ACE 427
Spring 2009

Lecture 2

Economic Data and Graphing

by
Professor Scott H. Irwin

Required Reading:

Cromartie, J. and S. Bucholtz. "Defining the 'Rural' in Rural America." ***Amber Waves*****, June 2008, pp. 28-35. (427 compass website)**

Kassel, K., J.M. MacDonald, and S.L. Wang. "Productivity Growth Drives Expanded Agricultural Production." ***Amber Waves*****, September 2008, pp. 40-41. (427 compass website)**

Optional Reading:

Diebold, Francis X. "Chapter 3: Statistical Graphics for Forecasting." ***Elements of Forecasting, Third Edition*****. South-Western College Publishing: Cincinnati, OH, 2004.**

Basic Types of Data Sets

- ***Cross Section Data***: Observations are for _____ entities, such as persons, firms, or commodities, at the _____ point in time

- ***Time Series Data:*** Observations are for the _____ entity in _____ periods of time

- Price forecasting tends to use more _____ data

A Cross Section Data Set for Evaluations of the *farmdoc* website

location	survey num	Visited Farmdoc Before (Y = 1)	How Often (1,2,3,4,5)?	Rate Farmdoc usefulness (1,2,3,4)	Rate Farmdoc clarity (1,2,3,4)
Rochelle	1	1	3	4	4
Rochelle	2	1	2	4	3
Rochelle	3	1	3	4	3
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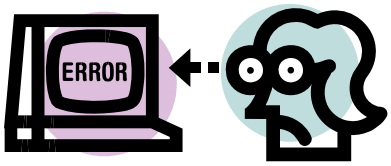
Rochelle	21	1	2	4	3
Rochelle	22	1	2	4	4
Rochelle	23	1	2	4	3
Rochelle	24	1	2	3	4
Rochelle	25	1	2	3	3

A Time Series Data Set for US Corn Supply and Demand

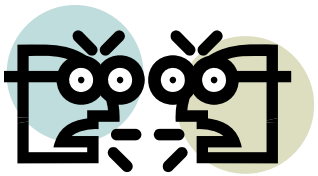
YEAR	PLANTED	HARVEST	YIELD	PRODUCED	BEGIN	TOTSUP	EXPORTS	FEED	FSI	CONS	ENDING	FPRICE
1975/76	78719	67625	86.4	5841	558	6400	1664	3582	521	5767	633	2.54
1976/77	84588	71506	88	6289	633	6925	1645	3602	542	5789	1136	2.15
1977/78	84328	71614	90.8	6505	1136	7643	1896	3730	581	6207	1436	2.02
1978/79	81675	71930	101	7268	1436	8705	2113	4274	608	6995	1710	2.25
1979/80	81394	72400	109.5	7928	1710	9638	2402	4563	640	7604	2034	2.48
1980/81	84043	72961	91	6639	2034	8675	2391	4232	659	7282	1392	3.12
1981/82	84097	74524	108.9	8119	1392	9511	1997	4245	733	6975	2537	2.47
1982/83	81857	72719	113.2	8235	2537	10772	1821	4573	855	7249	3523	2.55
1983/84	60207	51479	81.1	4174	3523	7699	1886	3876	930	6693	1006	3.21
1984/85	80517	71897	106.7	7672	1006	8680	1850	4115	1067	7032	1648	2.63
1985/86	83398	75209	118	8875	1648	10534	1227	4114	1153	6494	4040	2.23
1986/87	76580	68907	119.4	8226	4040	12267	1492	4659	1234	7385	4882	1.50
1987/88	66200	59505	119.8	7131	4882	12016	1716	4789	1251	7757	4259	1.94
1988/89	67717	58250	84.6	4929	4259	9191	2028	3934	1297	7260	1930	2.54
1989/90	72322	64783	116.3	7532	1930	9464	2367	4382	1370	8120	1344	2.36
1990/91	74166	66952	118.5	7934	1344	9282	1727	4609	1425	7761	1521	2.28
1991/92	75957	68822	108.6	7475	1521	9016	1584	4798	1533	7915	1100	2.37
1992/93	79311	72077	131.5	9477	1100	10584	1663	5252	1556	8471	2113	2.07
1993/94	73239	62933	100.7	6338	2113	8472	1328	4680	1613	7621	850	2.50
1994/95	78921	72514	138.6	10051	850	10910	2177	5460	1715	9352	1558	2.26
1995/96	71479	65210	113.5	7400	1558	8974	2228	4693	1628	8548	426	3.24
1996/97	79229	72644	127.1	9233	426	9672	1797	5277	1714	8789	883	2.71
1997/98	79537	72671	126.7	9207	883	10099	1504	5482	1804	8791	1308	2.43
1998/99	80165	72589	134.4	9759	1308	11085	1981	5472	1846	9298	1787	1.94
1999/00	77386	70487	133.8	9431	1787	11232	1937	5664	1913	9515	1718	1.82
2000/01	79551	72440	136.9	9915	1718	11639	1941	5842	1957	9740	1899	1.85
2001/02	75752	68808	138.2	9507	1899	11416	1905	5861	2054	9820	1596	1.97
2002/03	79054	69313	130	9008	1596	10619	1592	5593	2298	9532	1087	2.32
2003/04	78736	71139	142.2	10114	1087	11211	1975	5775	2480	10230	981	2.30

Errors in Data



- Before using data for price forecasting purposes, you must have a good understanding of how the data were _____ and for what _____
- Essential to detect errors in data
- Since price forecasters rarely participate in the generation of data, price analysis is quite susceptible to data errors

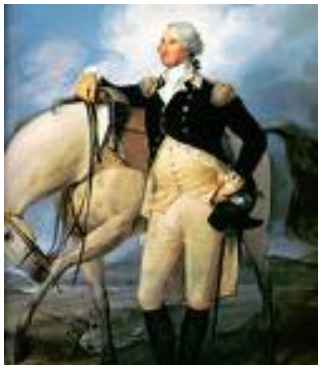
Misinterpretation of Data

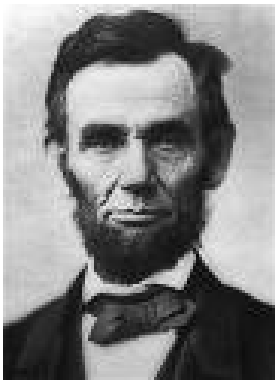


- Probably more _____ than data errors
- Most data is collected for administrative or journalistic reasons
- May not match economic concepts
- Examples
  - Illinois river terminal prices
  - Export data

Agricultural Data

- Focus is on collecting data to describe the _____ and _____ of farm commodities
- Long history in the US
- First known agricultural survey conducted by President George Washington in 1791
- US Department of Agriculture established by Abraham Lincoln in 1862





Structure of Agricultural Data Collection

- Several _____ within the US Department of Agriculture (USDA) are responsible for collecting farm data
- _____ (NASS) is the largest
- http://www.usda.gov/nass/
- Two major responsibilities
  - _____ every five years
  - _____
- USDA data is the primary information used in agricultural price analysis

NASS
FACT FINDERS FOR AGRICULTURE
Washington, D.C.

Crop Production

Released November 10, 2005, by the National Agricultural Statistics Service (NASS), Agricultural Statistics Board, U.S. Department of Agriculture. For information on *Crop Production* call (202) 720-2127, office hours 7:30 a.m. to 4:00 p.m. ET.

Corn Production Up 2 Percent from October
Soybean Production Up 3 Percent from October
Cotton Production Up 2 Percent from October

Agricultural Census

- First started in 1840 as demand grew for information on the agricultural sector
- Now conducted every ____ years on years that end in two and seven
- Recently transferred from the Department of Commerce to USDA/ NASS
- Collects a vast array of data on farms and farm families
- Acreage, land use, production, value of sales, organization, farm workers, etc.
- Taken as a ____ survey of all farm and ranch operators in the US
- Census data forms the _____ for NASS current statistics programs, which estimate crop production and livestock inventories

NASS Current Statistics Program

- Each year, estimates are made covering virtually every facet of U.S. agriculture
- _____ and supplies of food and fiber, prices paid and received by farmers, farm labor and wages, farm aspects of the industry
- NASS's 45 State Statistical Offices (SSO's) publish data about many of the same topics for local audiences

NASS Publications

- Cover a wide range of subjects, from traditional crops, such as corn and wheat, to specialties, such as mushrooms and flowers; from calves born to hogs slaughtered; from agricultural prices to land in farms
- The abundance of information produced has earned for NASS the title, *"The Fact Finders of Agriculture"*

Sources of Information for NASS Reports

- _____ those who should know the most about a particular subject:
- Farmers and ranchers, livestock feeders, slaughterhouse managers, grain elevator operators, and other agribusinesses
- The information is gathered in a variety of ways:
  - _____ surveys
  - _____ interviews
  - Face-to-face interviews
  - _____ observations

Statistical Graphics for Price Forecasting

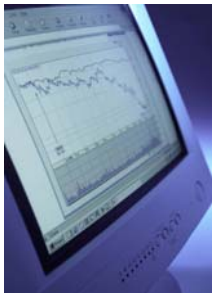
- After collecting data, it is always a good idea to begin a forecasting exercise by _____ the data

- Despite powerful developments in computer and statistical technology, the _____ is in many respects a more powerful tool

- Graphing has limitations, but it is the best place to _____

The Power of Graphics

- Graphics helps us _____ and reveal _____ in data
- Graphics helps us identify _____ and _____ in data
- Graphics facilitates and encourages _____
- Graphics enables us to _____ and interpret huge amounts of data in a small amount of space



Univariate Graphical Techniques

- Univariate means _____ variable
- The simplest univariate technique is a _____
- For each observation, the value of a variable is plotted vertically above the corresponding value for time
- A natural and often-used way to display data
- Usually best to generate time plots using _____ rather than columns

Another Univariate Technique

- Plot the _____ and _____ of a time series variable
- Observations in a time series have a natural order given the sequence in which they occurred
- Differences in values tell us about the history of how the variable has _____ or _____

Multivariate Graphical Techniques

- With two or more variables in a data set, _____ among the variables are important
- Relational graphics is used to display relationships
- The most basic relational graph is the _____

XY Scatterplots

- Value of one variable is plotted against the value of another variable at _____
- _____ of points usually does not have any inherent time _____
- Focus is on how one variable _____ as another variable changes, _____

Elements of Graphical Style

- Producing good graphics is like producing good writing…it is a craft that takes _____ and _____

- _____ graphics can destroy the effectiveness of presentations and reports

Three Keys to Good Graphics

- _____ you audience and your goals
- _____ the data and appeal to the viewer
- _____ and edit, again and again

Showing the Data

- Avoid _____ that mislead a viewer
- Use common scales in multiple comparisons
- Minimize _____ (ink used to depict anything other than data points)

Avoiding Chartjunk

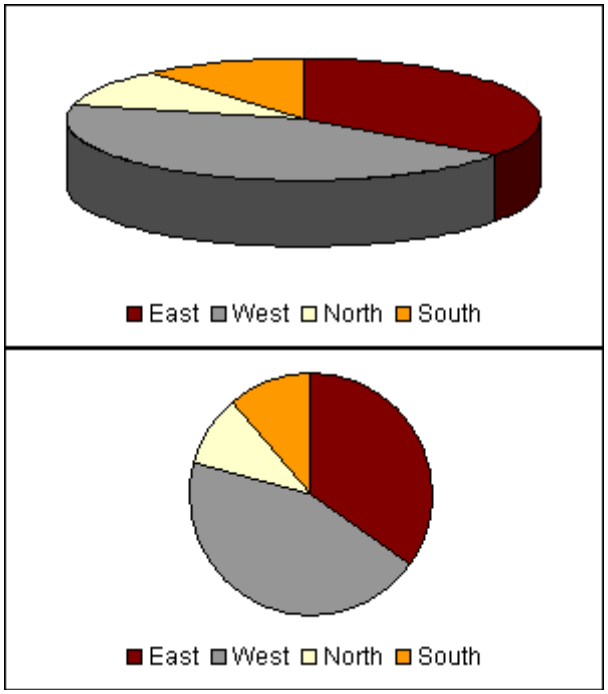
- Elaborate shadings
- Grids
- Decoration
- Un-necessary axes
- Three dimensional perspective

June 12, 2007 post at the blog "Random Sampling: Musings on Marketing and Research" (http://ericksonmr.com/blog/)

Just say no to 3-D

The only reason to ever make a 3D chart is if the third dimension displays data. Since – as far as I am aware – this isn't possible in commonly used software, your clients should never be subjected to a 3D chart in one of your presentations.

Why are these so bad? The 3D effects, particularly in pie charts, obscure the data. Consider the following example. Each pie chart shows the same data, but you have to work a lot harder to see significant findings in the 3D version.



In the 3D pie chart, it's very difficult to determine the relative size of the slices for East and West. In the 2D version, this is much clearer.

Appealing to the Viewer

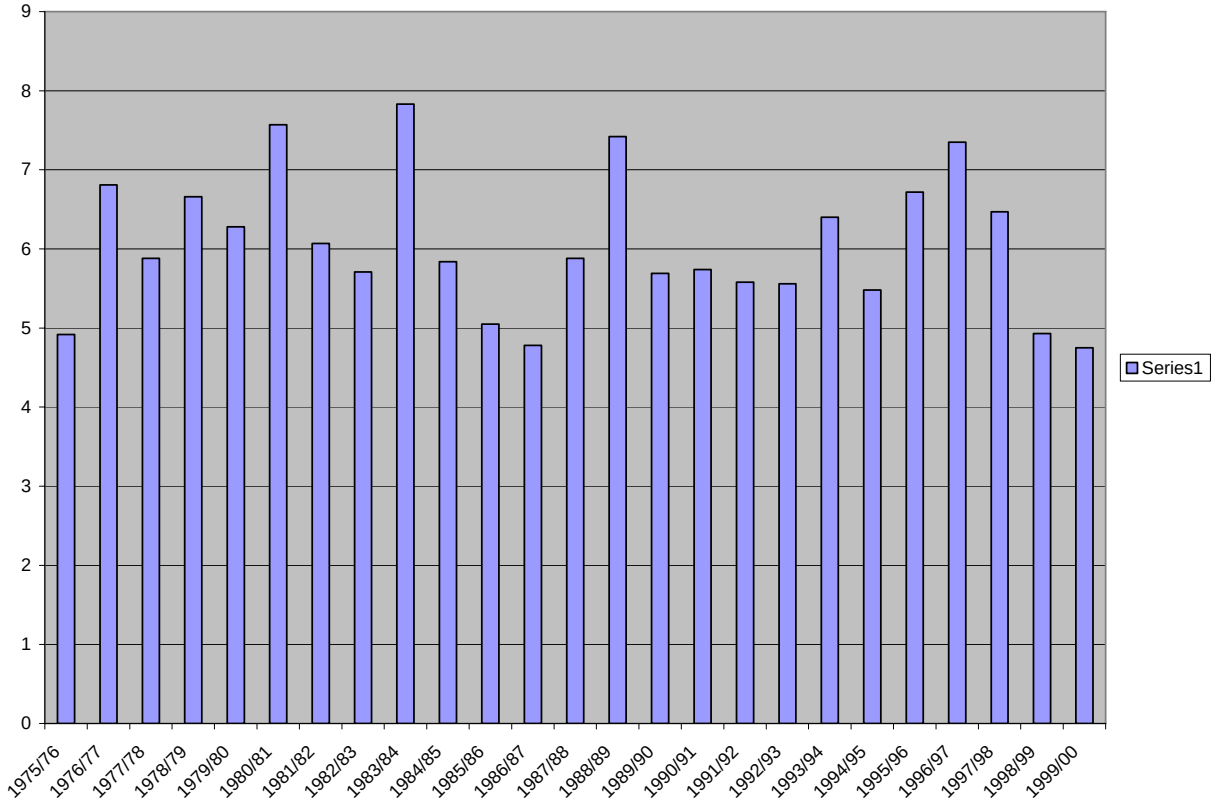
- Most important, make graphics _____
- Should meet the "stand-alone test":
- A knowledgeable viewer should be able to _____ the graphic _____ consulting the accompanying text, if any

Stand-Alone Requirements

- Clearly indicate variables graphed on the horizontal and vertical axes and their respective units
- Short but descriptive title to graphic
- _____ of data clearly indicated
- Use clear and modest type

(This is not modest type)

- Avoid mnemonics and abbreviations
- Use labels rather than legends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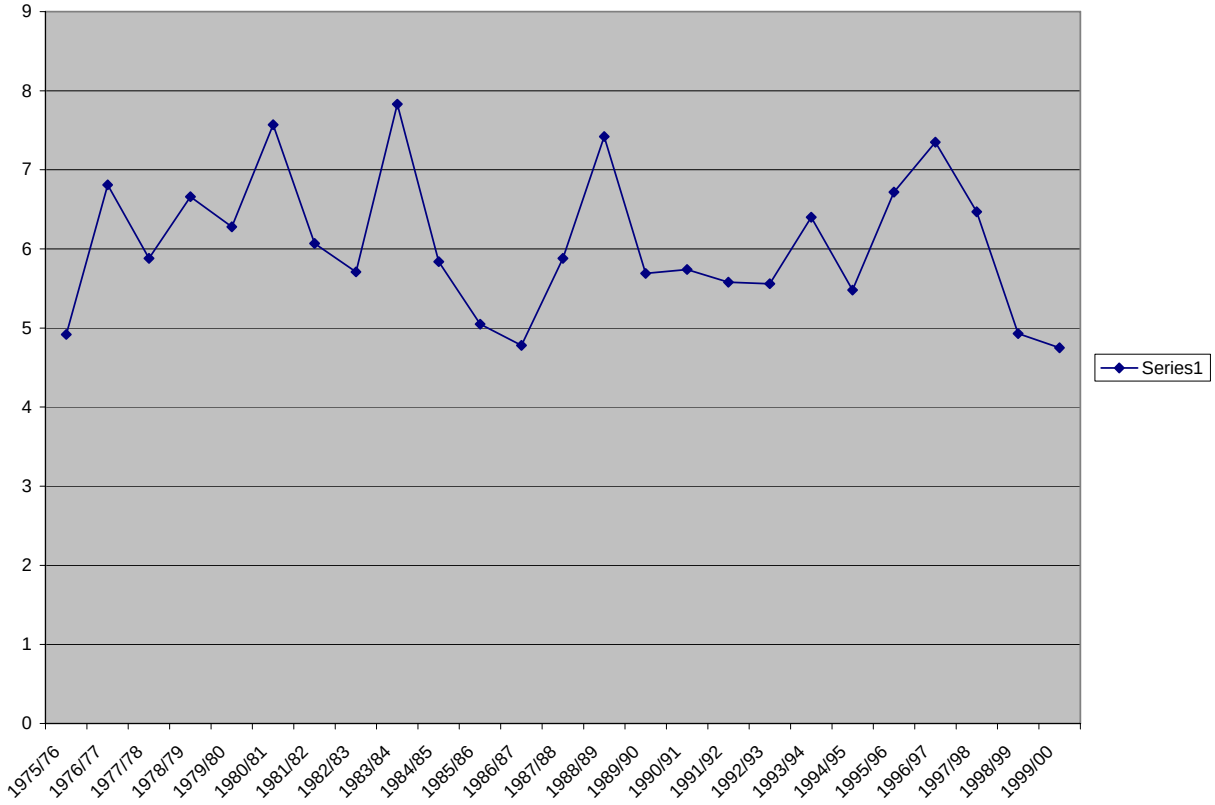
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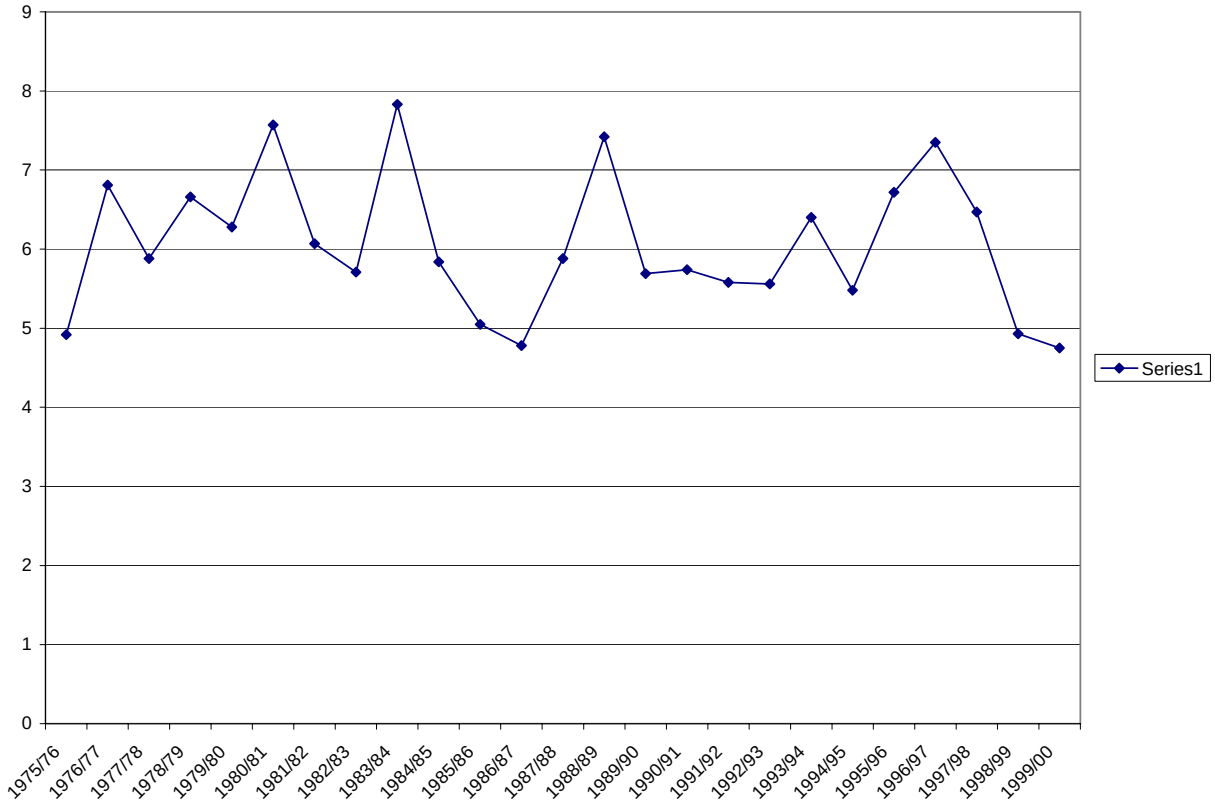
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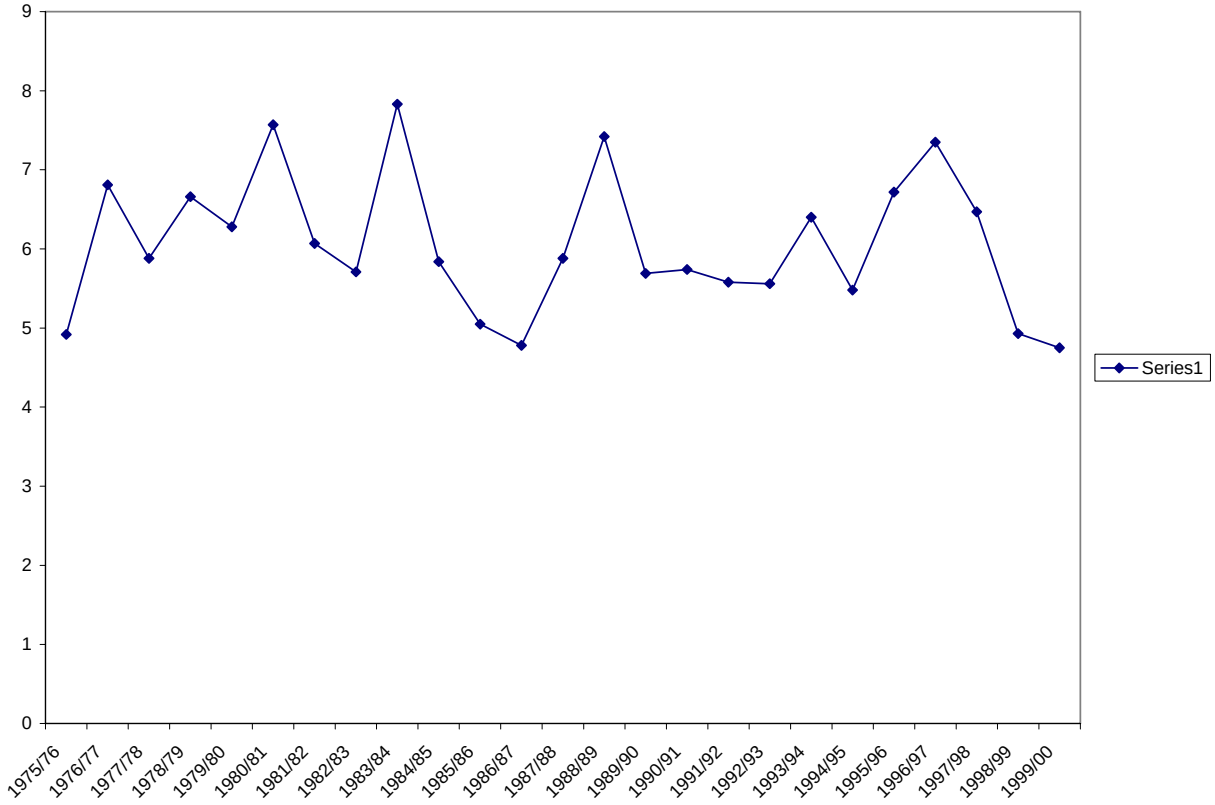
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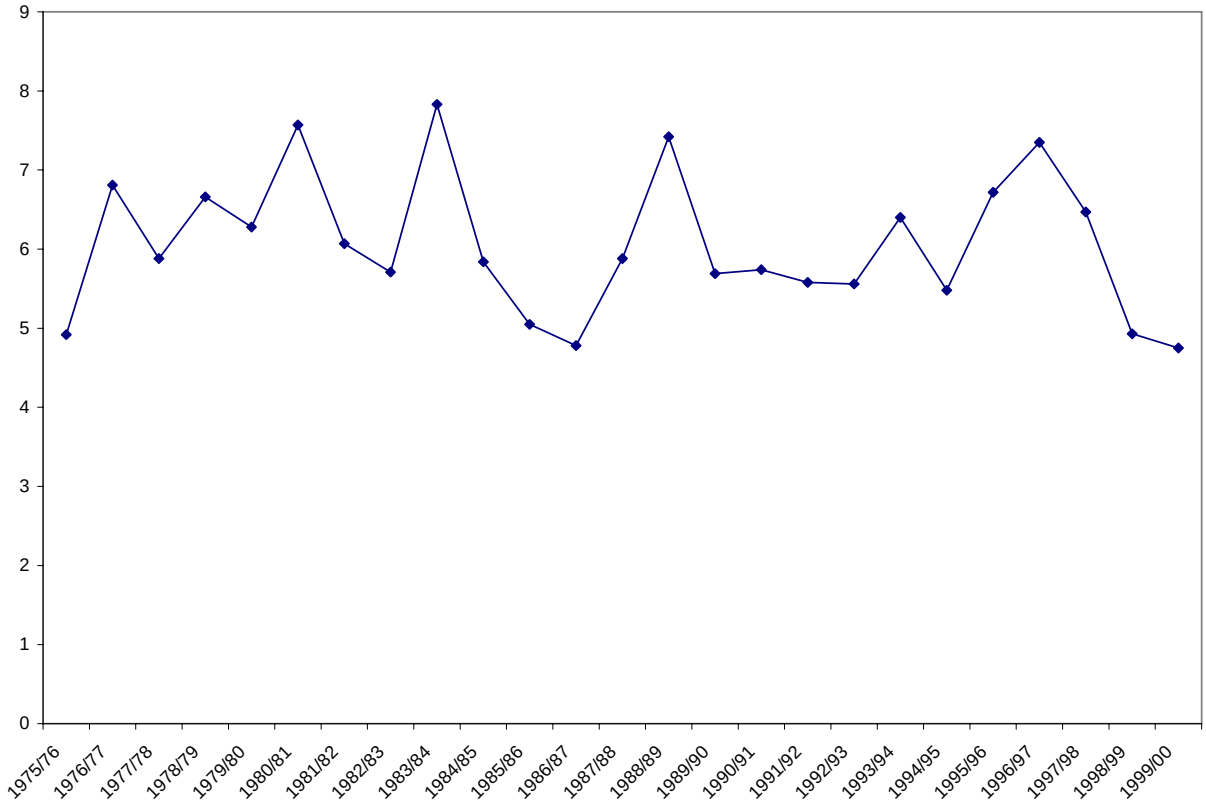
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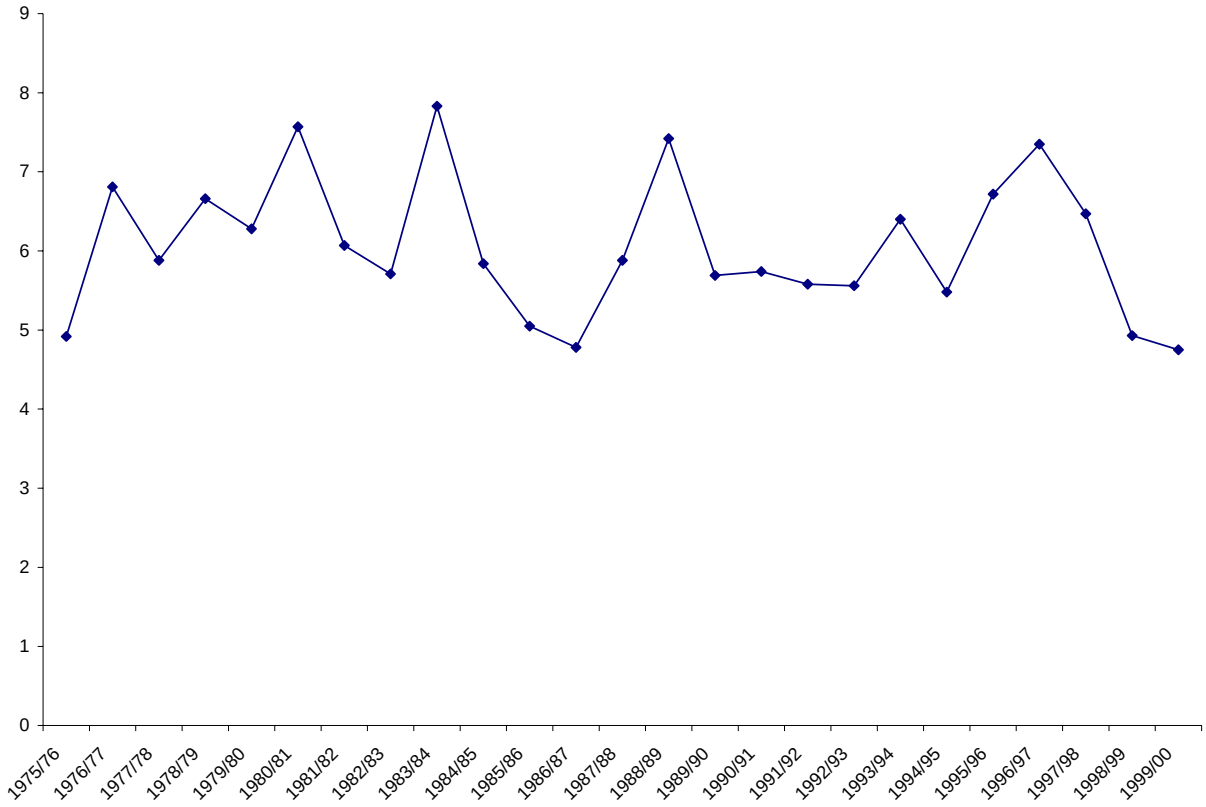
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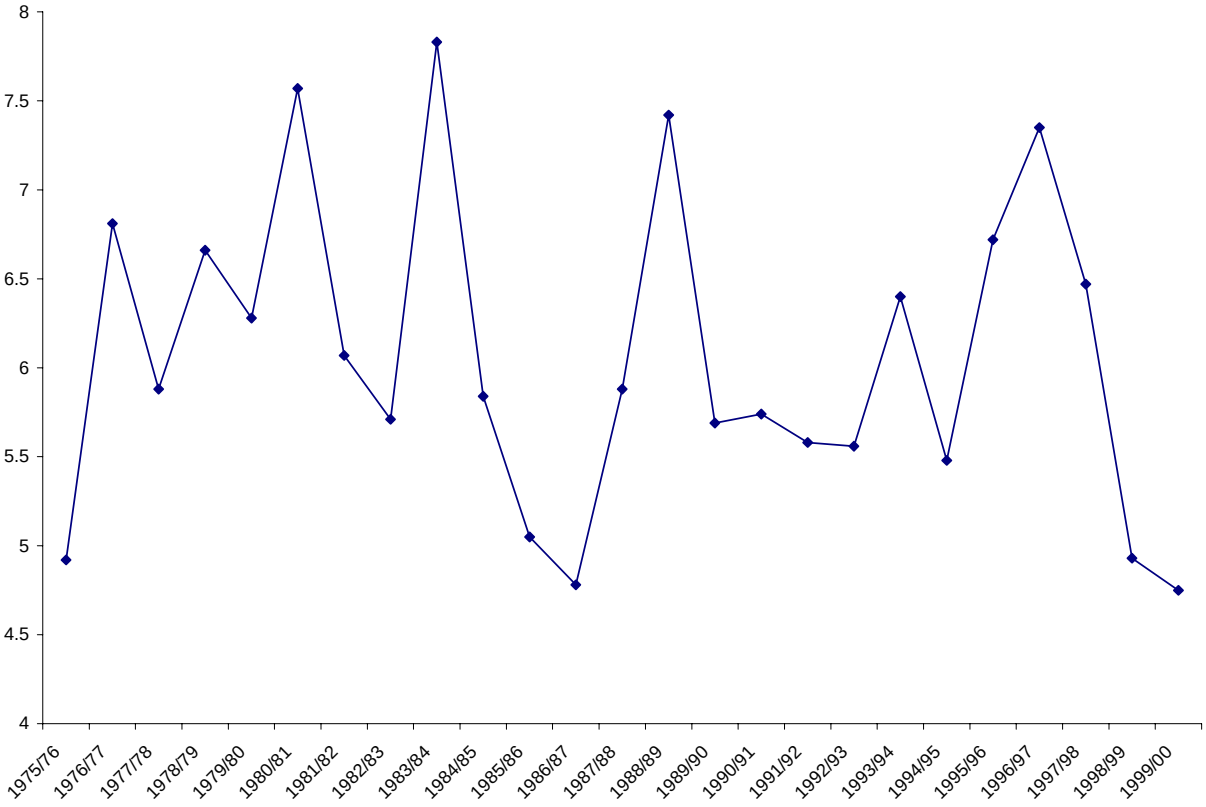
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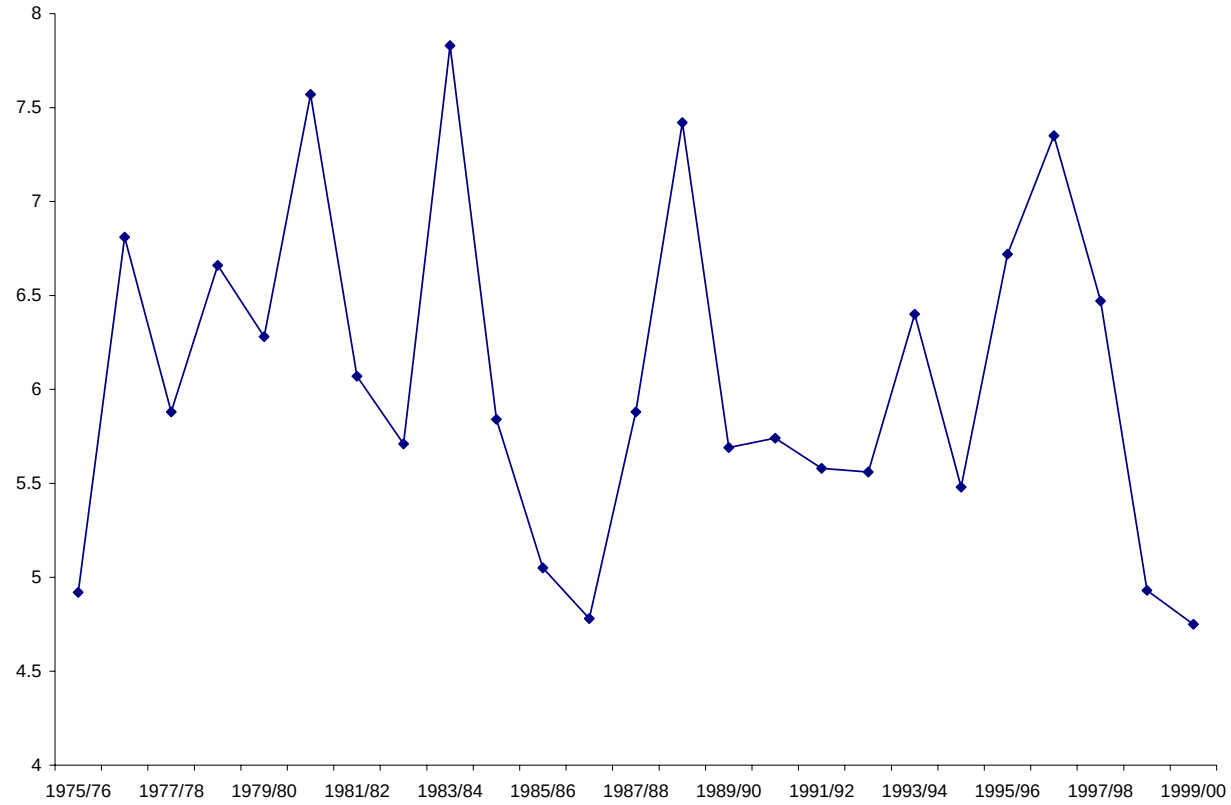
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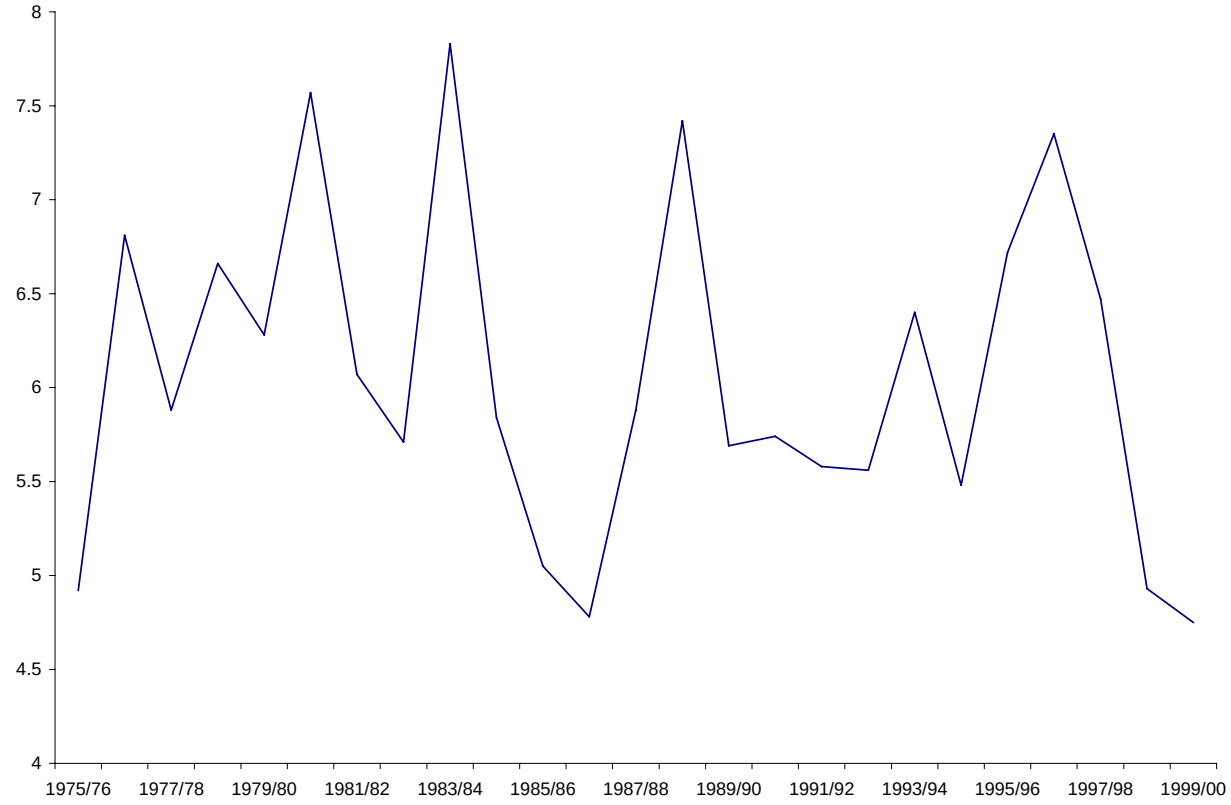
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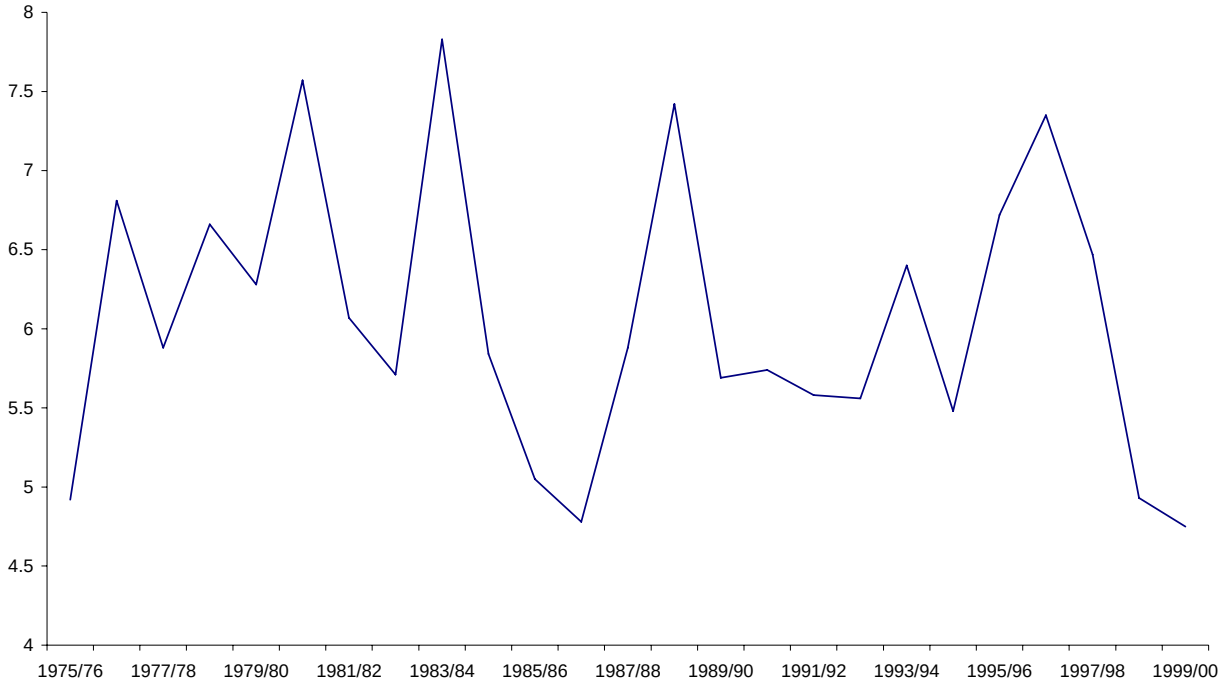
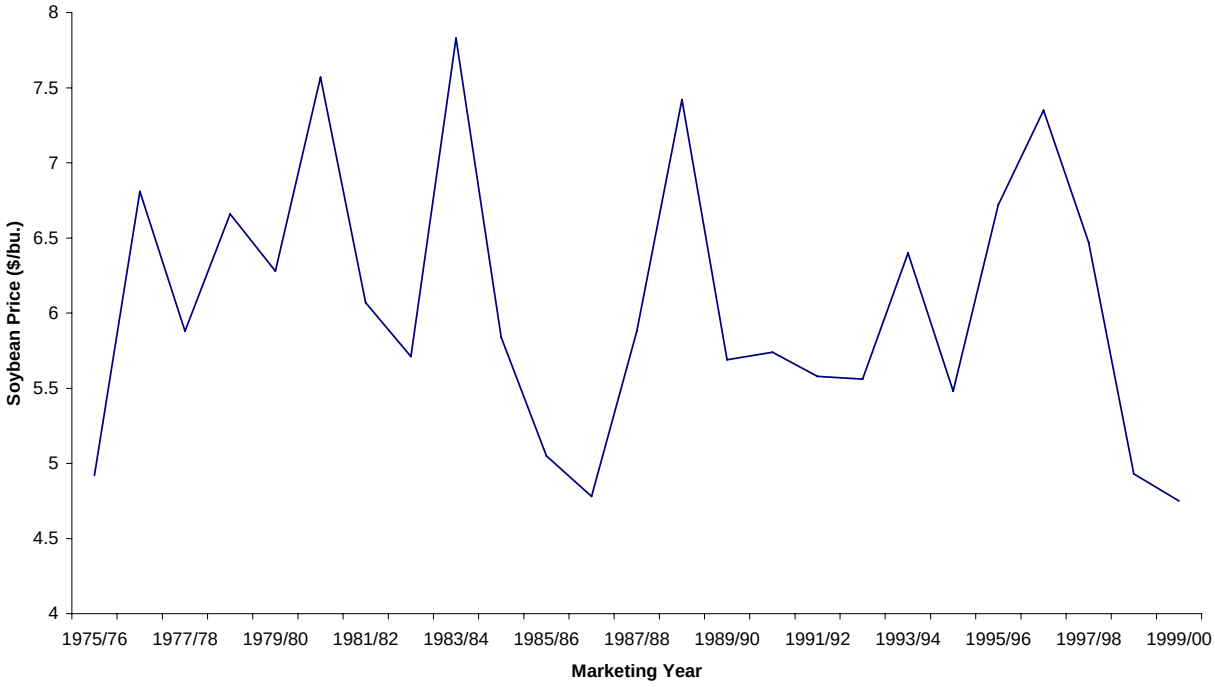
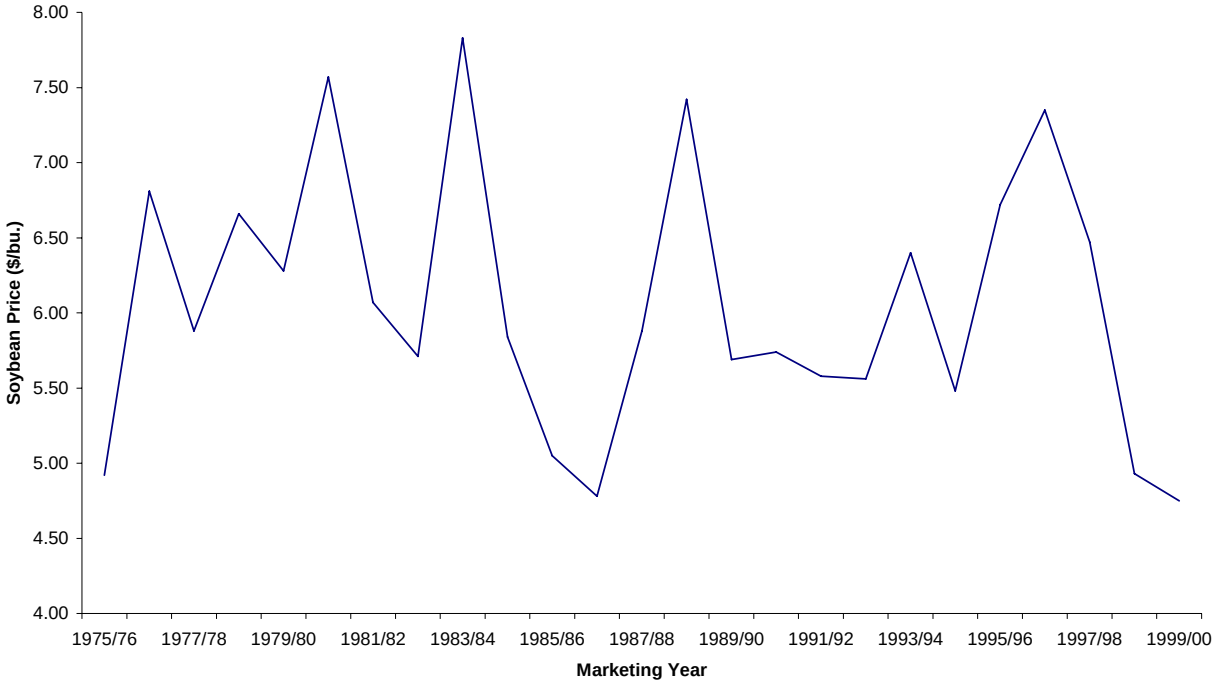
US Average Price of Soybeans, 1975/76-1999/2000 Marketing Years (1999/2000 Projected)



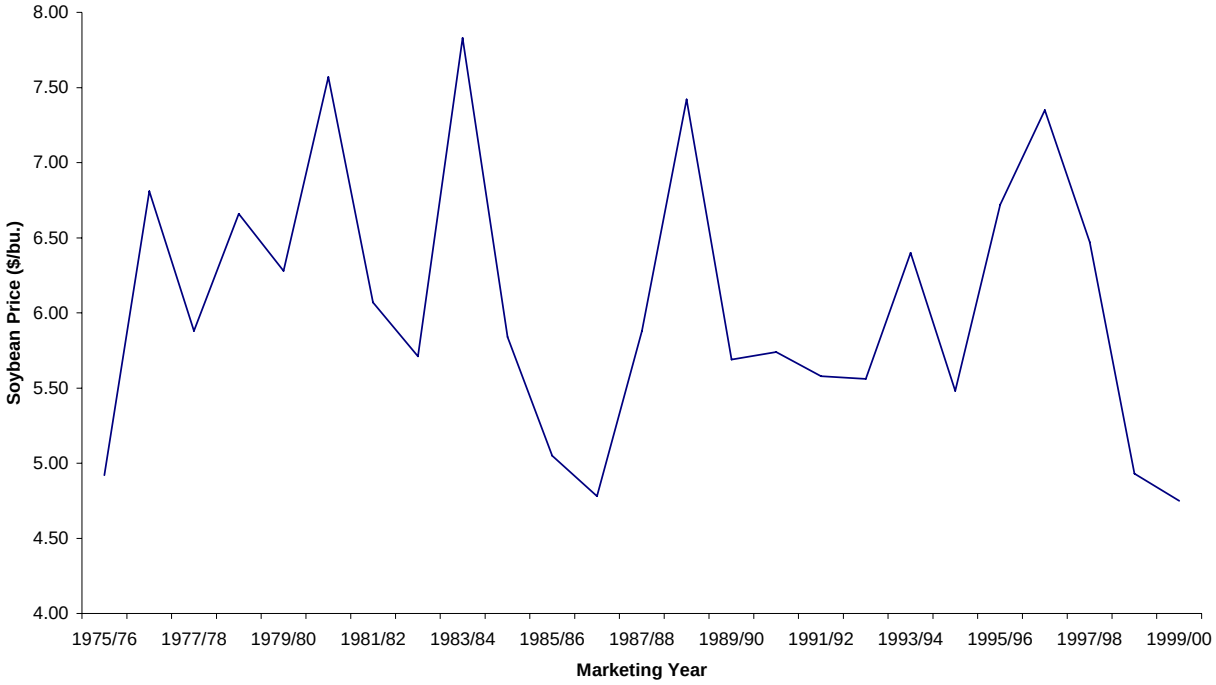
US Average Price of Soybeans, 1975/76-1999/2000 Marketing Years (1999/2000 Projected)



US Average Price of Soybeans, 1975/76-1999/2000 Marketing Years (1999/2000 Projected)



US Average Price of Soybeans, 1975/76-1999/2000 Marketing Years (1999/2000 Projected)



Source: US Department of Agriculture