

## Bus 273: Statistical Analysis for Business

Fall 2014

### PROBLEM SHEET # 4

**Problem:** Several times a year, OPEC (Organization of the Petroleum Exporting Countries) hosts meetings among its members to agree on further oil production policies. OPEC then announces which decision concerning world oil production levels (no change, increase, or cut) was made. (For those of you who are interested in crude oil prices and the OPEC, please find a list of announcement dates and other details on the next page. See also <http://opec.org>.)

The chart below shows a stemplot (with 50 observations) of the variable

$X$  = number of days between two successive announcements, in the time period 2000 through 2009.

```
1 | 5
2 | 002589
3 | 1123334557899
4 | 23334559
5 | 24458889
6 | 001349
7 | 11
8 | 18
9 |
10 |
11 | 5
12 | 49
13 | 1
```

The mean of  $X$  is 51.96 and the standard deviation of  $X$  is 26.76.

- Explain what the row 8 | 18 means.
- Determine the median of this distribution.
- Determine the lower (first) and upper (third) quartile of this distribution.
- Make a boxplot of this distribution.
- Make a histogram of this distribution, based on the breakpoints 0, 20, 30, 40, 50, 60, 70, 140. (The first interval is [0, 20), the second [20, 30), etc.)
- What can you say about the skewness of this distribution? Explain also in terms of median and arithmetic mean.
- Does the one-sigma rule hold in this example?
- Using this data set, estimate the probability that it takes more than 100 days until OPEC makes the next announcement.

Given are the dates of announcements and the number of days since the last announcement. For the decision,  $\circ$ : quantity unchanged;  $+$ : quantity increased;  $-$ : quantity reduced.

date	weekday	diff.	price	dec.	date	weekday	diff.	price	dec.
1986-08-05	Tuesday		14.35	$\circ$	2001-06-05	Tuesday	54	27.84	$\circ$
1986-10-22	Wednesday	54	14.85	$-$	2001-07-03	Tuesday	20	26.28	$\circ$
1986-12-22	Monday	42	16.95	$+$	2001-07-25	Wednesday	15	26.71	$-$
1987-06-29	Monday	128	20.38	$+$	2001-09-27	Thursday	45	22.80	$\circ$
1987-12-14	Monday	119	17.47	$-$	2001-11-14	Wednesday	34	19.63	$-$
1988-06-14	Tuesday	128	16.85	$\circ$	2001-12-28	Friday	28	20.42	$-$
1988-11-28	Monday	118	14.93	$+$	2002-03-15	Friday	52	24.47	$\circ$
1989-06-07	Wednesday	134	19.70	$+$	2002-06-26	Wednesday	71	26.67	$\circ$
1989-09-28	Thursday	81	19.99	$+$	2002-09-19	Thursday	58	29.49	$\circ$
1989-11-28	Tuesday	43	19.33	$+$	2002-12-12	Thursday	58	28.20	$+$
1990-07-27	Friday	169	20.07	$+$	2003-01-13	Monday	20	32.08	$+$
1990-12-13	Thursday	99	26.45	$\circ$	2003-03-11	Tuesday	39	36.81	$\circ$
1991-03-12	Tuesday	61	20.06	$-$	2003-04-24	Thursday	31	27.52	$+$
1991-06-04	Tuesday	58	20.90	$\circ$	2003-06-11	Wednesday	33	32.17	$\circ$
1991-09-25	Wednesday	80	22.11	$+$	2003-07-31	Thursday	35	30.56	$\circ$
1991-11-27	Wednesday	45	21.38	$-$	2003-09-24	Wednesday	38	28.19	$-$
1992-02-17	Monday	56	19.42	$-$	2003-12-04	Thursday	49	31.24	$\circ$
1992-05-22	Friday	68	20.79	$\circ$	2004-02-10	Tuesday	43	34.03	$-$
1992-09-17	Thursday	83	22.23	$+$	2004-03-31	Wednesday	35	35.75	$\circ$
1992-11-27	Friday	50	20.29	$+$	2004-06-03	Thursday	44	39.29	$+$
1993-02-16	Tuesday	53	19.59	$-$	2004-09-15	Wednesday	71	43.83	$+$
1993-06-10	Thursday	79	19.27	$\circ$	2004-12-10	Friday	60	40.71	$\circ$
1993-09-29	Wednesday	77	18.73	$+$	2005-01-31	Monday	33	48.25	$\circ$
1993-11-24	Wednesday	40	15.73	$\circ$	2005-03-16	Wednesday	31	56.50	$+$
1994-03-28	Monday	84	14.15	$\circ$	2005-06-15	Wednesday	63	55.53	$+$
1994-06-16	Thursday	56	19.83	$\circ$	2005-10-10	Monday	81	60.71	$\circ$
1994-11-22	Tuesday	111	17.70	$\circ$	2005-12-12	Monday	43	61.36	$\circ$
1995-06-20	Tuesday	143	18.01	$\circ$	2006-01-31	Tuesday	33	67.86	$\circ$
1995-11-22	Wednesday	109	17.93	$\circ$	2006-03-08	Wednesday	25	60.06	$\circ$
1996-06-07	Friday	135	20.28	$+$	2006-06-01	Thursday	59	70.11	$\circ$
1996-11-29	Friday	122	23.70	$\circ$	2006-09-11	Monday	69	65.42	$\circ$
1997-06-26	Thursday	144	18.84	$\circ$	2006-10-20	Friday	29	57.35	$-$
1997-12-01	Monday	108	18.76	$+$	2006-12-14	Thursday	37	62.48	$-$
1998-03-30	Monday	81	16.32	$-$	2007-03-15	Thursday	61	57.52	$\circ$
1998-06-24	Wednesday	60	14.54	$-$	2007-09-11	Tuesday	124	78.16	$+$
1998-11-25	Wednesday	108	10.86	$\circ$	2007-12-05	Wednesday	60	87.45	$\circ$
1999-03-23	Tuesday	78	15.36	$-$	2008-02-01	Friday	39	89.03	$\circ$
1999-09-22	Wednesday	127	24.26	$\circ$	2008-03-05	Wednesday	22	104.45	$\circ$
2000-03-29	Wednesday	129	26.36	$-$	2008-09-10	Wednesday	131	102.66	$+$
2000-06-21	Wednesday	58	33.64	$+$	2008-10-24	Friday	32	63.34	$-$
2000-09-11	Monday	55	35.14	$+$	2008-12-17	Wednesday	54	40.17	$-$
2000-11-13	Monday	45	34.30	$\circ$	2009-03-15	Sunday	88	46.22	$\circ$
2001-01-17	Wednesday	43	29.77	$-$	2009-05-28	Thursday	64	65.09	$\circ$
2001-03-19	Monday	42	26.17	$-$	2009-09-10	Thursday	115	71.95	$\circ$