Aggregate Demand & Aggregate Supply

In this section we will tie together in a graphical analysis the product, money, and factor markets. This is an extension of the IS-LM analysis we used earlier but with some additional assumptions and insights. First we will derive aggregate demand by using a new variable, price. Secondly we will discuss the various aspects of the labor market. From the labor market we will derive the aggregate supply curve. We will look at this framework from two perspectives, one, the case of wage and price flexibility, and two, wages inflexible downward. In each we will examine the effects of monetary and fiscal policy.

There are several important limitations to our analysis. One, we are focusing on the short run, consequently we are ignoring changes in capital. Secondly, we are ignoring dynamic indirect effects among the variables. Thirdly, we show a direction not strength of economic effects. These diagrams are meant to be used as teaching tools, not as a source of predictions or forecasts.

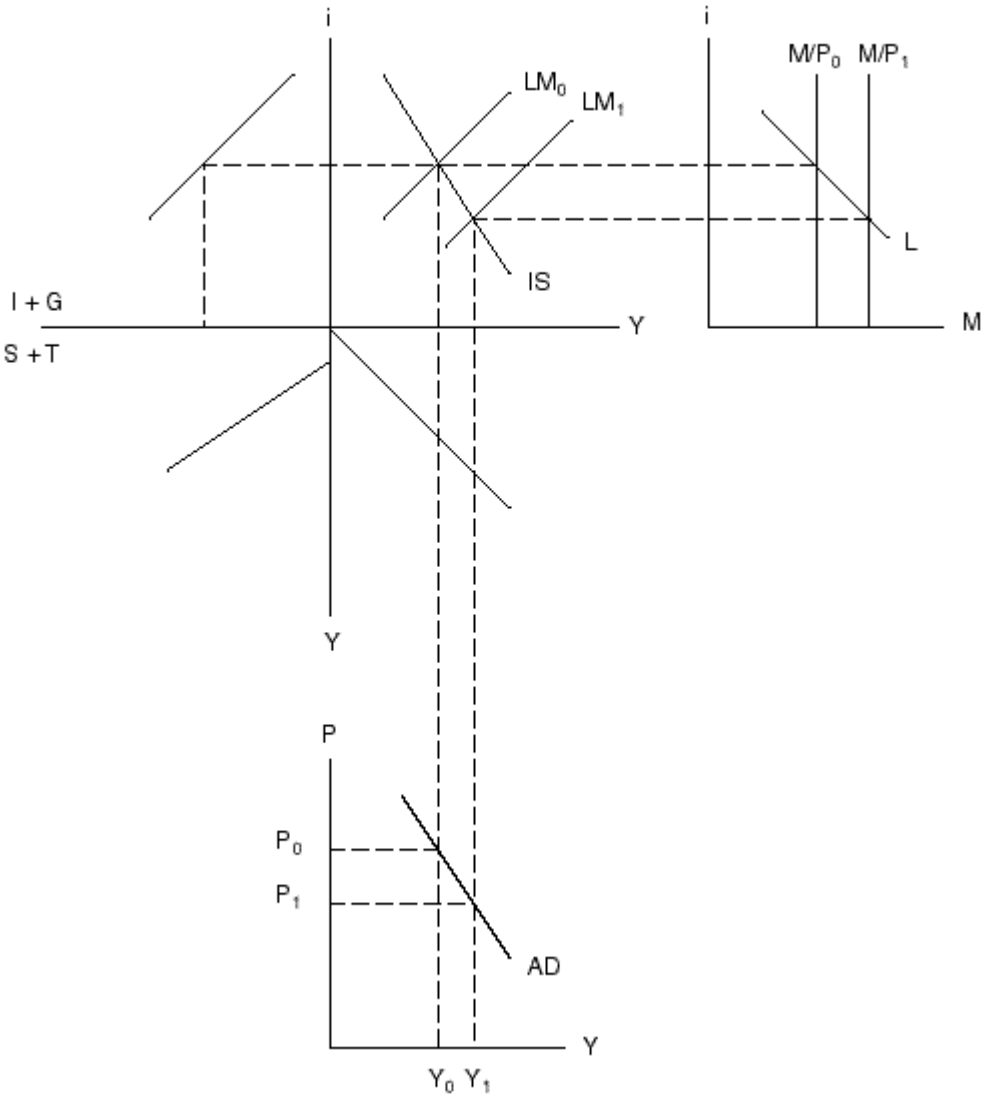
What should be achieved here is a basic understanding of how an economy works in the aggregate. That includes becoming familiar with some of the major relationships among key economic variables.

Derivation of the Aggregate Demand (AD) Curve

Before we drive the aggregate demand curve, we need to more precisely define income, Y. In this case, it is real income, the purchasing power expressed in terms of the goods and services it can buy. It is not nominal income, the current dollar amount of earnings.

We can extend the IS-LM framework to derive the AD curve be adding one new variable, the price level (P). The change from nominal to real variables is usually accomplished by dividing the nominal variable by a price index to calculate the real variable. For example, in Figure 1.0 we lower the price level from P_0 to P_1. The effect is to increase the real money supply (M/P). To see this let's substitute some numbers. Given that M = \$1,000 and P_0 = 2.0 then M/P (real money supply) = \$1,000 / 2.0 = \$500. Changing the price level to P_1, (.5) changes M/P to \$1,000 / .5 = \$2,000. Real money supply has increased from \$1,000 to \$2,000. This shifts the money supply curve to the right, which shifts the LM curve to the right. Now that we have two data points, (Y_0, P_0) and (Y_1, P_1), we can graph the AD curve as shown in Figure 1.0.

Figure 1.0

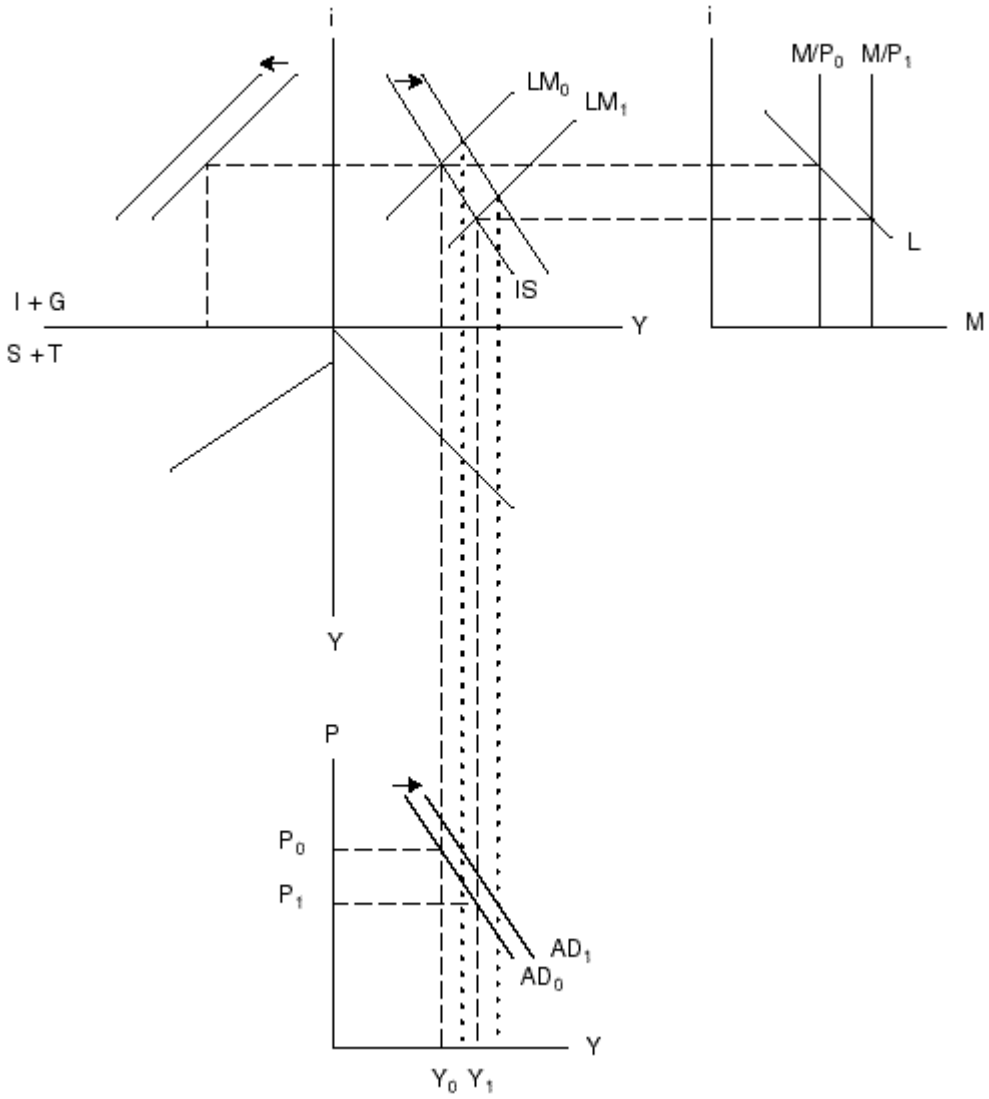


What is not obvious in the diagram above is that the AD curve represents the sum of the income-expenditures by the macroeconomic sectors (household, business, government, foreign). Another way of phrasing it, Y = C + I + G + X, where Y = AD. If government spending increases then aggregate demand increases. The two generic macroeconomic policies that we have been studying: fiscal and monetary policy, are really aggregate demand policies. Often called demand side policies, they may contain secondary effects that affect aggregate supply. For example, tax rate cuts may spur demand for capital goods which turn increase aggregate supply in the future. President Reagan's tax cuts in the 80's although often labeled as supply side policies, had more impact in stimulating demand. The best way to understand aggregate demand is the more money I put into your pocket, the more goods and services you are going to demand to buy.

4.2 Shifts in the Demand Curve

As shown in Figure 2.0, by engaging in an expansionary fiscal policy which shifts the MEI curve to the left which causes the IS curve to shift to the right. This is the same as in the previous analysis of government spending in the IS-LM framework. By following the dotted lines the shift in AD is made apparent. It shifts to the right. Expansionary monetary policy shifts the LM curve to the right which also shifts the AD curve to the right.

Figure 2.0



Expansionary fiscal policy, as discussed in IS-LM, will also shift the AD curve to the right. Conversely, contractionary monetary or fiscal policy will shift the AD curve to the left.

Before we can analyze the effects of these policies we need to add aggregate supply, the subject of the next module.

Aggregate Supply/Labor Market

We have discussed at length what determines aggregate demand, now it is time to shift our focus on what it takes to create those goods and services that we love to consume, in other words, aggregate supply. To do this we need to consider what resources are needed, which we will label capital and labor, and how we are going to accomplish this task, technology. This relationship is embodied in the production function. A mathematical equation establishing output based on inputs, it is expressed as Q = f(L,K,A). L (labor), K (capital), A (technology) are the inputs that generate Q, the quantity of output. Very often the level of technology is assumed so the production function is written as Q = f(L,K). If we assume that the level of capital is relatively stable in the short run, then output becomes a function of labor.

Q	5.5	6.0	6.4	6.6	6.7
L	100	200	300	400	500

As the quantity of input , labor, increases so does the quantity of input, labor, increases so does the quantity of output. However, the increase is not proportional. The interval from 100 to 200 produces .5 increase in output while fthe interval 200 to 300, .4. With constant increases in input, output is increasing but at a decreasing rate. This is called diminishing marginal returns. We calculate this marginal productivity of labor by dividing the change in output by change in input, which in this case is labor. We could perform this calculation on capital. Also called diminishing returns to scale, it is a common occurance in economics.

The question could be asked as to why labor would exhibit this tendency. Why isn't all labor equally productive? The answer is that not all labor is equally experienced, nor equally experienced at everything. When a firm hires for a new project, it seeks to hire experienced labor. If demand exceeds the pool of talent, then hiring inexperienced non-productive workers may be necessary.

There is that learning curve that we all face when attempting a new job or assignment. The first time that we do it frequently takes a large amount of time. After a couple of years worth of practice we can do it in our sleep. Firms pay more for experienced labor as the job gets done more quickly with fewer errors. As long as these workers are not overpriced, they will be hired before non-experienced individuals. This is one explanation for diminishing returns to scale as applied to labor.

To determine national output, we will need to first determine how much labor will be employed, the subject of the next section.

Labor Supply & Demand

What determines labor demand? Primarily it is product demand. As demand for autos increase, demand for workers to build those additional cars increase. When demand for an item or a factor (labor and capital are factors) is dependent on another demand, it is called a derived demand.

Another variable affecting factor demand is its productivity. There are several measures of productivity. The one we will focus on is called the marginal product of labor (MPL), the output generated by one unit of labor. If one labor hour can produce 6.50 pizzas then the MPL = 6.50. An alternative measure of productivity is the Average Product of Labor. Calculated by dividing total output by total input, is measures average productivity of the factor.

What affects productivity? Three major determinants will be discussed. First, education and trainning of the work force, Secondly, the quality of management, thirdly, the level of capital (investment) per worker, and finally technology.

The other major variable affecting labor demand is the cost of labor (factor cost). Higher costs lower demand. Those costs are usually thought of as wages but wages are not the total cost of employing

labor. Significant non-wage costs are health care benefits, hiring and training. These costs as a percent of payroll, frequently exceed 21%.

But it doesn't stop there, you need to consider the costs of supporting a typical office worker. Office space rent can cost $20 per square foot (granted this is prime space with a view). Let's say our new inductee is assigned one space in the cubicle farm. Each cubicle is 10 x 10, so it is 200 SF plus additional 20% for hallway area and we have 120 SF at $20 gives us an annual rent of $2,400. Add $1,000 for utilities, $2,000 for computer maintenance and upgrades, and you can see it costs nearly $5,000 to "maintain" this employee per year in costs not related to salary and wage.

Don't forget the upfront costs of buying and installing the cubicle complete with telephone and computer. That is easily $15,000!

One important assumption, that of a competitive labor market, needs to be explained in detail. A competitive labor market, by definition, has many buyers and sellers of labor services. Not one buyer (firm) nor any one seller (worker) can determine price. Everyone accepts the market price (wage). If one buyer of labor services wantes to pay less than the market wage, all laborers will forsake him selling their services to those willing to pay the market wage. Since there are plenty of jobs available, the cheap buyer will not find any one willing to work for him. Without labor, he cannot manufacture or deliver his good or service, therewithin, he goes into bankruptcy. There is an incentive to hire at market wages. A laborer for similar reasons will not be able to sell her services above the market rate.

Of course, reality is different. A competitive market assumes that all products are alike. Consequently a competitive labor market assumes that all labor services are alike. They are not. Not only are there differences in job skills, accounting vs mechanic but there are differences in skill level, bookkeeper vs CPA, tire change vs master mechanic. These differences can command earning differientials. A CPA usually earns more than a bookkeeper. Mechanics who can maintain racecars earn more than those who change oil.

Even within these labor submarkets there is a supply and demand. Labor supply and demand may approach the competitive ideal market as the number of participants rise.

Let's engage in a sidebar discussion on what affects wages. Productivity not only affects the overall level of wages but also wage differentials. Particularly in manufacturing and sales, higher output per employee and higher sales per employee generate higher wages. Low performers are paid less than high performance employees. In some work environments, individual productivity may not be discernable as output is generated by a team or group of employees. For example, an assembly line can move only at the pace of the slowest worker. Market structure can impact wages. If there is only one buyer of labor, termed a monoposony, then wage levels tend to be lower than in competitive factor markets. This topic is covered in more detail in courses in microeconomics and labor economics.

Increasing the relative ease in obtaining information about jobs and wages generally has a favorable impact on wage structure. However, wage gaps, due to discrimination, still exist on the basis of age, sex, race, religion, geographical location, etc. Although statistics from the Department of Labor suggest these gaps are closing, they are closing slowly. The bosses favorite nephew/nice will always have an advantage. Within these constraints, wages reflect supply and demand conditions.

We have already discussed some of the issues surrounding international trade's effect on labor in the product market but let's talk about its effect on demand for labor skills. International trade increases demand for labor skill in exportable goods and services while industries facing foreign competition experience decreasing demand for labor. In all industries in the trade sector competition forces labor to be more productive to compete globally. In the long run this increases standards of living.

So how do we tie these concepts together?

Let's say that Joe can bake 20 pizzas an hour. The price per pizza (after deducting the cost of dough, toppings, overhead etc) is $.70. Joe goes to his boss and says "I have developed a new pizza baking technique that allows me to cook 30 pizzas per hour. I think I deserve a raise to $21 per hour."

The restaurant makes more money as it sells more pizzas (profit is one of the costs we subtracted from the price to calculate net price). If it doesn't pay Joe more, Joe will take his pizza baking expertise to a competitor who is willing to pay Joe more to take some of your customers (and your profit). We are assuming that Joe's productivity is measurable and observable by competitors. Unfortunately most output is generated by teams so that individual productivity is dificult to discern by the employer and more difficult to observe by potential employers.

Notice here that productivity improvements increase Joe's wage level. In fact an economy must increase its productivity if it is to increase its standard of living. Joe's increased productivity may allow the restaurant to reduce the number of cooks it employs. This may be necessary as there is only so much demand for pizzas. In a dynamic economy, these laid off pizza chefs will find employment in related areas such as general cooks or seek a new occupation such as network engineer (after some training).

What happens if the product price falls? To answer that question, note that W represents the cost of hiring a unit of labor and that the quantity MPL * P represents the revenue associated with hiring a unit of labor. If costs are greater than revenue then lay off workers. Lay off your least productive workers. As the least productive workers leave, the MPL increases which causes the revenue to increase until W = MPL * P.

This rule applies conversely, if W < MPL * P, then hire more labor. As more labor is hired the MPL decreases causing the quantity MPL * P to decrease. When W = MPL * P, the process stops. In the competitive labor market for pizza cooks, we will assume that all workers are paid the same wage. Workers that have superior abilities will seek jobs that pay higher wages which probably will not be pizza work.

Why does MPL decrease as labor increases? It is because of diminishing returns to scale. Let's illustrate this with a simple example, the pizzeria. Starting out with a one cook we can serve 20 customers per hour. Adding another increases output by 15 customers per hour, but when we add another output barely increases by 5 because cooks start bumping into one another and are constrained by the capacity of the oven.

Looking at the pizzeria from a slightly different perspective, another constraint would be the size of the kitchen. Once the limit of the number of ovens due to limited space has been reached, no additional cooking can take place regardless of the number of chefs. Very often additional capital is needed to expand production which in this case would require additional kitchen space and cooking facilities.

There is another interesting relationship between the productivity of capital and the productivity of labor, productivity of either is dependent on the quantity of the other used. This is illustrated in the table below. Assume the market price of a pizza is $12, minus: dough and toppings costs of $3, and overhead costs (rent, managers salary, etc, that we will assume will vary with output) of $6, leaves an amount available to pay labor and earn profits of $3, which we will call the net price. Each oven costs $30 per period regardless of the quantity produced, which is designated as $k in the table. In this example, we assume that the pizzeria can sell all that if produces, that demand is not a constraint.

Table 4.1

Number of Cooks	Total Output	MPL	Number of Ovens	MPK	Wage	Net Price	MPL * P	$k	Profit
1	30	30	1	30	$20	3	90	30	30

2	45	15	1	45	20	3	45	30	65
3	50	5	1	50	20	3	15	30	60
1	40	40	2	10	20	3	120	60	40
2	75	35	2	30	20	3	105	60	125
3	95	20	2	45	20	3	60	60	165
4	100	5	2	50	20	3	15	60	160

Note that as the number of chefs increase, the output increases from the increased usage of the first oven. Consequently, the marginal product of capital (MPK), which is DQ/DK, rises until the production capacity of the oven is reached. Adding a second oven allows the first chef to bake an additional 10 pizzas. MPL increases to 40 compared to 30 for one oven alone, thus the MPK is 10. MPL for the third chef increases from 5 to 20, but MPK for the second oven is 45 as DQ/DK is (95-50)/1.

Applying the marginal benefits equal to marginal cost rule, from this table we can observe the quantity of labor that will be hired. With one oven two chefs will be hired, adding the second oven allows the the pizzeria to hire three chefs. This follows from the discussion above of hiring to the point W = MPL * P. Profitability is maximized at these points as shown in the table above.

In the last column profit is calculated by subtracting costs from revenue. In the first row total revenue is 30 * 12 = 360, less costs of materials and overhead, 30 * 9, less the labor costs of 20, and less the cost of the oven of 30 equal 330 in total costs which gives a profit of 30.

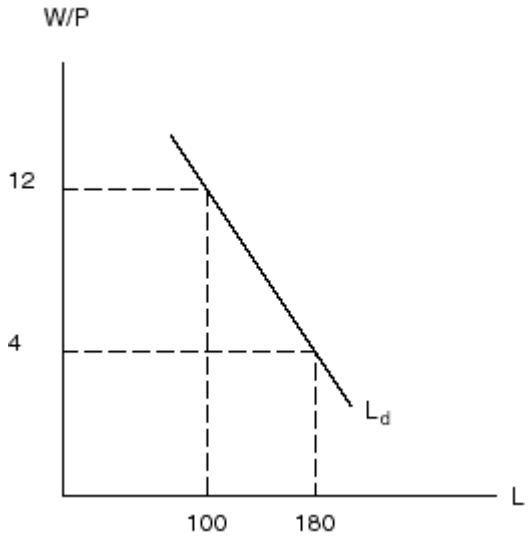
In constructing the labor demand curve, productivity and product price are shift factors. We plot labor demand based on wage and quantity of labor.

If product price increases holding everything else constant then demand for labor will increase. In the pizzeria example, if pizza prices increase to $15, then it would be profitable to hire the third chef using the one original oven. For productivity the situation becomes more complex, if demand is a constraining factor, then increasing productivity would cause a fall in demand for labor. If demand is not a constraint, then the firm will hire more labor until it maximizes profitability. In this case, profitability is the constraint. What is true at the firm level usually holds true at the aggregate level. Let's combine our knowledge of labor demand, supply , and productivity to determine aggregate supply.

Graphing Labor Supply and Demand

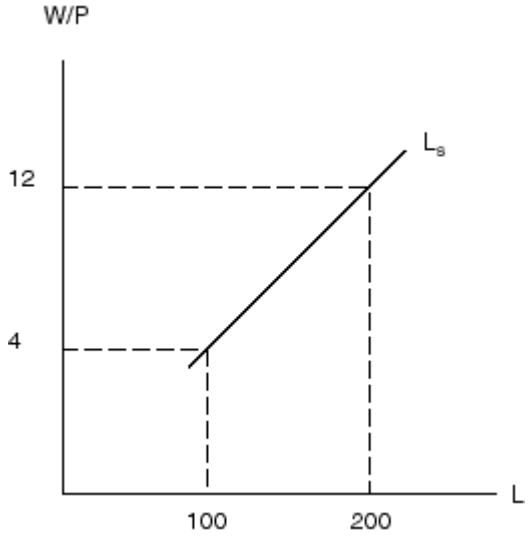
From figure L1, one can see that the labor demand curve is downward sloping. This reflects the fact that at high wage levels firms cannot afford to hire large quantities of labor.

Figure L1



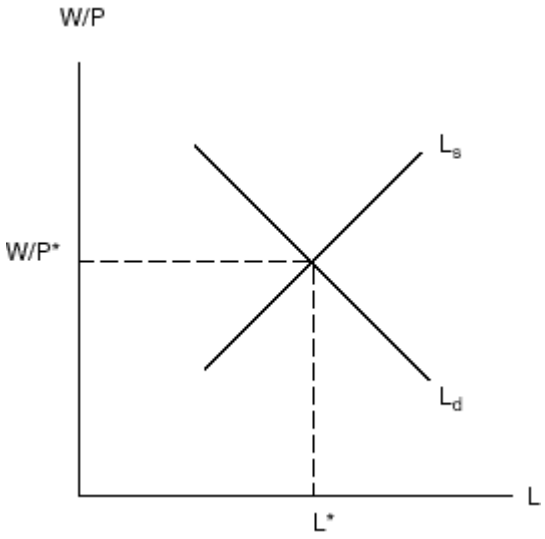
Labor supply is the inverse of labor demand. As shown in figure L2, as wages increase, the quantity of labor supplied increases. Labor supply is a function of population and labor force participation rates. People limit their participation due to a number of reasons such as child bearing, partial retirement, pursuit of education, pursuit of leisure, etc.

Figure L2



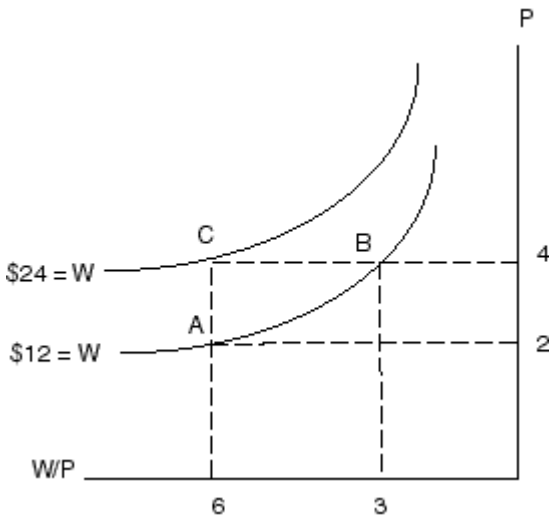
Putting together labor demand and supply in figure L3 gives us the labor market equilibrium.

Figure L3



One last item needs to be covered in detail on this diagram, the difference between the nominal wage, W and the real wage, W/P. The real wage , W/P reflects the nominal wage adjusted for purchasing power. This is achieved by dividing the nominal wage by a price index.

Figure L4



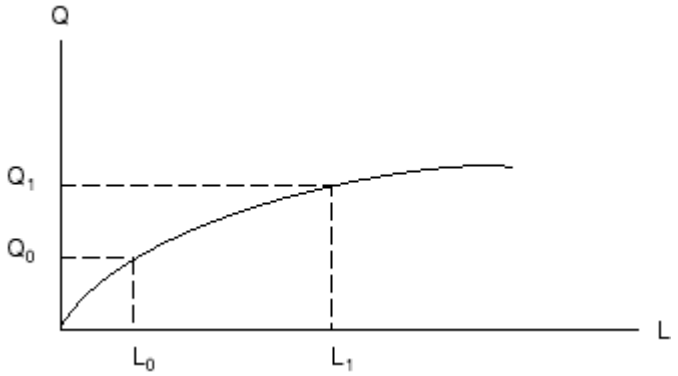
Consider figure L4, graphing the curve for w = 12 produces a hyperbola. At point A, with a nominal wage of $12 at a price level of $2 produces a real wage of $6. At point B, at a price level of 4, the real wage drops to $3 per hour. Returning to the real wage level of $6, if we expect to maintain that real wage when the price level increases to 4, then the nominal wage level has to increase to $24, as shown by point C.

To derive the Aggregate Supply curve, one more graph is needed,the production function. The production function reflects a given output level given a combination of inputs, also known as factors. Usually these inputs are grouped into two categories: capital and labor. Sometimes a third category, technology is added. Capital is thought to be relatively fixed in the short run. Investment increases capital stock. Investment as a % of GDP rarely exceeds 15%. Given consumption of fixed capital it is doubtful that capital stock grows more than 10% in any given year.

Labor is variable in the short run. Unemployment can easily double within a year. Therefore labor force fluctuations will have more impact on output than capital. However, capital spending changes are

thought by some economists to play a significant role in business cycles. Nevertheless we will assume that capital is fixed in the short run and that is doesn't affect short run economic performance.

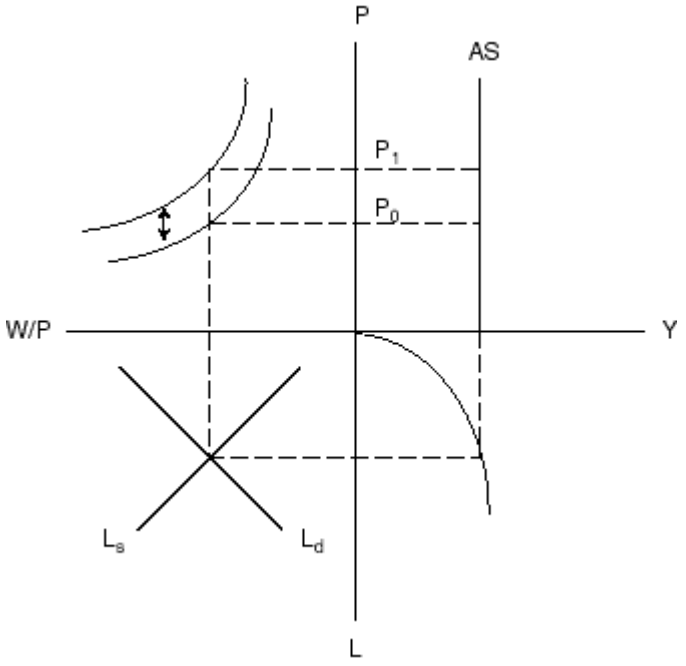
Figure L5



From figure L5, as labor, L, increases, output increases. We are now in a position to derive the AS curve. First we need to make one critical assumption, that money wages are flexible upward and downward. In figure L4 we showed that at a constant real wage the nominal wage has to change when the price level changes. This is somewhat of a brave assumption. That workers are willing to take cuts in nominal wages even if the price level falls does not fit very well with normal daily experience. We will return to this point a little later. In figure L6 is the complete derivation of the AS curve.

Note that the AS curve is vertical. Changes in the price level do not affect output. Output is equal to income since money income in a sense represents claims to that output. More output equals more income.

Figure L6

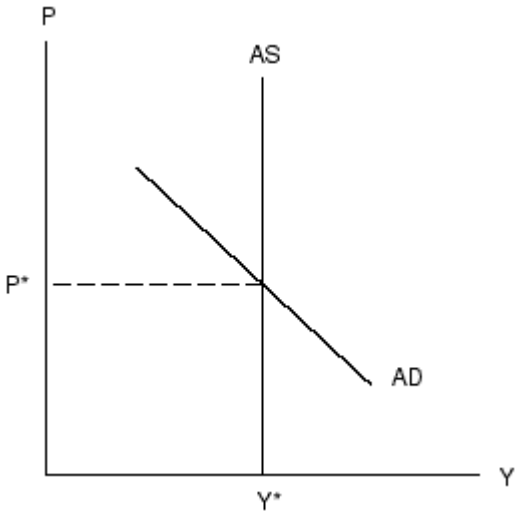


The output equilibrium is established in the labor market the southwest quadrant in our diagram. Given the level of labor employed, L*, we can determine the level of output it will generate given the production function.

Adding AD to AS in figure L7, we see that output is relatively fixed and that the price level varies with

aggregate demand.

Figure L7

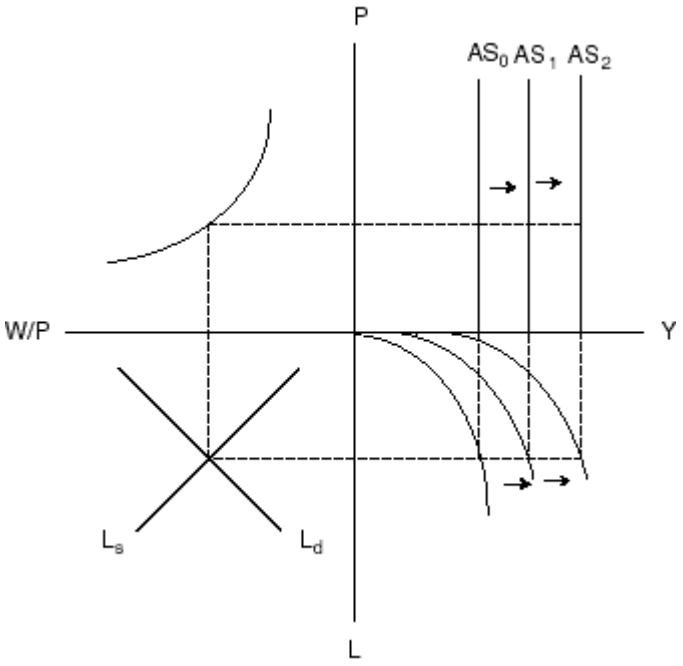


In this scenario, fiscal policy is meaningless. It contributes to inflation but does not increase output. That is because the economy is at full employment, and with capital fixed, output cannot change.

Increase in investment

How does an economy grow under these circumstances? Investment. Investment shifts the production function to the right thus shifting the AS curve to the right. This is one reason why investment is considered so important.

Figure L8

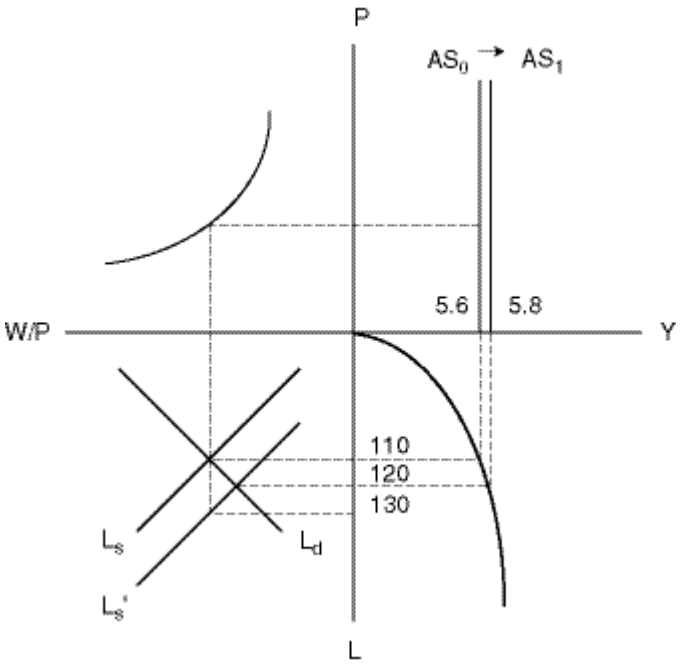


It is not just the accumulation of capital stock that shifts the production curve, it is also the advancement of technology. Research and development expenditures by both government and private firms contribute to technological advance. Improvements in operations contributes to productivity improvements. New techniques in manufacturing, new methods in service delivery, and new systems of

management all help to improve operational efficiency.

Traditionally economics has been concerned with the quantity of output but quality has importance as well. This may be measured only indirectly. A car that lasts eight years instead of five may cause annual production to decrease. Using automobile production as a measure of welfare it may seem that the economy would be declining but it must be remembered that resources are being freed to be used in other sectors of the economy. Consumer spending on other items will be increased, therefore consumer welfare is increased.

Figure L8b



Increase in labor supply

Consider what happens when there is an increase in labor supply. In figure L8b, there is an increase in labor of 20 million. Of those, 10 million will be employed, thus increasing aggregate supply from $5.6 trillion to $5.8 trillion. Technically we are still at full employment, all who want to work at the current real wage are working. This could be representative of a baby boom coming into the work place as they reach working age. Note that increase in labor increases output less than proportionately, hence MPL has decreased. What this means is the cohort of laborers adds very little to national output compared to the rest of the labor force. Since these are people in their early 20's, this scenario makes sense. People usually do not reach their maximum productivity until their 50's. In fact as America's population ages and as those baby boomers are now entering their most productive years, it would make sense for national productivity to rise as it has been doing just that.

What about an increase in labor supply due to immigration? Here we need to make an assumption about the relative productivity of immigrants compared to the native population. Many argue that the massive Latin immigration we have been experiencing is bringing workers with little job skills and a poor ability to communicate in English (shared by college freshman I would add). But does that mean less productivity? If these immigrants have a good work ethic and take jobs that natives do not want then possibly the answer is no. (My personal observations here in Florida suggest this may very well be the case.) US immigration law heavily favors immigrants with experience in skilled occupations such as computer technology and medical services. This would indicate higher productivity than the average population. The result in both cases is that immigration adds to the aggregate supply, possibly

increasing per capita income in the second case.

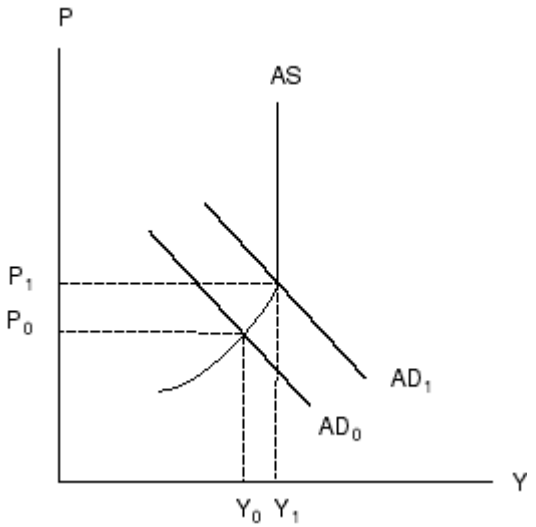
In the long run, it takes an increasing aggregate supply to increase national and personal wealth. There are really two choices, increases in productivity (which tends to increase per capita wealth) and increases in labor supply. To project GDP growth as a quick approximation add the percentage change in labor supply to productivity. For example, a 2% labor supply growth and a 2.5% productivity growth would imply that the economy could grow 4.5%

Wage Inflexibility

We had made the assumption that nominal wages were flexible upward and downward. Labor is interested in maintaining its standard of living, ie. W/P, the real wage should remain constant. It can be argued however that nominal wages are inflexible downward, or as the are sometimes called sticky wages. There are three main reasons why this may be true. One, there are legal constraints in the form of minium wage laws. In other countries these laws and regulations may be quite elaborate. In the United States there is some debate as to how much of a constraint the minimum wage law really is. Secondly, labor contracts constrain both wage cuts and employment flexibility. Again in the US labor unions are not as powerful as in other countries. Thirdly, there is a natural reluctance for anyone to take a pay cut. After a pay cut, most people are looking for another job. Some employers realize this, and also realize that the employees they would want least to go are among the first to leave.

Certainly the wage inflexibilities exist in the short run. However, given the choice of losing one's job or taking a pay cut, most people will take the pay cut (but very often find another job). Given inflation as a permanent condition then just merely holding one's income constant amounts to a loss of purchasing power (i.e. a pay cut). From this point of view one could argue that figure L9 represents a short term response and that figure L7 will look like the long term equilibrium. How long will the process take? I don't think anyone has the definitive answer but in studying the Great Depression, it's obvious it can take years.

Figure L9



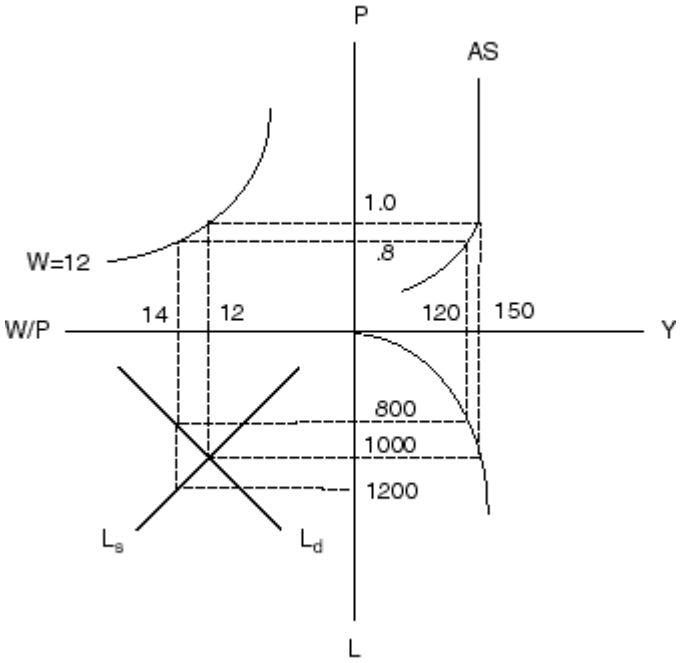
When is wage inflexibility a problem? Consider figure L9, if aggregate demand drops from AD_1 to AD_0, then because of wage inflexibility we have unemployment. The economy is in equilibrium at P_0,Y_0 despite the unemployment. Given an economy at P_0, Y_0, to get to full employment the government will need to adopt expansionary fiscal or monetary policies to shift AD from AD_0 to AD_1.

It is a point of contention among economists as to which model has more validity. Favoring wage

flexibility are the classical economists, monetarists, and others. On the other side are the Keynesians (named after the economist who was the first proponent of price and wage rigidities).

To analyze the effect of wage inflexibility downward, from a given point, lower the price level. From figure L10, at P=1, w = 12 then Y = 150. Lower the price level to .8 holding w constant at $12, then w/p = 12/.8 = 15, we see the labor demanded equals 800 and labor supplied equals 1200. We now have 400 unemployed. Output drops to 120. Now the AS curve slopes downward and leftward.

Figure L10



So what is more important in economics, aggregate demand or supply? Which comes first the chicken or the egg? Many analysts consider flucations in the economy in the short run to be driven by changes in demand and long term economic growth to be driven by supply considerations. That is not to say that there cannot be supply side shocks such as an oil crisis but that variables such as productivity are the key to increasing the standard of living in the long run.

AS-AD Classical Viewpoint

Classical economists argued that the economy would attain full employment equilibrium due to wage and price flexibility. They saw no need for government intervention. Key to maintaining equilibrium were several mechanisms. Say's Law - supply creates its own demand, flexible interest rates, and flexible prices. There are many variants on the classical case, but let's talk about unemployment. In the classical model, unemployment would put downward pressure on the wage rate until at the lower wages all that want to work are employed. In this model there is not downward wage rigidity.

Certainly there is some price and wage rigidity, but there can be a moderation of pricing and wage demands as shown by the recession in the early 90's. The classical model has some merit.

What hurt the popularity of the classical model was the Great Depression of the 1930's. Classical economists were at a loss to explain the length and severity or to have a solution for it. Unemployment during that time peaked near 28% in the United Sates. Europe as well as the U.S. experienced tough times. Germany was particularly hit hard, thus laying the foundations for the rise of the Nazi's and of course WWII. Milton Friedman's writings would ascribe some of the blame during that time to faulty monetary policy which, in reacting to an oversupply of credit to the stock market, cut the nation's

money supply in half contributing greatly to the misery. When the stock market crashed again in 1987, money and liquidity was pumped into the economy by the Federal Reserve causing the economy to continue its expansion. History learned is a new future created.

AS-AD Keynesian Viewpoint

In 1936, John Maynard Keynes published The General Theory of Employment, Interest, and Money in which he argued that an economy could be in an economic equilibrium yet still not achieve full employment. Among Keyne's many arguments were two main ideas: price and wage flexibility could not be relied upon as an adjustment mechanism to provide full employment because prices and wages could be sticky, and secondly savings is not a function of interest rates, but of income. Whereas the classical school argued that savings and investment are held in equilibrium by the interest rate, Keynes argues savings and investing are undertaken by different people with different motivations. People do not save to take advantage of high interest rates, therefore, interest rates may not be a sufficient adjustment mechanism to equate aggregate demand and supply.

This IS-LM and AS-AD framework was developed by the Keynesians although it is adaptable to explain a broader menu of ideas, not just those of Keynes.

AS-AD Monetarist Viewpoint

While the Keynesians argued that fiscal stimulus by the government was needed to end the Great Depression (and may people believed it was the stimulus of WWII that ended the Great Depression), another group called the Monetarists argued that money supply and credit have a more powerful effect on the economy. Their argument is the supply curve is very steeply upward sloping and, thus, increasing aggregate demand (shifting it to the right) causes a very large increase in the price level relative to a small change in outpost. Consequently, increasing the money supply to pump up aggregate demand serves only to increase inflation. Money supply should be controlled to limit inflation.

Fluctuation in output cannot be dampened by monetary policy due to lags in administration and impact. By the time a need for action has been recognized, action taken and effects felt, the recession has ended. The additional stimulus triggers inflationary pressures.

AS-AD Supply Side Viewpoint

Supply siders argued that by cutting taxes, incentives to work, save and invest would be restored to the economy, thus, cutting unemployment. Federal income redistribution programs were a drag to economic performance. Also known as the trickle down approach, it was thought that by providing more spendable income to the upper classes that their demand and investment would create more opportunities for the lower income classes and unemployed. The recession of the early 90's didn't help their cause.

AS-AD Modern Viewpoint: Consensus?

All of the viewpoints discussed so far have their supporters. Some of these "schools of thought" have evolved, thus creating new movements such as the Neo-Keynesians, Neo-Classical, New Monetarists, etc. It is not easy to understand all of the differences and subtleties of their arguments.

Nevertheless, as we shall see in the discussion of business cycles, there is a growing recognition that fluctuation in economic activity can arise from different causes, and that one solution doesn't always work.

Study Guide

Fill in the Blank

1. Labor supply is a function of _____.
2. The production function is a function of _____.
3. In the _____ run, capital is considered fixed.
4. Wages are considered inflexible downward due to _____.
5. Real wages are _____ adjusted by _____.
6. Fiscal and monetary policies generally target _____.
7. Marginal product of labor equals _____ divided by _____.
8. Labor productivity can be improved by _____.
9. _____ are included in labor costs.
10. Flexible wages imply _____ in the classic AS model.
11. Boosting aggregate demand in the presence of full employment creates _____.
12. Demand for labor is a function of _____, _____, and _____.
13. Exports ____ demand for domestic labor.
14. Imports ____ demand for domestic labor.
15. Factors crucial to plant location decisions include: _____.
16. Wages may reflect _____ within firms and local markets.
17. With wages greater than P * MPL, firms will hire _____ workers.
18. In the work-leisure trade-off, as wages increase above a certain level, hours worked will _____.
19. Demand for labor is a _____ demand from the product market.
20. If demand in the product market drops, then demand in the labor market will _____.
21. A tax reduction _____ aggregate demand.
22. Flexible money wages establish a _____ aggregate supply curve.
23. A vertical supply line _____ change due to a change in the price level.
24. An increase in investment in the short run increases _____.
25. A(n) _____ in labor supply decreases aggregate supply.
26. An increase in the money supply will increase _____.
27. An increase in government spending will increase _____.
28. Money wages that are inflexible downward create _____ aggregate supply curves.
29. Increasing aggregate demand, given a downward sloping aggregate supply curve will cause prices to _____ and output to _____.
30. Increasing aggregate demand, given a vertical aggregate supply curve, causes prices to _____, and output to _____.

Solutions

1. employable population
2. capital and labor
3. short
4. labor contracts, wage laws, labor reluctance
5. nominal wages, prices
6. aggregate demand
7. change in output, change in labor
8. trainning and education, better management methods, capital investment
9. wages and benefits
10. full employment
11. inflaton
12. real wage rate, productivity, product demand
13. increase
14. increase
15. proximity to local market, etc
16. discrimination
17. less
18. decrease
19. derived
20. drop
21. increases
22. vertical
23. does not
24. aggregate demand
25. decrease
26. aggregate demand
27. aggregate demand
28. downward sloping
29. increase, increase
30. increase, remain the same

True/False

1. Prices do not affect output under flexible wages assumptions.
2. Capital does not affect output under short run assumptions.
3. Real wages rise when prices rise faster than nominal wages.
4. Unemployment can exist in economics equilibrium in the prescence of wage inflexibility.
5. Additional capital increases labor output.
6. The Marginal Productivity of Labor typically increases as more labor is hired.
7. Investment shifts the labor-output curve upwards.
8. Labor demand is a function of product demand, and productivity.
9. Under the assumption of flexible wages, AS is considered fixed in the short run.
10. Under the assumption of sticky wages, AS is considered fixed in the short run.
11. Demand side policies under the flexible wages assumption are ineffectual.
12. Demand side policies include tax cuts.
13. Classical economics emphasized flexible wages leading to full employment.
14. Keynesian economics emphasized sticky wages with the possibility of unemployment.
15. Capital per worker has no effect on productivity.
16. Population size affects labor supply.
17. Management has an effect on labor productivity.
18. Generally, there is a correlation between productivity and national income.
19. Technology has no effect on productivity.
20. Trainning decreases productivity.
21. Wages reflect relative labor supply and demand.
22. Wage differentials reflect productivity differentials, generally.
23. When productivity is rising faster than wages, unit labor costs are decreasing.
24. Labor demand directly related to labor supply.
25. A general tax reduction has little effect on output given a vertical aggregate supply line.
26. Expansionary monetary policy decreases aggregate demand.
27. Expansionary fiscal policy, given a downward sloping aggregate supply curve, increases employment.
28. Policies focusing on labor trainning and productivity increase aggregate supply and therefore, output.
29. Given unemployment, an expansionary monetary policy increases output.
30. At full employment, an expansionary fiscal policy increases output.
31. A tax cut is considered an expansionary monetary policy.
32. Expansionary fiscal policy decreases aggregate demand.
33. A cut in government spending decreases aggregate demand.
34. A cut in government spending increases aggregate supply.

Solutions

1. True
2. True
3. False, real wages would decrease.
4. True
5. True
6. False, it decreases.
7. True
8. True
9. True
10. False, decreases in the price level trigger unemployment and lower output.
11. True
12. True
13. True
14. True
15. False, increasing capital per worker increases productivity.
16. True
17. True
18. True
19. False, technological improvement increases productivity.
20. False, trainning is one of the more effective means to increase productivity.
21. True
22. True
23. True
24. False, labor demand is directly related to productivity and real wage level; labor supply to real wage level and working age population.
25. True
26. False, it increases aggregate demand.
27. True
28. True
29. True
30. False, on the vertical portion of the aggregate supply curve, an increase in aggregate demand merely increases the price level.
31. False, a tax cut is an expansionary fiscal policy.
32. False, expansionary fiscal policy increases aggregate demand.
33. False, a cut in goverment spending is an expansionary fiscal policy that increases aggregate demand.
34. False, normally in the short run a cut in spending does not affect aggregate supply, given a vertical supply curve. It would decrease aggregate demand. Practically, in the short run, cutting government before the private sector has a chance to reallocate resources could cause a decrease in output.

Problems & Exercises

1. If hiring one more cook increases pizza production from 200 to 250 then what is the marginal product of labor?
2. If productivity increases 5% while the product price remains constant, then by what percentage can wages be increased or decreased?
3. If productivity is 50 pizzas per hour and the net price (dollars available for labor) per pizza is $.50, then how much could potentially be paid in wages?
4. If wages increase 4% and productivity increases 1%, then how much will prices need to increase?
5. From the data below, how many workers would be hired?

L	5	6	7	8	10
MPL	6	5	4	2	0
W	16	16	16	16	16
P	4	4	4	4	4

Answers & Solutions

1. (250-200)/1 = 50
2. increases 5%
3. 50 * .5 = $25
4. 4% - 1% = 3%
5. 7, MPL*P = W