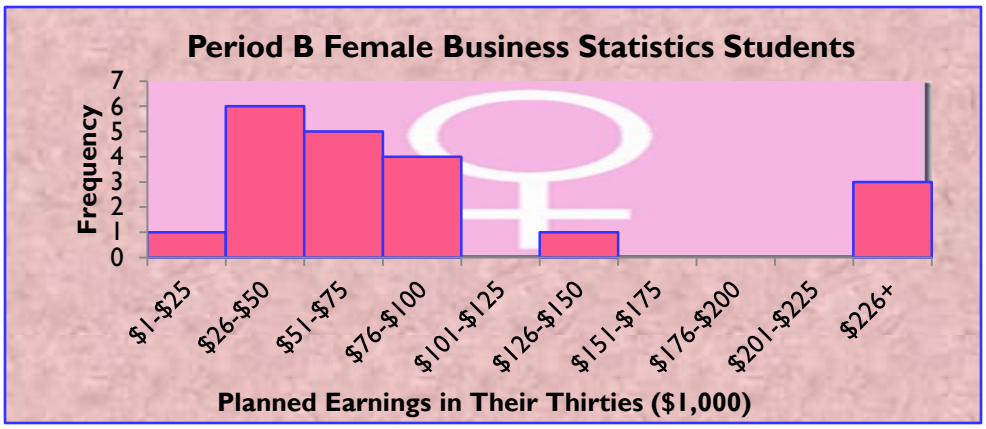
The report has been organized as follows:

Description of Distribution:

Comparison of Distributions:

Population: Period B Female Business Statistics Students

Variable: Planned Earnings in Their Thirties Type: Quantitative, Ratio, Continuous



Shape

A histogram was examined to determine the shape of the distribution. The histogram was displayed using a bin width of 30 ($1,000s) increments.

This plot was found to be **uni**modal and highly skew right.

The Fisher skew statistic was **3.15**. This statistic fell outside the computed range of **- 1.09 to + 1.09** indicating that the distribution's shape is highly skew right.

Center

Mean = **190.25** ($1,000s), Median = **67.5**($1,000s), Mode = **50** ($1,000s)

The best measure of central tendency is the median because the distribution is skewed. This skew right shape causes the mean to be nearly greater than the median.

Spread

Range = **1,490** (1,000s), IQR =**50**($1,000s), σ = **362.32** ($1,000s)

The best measure of spread is the range and interquartile range because the distribution is skewed.

Outliers

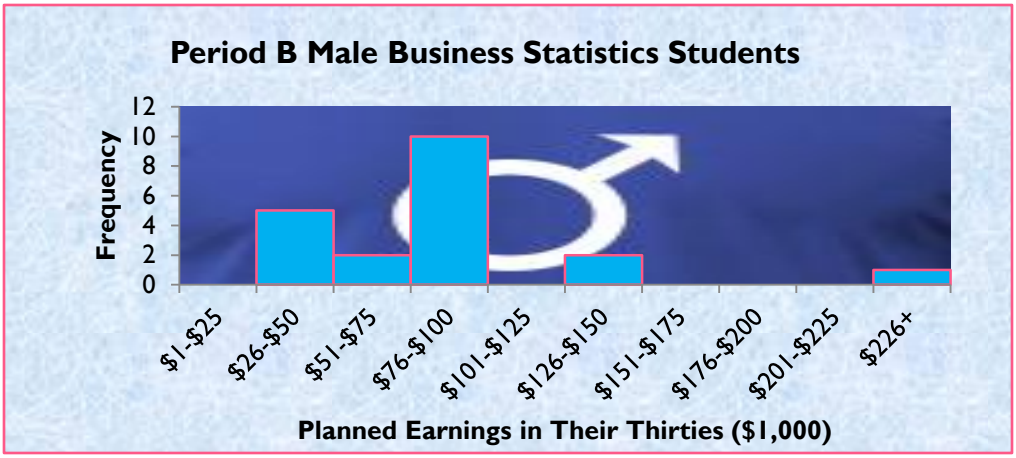
IQR Method: Adding 1.5 times the IQR to the third quartile value of **100** ($1,000s) results in an upper outlier threshold of **175** ($1,000s). Subtracting 1.5 times the IQR from the first quartile value of **50** ($1,000s), results in a lower outlier threshold of **-25** ($1,000s) .Examination of the data found three outliers that exceeded these thresholds, $250,000 $900,000 $1,500,000.

Standard Deviation (σ) Method: Adding and subtracting three standard deviations from the mean of **190.25** ($1,000s), establishes an upper outlier threshold of **1,277.21** ($1,000s) and a lower threshold of **-896.71** ($1,000s). Examination of the data found one outlier that exceeded these thresholds, $1,500,000.

The best measure of outliers is the IQR Method because the distribution is skewed.

Population: Period B Male Business Statistics Students

Variable: Planned Earnings in Their Thirties Type: Quantitative, Ratio, Continuous



Shape A histogram was examined to determine the shape of the distribution. The histogram was displayed using a bin width of 30 ($1,000s) increments.

This plot was found to be **uni**modal and highly skew right.

The Fisher skew statistic was **1.95**. This statistic fell outside the computed range of **- 1.09 to + 1.09** indicating that the distribution's shape is highly skew right.

Center Mean = **89.7** ($1,000s), Median = **80** ($1,000s), Mode = **80** ($1,000s)

The best measure of central tendency is the median because the distribution is skewed. This skew right shape causes the mean to be nearly greater than the median.

Spread Range = **218** ($1,000s), IQR =**35** ($1,000s), $\sigma =$ **49.17** ($1,000s)

The best measure of spread is the range and interquartile range because the distribution is skewed.

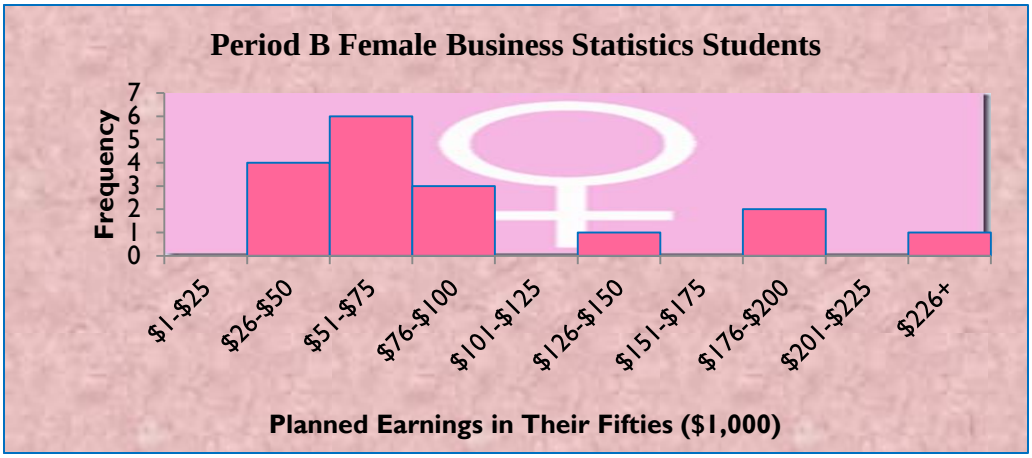
Outliers IQR Method: Adding 1.5 times the IQR to the third quartile value of **100** ($1,000s) results in an upper outlier threshold of **152.5** ($1,000s). Subtracting 1.5 times the IQR from the first quartile value of **65** ($1,000s), results in a lower outlier threshold of **12.5** ($1,000s) .Examination of the data found 1 outlier that exceeded these thresholds, $250,000.

Standard Deviation (σ) Method: Adding and subtracting three standard deviations from the mean of **89.7** ($1,000s), establishes an upper outlier threshold of **237.21**($1,000s) and a lower threshold of **-57.81** ($1,000s). Examination of the data found one outlier that exceeded these thresholds, $250,000. .

The best measure of outliers is the IQR Method because the distribution is skewed.

Population: Period B Female Business Statistics Students

Variable: Planned Earnings in Their Fifties Type: Quantitative, Ratio, Continuous



Shape A histogram was examined to determine the shape of the distribution. The histogram was displayed using a bin width of 25 ($1,000s) increments.

This plot was found to be **uni**modal and highly skew right.

The Fisher skew statistic was **3.63**. This statistic fell outside the computed range of **- .1.2 to + 1.2** indicating that the distribution's shape is highly skew right.

Center Mean = **129.1** ($1,000s), Median = **70** ($1,000s), Mode =**50** ($1,000)

The best measure of central tendency is the median because the distribution is skewed. This skew right shape causes the mean to be nearly greater than the median.

Spread Range = **750** ($1,000), IQR = **75** ($1,000s), $\sigma =$ **179.8**($1,000s)

The best measure of spread is the range and interquartile range because the distribution is skewed.

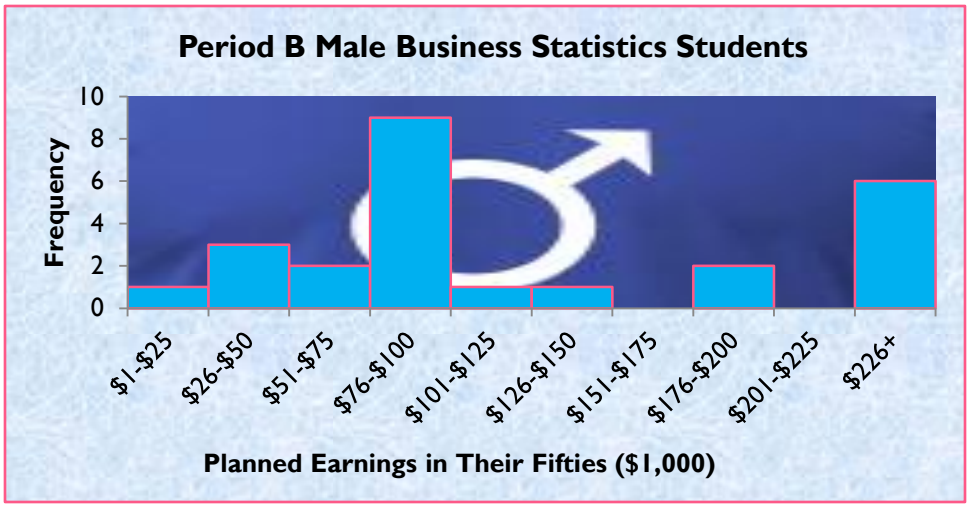
Outliers IQR Method: Adding 1.5 times the IQR to the third quartile value of **125** ($1,000s) results in an upper outlier threshold of **237** ($1,000s). Subtracting 1.5 times the IQR from the first quartile value of **50** ($1,000s) results in a lower outlier threshold of **-62.5** ($1,000s). Examination of the data found 1 outlier that exceeded these thresholds, $800,000.

Standard Deviation (σ) Method: Adding and subtracting three standard deviations from the mean of **129.1** ($1,000s) establishes an upper outlier threshold of **668.6** ($1,000s) and a lower threshold of **-410.3**($1,000s). Examination of the data found one outliers that exceeded these thresholds, $800,000.

The best measure of outliers is the IQR Method because the distribution is skewed.

Population: Period B Male Business Statistics Students

Variable: Planned Earnings in Their Fifties Type: Quantitative, Ratio, Continuous



Shape A histogram was examined to determine the shape of the distribution. The histogram was displayed using a bin width of 25 ($1,000s) increments.

All of these plots were found to be **uni**modal and highly skew right.

The Fisher skew statistic was **4.9**. This statistic fell outside the computed range of **- .97 to + .97** indicating that the distribution's shape is highly skew right.

Center Mean = **352.8** ($1,000s), Median = **100** ($1,000s), Mode = **100** ($1,000s)

The best measure of central tendency is the median because the distribution is skewed. This skew right shape causes the mean to be nearly greater than the median.

Spread Range =**4,800** ($1,000s), IQR =**155** ($1,000s), σ = **947**($1,000s)

The best measure of spread is the range and interquartile range because the distribution is skewed.

Outliers IQR Method: Adding 1.5 times the IQR to the third quartile value of **225**($1,000s) results in an upper outlier threshold of **457.5** ($1,000s). Subtracting 1.5 times the IQR from the first quartile value of **70** ($1,000s) results in a lower outlier threshold of **-162.5** ($1,000s). Examination of the data found two outliers that exceeded these thresholds, $4,800,000, and $1,000,000,000.

Standard Deviation (σ) Method: Adding and subtracting three standard deviations from the mean of **40,312,800**($1,000s) establishes an upper outlier threshold of **640,123,897** ($1,000s) and a lower threshold of **-559,498,297**($1,000s). Examination of the data found one outlier that exceeded these thresholds, $1,000,000,000.

The best measure of outliers is the IQR Method because the distribution is skewed.

Variable: Planned Earnings in Their Thirties in the population of Period B Female Business Statistics Students

Variable: Planned Earnings in Their Thirties in the population of Period B Male Business Statistic Students

	Female	Male	Comparison
Shape	highly skew right	highly skew right	The distributions have the same shape.
Center	Mean = **190.25** ($1,000) Median = **67.5** ($1,000)	Mean = **89.7** ($1,000) Median = **80** ($1,000)	Since both distributions are skewed, the best measure for comparing central tendencies is the median. The center of the distribution for Female Planned Earnings in their thirties is about 12.85 units lower than the distribution for Male Planned Earnings in their thirties.
Spread	Range = 1,490 ($1,000) IQR = 50 ($1,000) 362.32 ($1,000)	Range = 218 ($1,000) IQR = 35 ($1,000) 49.17 ($1,000)	Since both distributions are skewed, the best measure for comparing spread is the range and interquartile range. Examination of these statistics shows both distributions have similar spreads.
Outliers	$250,000 $900,000 $1,500,000 using the IQR Method	$250,000 using the IQR Method	The distribution for Female Planned Earnings in their thirties has 3 outliers while the distribution for Male Planned Earnings in their thirties has 1 outlier

Variable: Planned Earnings in Their Fifties in the population of Period B Female Business Statistics Students

Variable: Planned Earnings in Their Fifties in the population of Period B Male Business Statistic Students

	Female	Male	Comparison
Shape	highly skew right	highly skew right	The distributions have the same shape.
Center	Mean =129 ($1,000s) Median =70 ($1,000s)	Mean = 352.8 ($1,000s) Median =100 ($1000s)	Since both distributions are skewed, the best measure for comparing central tendencies is the median. The center of the distribution for females is about 30,000 units lower than the distribution for males.
Spread	Range =750 ($1,000s) IQR =75 ($1,000s) 179.8 ($1,000s)	Range = 4,800 ($1,000s) IQR =155 ($1,000s) 947 ($1,000s)	Since both distributions are skewed, the best measure for comparing spread is the range and interquartile range. Examination of these statistics shows the distribution for males has more spread than the distribution for females.
Outliers	$150,000, $200,000, $200,000, $800,000 using the IQR Method, Standard Deviation Method	$4,800,000, $1,000,000,000 using the IQR Method, Standard Deviation Method	The distribution for females has 4 outliers, while the distribution for males has 2 outliers.