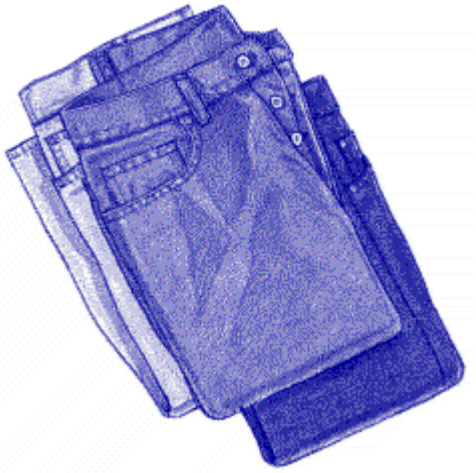


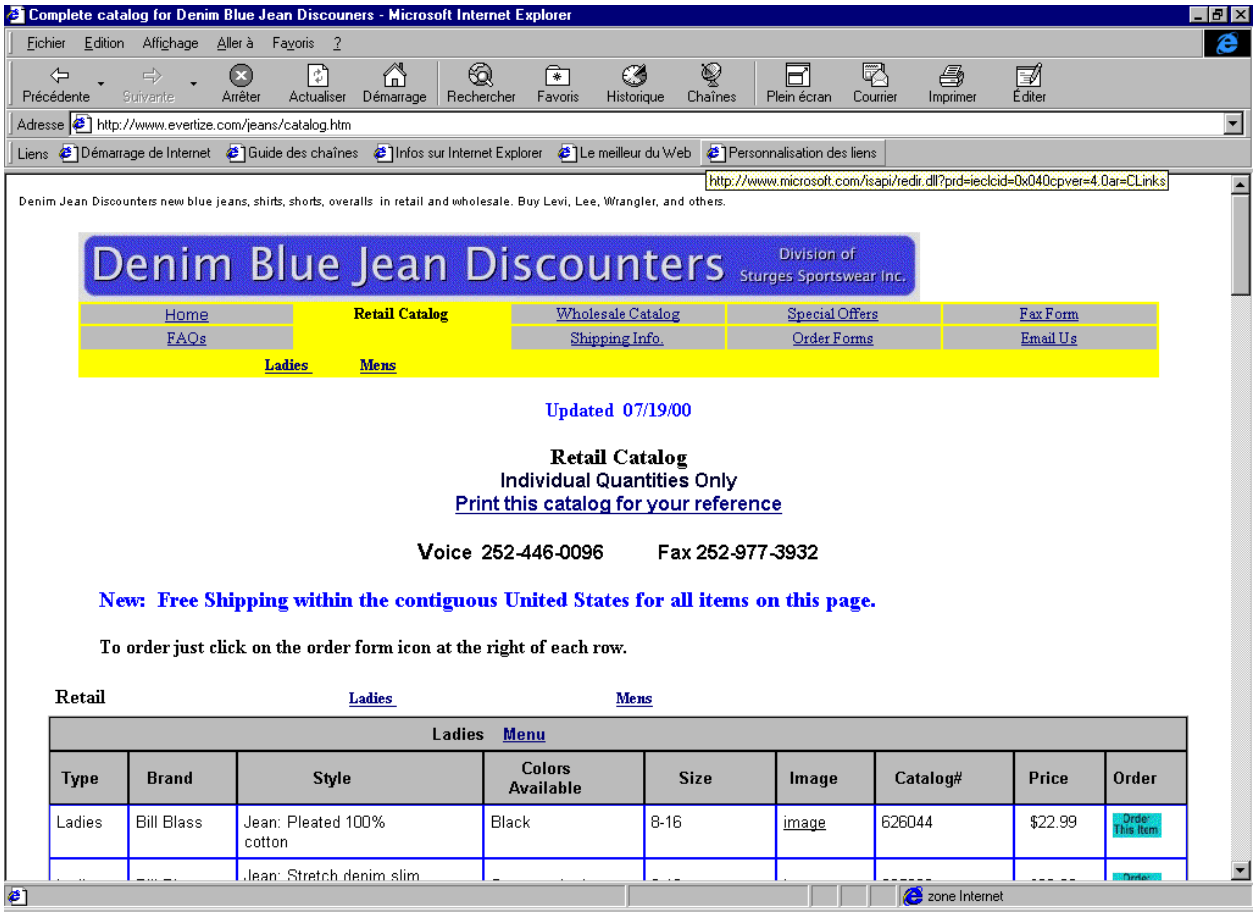
## Explorations in Economic Demand, Part I

Bob is really excited about next year at the University, which starts in two weeks! But his parents just dropped a bombshell: he is going to have to buy all of his own clothes for the fall semester. (And this is NOT a virtual university!) Oh no, he's never paid for his own clothes! And he really wants more of his favorite blue jeans (whose brand shall be nameless since we don't want to give plugs, but it does start with L and end with 501). Well, at least he knows his own **TASTES**! And Bob wants **lots** of pairs so he won't have to do laundry between visits home! Then Bob looks at his tattered and outdated sneakers and wonders how long they will last. What good are great blue jeans if the sneakers are too weird? Sigh. Time to do some research and figure out how to manage this.

"OK," Bob thinks, "I can figure this out. I'll just get on the Internet and find what I need to know. I wonder what the **PRICES** of blue jeans are these days? Perhaps the web site of a certain company L will have some information about the jeans and the prices." Hmmm, Company L has lots of great graphics and information, but it doesn't post prices. Wonder why? Bob finds another web page that explains a bit about policies on retail pricing of jeans. This is useful information which tells Bob that he needs to do some price comparing. A bit more searching and there they are -Maxtron Jeans Wholesale and Denim Blue Jeans Discounters- prices of exactly what he wants in both new and used. Additional sites can be found by using search engines. *What are the range of prices from these outlets?* Allright! Bob is ready to think about how many pairs he can buy.

Oops, he's not quite ready to plan how many pairs he can buy. "Let's see," thinks Bob. "Two more weeks of work before school starts and the part-time job has been paying an **INCOME** of about $200 per week. No way can I buy the 8 pair that would last from one home visit to another without hitting the laundromat. And then there is the issue of new sneakers **(RELATED GOODS)**. Time to be realistic! For sure my rich older sister Jackie won't help me! Maybe I could talk to my boss, Tina, and work a few more hours to increase my **EXPECTED INCOME**. Hey, I'll bet they'll have a 'back to school sale' next week and **EXPECTED PRICES** will be lower. Maybe I should wait to buy some of the blue jeans."

Bob works an extra five hours this week and the blue jeans prices do come down by several dollars. He manages to buy 4 new pairs of blue jeans, new sneakers, and the shoe store throws in a new t-shirt to promote their sale. Bob has a gloriously successful first semester in his blue jeans and his economics class at the University!




### For Discussion

Bob considered every major element that determines how much of a product a buyer purchases.

***1. Review Bob's decision process. What are these elements or determinants of amount purchased?***
***2. Consider each of these elements or determinants individually (one at a time): if that determinant increases, how does that affect the amount of the good that is purchased?***

## Explorations in Economic Demand, Part II

### The Demand Relationship

### The Determinants

Economists approach the analysis of demand for a product by considering each of the same determinants or elements Bob considered in Part I. These determinants are:

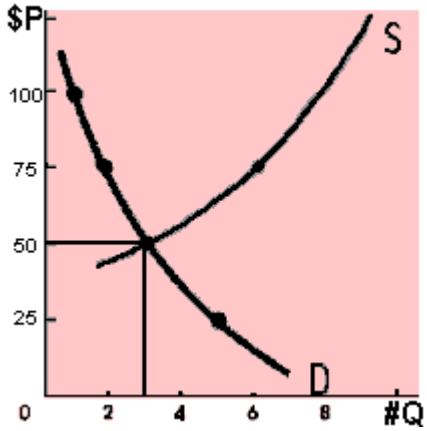
1. Price of the good;
2. Taste or level of desire for the product by the buyer;
3. Income of the buyer;
4. Prices of related products: substitute products (directly competes with the good in the opinion of the buyer) or complementary products (used with the good in the opinion of the buyer);
5. Future expectations: expected income of the buyer, expected price of the good;
6. For the total market demand (rather than Bob's individual one) the number of buyers in the market is also a determinant of the amount purchased.

To allow us to think about all of this logically and simply, we imagine each determinant by turn changing while the others do not change. We analyze, for example, a price change by assuming that the other determinants are "given" or fixed. How many pairs of (L-501) jeans will Bob buy at **each possible price**, if his taste for blue jeans, his income, the prices of sneakers or baggy shorts, and his expectations about future income and prices, do not change? Then when we understand the impact of price, we consider each of the other determinants by itself. When we finish, we will have a convenient tool or framework to consider **any** combination of determinants at once.

**The Role of Price**

Economists give prices a special place in this analysis. **The DEMAND CURVE is defined as the relationship between the price of the good and the amount or quantity the consumer is willing and able to purchase in a specified time period, *given* constant levels of the other determinants--tastes, income, prices of related goods, expectations, and number of buyers.** In the diagram, the line labeled "D" shows a plot of that demand curve, say for blue jean prices and number of pairs demanded. Prices are P (in $) and quantity is Q (in number of product units) on this diagram. At a price of $75 (vertical axis), two pairs are demanded (Q on horizontal axis). As the price P on vertical axis is lowered from $75 to $50, the quantity demanded Q is increased from two pairs to three pairs of blue jeans. Although this price-quantity demanded relationship is obvious to Bob and any other struggling consumer, several formal reasons can be given. Two important explanations are the (1) **income effect**--as the price per pair is smaller, Bob can buy more pairs with his fixed income without giving up buying other goods, and (2) the **substitution effect**--that there are other goods that he regards as substitutes for L-501s and when L-501s become more expensive he might switch to wearing other clothes, such as baggy shorts.

**Diminishing marginal utility** might also come into play--as Bob buys more and more pairs of blue jeans, his increase in satisfaction with having yet another new pair falls, so the price he is willing to give up also falls. After a few new pairs, the thrill is gone (or at least it's declining)!

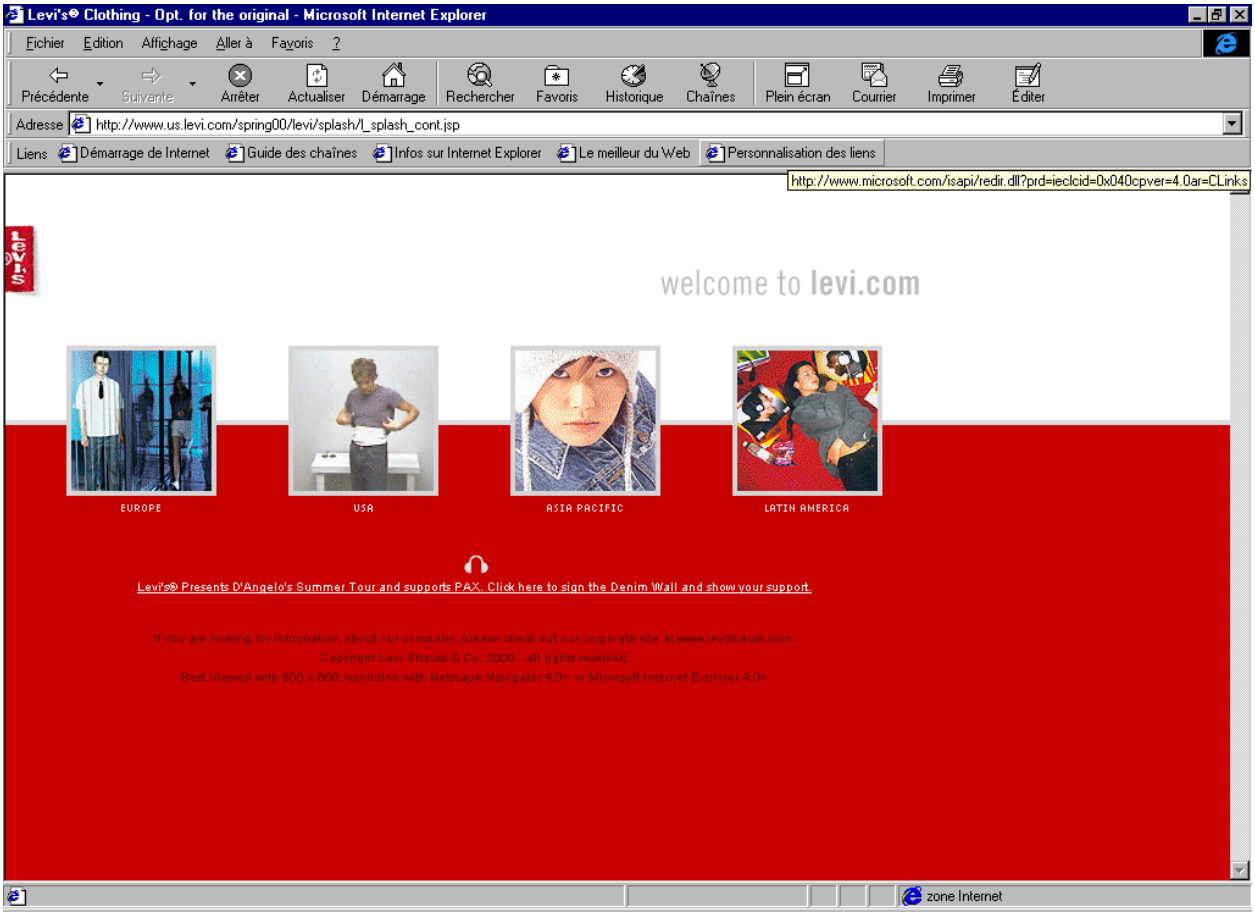



**A Word About Supply**

The diagram shows that the equilibrium price $P_e$ at $50 cannot be determined by demand alone. To find the market price, we need to compare the amount consumers will buy to the amount sellers will offer at each price. The sellers choices are shown by the supply curve "S," illustrating that sellers offer more quantity for sale as the price they will receive rises. The reasons for this are in another lesson (to be linked here, but not yet implemented).

**Summary to this point:**

We have learned the determinants of the quantity of a good consumers will purchase. These are often separated into two categories, (1) the good's price, and (2) the "non-price" determinants--consumers' tastes, income, prices of related goods, expectations about income and prices, and number of buyers in the market. We have learned that price plays a special role in the way we analyze this--we start by considering various potential prices and the quantities demanded, given a fixed level of the other (non-price) determinants. We have also learned how to show this P-Q relationship in a demand curve. But how do we show the impact of the other (non-price) determinants? This is the subject of Part III.



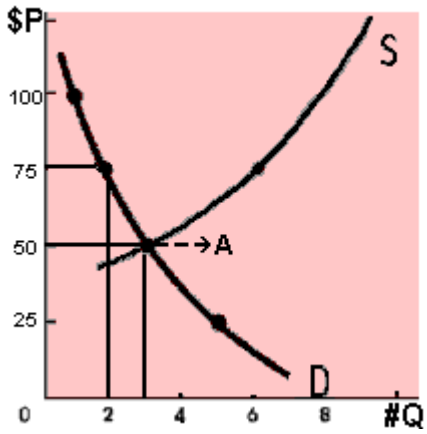

# Explorations in Economic Demand, Part III

## Shifts in the Demand Curve

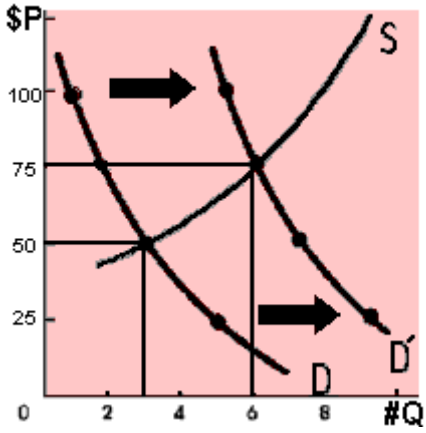
### Income

Bob managed to increase his income by working a few extra hours. How would this affect the quantity of jeans he purchased, **given the other things that determine his demand? As we figured out in Part I, with a higher income the number of pairs he'd buy will RISE at the current price ($P_e$). This is shown as point "A" on the diagram, where more Q is demanded at the same price $P_e$. Now consider what might happen at some prices other than $P_e$. What effect would an increase in income have if the price were lower than $P_e$ (but constant at that lower level)? Bob would also buy more jeans in that case, so the point of purchase would again be to the right of the demand curve D at that lower price. And if the price were constant but higher than $P_e$, Bob would increase his purchases of blue jeans at that price if his income rises. In other words, at higher incomes for the buyers in this market, the whole**

**demand curve would lie to the right of the original demand curve. This** we call a "shift in demand" cause by an increase in the income level. It is shown in the next diagram. According to this diagram, what happens to the equilibrium price P and quantity Q when the income rises? Yep, more folks want the product so the price will go up! Sellers will provide more, too, at higher prices, so the equilibrium quantity purchased rises.




Now we can see the special role of prices in the diagram: **we always show the relationship between prices and quantity demanded of a good or service on a single demand curve**, e.g. D1. But the **position** of the demand curve, how many pairs Bob and everyone else buys at **each** price, depends on the level of the non-price determinants such as their income levels. When price changes and other demand determinants are constant, the outcome is given by an equilibrium on the same demand curve D1 (for example, imagine the supply curve shifting and demand curve constant). We call this change on one curve a "change in quantity demanded." If a non-price determinant changes in such a way as to increase demand, this is a "shift in" or just "change in" the demand curve such as from D1 to D2. This also provides a nice framework for us to figure out what happens to price and quantity purchased when **any** of the non-price determinants changes! What if Bob's tastes change, and he decides he actually **prefers** baggy shorts? At each price, he buys fewer pairs of jeans, so his demand curve "shifts" to the left rather than the right. If lots of consumers have the same change in their clothing tastes, the market demand curve shifts to the left, the price falls, and the equilibrium quantity purchased/sold falls.




In Part I, we discussed how each of the price and non-price determinants will affect Bob's decision. In Part II, we developed the most important graphical tool in all of economic analysis: the demand and supply diagram. In this section, Part III, we put Part I and II together to see how non-price determinants affect--cause a shift in--demand curves. At this point, either tackle the

supply curve or go to the self-quiz and practice your understanding of demand concepts on the first two questions (other questions might involve supply analysis also.) The self-quiz requires a browser that can handle frames.

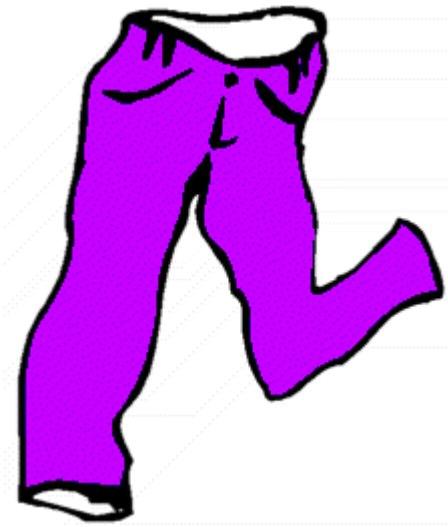
## Explorations in Economic Supply, Part I

***Concepts covered:*** law of supply, fixed and variable resources, fixed and variable costs, law of diminishing returns, change in technology, change in resource prices.

Your friend Bob, who could barely afford to buy bluejeans (see the demand analysis), decides he wants to be an entrepreneur and buy a plant to produce bluejeans. Company L does quite well, right? So why not get "into jeans" himself? After a brief market analysis, Bob makes his first good decision: not to attempt to differentiate his product by specializing in fuchsia colored denim jeans. So **blue** denim jeans it will be, and he has many things to think about before opening the doors on this production operation! He has asked you to be his business partner and to help him examine some of the decisions that have to be made. Although you both have some important investment decisions and expected return calculations to make about the purchase of the plant and equipment itself, those are beyond our concerns here. For more information about small businesses, you can check out one of the sites about this topic, for example, Online, Inc, and Small Business Exchange

(http://home3.americanexpress.com/smallbusiness/resources/starting/biz_plan/index.shtml?aexp_nav=hp_ads).

In these web pages, we'll restrict the analysis to your decisions about ***how many pairs of jeans you would be willing to supply, i.e., offer for sale***. What determines how many pairs you might produce and offer for sale each month from this plant? As in the investigation of demand for bluejeans, there are several considerations that the **buyer** or **demander** will take into account. Likewise, you as **producer** and **seller** must also consider several things when making the decision about how many pairs of bluejeans to offer for sale.



As in the demand analysis, the price of the product will be one of the most important determinants of how many you offer for sale. Why? Let's start with a common sense approach.

Your objective is to earn a profit ("maximize profits"), where profits are the difference between your total revenue and total cost. Since the sale price of a good is your revenue, **a higher price encourages you as seller to produce and offer for sale more pairs of jeans**.

This "***Law of Supply***" is common sense, but there are also some specific reasons for the positive relationship between **quantity supplied** and **produce price.** The most important reason has to do with productivity and the unit costs of producing and selling jeans, which we will analyze in Part II.

Are there other conditions that might affect how much you offer for sale? What are the other influences or **determinants of supply**? What if TECHNOLOGY CHANGES--for example, you

discover a new device for sewing machines that increases productivity (increases the number of bluejeans that can be made per hour)? Or perhaps you have to pay higher RESOURCE PRICES (e.g. wages). If the jeans had a special government TAX or SUBSIDY, that would also influence the supply relationship. If your EXPECTATIONS ABOUT THE PRICE of jeans is that they will be much higher next month, that would influence how many you offer today. Finally, if you produced other goods (e.g. shirts) using the same resources, the PRICE OF THE OTHER GOODS PRODUCED would influence the supply of jeans. Sounds like all of these are important!

**Summary so far:**

Price is an important determinant of the quantity of a good supplied. The **"Law of Supply"** states that the amount offered for sale rises as the price is higher. The quantity of pairs of jeans you are willing to offer for sale rises as their price is higher primarily because you need to cover the rising costs of production in your plant. Let's explore that in Supply, Part II.

In Part II, we will explore the relationships among productivity, costs, and price. We will develop a ***supply curve*** **without** considering changes in the other determinants of supply: technology, resource prices, taxes or subsidies, expectations, and the price of other goods produced by the same seller. We will "hold constant" these other determinants in Part II to highlight the role of the impact on costs as output changes. But of course these other influences do change, so in Part III, we take up the matter of changing the other conditions surrounding production: technology, resource prices, taxes or subsidies, expectations, and the price of other goods produced by the same seller.

**For Discussion**

Consider the major influences or determinants of supply to make decisions about how much to produce and offer for sale.

**1.** ***What are these determinants of the amount supplied?***
**2. What will happen to the quantity of jeans you will supply if the price goes down (and other determinants are constant)?**

## Explorations in Supply, Part II

Goal of Part II: work out the ***supply curve*** (relationship between price and the quantity supplied) **without** considering changes in the other determinants of supply discussed in Part I (no changes in technology, resource prices, taxes or subsidies, expectations, and the price of other goods produced by the same seller). So suppose these other things don't change (until Part III). Under those circumstances, why would it take a higher price to encourage you to supply a higher quantity of goods?

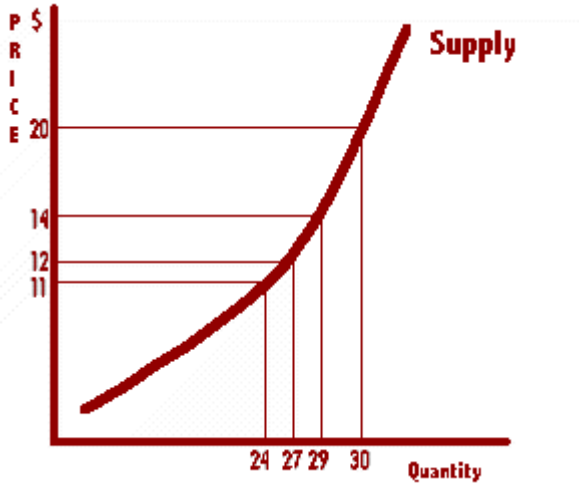
Let's start with a bit more information about your potential bluejeans production operation and apply some basic economic cost ideas. If you go through with the purchase, you will have a plant (building) and some equipment--for example, sewing machines. This is the capital stock when your enterprise opens its doors. Economists separate supply analysis into the ***short run*** and ***long run***: in the short run, your plant and equipment is a fixed or constant and thus is a limiting factor of your production. In the long run, none of the factors of production are fixed so you could expand or contract the size of the plant and equipment. **Thus, the short run is not defined in terms of months or years, but as a period of time certain production conditions hold constant.** Since you and Bob are considering a particular building and set of equipment for this analysis, your analysis should be "in the **short run**". Later, if things go well, you might want to

expand, but for now we are limited to the given resources. Roughly speaking, the costs associated with these fixed resources are called **fixed costs**.

What else do you need to produce bluejeans? Of course--to produce the jeans, you'll need some employees to work with the equipment. Here you have more options. You figure that you can hire any number of employees that you might want at the same wage rate per hour. You could hire only one person, who would have to run around like a dervish from one piece of equipment to another trying to keep production going, or you could hire more employees to keep the plant running smoothly, or you could hire a whole crowd of employees to run the plant at highest capacity, perhaps even 24 hours per day. In this last case, you might have so many employees that they get in each other's way, not to mention the heavy wear and tear on the equipment from running continuously. Since your labor force is not "fixed" in number of employees, labor is a **variable resources** and labor cost is part of your **variable cost**.

These costs rise (beyond some point) as production increases because of the ***"Law of Diminishing Returns,"*** e.g., the last unit of variable resource (worker) added to fixed plant and equipment is less productive than the unit added just before. This is not because of any lack of skills or other defect of the new worker. Also, it does not mean that this particular new worker produces less than the other workers produce **after** the new worker starts the job! The decline in marginal output occurs because each and all workers have less fixed capital (plant and equipment) to work with after more workers are added. Now to the point about supply and price: **Since the objective of the producer/seller is to earn a profit, the rising marginal cost per unit as more is produced causes the seller's required product price to rise**.

If you would like to delve into some numbers illustrating the Law of Diminishing Returns and marginal costs, an addendum has been provided for you to digress to at this point. Otherwise (or if you went, welcome back), let's go on to show the supply data and the supply curve.



| Supply Data | |
|---|---|
| Price | Quantity Supplied |
| $11.00 | 24 |
| $12.00 | 27 |
| $14.00 | 29 |
| $20.00 | 30 |

This supply data is shown as a supply curve in the diagram. The curve shows what you've just figured out: a higher price is required for a higher quantity of output to be supplied, i.e., the **Law of Supply**. We could also say that **the supply curve is positively sloped, showing a positive relationship between price and quantity supplied.**

## Explorations in Supply, Addendum to Part II

As promised , here is the more detailed cost analysis behind the supply curve. Consider the following hypothetical table showing various numbers of employees, the total labor cost assuming a wage of $10 per hour, and the total output you expect these workers will produce:

| Employees | Tot Labr Cost/hr | Total Output | Marginal Output | Average Labor Cost | Marginal Labor Cost |
|---|---|---|---|---|---|
| Number | C | Q | Change in Q | C/Q | Ch. in C/Ch. in Q |
| 10 | 120 | 20 | | $6.00 | |
| 11 | 132 | 24 | 4 | $5.50 | $3.00 |
| 12 | 144 | 27 | 3 | $5.33 | $4.00 |
| 13 | 156 | 29 | 2 | $5.38 | $6.00 |
| 14 | 168 | 30 | 1 | $5.60 | $12.00 |

Remembering that these figures are hypothetical, let's take a look. The 11th person hired increases labor cost/hour to $132 and output to 24 units. This is an average labor cost per unit (labor cost/output units) of $5.50 and a marginal cost per unit, the addition to cost per unit of output (change in cost divided by change in output), of $3.00. As more employees are added, both labor cost and output product rise. But at some point, because we are adding workers to a fixed size of plant and equipment, we find that adding one more worker does not increase output by as much. This is shown in the marginal product (or marginal returns) column by the falling marginal product.

The falling marginal product as labor is added shows the famous ***"Law of Diminishing (Marginal) Returns."*** **As one more unit of a variable resource (labor) is added to a fixed resource (capital), beyond some point the additional (or marginal) output from the last unit of the variable resource will be lower.** Here is the basic point: beyond some number of employees, each additional person you hire adds to the level of production per hour, but adds less to production than the person hired just before. Since the last person costs just as much as the person before but doesn't add as much to production, your cost per unit of producing jeans rises. Whereas the 11th worker added $3.00 to marginal cost per unit, adding the 14th worker adds $12 to these marginal production costs. Would you be willing to hire this last person? Well, sure, if you could get the "right" price for the jeans! That's why it takes a higher price to induce you to supply more goods.

Of course, you will have other production costs also, since you must buy the materials for the jeans. If these other production materials cost a constant $8 per pair, then adding $8 to the

marginal cost column should show the minimum price you'd be willing to accept for producing and selling various quantities of blue jeans. In other words, this would be your supply data!

**For Discussion**

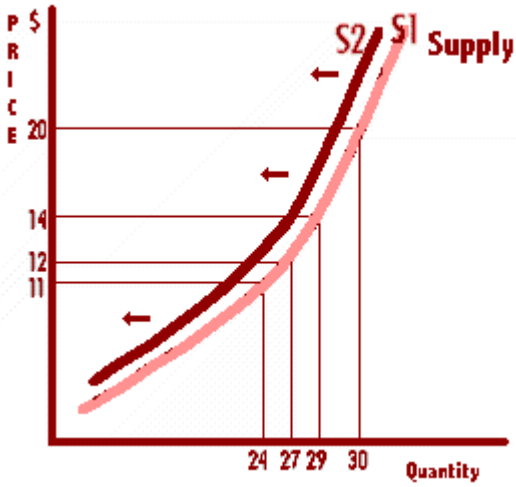
1. Why is the supply curve positively sloped? What do the Law of Diminishing Returns and productivity have to do with the supply curve? What does this mean for the relationship between price and quantity supplied?

## Explorations in Economic Supply, Part III

Nice going! You and Bob, co-owners of the new bluejeans finishing plant, have figured out how important the selling price is in your decisions about how many pairs of bluejeans to supply. And you are certainly aware that other determinants of supply are important too! Indeed, changes in technology, resource prices, taxes or subsidies, expectations, and the price of other goods produced by the same seller are no less important as changes in price.

Oh oh! The $12 wage rate at which you started to hire labor is not enough to hire the level of skills that you need. It appears that you are going to have to pay at least $16 per hour for the workers hired. Using the same other assumptions as before, how will this affect the amount you are willing to sell? The supply curve is still critical, but clearly it won't be the same supply curve as we used before. The production levels from hiring resources is the same as before and so is the the productivity of labor. You just blew it when you estimated the going wage rate!

Changes in these determinants of supply result in a new supply curve, and we say that the supply curve has SHIFTED from the initial position to the new position. Here are the old and new supply relationships for our wage increase. The lighter curve is the original supply curve labeled S1. The darker curve S2 shows how the supply curve changes after the higher wage.



| **Supply Data** | | |
|---|---|---|
| Price | Price | Quantity Supplied |
| (wage $12) | (wage $16) | |
| $11.00 | $12.00 | 24 |
| $12.00 | $13.30 | 27 |
| $14.00 | $16.00 | 29 |
| $20.00 | $24.00 | 30 |

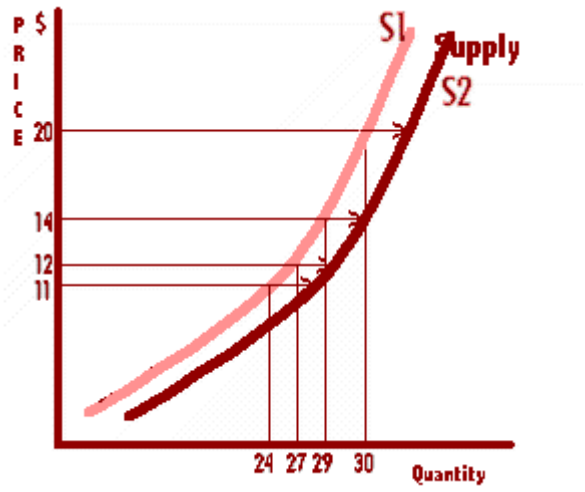
We could view the SHIFT in the supply curve as showing that it takes a higher price to provide the same quantity (as the table shows). **Also note that the diagram also shows that, for a particular price, say $14.00, a lower amount of the product will be supplied with the new supply curve.** We use different ways to describe:

(a) a movement along a constant supply curve, which only happens when the price changes, and,
(b) (b) a change in the position of the supply curve.

A **CHANGE IN QUANTITY SUPPLIED** means that only the **price** has changed and a new quantity is supplied along a constant supply curve. A **CHANGE (DECREASE OR INCREASE) IN SUPPLY** or a SHIFT IN SUPPLY means that a change in amount supplied occurs because of a change (shift) in the position of the supply curve. This SHIFT IN SUPPLY means that one of the other determinants of supply (technology, resource prices, taxes or subsidies, expectations, and the price of other goods produced) has changed. In our example, resource prices went up so that less is supplied at each price. This shift could also be called a DECREASE IN SUPPLY.

One of the most important determinants of the position of the supply curve is the technology of production. Check out some facts about the technology of producing bluejeans at Company L. Whoa, did you and Bob know how complicated this could be?? But you have a great idea for making each worker more productive, just a little change in the machines they work with, a wee change in the organization of production, and output will soar. The supply curve? This INCREASE IN SUPPLY can be shown as a shift of the curve to the right, an increase in the amount you are willing to sell at each price.

The second supply diagram shows an INCREASE IN SUPPLY, where again the dark supply curve S2 is in the new position.




**For Discussion**

1. What happens to the supply curve today if your expectations about the price **next** month change so that you anticipate significantly higher prices at that time? Yes, it shifts--which way? Why?
2. What happens to the supply curve for bluejeans if the price of another good you produce with the SAME resources becomes significantly higher? Why?
3. Consider each of the determinants individually (one at a time): if that determinant increases, how does that affect the amount of the good that you offer for sale?