

# SCM 651: BUSINESS ANALYTICS

Week 7

Business Analytics

# AGENDA

- Overview of homework #3 (Regression and Optimization)
- Overview of homework #4 (Logit, Probit, Neural networks: info in week 9 videos)
- Review of hands-on exercises
- Group discussion of articles
  - Big Data in Health Care: Using Analytics to Identify and Manage High-Risk and High-Cost Patients
  - A Review of Analytics and Clinical Informatics in Health Care

# HOMEWORK #4

1. Logit and probit analysis (see week 9)
2. Moderating effects (week 7)
3. Final logit & probit models with interaction effects (moderating effects), prediction of outcome, sensitivity analysis
4. Neural network analysis
5. Neural network prediction model and sensitivity analysis (new material in handout in week 9)

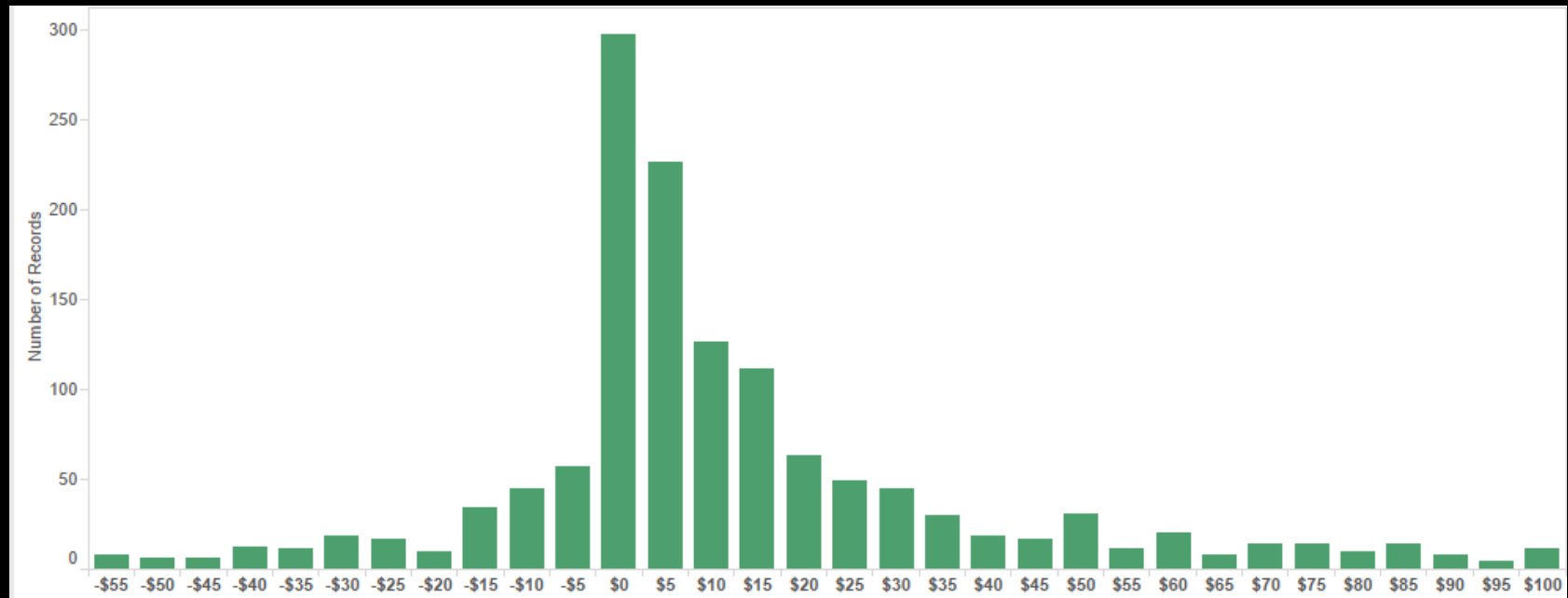
# WEEK 7 - REVIEW

- Statistical summaries
  - Replicates capability seen in Excel: minimum, average, median maximum
  - Also can calculate by brand or other category
- Correlation
  - Positive correlation means when one variable increases, the other increases
  - Negative correlation means when one variable increases, the other decreases
  - Correlation does not measure the magnitude of the change

# WEEK 7 - REVIEW

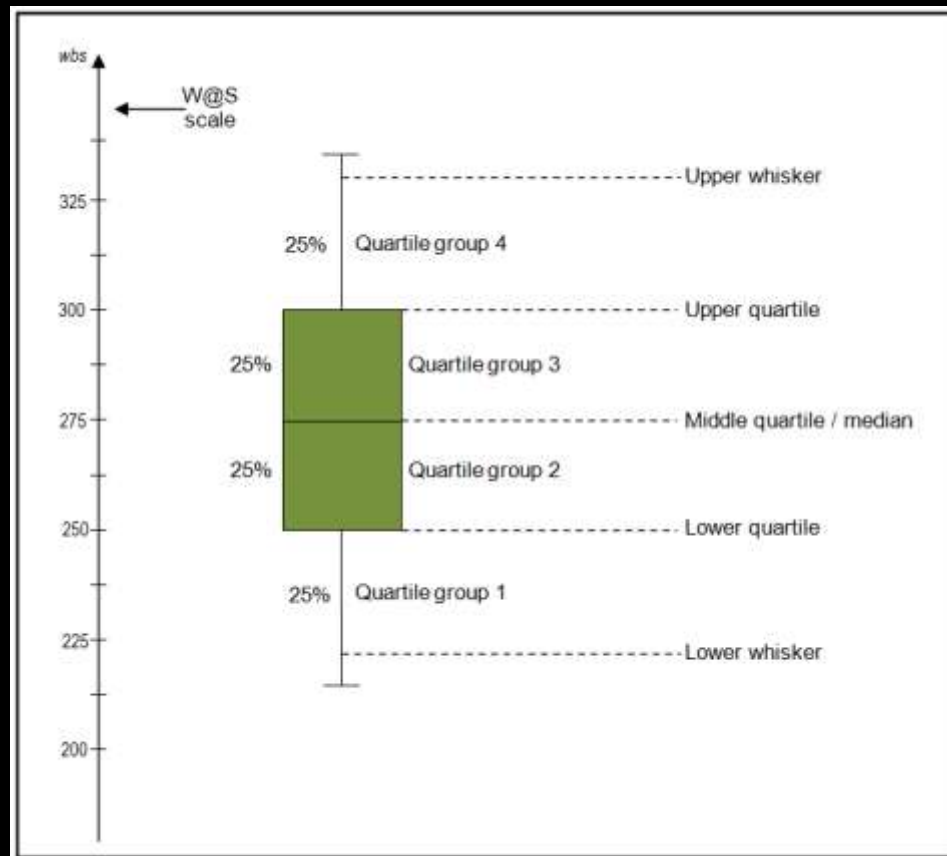
- ANOVA (Analysis of Variance)
  - Compares the means of two populations
- Regression
  - Linear regression in Excel is similar to multivariate regression in R
- One Measure?

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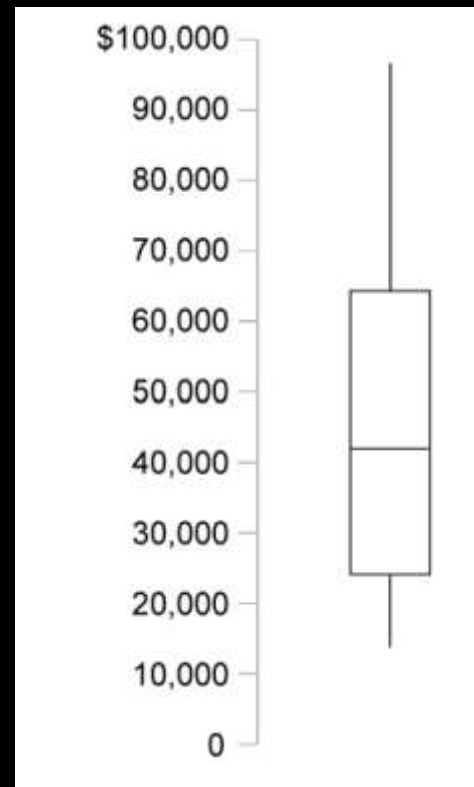


Profit

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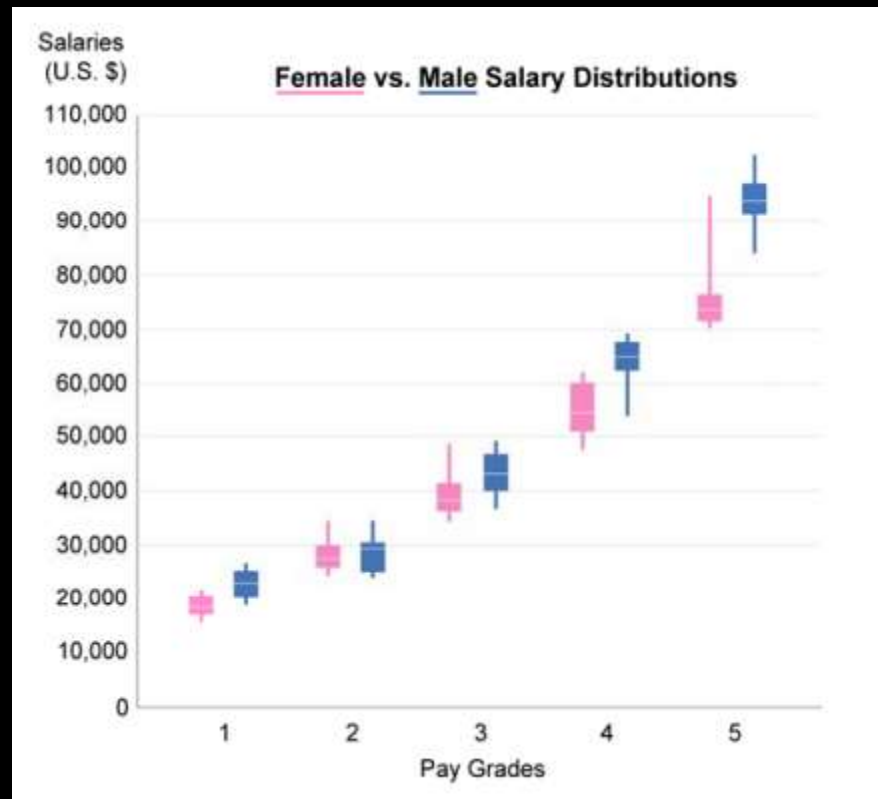


# DISTRIBUTION





# MULTIPLE DISTRIBUTION



# WEEK 7 - REVIEW

- Histograms, Boxplots, and other charts
  - Boxplots show minimum, 25%-ile, median, 75%-ile, maximum
  - Histograms show frequency of data within intervals
  - Scatterplots add trend line, average, standard deviation
- Statistical summaries
  - Replicates capability seen in Excel: minimum, average, median maximum
  - Also can calculate by brand or other category

# WEEK 7 - REVIEW

- Dummy variables
  - Dummy variables are used to measure the differences in intercepts between two groups, for example, different brands
- Moderating effects (interaction term  $x_1 * x_2$ )
  - Moderating effects (interaction effects) measures the difference in slope between two groups

# ARTICLE #1: BIG DATA IN HEALTH CARE

- Big Data in Health Care: Using Analytics to Identify and Manage High-Risk and High-Cost Patients
  - What are the six opportunities to reduce costs through analytics?
  - How can cost be reduced in each

# ARTICLE #1: BIG DATA IN HEALTH CARE

- Big Data in Health Care: Using Analytics to Identify and Manage High-Risk and High-Cost Patients
  - What are the six opportunities to reduce costs through analytics?
    - High cost patients
    - Readmissions
    - Triage
    - Decomensation
    - Adverse events
    - Diseases affecting multiple organs
  - How can cost be reduced in each

# ARTICLE #2: A REVIEW OF ANALYTICS IN CLINICAL INFORMATICS IN HEALTH CARE

- A Review of Analytics and Clinical Informatics in Health Care
  - What are some methods for improvement in health care using analytics (page 2)
  - What are some challenges for analytics in health care (page 4)

# ARTICLE #2: A REVIEW OF ANALYTICS IN CLINICAL INFORMATICS IN HEALTH CARE

- A Review of Analytics and Clinical Informatics in Health Care
  - What are some methods for improvement in health care using analytics (page 2)
    - Identify patients of greatest risk: early detection in neo-natal care
    - Wearable monitors: disease prevention through monitoring
    - Costs savings and resolution of billing anomalies: revenue leakage
    - Better manage resource allocation: patient's length of stay
  - What are some challenges for analytics in health care (page 4)
    - Garbage in, garbage out
    - Increased demand for professionals well versed in analytics and medicine

# HOMEWORK #3



GRAPH, REGRESSION,  
CALCULATED SALES,  
REVENUE, PROFIT



CONSTRAINED  
OPTIMIZATION



DISCUSSION OF RISKS,  
OTHER DATA WHICH  
WOULD BE VALUABLE