

STATISTICAL REPORT

EXAMPLE ONE

STATISTICAL ANALYST WRITER

I am working for the Spring Mills Company, and my boss, Sharon Sanders, has asked me to report on the account receivable problem our company currently experiencing. My task is to describe data on our customers, analyze the magnitude of interest lost because of late payments from our customers and suggest a solution for remedying the problem. Mrs. Sanders knows basic statistics but she might need a refresh on the meaning of boxplots.

**SPRING MILLS COMPANY
ZANESVILLE, OHIO**

**To: Sharon Sanders
From: Chris Albright
Subject: Report on accounts receivable
Date: July 6, 1999**

Executive summary

Our company produces and distributes a wide variety of manufactured goods. Due to this variety, we have a large number of customers. We have classified our customers as small, medium, or large, depending on the amount of business they do with us. Recently, we have had problems with accounts receivable. We are not getting paid as promptly as we would like, and we sense that it is costing our company a good deal of money in potential interest. You assigned me to investigate the magnitude of the problem and to suggest a strategy for fixing it. This report discusses my findings.

Data set

I collected data on 280 customer accounts. The breakdown by size is: 150 small customers, 100 medium customers, and 30 large customers. For each account, my data set includes the number of days since the customer was originally billed (Days) and the amount the customer currently owes (Amount). If necessary, we can identify any of these accounts by name, although specific names will not appear in this report. However, my data and analysis are in the file Receive.xls. I have attached this file to my report in case you want to see further details.

Software

My analysis was performed entirely in Excel 97, using the well-known StatPro add-in where necessary.

Analysis

Given the objectives, I have broken down my analysis by customer size. Exhibit 1 shows summary statistics for the Days and Amount for each customer size. (Small, medium, and large are coded throughout as 1, 2, and 3. For example, Days1 refers to the Days variable for small customers.) We see, not surprisingly, that larger customers tend to owe larger amounts. The median amounts for small, medium, and large customers are \$250, \$470, and \$1395, and the mean amounts follow a similar pattern. In contrast, medium and large companies tend to delay payments about equally long (median days delayed about 19-20), whereas small companies tend to delay only about half this long. The standard deviations in this exhibit indicate some variation across companies of each size, although this variation is considerably smaller for the amounts owed by small companies.

Exhibit 1. Summary measures for different size customers

| <i>Summary measures for selected variables</i> | | | | | | | |
|--|----------|-----------|----------|-----------|---------|-----------|--|
| | Days1 | Amount1 | Days2 | Amount2 | Days3 | Amount3 | |
| Count | 150.000 | 150.000 | 100.000 | 100.000 | 30.000 | 30.000 | |
| Sum | 1470.000 | 38180.000 | 2055.000 | 48190.000 | 577.000 | 43630.000 | |
| Mean | 9.800 | 254.533 | 20.550 | 481.900 | 19.233 | 1454.333 | |
| Median | 10.000 | 250.000 | 20.000 | 470.000 | 19.000 | 1395.000 | |
| Standard deviation | 3.128 | 49.285 | 6.622 | 99.155 | 6.191 | 293.888 | |
| Minimum | 2.000 | 140.000 | 8.000 | 280.000 | 3.000 | 930.000 | |
| Maximum | 17.000 | 410.000 | 39.000 | 750.000 | 32.000 | 2220.000 | |

Graphical comparisons of these different size customers appear in Exhibits 2 and 3. Each of these shows side-by-side boxplots (the first of Days, the second of Amount) for easy visual comparison. (For any boxplot, recall that the box contains the middle 50% of the observations, the line and the dot inside the box represent the median and mean, and individual points outside the box represent extreme observations.) These boxplots graphically confirm the patterns we observed in Exhibit 1.

Exhibit 2. Boxplots of Days by different size customers

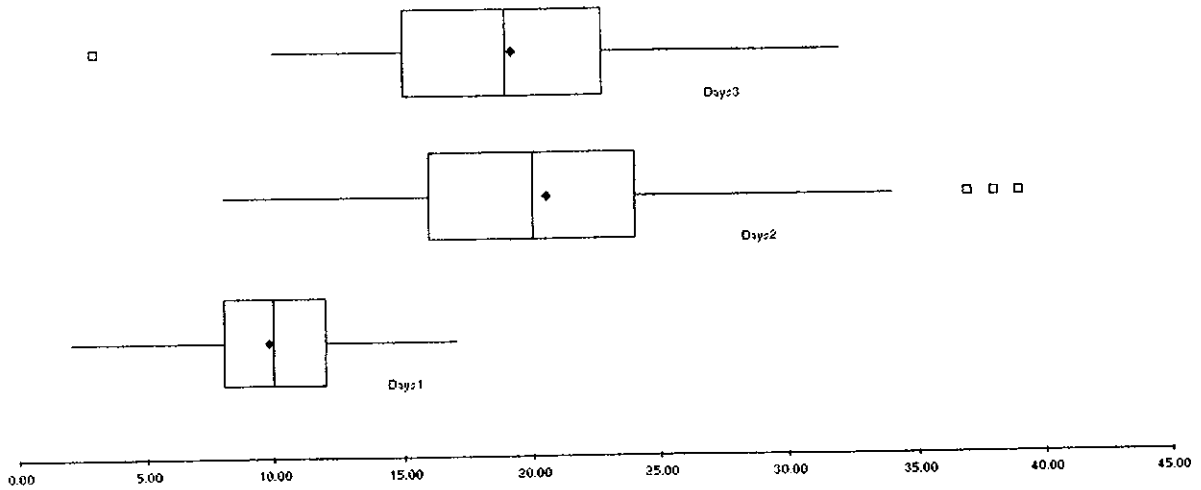
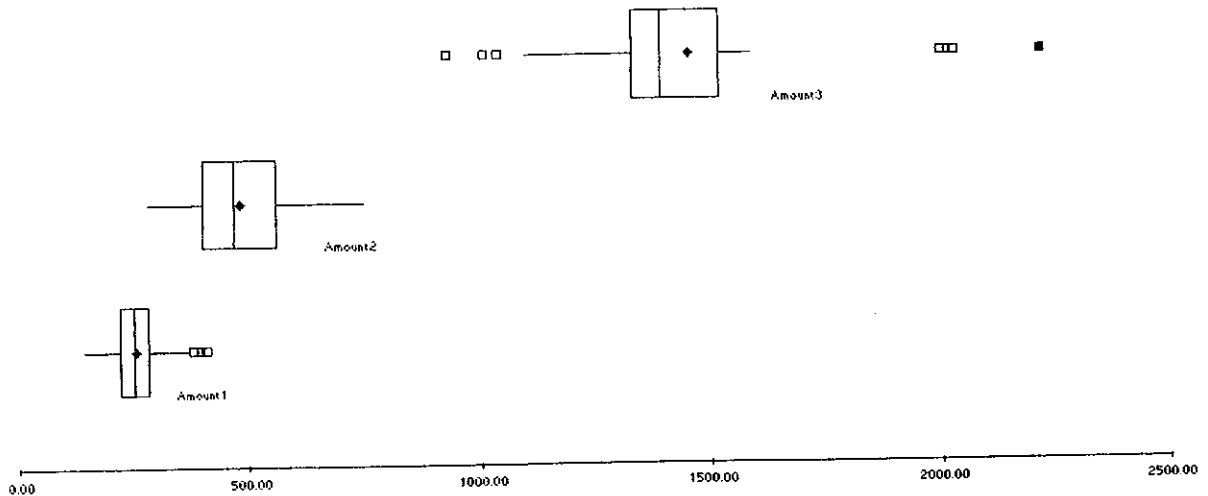
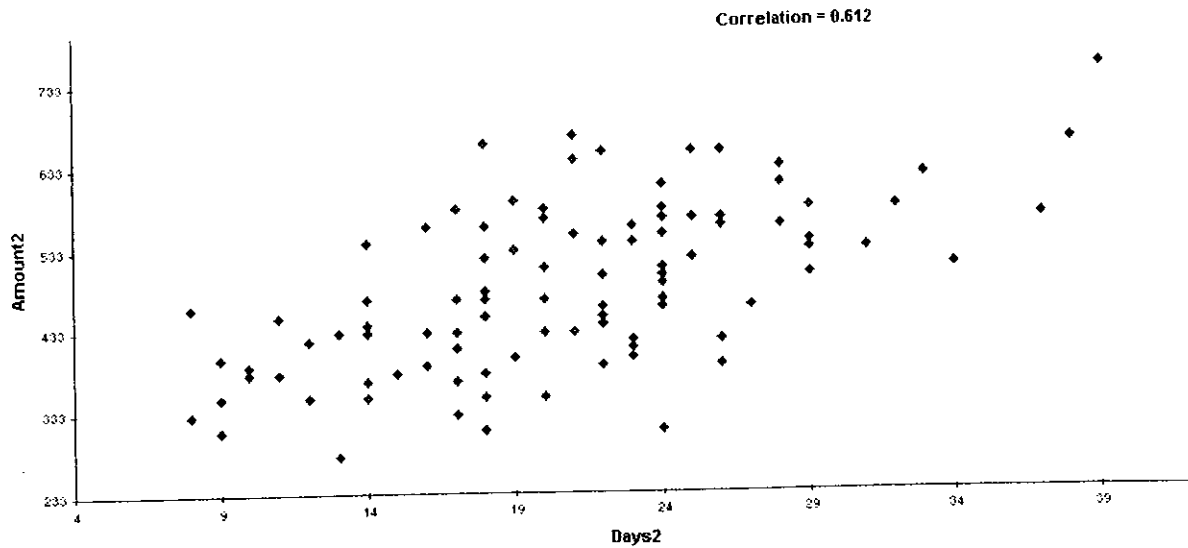


Exhibit 3. Boxplots of Amount by different size customers



Exhibits 1–3 describe the variables Days and Amount individually, but they do not indicate whether there is a relationship between them. Do our customers who owe large amounts tend to delay longer? To investigate this, I created scatterplots of Amount versus Days for each customer size. The scatterplot for small customers (not shown) indicates no relationship whatsoever; the correlation between Days and Amount is a negligible -0.044 . However, the scatterplots for medium and large customers both indicate a fairly strong positive relationship. The scatterplot for medium-size customers is shown in Exhibit 4. (The one for large customers is similar, but with many fewer points.) The correlation is a hefty 0.612 , and the upward sloping (and reasonably linear) pattern is clear: The larger the delay, the larger the amount owed—or vice versa.

Exhibit 4. Scatterplot of Amount versus Days for medium customers



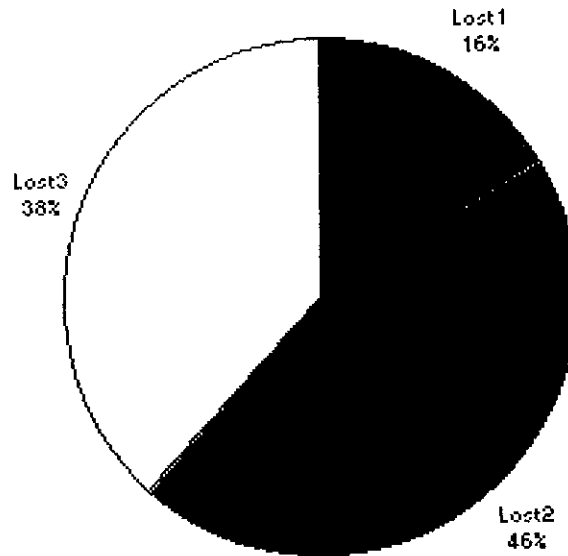
The analysis to this point describes our customer population, but it does not directly answer our main concerns: How much potential interest are we losing and what can we do about it? The analysis in Exhibit 5 and accompanying pie chart in Exhibit 6 address the first of these questions. To create Exhibit 5, I assumed that we can earn an annual rate of 12% on excess cash. Then for each customer, I calculated the interest lost by not having a payment made for a certain number of days. (These calculations are in rows 10 down; data are shown for only a few of the customers.) Then I summed these lost interest amounts to obtain the totals in row 5 and created a pie chart from the totals.

Exhibit 5.

| Interest lost | | | | | | | | | |
|---|----------|----------|----------|---------|--------|-------|---------|---------|--|
| Summary measures for selected variables | | | | | | | | | |
| | Lost1 | Lost2 | Lost3 | | | | | | |
| Sum | \$122.68 | \$338.65 | \$287.25 | | | | | | |
| Annual interest rate | 12% | | | | | | | | |
| Days1 | Amount1 | Lost1 | Days2 | Amount2 | Lost2 | Days3 | Amount3 | Lost3 | |
| 7 | \$180 | \$0.41 | 17 | \$470 | \$2.63 | 19 | \$1,330 | \$8.31 | |
| 8 | \$210 | \$0.55 | 22 | \$540 | \$3.91 | 20 | \$1,400 | \$9.21 | |
| 10 | \$210 | \$0.69 | 28 | \$560 | \$5.16 | 14 | \$1,550 | \$7.13 | |
| 8 | \$150 | \$0.39 | 24 | \$470 | \$3.71 | 15 | \$1,460 | \$7.20 | |
| 9 | \$300 | \$0.89 | 26 | \$650 | \$5.56 | 23 | \$2,030 | \$15.35 | |
| 5 | \$240 | \$0.39 | 29 | \$530 | \$5.05 | 19 | \$1,520 | \$9.49 | |
| 4 | \$330 | \$0.43 | 21 | \$550 | \$3.80 | 15 | \$1,330 | \$6.56 | |
| 10 | \$290 | \$0.95 | 33 | \$620 | \$6.73 | 17 | \$1,520 | \$8.50 | |

Exhibit 6.

Interest Lost by Customer Type



The message from the pie chart is fairly clear. We do not need to worry about our many small customers; the interest we are losing because of them is relatively small. However, we might want to put some pressure on the medium and large customers. I would suggest targeting the large customers first, especially those with large amounts due. There are fewer of them, so that we can concentrate our efforts more easily. Also, remember that amounts due and days delayed are positively correlated for the large customers. Therefore, the accounts with large amounts due are where we are losing the most potential interest.

Attachment: Receive.xls