Overview

After having detailed demand and supply in the previous two chapters, we are now ready to bring them together to complete our discussion of the market mechanism. The intersection of the demand curve and the supply curve determines the market-clearing price. In addition, this chapter will contain several case studies to bring your theoretical understanding to a more practical setting.

Objectives

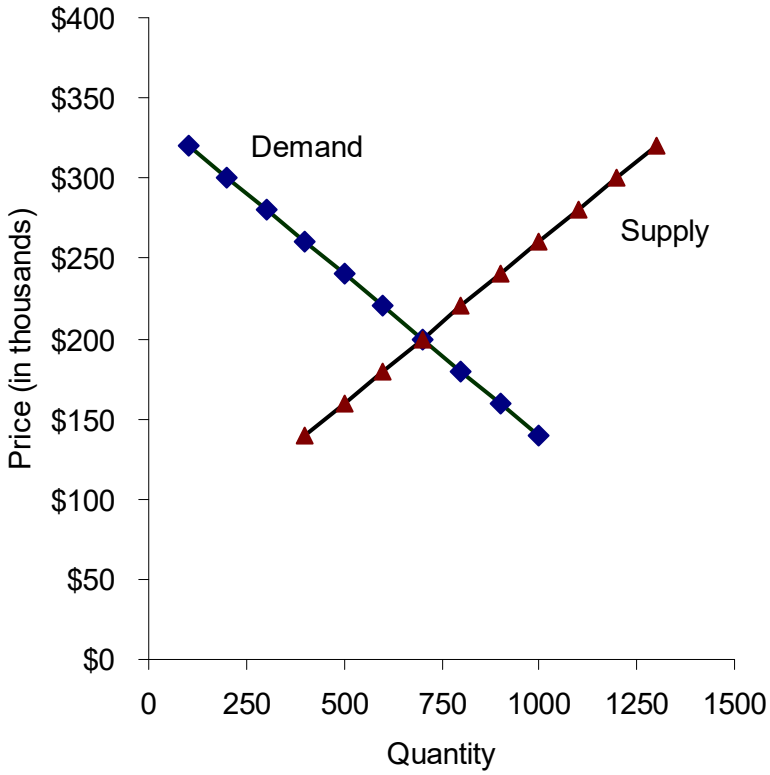
- Understand how supply and demand come together to form the equilibrium condition
- Graphically define surplus and shortage
- Learn how equilibrium adjusts with changes in the determinants of supply and demand
- Identify the array of market structures and where real estate fits in the spectrum
- Define market value in Economics and real estate appraisal

Chapter 4: Markets: The Intersection of Supply and Demand

We can now put together the two sides of the market, demand and supply. Below are the demand and supply schedules that we used in previous chapters.

Data Point #	Price	Quantity Demanded	Quantity Supplied
	$340,000	0	1,400
1	$320,000	100	1,300
2	$300,000	200	1,200
3	$280,000	300	1,100
4	$260,000	400	1,000
5	$240,000	500	900
6	$220,000	600	800
7	$200,000	700	700
8	$180,000	800	600
9	$160,000	900	500
10	$140,000	1,000	400

Here is the graph of the data from the table. The demand curve and the supply curve have been superimposed upon each other.



Surpluses, Shortages, and Equilibrium

Referring to our example data, assume that homes are priced at $300,000. At that price buyers want to buy 200 homes, while sellers want to sell 1,200 homes (data point 2 in the table). This situation creates a problem (economists would say an inefficiency) in the market. There are 1,000 homes that sellers wish to sell that no one wishes to buy (1,200 minus 200). This is called a surplus (there is no fancy economic name for it). In the real world, sellers know a surplus exists when their goods are not selling; homes are listed and sit for months without any offers. Eventually, sellers adjust and realize that they must lower their price. As the price falls, buyers will buy more which is a movement along the demand curve. Sellers will sell less at the lower price, taking homes off the market, which is a movement along the supply curve. The surplus becomes smaller and smaller until it disappears. Economists call this a movement toward equilibrium.

As a second example, assume that the price is $160,000 per home. At that price buyers want to buy 900 homes while sellers want to sell 500 homes (data point 9 in the table). This too creates a problem. All 500 homes will sell and more buyers will come seeking to buy. This is (quite obviously) known as a shortage. A shortage is fairly easy to recognize in the real world. Homes are listed and snatched up (days on market is a useful clue). As a result, sellers raise their price. The higher price will cause buyers to buy fewer homes, a move along the demand curve. It will also induce sellers to market more homes, a move along the supply curve. The shortage becomes smaller and smaller as the price and quantity move toward the equilibrium condition.

At the price of $200,000 (data point 7), there is no surplus or shortage. Sellers want to sell 700 homes which is precisely what buyers seek to buy. There is no reason to either lower or raise the price. This is the market-clearing or equilibrium price. The 700 homes is the equilibrium quantity. Sustained equilibrium is rare in the real world. Rather markets are constantly changing.

Changes in Equilibrium: Case Studies

We will now exercise our understanding of supply and demand and how shifts in equilibrium occur. Try to answer each case on your own before clicking to the answers on the following pages. Recall your knowledge of the non-price determinants of supply and demand.

Case 1: Assume that we begin with a market for homes that is in equilibrium. Then let's say that income for buyers goes up. How do we analyze this situation? Ask yourself the following questions: Does income affect supply or demand? Will there be a shift or movement along the curve? Is the shift right or left?

Case 2: Again, assume that there is a market for homes that begins in equilibrium. In this case, the change that occurs is an increase in the price of wood. How do we analyze this situation?

Case 3: Once again, assume that the market for homes begins in equilibrium. Then, let's say that buyers and sellers both expect the price for homes to increase in the near future. How do we analyze this situation?

Click to the following page for a discussion of Case 1.

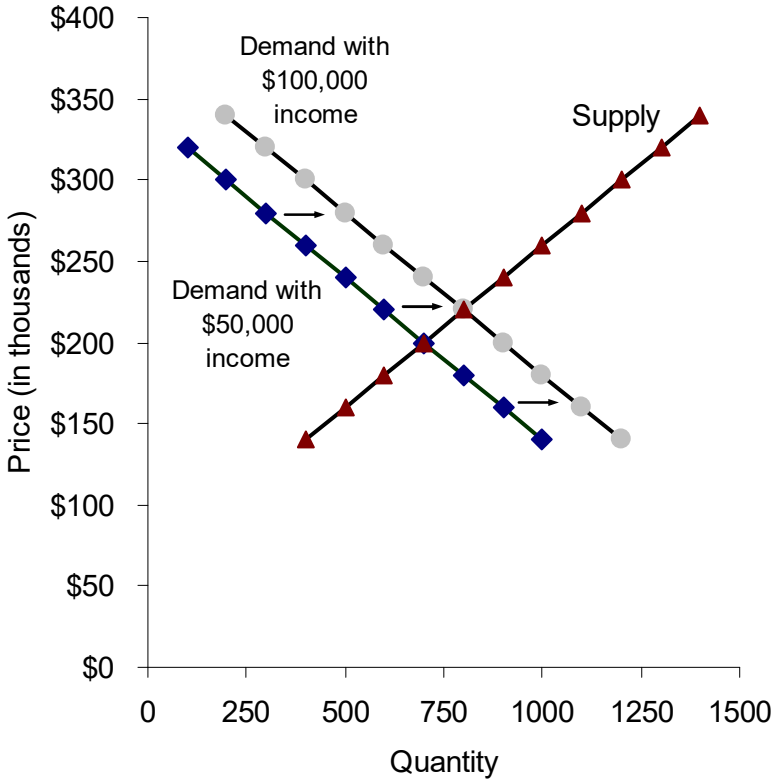
Case 1 Discussion

Income affects demand and there will be a shift of the curve because the change (economists call this a perturbation of the equilibrium condition) is caused by something other than the price. What direction is the shift? Demand will increase, so the shift is to the right. To illustrate, the data below are repeated from the last two chapters.

Data Pt	Price	Quantity Demanded		Quantity Supplied
		Income=$50,000	Income=$100,000	
	$340,000	0	200	1,400
1	$320,000	100	300	1,300
2	$300,000	200	400	1,200
3	$280,000	300	500	1,100
4	$260,000	400	600	1,000
5	$240,000	500	700	900
6	$220,000	600	800	800
7	$200,000	700	900	700
8	$180,000	800	1,000	600
9	$160,000	900	1,100	500
10	$140,000	1,000	1,200	400

Examining the data above and the graph on the next page tells us that there will be a new equilibrium price and quantity. The equilibrium price will rise to $220,000 and the equilibrium quantity will rise to 800 homes. How does this occur? At the initial equilibrium price of $200,000, buyers with their increased income wish to buy more homes (900) than are available (700). Thus a shortage of 200 homes results (900 minus 700). Recognizing the shortage (the increased demand), sellers will begin to raise the price. As the price rises, sellers will desire to sell more homes (from 700 homes to 800 homes). And with the price rise, the quantity demanded will fall from 900 homes back to 800 homes. The shortage will be eliminated and a new equilibrium established.

Case 1 Graphically



Reminder of Case 2

Again, assume that there is a market for homes that begins in equilibrium. In this case, the change that occurs is an increase in the price of wood. How do we analyze this situation?

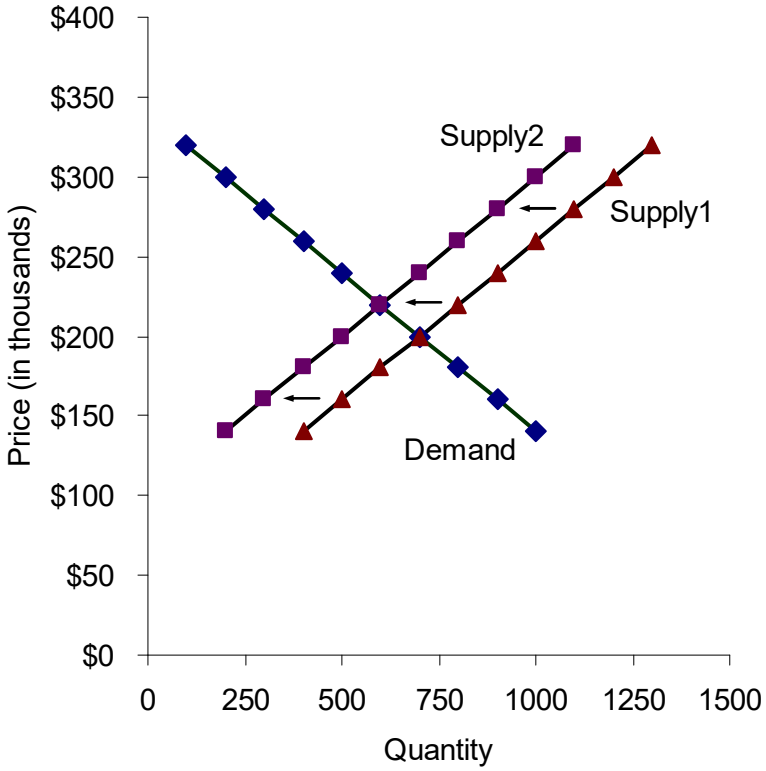
Case 2 Discussion

Since wood is used in the construction of homes, this will inflate the cost of production. Costs of production affect supply. There will be a shift in the curve since this is a non-price change. (A price-oriented change would dictate movement along the curve.) Will the shift be to the right or to the left? Since costs are increasing, supply will decrease which is a shift of the supply curve to the left. To illustrate, let's say that supply will decline by 200 homes per price point; this is shown in the table below.

Data Point #	Price	Quantity Demanded	Quantity Supplied	New Quantity Supplied
	$340,000	0	1,400	1,200
1	$320,000	100	1,300	1,100
2	$300,000	200	1,200	1,000
3	$280,000	300	1,100	900
4	$260,000	400	1,000	800
5	$240,000	500	900	700
6	$220,000	600	800	600
7	$200,000	700	700	500
8	$180,000	800	600	400
9	$160,000	900	500	300
10	$140,000	1,000	400	200

From looking at the numbers above and the graph on the next page, you can see that the price of homes will rise to $220,000 while the quantity of homes sold will fall to 600. How does this occur? As production costs go up, selling homes becomes less profitable. Sellers are willing to sell fewer homes at every price, a shift from Supply1 to Supply2 on the graph. At the original equilibrium of $200,000 buyers still want the same number of homes, 700. But sellers are only willing to provide 500. The result is a shortage of 200 homes (700 minus 500). Recognizing the shortage, sellers will raise the price. As the price rises, buyers will buy fewer homes (from 700 to 600) while the quantity supplied will rise from 500 homes to 600 homes. The shortage will be eliminated and equilibrium restored. Note that in all of our examples economists would be using the term *ceterus parabus* that we learned in second chapter, meaning "all other things being equal." It is rare that only one issue or change impacts a particular market at one time. Life, as they say, happens all at once. But examining one thing at a time is necessary for understanding the principles.

Case 2 Graphically



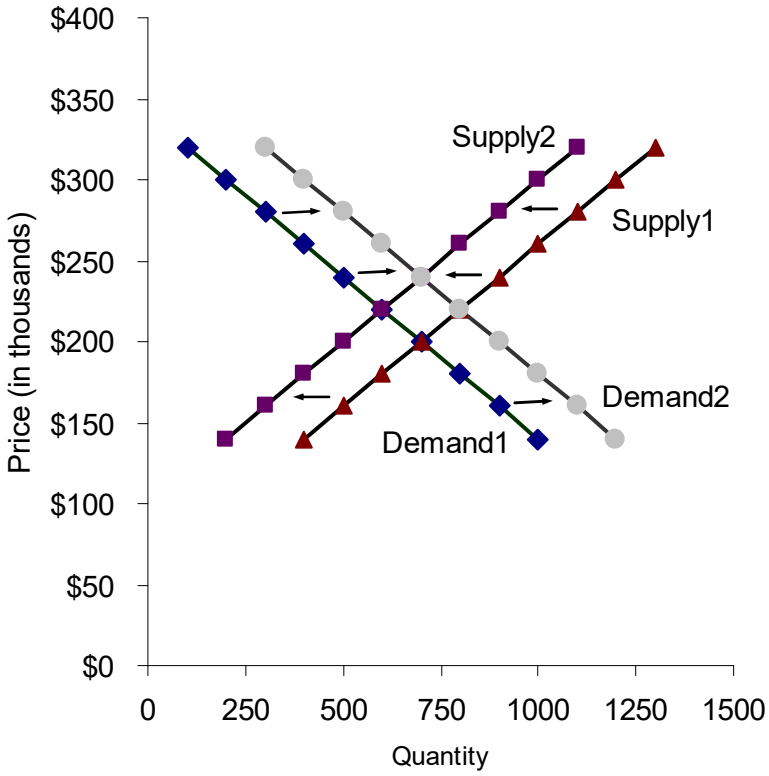
Reminder of Case 3

Assume that the market for homes begins in equilibrium. In this case, the change that occurs is that buyers and sellers both expect the price to rise soon. How do we analyze this case?

Try to answer on your own before clicking to the answer on the following page.

Case 3 Discussion

Both buyers and sellers are affected by the expectation of rising prices. Since expectations are a non-price determinant of both demand and supply, both the demand curve and the supply curve will shift. The demand curve moves to the right because buyers will desire more homes now before the expected price increase. The supply curve shifts to the left because sellers will be reluctant to market their homes if they feel the price will be higher in the near future. As shown in the graph, if the demand curve shifts to the right and the supply curve shifts to the left, we definitely know that the price of homes will rise. What we cannot say for certain is what will happen to the quantity of homes traded. Alone, an increase in the demand for homes will make the quantity of homes rise. Also alone, a decrease in the supply of homes will make the quantity of homes fall. If both happen at the same time, it is not possible to know what will happen to the quantity traded unless we know which of the two shifts is greater and the precise slopes of the curves.



The Range of Market Structures

We will now shift gears slightly and consider market structures. A standard way that economists classify industries is by how much power any particular company can exert to affect the price of the product. It is useful to group industries into four general types.

- Perfect Competition
- Pure Monopoly
- Monopolistic Competition
- Oligopoly

Perfect Competition

The “perfectly competitive” industry is largely a descriptive learning tool dreamed up by economists. Nothing is perfect (a sad fact of life). But there is much to learn from the four criteria that would characterize a perfectly competitive industry.

The first is that there are so many sellers that no one seller can affect the price by herself. Think of purchasing gasoline and assume that the price is $3.00 per gallon. If one seller decided to charge $4.00 per gallon, drivers would simply drive down the street to the next station.

This leads to the second criteria; all buyers and all sellers have perfect information. Each knows what the price is, what others are charging, and all relevant features of the product. A rational buyer would never pay $4.00 for a gallon because everyone knows that there are sellers willing to charge $3.00.

Third is that there is easy entry into and exit from the industry and the fourth is that the industry’s products are identical. Octane of 90 gasoline is the same no matter where you get it (though the oil companies may beg to differ).

While we used the example of a gasoline retailer, where it fails to be perfectly competitive is criteria three, easy entry and exit. It is not so easy to become a gasoline franchiser, build a station, or purchase a mini-mart. And it is not so easy to quit once involved due to the capital invested.

Pure Monopoly

At the other end of the market spectrum is pure monopoly. "Mono" means one. Therefore, a pure monopoly is an industry with only one firm or seller. This company will have considerable ability to affect the price in the market. Two characteristics are necessary for monopoly power to exist. The first is that there must be high barriers to entry, otherwise when the company set a high price and earned large profits, new sellers would enter to compete with it. Then competition would drive down prices, erasing the monopoly profit. The second is that the demand for the product needs to be relatively inelastic. Basically that means that there are few substitutes. If there was a good substitute available, when the company raised its price, consumers would simply shift to the other substitute product. This would limit the company's ability to raise the price. An electric utility is a good example of a monopoly (prove for yourself why this is the case).

Monopolistic Competition

The final two market structures we will discuss are between the extremes of perfect competition and monopoly. In monopolistic competition, there is one seller but a very elastic demand for the product. The monopolistic portion results from there being one seller of the narrowly defined product (only one Big Mac from McDonalds). The competition portion comes from other products that are close substitutes (Whopper from Burger King among others). Most real-world competition takes this form. A company in this industry can raise its price and not lose *all* of its sales, but it will lose a significant amount. This limits the power of a particular company to affect the price. Because products are differentiated (unlike in perfect competition), monopolistic competition involves considerable use of advertising.

Oligopoly

The last market structure we will consider is oligopoly. "Olig" means "few." Thus, there are only a few sellers in this type of industry. Only a few companies means that each seller has an ability to affect the price. Most often this means between two and ten companies. Auto makers and oil companies are two examples. In oligopoly, a firm's decisions must consider not only the response of consumers but also the response of the other firms.

It would obviously be much simpler to predict the responses of the other firms in the industry if the competitors just would meet to discuss their decisions. The meeting of companies in an oligopoly where they coordinate decisions (particularly about the price) is known as a cartel. For the most part, cartels are largely illegal in the United States. On a world basis, most famously there have been cartels in petroleum (e.g. OPEC).

In summary, if we put the market structures in order of the ability of producers to affect the price of their product from least power to the most, it would look like this.

- Perfect Competition
- Monopolistic Competition
- Oligopoly
- Pure Monopoly

Note that even a pure monopoly does not have the power to set *any* price. Consumers always have the option to not buy the product.

So What Sort of Market Structure is Real Estate?

Real estate has substantial variation. Some real estate can be quite competitive. For example, there may be many buyers and sellers for three-bedroom ranch homes. Plus there is the limitation of geography in real estate. On the other hand, there are few buyers and sellers for funeral homes and shopping malls. Thus, real estate should be considered on a range as far as market structures are concerned.

Scaling in the Real Estate Market

Appraisers need to understand and if necessary explain to the client the scale that is used in any particular analysis. On page one of the URAR the price range of the neighborhood is asked for; this may be an entire suburban community and include homes from 1,000 square feet to 5,000 square feet. This differs from the three-bedroom ranch homes in the same community which you may ultimately be seeking for your comparable sales analysis.

Market Value in Appraisal and Economics

From USPAP we define market value as “a type of value, stated as an opinion, that presumes the transfer of a property (i.e., a right of ownership or a bundle of such rights), as of a certain date, under specific conditions set forth in the definition of the term identified by the appraiser as applicable in an appraisal.”

The “definition of the term” noted in the description above is pre-printed on the current URAR form. In part this reads, “The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller, each acting prudently, knowledgeably and assuming the price is not affected by undue stimulus.”

The important thing to notice about market value as used in the appraisal context is that it is an opinion and a probability. It could be said that appraisers are trying to predict the future and in a way are creating that future. Economic thinking and in particular the interplay of supply and demand is the cornerstone of the appraiser’s construction of market value.

Final Case Study Using Supply and Demand Analysis

We will close this chapter by bringing together aspects of everything we have learned about supply, demand, and equilibrium into a single case study. Try to work through the answers on your own before clicking ahead.

Let us assume a neighborhood called Adams. Due to zoning, it is composed exclusively of apartments and is populated by low-income residents. We will also assume that residents tend to stay in this neighborhood. Rents are a very high percentage of peoples' incomes.

Question 1: Would the demand for apartments in this neighborhood be relatively inelastic or relatively elastic?

Question 2: Draw the demand and supply curves based on your answer to the question above. Label the equilibrium price and quantity.

Question 3: Assume that the government creates a rent subsidy program. In this program, the tenant is required to pay 25 percent of their income in rent. Up to a limit, any additional rent is paid by the government. For example, a low-income person with an income of $800 a month would be required to pay $200 in rent. If the rent is $500, the other $300 would be paid by the government. Draw the changes on the graph and label carefully.

Question 4: Instead, assume that the government decides to provide a subsidy to builders to construct apartment buildings in this low-income neighborhood. A certain percentage of their costs will be paid by the government. Draw this on the graph.

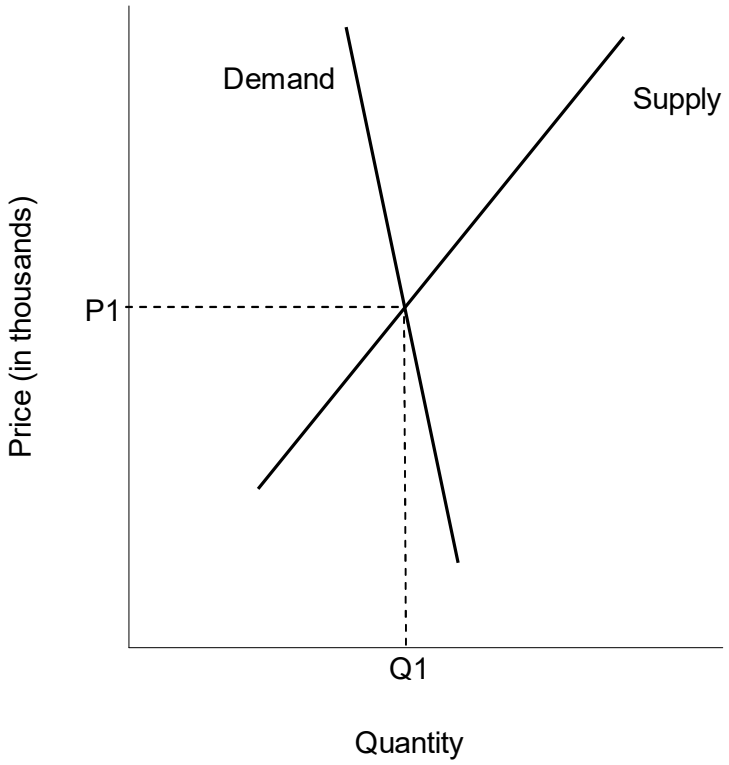
Answers to Final Case Study (Questions 1 and 2)

Question 1: Would the demand for apartments in this neighborhood be relatively inelastic or relatively elastic?

Answer: The demand would be relatively inelastic because there are few substitutes for the apartments in this area (due to zoning). However, a case could be made that demand would be relatively elastic because the rent is a high proportion of the tenant income.

Question 2: Draw the demand and supply curves based on your answer to the question above. Label the equilibrium price and quantity.

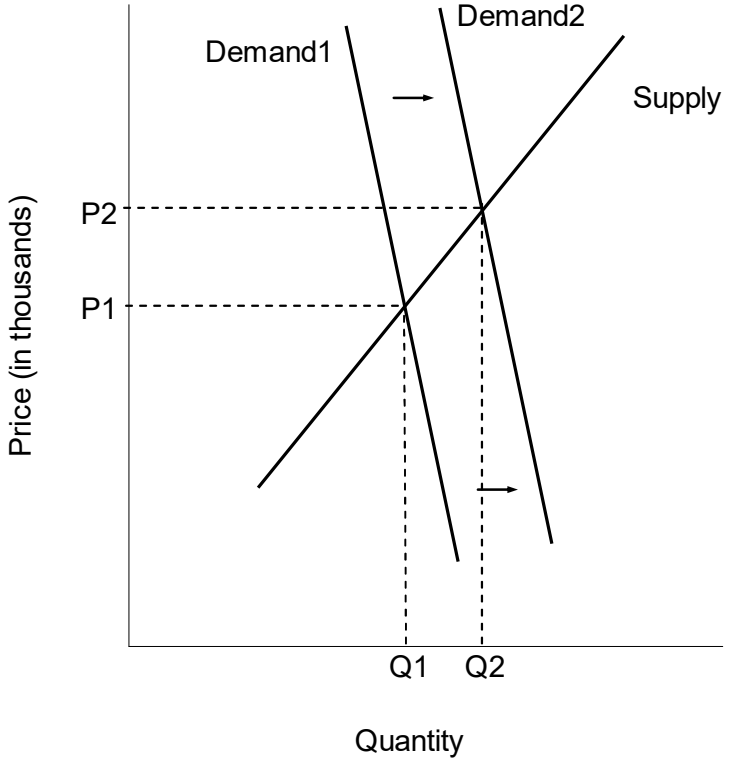
Answer: An inelastic demand curve should be graphed as steep. See below.



Answers to Final Case Study (Question 3)

Question 3: Assume that the government creates a rent subsidy program. In this program, the tenant is required to pay 25 percent of their income in rent. Up to a limit, any additional rent is paid by the government. For example, a low-income person with an income of $800 a month would be required to pay $200 in rent. If the rent is $500, the other $300 would be paid by the government. Draw the changes on the graph and label carefully.

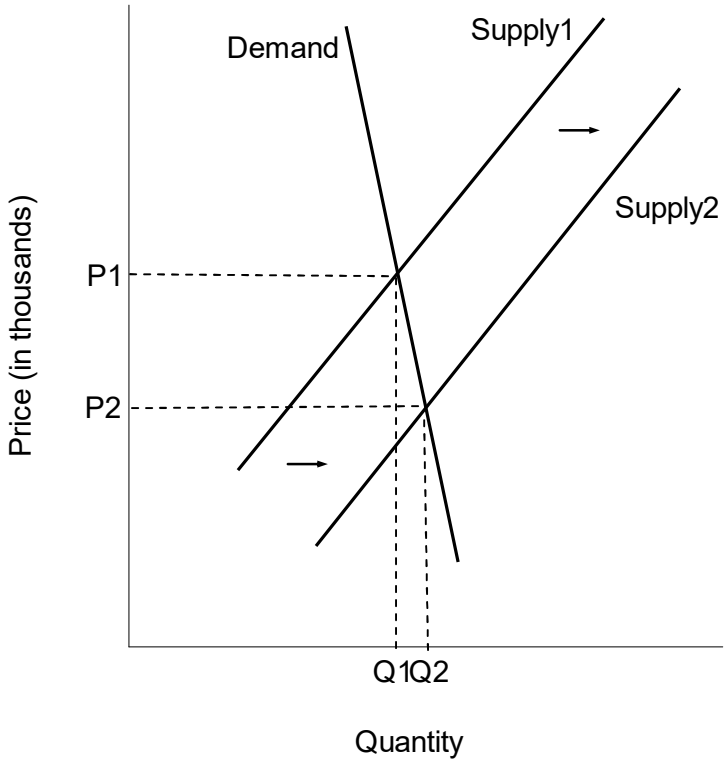
Answer: The payment by the government should be viewed as an increase in income for consumers. As we know, income is a non-price determinant of demand. More income increases the demand for apartments and this would be shown as a shift of the curve to the right. This creates a shortage of apartments at the original price and as a result overall rents rise. The quantity of apartments supplied also rises (a movement along the curve) until the new equilibrium is reached. See the graph below.



Answers to Final Case Study (Question 4)

Question 4: Instead, assume that the government decides to provide a subsidy to builders to construct apartment buildings in this low-income neighborhood. A certain percentage of their costs will be paid by the government. Draw this on the graph.

Answer: The subsidy to builders can be viewed as a reduction in production costs. With lower costs, supply increases. This is a shift in the supply curve (to the right) since the change is a non-price determinant. This creates a surplus at the original price which causes rents to fall. The quantity of apartments sold increases over the old equilibrium quantity. If demand is relatively inelastic, the largest effect is the decline in rents, and quantity traded increases only a little. Tenants and apartment owners both gain from the program. But with inelastic demand, tenants gain the most.



Summary

In this chapter, we have brought supply and demand together to develop a market-clearing price or what economists call an equilibrium condition. We have defined and graphed market surpluses and shortages. In addition we have examined market structures from perfect competition to monopoly. Finally, with case studies we have looked practically at the intersection of supply and demand and how equilibrium is sometimes a moving target.