1. Develop a regression model to predict the price of stock 1 based on the Dow Jones Industrial Average.

model and predict the harvest for 2016 given that the total rainfall was 6.45 inches. Critique your prediction.

1. Develop a regression model to predict the price of stock 2 based on the Dow Jones Industrial

|  |  |  |
| --- | --- | --- |
| **YEAR** | **RAIN (INCHES)** | **REAP (TONS)** |
| 2011 | 2.06 | 325 |
| 2012 | 5.11 | 408 |
| 2013 | 7.43 | 609 |
| 2014 | 6.12 | 512 |
| 2015 | 7.14 | 544 |

Average.

1. Which of the two stocks is most highly corre- lated to the Dow Jones Industrial Average over this time period?

4-33 Annual rainfall plays an important role in corn agri- culture. The drought of 2011 literally affected corn prices for years. Given the following data, build a

##### Case Study

North–South Airline

In January 2012, Northern Airlines merged with Southeast Air- lines to create the fourth largest U.S. carrier. The new North– South Airline inherited both an aging fleet of Boeing 727-300 aircraft and Stephen Ruth. Stephen was a tough former Secre- tary of the Navy who stepped in as new president and chairman of the board.

Stephen’s first concern in creating a financially solid com- pany was maintenance costs. It was commonly surmised in the airline industry that maintenance costs rise with the age of the aircraft. He quickly noticed that historically there had been a significant difference in the reported B727-300 maintenance costs (from ATA Form 41s) in both the airframe and the engine areas between Northern Airlines and Southeast Airlines, with Southeast having the newer fleet.

On February 12, 2012, Peg Jones, vice president for op- erations and maintenance, was called into Stephen’s office and asked to study the issue. Specifically, Stephen wanted to know whether the average fleet age was correlated to direct airframe maintenance costs and whether there was a relationship be- tween average fleet age and direct engine maintenance costs. Peg was to report back by February 26 with the answer, along with quantitative and graphical descriptions of the relationship.

Peg’s first step was to have her staff construct the average age of the Northern and Southeast B727-300 fleets, by quarter,

since the introduction of that aircraft to service by each airline in late 1993 and early 1994. The average age of each fleet was calculated by first multiplying the total number of calendar days each aircraft had been in service at the pertinent point in time by the average daily utilization of the respective fleet to determine the total fleet hours flown. The total fleet hours flown was then divided by the number of aircraft in service at that time, giving the age of the “average” aircraft in the fleet.

The average utilization was found by taking the actual total fleet hours flown on September 30, 2011, from Northern and Southeast data, and dividing by the total days in service for all aircraft at that time. The average utilization for Southeast was

8.3 hours per day, and the average utilization for Northern was

* 1. hours per day. Because the available cost data were calcu- lated for each yearly period ending at the end of the first quarter, average fleet age was calculated at the same points in time. The fleet data are shown in the following table. Airframe cost data and engine cost data are both shown paired with fleet average age in that table.

Discussion Questions

* + 1. Prepare Peg Jones’s response to Stephen Ruth.

**Note:** Dates and names of airlines and individuals have been changed in this case to maintain confidentiality. The data and issues described here are real.

north–south Airline Data for Boeing 727-300 Jets

|  |  |
| --- | --- |
| **YEAR** | **NORTHERN AIRLINES DATA** |
| **AIRFRAME ENGINE**  **COST PER COST PER AVERAGE AIRCRAFT ($) AIRCRAFT ($) AGE (HOURS)** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | |  | **SOUTHEAST AIRLINES DATA** | | |
|  |  |  |  |  | **AIRFRAME COST PER** | **ENGINE COST PER** | **AVERAGE** |
|  |  |  |  |  | **AIRCRAFT ($)** | **AIRCRAFT ($)** | **AGE (HOURS)** |
| 2001 | 51.80 | 43.49 | 6,512 |  | 13.29 | 18.86 | 5,107 |
| 2002 | 54.92 | 38.58 | 8,404 |  | 25.15 | 31.55 | 8,145 |
| 2003 | 69.70 | 51.48 | 11,077 |  | 32.18 | 40.43 | 7,360 |
| 2004 | 68.90 | 58.72 | 11,717 |  | 31.78 | 22.10 | 5,773 |
| 2005 | 63.72 | 45.47 | 13,275 |  | 25.34 | 19.69 | 7,150 |
| 2006 | 84.73 | 50.26 | 15,215 |  | 32.78 | 32.58 | 9,364 |
| 2007 | 78.74 | 79.60 | 18,390 |  | 35.56 | 38.07 | 8,259 |