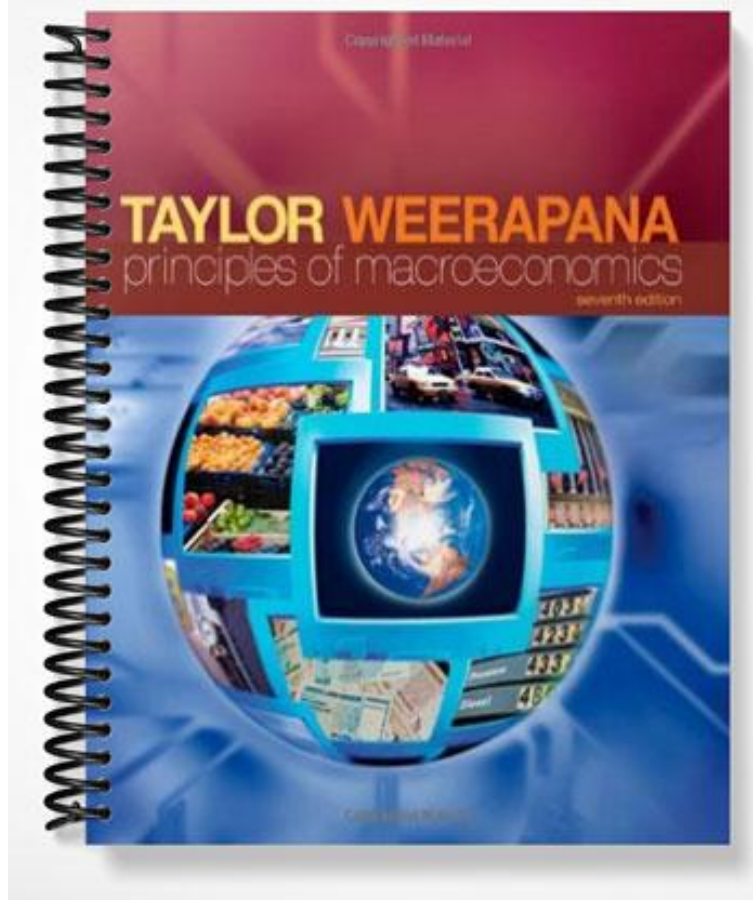


SOLUTIONS MANUAL



CHAPTER 2

Observing and Explaining the Economy

CHAPTER OVERVIEW

This chapter presents a rationale for studying economics and describes the tools needed to begin forming an economic perspective. In a sense it tells the student what economists do and how they do it. An understanding of economics gives us a framework for analyzing many of today's events and issues including examples like the behavior of gasoline prices over time and the dynamics of rising health-care costs. The foundation of all economic analysis is the use of data, graphs, and models. These topics are introduced and discussed with an exploration of the relationship between vehicle miles traveled and the average retail price of gasoline. The chapter ends with a discussion of how economics can affect public policy, and the distinction between positive and normative economics is stressed.

TEACHING OBJECTIVES

1. Communicate the importance of studying economics.
2. Discuss how economics makes use of data and graphs. Problems in using data should also be discussed.
3. Begin developing an economic vocabulary. Stress that Economics, like all scientific subjects, has its own vocabulary.
4. Discuss negative and positive correlation between variables. Differentiate between correlation and causation.
5. Discuss the absence of controlled experiments in economics.
6. Introduce economic models and indicate the 4 ways models may be presented.
7. Describe the micro/macro division of economics.
8. Briefly discuss the role of economics in the development of government policies. Be sure to include in the discussion the difference between normative and positive economics.

KEY TERMS

economic variable

controlled experiments

experimental economics

economic model

microeconomics

macroeconomics

gross domestic product (GDP)

positively related

negatively related

ceteris paribus

capitalism

socialism

mixed economy

positive economics

normative economics

Council of Economic Advisers

TEACHING TAYLOR AND WEERAPANA'S *MACROECONOMICS*

Economic measurement and the relationships between variables are very important in economics. The example of the price of gasoline is used in the chapter to highlight this feature of economics. The role and importance of information in analyzing problems and making decisions is found in the discussion of data. Finally, the seeds of marginal analysis are sown in the brief introduction to economic models and the application of economic theory to real-life government policy decisions is stressed.

LECTURE OUTLINE AND TEACHING TIPS

I. Understanding the Decline in Vehicle Miles Traveled

- A. Virtually all the questions economists seek to answer come from observing the economy. Economists document and quantify their observations by collecting and examining data.
- B. The first task of most economic examinations is to collect data. The focus of this chapter is on the behavior of the price of gasoline.

Teaching Tip

Plot employment in service and in manufacturing industries, and then plot them again as a percent of total employment. This is an example of economic evolution. To bring in an international aspect, show that, in many instances, manufacturing has moved overseas.

- C. Data on the vehicle miles traveled are given in **Figure 2-1** in the text. **Figure 2-2** shows the same data on a per person basis. The average retail price of gasoline is seen in **Figure 2-3**.

II. Variables, Correlation and Causation

- A. Two series of data may be related. Correlation (positive and negative) measures the potential relationship.

Teaching Tip

Ask student opinion about the correlation between good grades on economics tests and time spent studying versus time spent partying. What might explain a less than perfect correlation?

- B. Correlation and causation are not the same. To say that two data series are correlated does not mean that one causes the other.
- C. The data employed by economists are not always accurate. Economics, unlike the physical sciences, lacks controlled experiments.

III. Economic Models

- A. A model is an explanation of how the economy or part of the economy works.
- B. Economic models may be classified according to whether they seek to explain an economy (macroeconomics) or seek to explain aspects of individual behavior within an economy (microeconomics).
- C. Models are built on theories and tell economists whether variables are negatively or positively related. **Figures 2-4 and 2-5** in the text will be useful.
- D. Models can be presented in numerical tables, graphically, algebraically, and verbally.

- E. The *ceteris paribus* assumption means to hold all other things constant. This is the way that economists focus on the impact of a single variable on an economic event.
- F. Economists will use the same model repeatedly. However, new models come into existence all the time as new hypotheses are tested.

III. Recommending Appropriate Policies

- A. Ever since the *Wealth of Nations* by Adam Smith, economists have been motivated by a desire to improve government policy. Karl Marx saw contradictions in capitalism that would lead to its collapse. A new system called socialism would evolve. Many modern economies are mixed economies of both capitalism and socialism.
- B. Normative economics attempts to develop and recommend policy. Positive economics simply explains the results of policy.

Teaching Tip

Students may initially believe both positive and normative statements are opinion. But, if a statement can be tested by examining data, then the statement would be a positive economic statement.

- A. Economics is independent of political parties. It is a set of tools that aid in thinking.
- B. Economists do not always agree in their policy recommendations.
- C. The Council of Economic Advisors is a small organization designed to give the best economic advice to the President of the United States.

DISCUSSION TOPICS

1. Have students collect annual data on some aspect of the economy (manufacturing, agriculture, service). Plot with respect to time and as a percent of GDP. The *Economic Report of the President* is a good source. Place this source on reserve at the library or have them go to the website of the Council of Economic Advisers.
2. Have students explore the reasons why economic theories change. Why might economists be interested in using alternative models to examine a unique economic event?
3. Use an example of an ill person and a thermometer to discuss correlation and causation. Many ill people have high temperatures. Thus, illness and raised temperatures are correlated. But does a raised temperature cause illness?
4. Relate scarcity to the use of limited student time to study, party, sleep, and so on.

SOLUTIONS TO END-OF-CHAPTER PROBLEMS

1.
 - a. Macroeconomic
 - b. Microeconomic
 - c. Macroeconomic

d. Microeconomic

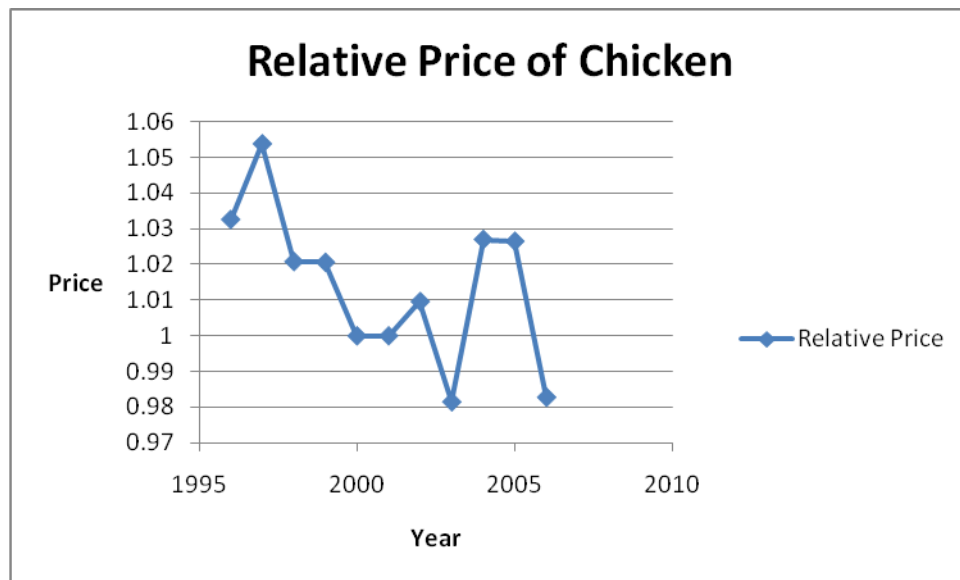
e. Microeconomic

2.

a.

Year	Relative Price
1996	1.0326
1997	1.0538
1998	1.0208
1999	1.0206
2000	1.0000
2001	1.0000
2002	1.0096
2003	.9815
2004	1.0270
2005	1.0265
2006	.9828

a.



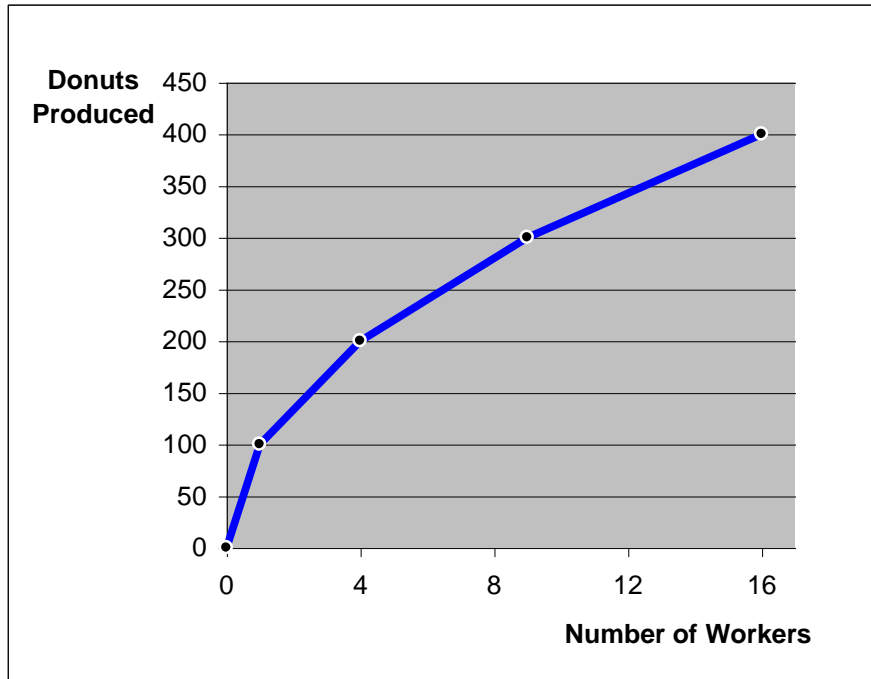
Graph 2-1

b. Over the long term of the whole data series the relative price has fallen, while in a few shorter term periods the either did not change or actually increased. An economic model of the data should attempt to explain both the long term trend and the short term variability.

1. The relative price was lower than the previous year six times in Problem 2. In those six cases, when viewed from the previous year the (absolute) price increased in 1999, 2000, 2003 and 2005, decreased in 2006, and was unchanged in 1998.

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2. A positive correlation is expected. To show causation, it is necessary to argue that one of these causes the other. In this case, it would be useful to have both a theory explaining how roosters respond to sunrise and data supporting the positive relationship.
- a. A positive correlation is expected. Thunderstorms cause the use of umbrellas.
 - b. A negative correlation could be expected. To show causation, it is necessary to have a theory and supporting data showing that people go to the theater less when the price of tickets rises. But, if it can be argued and supported by data that the more theatergoers there are, the higher will be the price of tickets then the correlation is expected to be positive.
 - c. As hours worked rise, then weekly earnings should rise. There is a positive correlation.
 - d. A negative correlation is expected. The more children vaccinated, the fewer children with the disease.
5. **Graph 2-2** shows the model.



Graph 2-2

An algebraic representation would be donuts produced = $(\sqrt{\text{number of workers}}) \times 100$.

A verbal representation could be the following. As the number of workers making donuts increases, so does the numbers of donuts produced. Moreover, to get equal increments of donuts, increasing amounts of workers must be added.

- 3.
- a. The data should be for many workers in the same occupation over time.
 - b. The explanatory variable would be calendar time on a week by week basis.
 - c. You would expect some oscillation about some average number of hours.
 - d. You would expect one or the other depending on the month of a year.

4. The variable the economist would like to predict may be influenced by many explanatory variables. The *ceteris paribus* assumption is made to isolate the impact one explanatory variable has on the main variable. If the local McDonald's reduces the price of a Big Mac hamburger, it will sell a lot more Big Mac's assuming the prices of items at other local fast food restaurants stay the same and given that the income of local residents stays the same.
8. To test gender one could run an experiment where resumes were sent out in which the individual had similar sounding names (to hold race constant), similar experiences (holding resume quality constant), but different genders. This format would only allow gender to vary, hence testing for its effect.
9.
 - a. This is a normative statement. This is a statement of opinion.
 - b. This is a positive statement. This statement is a statement of fact. It is either true or false.
 - c. This is a positive statement. It can be tested by examining data.
 - d. This is a normative statement. It is an opinion.
 - e. While the statement is somewhat vague, there is a suggestion of a testable hypothesis. Thus, this is a positive statement.
10. The statement in part (a) is clearly positive, while the statement in part (e) is clearly negative. The other three statements have the positive element made in the supposition, but enter the realm of normative economics with the recommendation of economic policy.

APPENDIX TO CHAPTER 2

Reading, Understanding, and Creating Graphs

ADVANCED TOPIC OVERVIEW

A good grasp of graphs is a prerequisite for understanding economics. This appendix explains Cartesian coordinates, time-series graphs (single and dual scale), scatter plots, and pie charts. To enhance future lectures, you should connect graphs to models. Words, tables, and mathematics can be used to depict a model. The concept of slope is discussed. Finally, the distinction between movement along the curve and shifts in the curve is explained.

TEACHING OBJECTIVES

1. Describe the Cartesian coordinate graphing system.
2. Explain time-series graphing. Bar charts, scatter plots, and pie charts should be discussed.
3. Show how models are expressed in words, tables, graphs, and algebra.

4. Discuss the concept of slope. Stress its importance.
5. Differentiate between movements along a curve and shifts of a curve.

KEY TERMS

Cartesian coordinate system

positive slope

time-series graph

negative slope

dual scale

linear

scatter plot

movement along the curve

slope

shift of the curve

LECTURE OUTLINE AND TEACHING TIPS

IV. Visualizing Observations with Graphs

- A. Graphing in economics uses Cartesian coordinates. Data listed in tables can be given a visual dimension by graphing. Use **Table A.2-1** and **Figure A.2-1** from the text.

Teaching Tip

Have students plot series found in the *Economic Report of the President*.

- B. Different scales can give the same data a different look. Show **Figure A.2-2** relative to **Figure A.2-1** to make the point. Percentages may be used as well. See **Figure A.2-4** and **Table A.2-2**. Also, several variables may be plotted on the same graph.
- C. The correlation between two variables may be shown on a scatter plot. Use **Figure A.27**. Pie charts are also used in economics. Show **Figure A.2-8**.

V. Visualizing Models with Graphs

- A. Slope is very important in economics. It shows the change in the variable in the vertical axis resulting from a 1-unit change in the variable measured on the horizontal axis. See **Figure A.2-9**.
- B. Models that relate two variables can be shown on a graph. Also, models may be described verbally, mathematically, and in tables. Variables can be related in several different ways. See **Figure A.2-11**.

Teaching Tip

Use the discussion of slope to emphasize the importance of change in economic analysis. Also, tell students that *change* and *marginal* have similar meanings in economics.

- C. Variables not measured on an axis cause the graphed function to shift. **Figure A.2-12** in the text shows this affect.

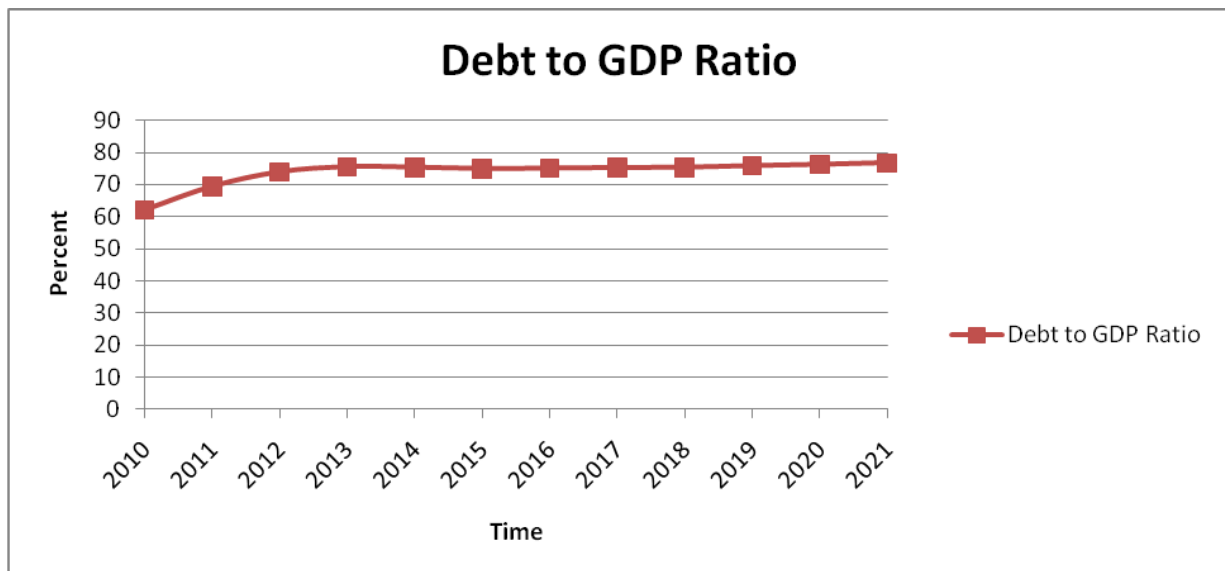
Teaching Tip

It is extremely important to differentiate between movements along a curve and shifts of that curve. This differentiation is necessary in order to understand many of the graphs in the text.

SOLUTIONS TO PROBLEMS

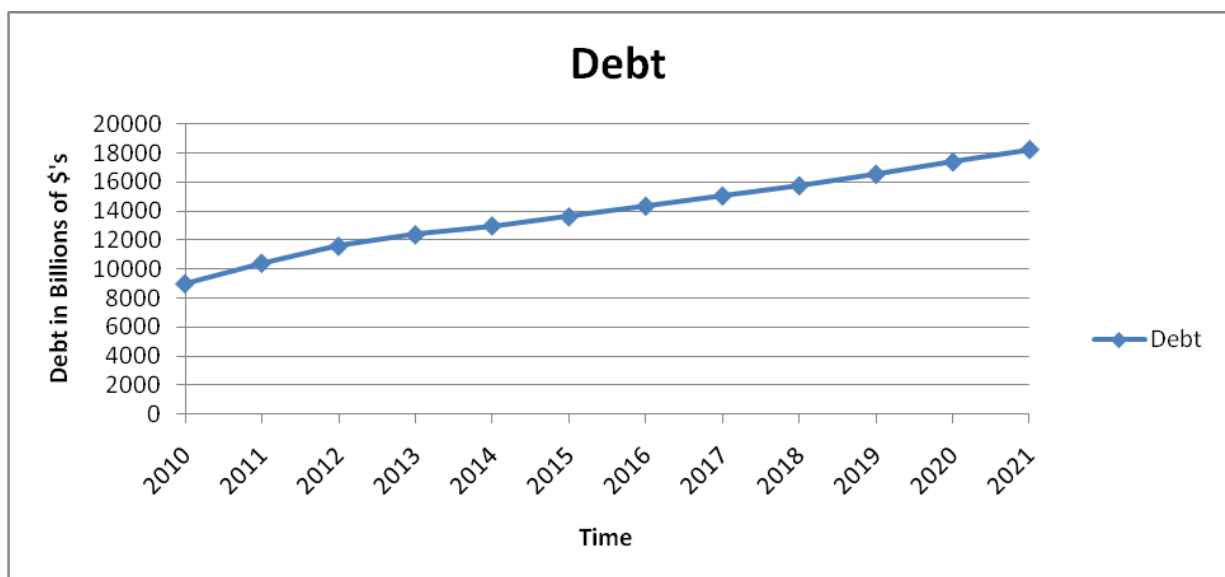
1.

- a. **Graph A.2-1** is a time-series plot of the ratio of government debt to GDP.



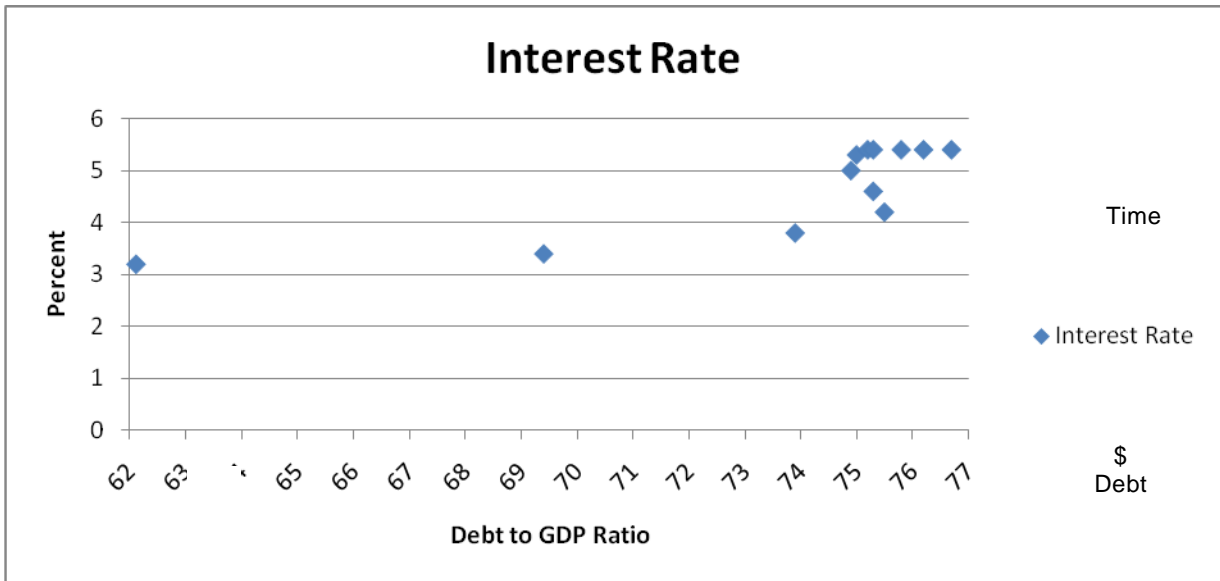
Graph A.2-1

- b. **Graph A.2-2** is a time-series plot of debt.



Graph A.2-2

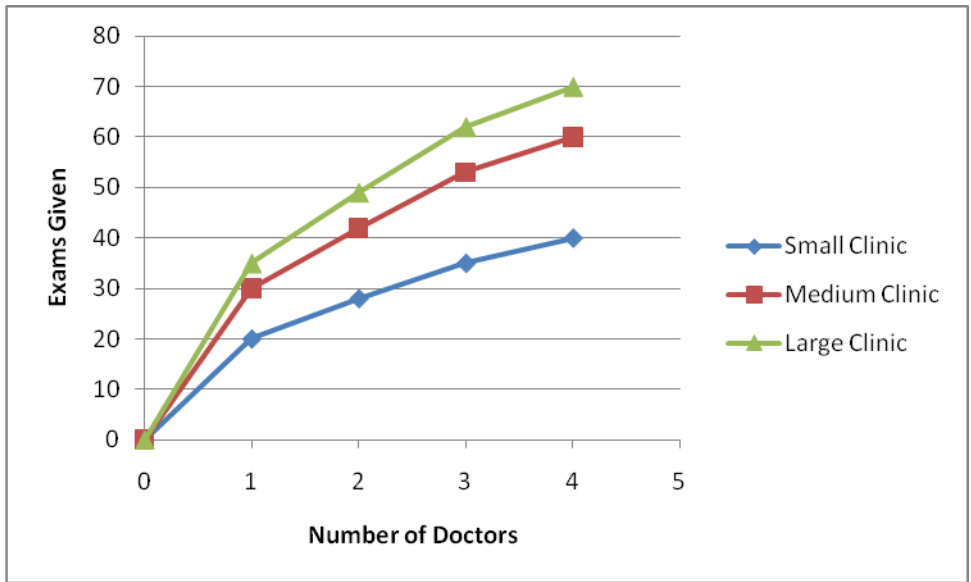
c. **Graph A.2-3** shows a scatter plot of debt ratio and the interest rate.



Graph A.2-3

2.

a. **Graph A.2-4** is a plot of the relationship between doctors and physical exams given.



Graph A.2-4

- b. The number of exams given increases at a decreasing rate with the number of doctors, holding clinic size constant. Alternatively, a given number of doctors can give more physical exams as clinic size increases. This increase is also at a decreasing rate.
- c. A change in the number of doctors is a movement along the curve because the number of doctors is one of the variables shown explicitly in the graph.
- d. A change in the size of the clinic is a shift in the curve because the size of the clinic is a third variable not shown explicitly as an axis in the graph.