AGGREGATE SUPPLY AND DEMAND

Reading Assignments:

Principles of Economics: Chapters 24 & 26
Madariaga: 34, 64, 82, 99

Our primary purpose in notes 7 is to revisit and further analyze the aggregate demand/ aggregate/supply model that we touched upon in notes 3, 4, and 6 and describe how it can be used to help understand methods of stabilizing the economy that have been developed since 1935. Before embarking on this discussion, however, we will briefly mention several earlier great thinkers in macroeconomics and their continuing influence, including John Maynard Keynes, who developed basic economic insights that form the basis of much current macroeconomic policy.

1. Great Thinkers in Economics of the past:

A. Adam Smith (1723-1790): We have already discussed his economic framework in notes 2. In 1776, in his seminal book, **The Wealth of Nations**, he developed a modern theory of a market economy which has guided the thinking of almost all economists, as well as the *current* economic policies of most countries in the world. He set forth the famous principle of the invisible hand, which leads producers, *if they are in a competitive situation,* and each following his or her own self interest, to make decisions which result in producing only those goods and services that people most desire, by the least expensive method.

I, and many/most other economists, would regard Adam Smith as one of the most influential economists of all time.

B. Thomas Malthus (1766-1834): Malthus argued that population increases rapidly at a geometric rate (i.e. 2, 4, 8, 16, 32, 64, 128, etc.) whereas the food supply grows at a slower arithmetic rate (i.e. 1, 2, 3, 4, 5, 6, 7, 8, etc.). Basically, population would always increase faster than the food supply.   In consequence, the bulk of humanity was always doomed to a subsistence existence. These ideas gained great popularity at the time and economics came to be known as *"the dismal science,"* a term still sometimes used to describe economics, especially by students. The population would ultimately be limited by starvation and disease.

Why hasn't the predictions of Malthus been borne out. Many different reasons can be postulated. Among the more important are:

1.　　the enormous outlet for excessive populations made possible by the discovery of the Americas;
2.　　the enormous changes in technology leading to a rapid rise in output;
3.　　and more recently, reliable and widely used birth control methods.

Laugh if you will, this was a widely accepted theory at the time, and used by some as a basis for a do-nothing public policy for poor people (since their number would always expand faster than output so any aid would be self-defeating),\. His theories may not have been as inaccurate as some of you may think. At the time that Malthus made these predictions, they came close to actually describing the world he lived in. Moreover, even today, in some parts of the world, perhaps mostly in Africa and the Middle-East, the Malthusian trap might still be occurring. India (including Pakistan), at the time the British took it over, was almost as prosperous as Europe. The introduction of modern sanitation and public health measures, along with other self serving policies, is sometimes credited with causing a population explosion which eventually led to conditions approximating what Malthus had predicted. Fortunately, India is emerging from this abyss, partly (I believe) due to aggressive population control measures.

China was the most populous country on the Earth when the communists took control. Sometime after the communists took over, rigid population control measures were instituted which most Americans were very critical of, and still remain so. China has now emerged as a major world economic power, with low but rising living standards for its citizens. Do you think any of this growing prosperity would have happened if China's population had continued to expand t its original rate?

C. Karl Marx (1818-1883): Karl Marx, though often reviled as one of the founders of communism, was also one of the greatest economic thinkers in history. He predicted the up and down cycles (boom and bust, see below) of western economies. He also had a gloomy view of the economy. Taking a cue from Malthus, he felt that population would expand rapidly and that there would always be a great army of unemployed workers willing/compelled to work for very low wages. Competition for jobs would drive wages down to where they would only support a subsistence livelihood. The need to survive would force all members of many families to work, including young children, a situation which was common even some 70-80 years ago among the poor in the world, and existed even in this country. In some countries it still exists, although greatly diminished in size. Little wonder that Marx believed that capitalism would necessarily lead to widespread discontent, a class war, and eventually revolution, which he thought would be sooner rather than later. Many of you probably scorn Marx, whose predictions have obviously not come true throughout many parts of the world.   But before you do so, keep in mind that:

- Marx lived in the 19th century. The conditions that he described were a reasonably accurate depiction of conditions that existed during this time.
- Moreover, like Malthus, he could hardly have predicted the astonishingly fast pace of technological change and the development of birth control methods.
- In addition, the society has changed. Marx listed (in the Communist Manifesto) ten steps in the evolution of capitalistic economies to communist economies. In this country, we have completed, to some extent, at least half of them (including universal free education, at least through high school).   Remember, we live in a mixed economy, not pure capitalism; in effect, we have adopted some Marxian policies (gosh, many Marxian disciples felt that countries would slowly evolve into socialism which some people may believe is happening, rather than have a violent revolution,

I remember driving through the South of the United States in my youth, which had large numbers of Hispanic families, and I was always struck by the number of families in which all members, including young children, had to work in order for the family to survive, a situation very similar to what Marx predicted.

Although the theories of Marx and Malthus are often ridiculed, they were brilliant men who developed theories that explained much of the economies of the world **at the time** they lived.

D. John Maynard Keynes: John Maynard Keynes (1883 -1946) is one of the most influential economists in history; in my opinion, second only to Adam Smith. During the great depression, while many economists were perplexed at the persistence of massive worldwide unemployment (a persistence that was inconsistent with the Classical model, described below), Keynes challenged the assumptions of the classical model and developed a theory on why massive unemployment occurred and persisted, and developed methods of dealing with both unemployment and price level changes and (though not immediately recognized) all other aspects of macroeconomics (e.g., economic growth, foreign trade). With some modifications, these methods are still employed, and are likely be employed far into the future (in conjunction with other policies to improve worker skills, economic growth, and other macroeconomic goals). The combination of the theories of Keynes and Adam Smith have proven far superior to competing theories involving some form of central control over most production, e.g., communism/socialism. Read what Robert Reich, a former Secretary of Labor, wrote:

Before Keynes, economists were gloomy naysayers. "Nothing can be done," "Don't interfere," "It will never work," they intoned with Eeyore-like pessimism. But Keynes was an unswerving optimist. Of course we can lick unemployment! There's no reason to put up with recessions and depressions! The "economic problem is not — if we look into the future — the permanent problem of the human race,.".

Born in Cambridge, England, in 1883, the year Karl Marx died, Keynes probably saved capitalism from itself and surely kept latter-day Marxists at bay.

3. What are business cycles? What is meant by a recession?
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The basic notion of the business cycle is clear. The private sector, which is dominant in most economies, operates on the basis of decisions to hire and produce made by thousands of individual entrepreneurs/managers. Clearly, these decisions are partly based on the optimism or pessimism of decision-makers about the prospect (expectations) of sales for their businesses and the prospects for the economy as a whole. Often, what affects each decision maker's view of the future will affect many different decision-makers *in the same way at the same time.*

Suppose, as an example, the price of oil jumps by 20%. Producers of goods immediately fear that their costs will significantly rise. Airplane travel will become more expensive. Electricity will become more expensive to generate. It will become more expensive to import goods from Asia. The reverberations will echo through hundreds of business decisions. Companies may anticipate a decline in sales of their products. They will begin to cut back production and lay off workers. The AD curve shifts to the left. Without countervailing influences, we would fall into a recession with significant unemployment. This is the "bust" of the boom and bust cycle.

But at some point, businesses may see that sales do not fall as much as they feared, they may find alternative sources of energy, or people may simply learn to live with higher prices. People's expectations will begin to rise.   At that point, workers begin to be hired, boosting their purchases of goods and services, leading to the hiring of more workers, further boosting sales. This will continue, perhaps even reaching the point where it is difficult to find workers to hire and inflationary pressures result. This is the "boom" of the boom and bust cycle. In this phase, the AD curve moves to the right.

This is the classic business cycle, sometimes described as "boom and bust ." Many different types of shocks can create these unplanned up and down movements in the economy. Perhaps a technological breakthrough will cause decision makers to become overly optimistic, e.g., the dot.com bubble. Or perhaps fear of a widespread contagion, such as the zika virus will cause them to become fearful. Or perhaps the anticipation of armed conflict will cause business to boom. Or perhaps a catastrophe, such as a major earthquake or hurricane, will cause a major negative disruption of production. Literally, one can imagine hundreds of possible changes that would lead to upward or downward pressures on production and employment. The usual view of the business cycle is shown in figure 35. The upward sloping straight line is a trend line of *real GDP* over time.

Figure 35
Illustrated boom and bust cycle
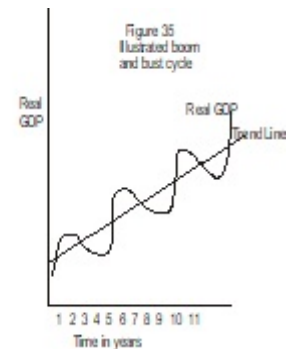
The federal government keeps a close watch on the economy by measuring levels of output, inflation, and unemployment. The Feds have an assortment of tools, which we will be discussing over the next sessions, which could be used to moderate the effects of the business cycle.   Most of these methods have evolved since Keynes and the end of WWII. Despite rancor and controversy over their application, they have worked rather well for most (but not all) Americans, at least until recently when skill levels have become increasingly important to job success and jobs have required greater skill levels. The widely agreed upon goal is to minimize the ups and downs of business cycles. We can envision this as shown in figure 36 where the divergences from the real GDP trend line are smaller than is shown in figure 35

Figure 36
Illustrated boom and bust cycle
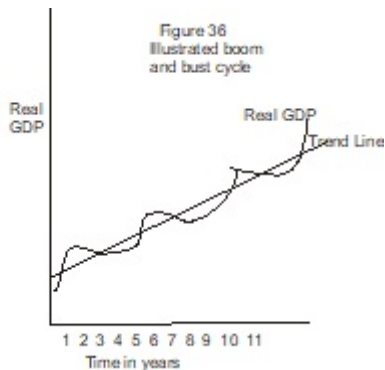
The down side of the business cycle is regarded as a recession if it is severe enough. There are technical definitions of when the economy is in a recession, usually based on the number of successive quarters of declining growth. I never pay much attention to these technical definitions, although you are free to recite them in an exam and you will be given full credit. My preference would be to decide when unemployment, or underemployment, or the number of low wage jobs are too high, then identify the causes of these problems, and then decide what to do about it. Similarly, you might also decide when inflation is too high, what its causes are, and what to do about it.

Such ups and downs of the economy occur even during a prolonged many-year period of economic growth. The U.S. economy has shown substantial growth since WWII, but has had ups and downs, twice reaching over 10% unemployment (by the way unemployment is measured) during 1982-1983 and once again in 2009.

During the great depression of the 1930s, there was so much pessimism that it looked as if massive unemployment was a normal state of things - which was partly the reason for the popularity of socialism in those days. We are now unlikely to have such *major* depressions again as we know methods, which have been briefly mentioned and will be discussed in greater detail later for encouraging spending, production, and rising employment. Unfortunately, I warn you, that the tools we have do not do nearly as well as we would like in controlling unemployment and inflation, e.g., consider the devastation and lingering effects being caused by the recent great recession. But we do far better that the tools used in the time of your great grandparents. But note that nothing is guaranteed.

4. What is the classical theory of macroeconomics?

The "classical theory of economics" is the view that most economists had of how the economy worked prior to 1935. Classical theory basically held that the economy always tended toward full employment and that price levels were primarily determined by the quantity of money in circulation, hence it was usually called the *quantity theory*. **Price levels** were the **main** concern of this theory. Classical theory reached its highest development with the development of the famous Equation of Exchange by Irving Fisher (1867-1947), considered one of the U.S.'s greatest economists. Before explaining the equation of exchange, we need to describe two basic assumptions generally held by economists prior to 1935.

A) Full Use of Resources*:* It was assumed that the economy **usually** operated near its capacity, i.e., close to its production possibility frontier. If some workers became unemployed, they would accept lower wages and return to work. If people started to save more, reducing their purchases of goods and services, and reducing the demand for workers, the higher level of savings would lead to lower interest rates which would encourage people to invest in new enterprises stimulating employment. At the same time lower levels of interest would discourage people from saving so that after a little time, planned savings would again equal planned investment and everything produced would be purchased. Foreign trade and government spending was small, and in consequence, C plus intended I would tend to equal C plus intended S. Think of the circular flow of resources. The value of whatever is produced results in income to someone who will either spend it or save it or be taxed- i.e. the incomes that flow from producing and selling goods and services become resources/buying power from which the demand for goods and services is generated, described as Say's law in the text - remember the circular flow of resources).
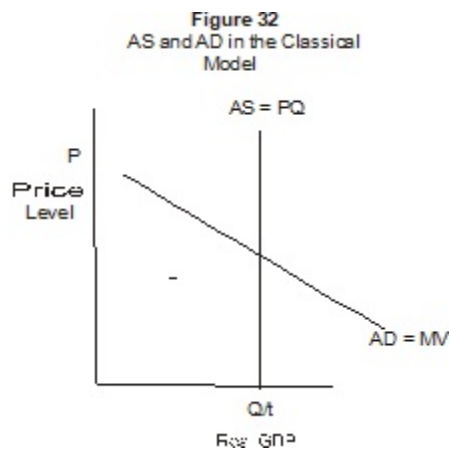
Of course, economists of that time were well aware that the economy had ups and downs, and that sometimes unemployment became too high. The early textbooks frequently talked about unemployment and its causes. But it was generally felt that these were short-term problems and left to itself, many (but not all) economists felt that the economy would be self correcting. Most economists felt that the best policy was to be patient and wait for the *inevitable* recovery

Actually, in a world where: a) most output took place in agriculture and unemployed family members could often be placed, even if underemployed, on a family farm; and b) some output was produced by independent craftsmen who might face a drop in income, but most would not become unemployed, and c) where there were few unions to dispute with employers, this rosy assumption about the economy had considerable logic.

B. Stable velocity (V) of money: The second major assumption of classical macroeconomic theory was that the velocity of money was stable.   In the early classical world, most people had only coin, currency, or bank deposits to spend.   Most people lived at close to a subsistence level and had little excess income to save.   It was believed that the average speed at which each unit of money (e.g., a dollar) was spent depended primarily on such variables as the time needed for people to use their money to purchase consumption items or investment goods, and the speed with which banks could clear checks, which was limited largely by the time it took checks to travel from the bank used by the payer to the bank used by of the payee so that the money could be spent by the payee. Since checks often had to be transported to a distant location, train schedules were an important factor in determining the velocity with which money was spent. The basic conclusion was that the velocity (V) of money was *very stable*, that is, the number of times each unit of money was spent in a given time period was constant. In a world **without** credit cards, minimal savings deposits, and computers to facilitate the rapid exchange of cash, this assumption was not unreasonable . The existence of credit cards, savings deposits, and computers obviously makes it possible to greatly increase the velocity of money.

Now, we come to the famous (even if outdated) equation of exchange, $MV = PQ$. Actually, it is a truism or tautology since the quantity of money (M) times the number of times it is spent (V) must necessarily equal the average price of goods (P) times the quantity (i.e., number) of goods sold (Q).[1] Both terms must equal GDP or, the equivalent, total expenditures on goods and services.. It is like saying 3 times 4 equals 6 times 2. Think of it this way, total spending, i.e., MV equals total revenue, i.e., PQ.

What is important is the two classical assumptions that V and Q were predetermined, or fixed. Think of V and Q as constants. If this is true, then the price level, which was one of their main concerns, necessarily varied directly in proportion to the quantity of money. If the quantity of money doubled, the price level would double. If a new source of gold was found in California, for example, then prices would necessarily increase by the percentage addition to the money supply as people would try to spend the additional money, but since Q could not increase, prices must. Since most developed countries relied on the gold standard to regulate (and limit) the quantity of money (and inflation), this belief seemed reasonable.
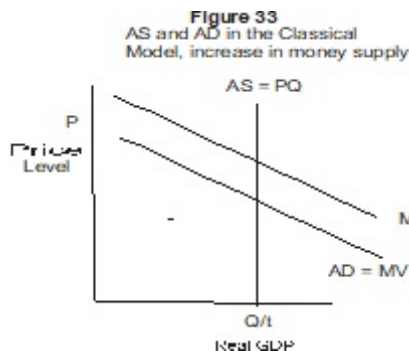
Figure 32
AS and AD in the Classical Model

AS = PQ

P
Price Level

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AD = MV

Q/t
Real GDP

Figure 32 may help explain the mechanics of the classical theory of macroeconomics.   The quantity of output, I. e., *real* GDP, is assumed to be fixed regardless of the price level, at a point in time (our first assumption). So PQ in the classical expression and can be represented by a vertical line, AS, i.e., the quantity of production will always be the same regardless of the price level. The expression, MV, money times the number of times that it is spent, is equivalent to the AD curve. Since the amount of M is fixed in the classical model, the AD/MV curve can be represented by a straight line sloping downward and to the right (since V is constant- our second assumption). Think of it this way, if **real** GDP were to increase, prices must necessarily fall, given that the supply of money is assumed to be fixed and, the existing level of spending must be distributed/divided among more goods, a concept that makes sense but is initially hard to visualize.

In consequence, where the MV curve (AD curve) cuts the PQ

Figure 33
AS and AD in the Classical Model, increase in money supply

AS = PQ

P
Price Level

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MV^2

AD = MV^1

Q/t
Real GDP

The original equation was $MV = PT$ where T equaled the number of transactions in the economy. Most economists prefer to replace PT with PQ where Q equals some ambiguous concept termed the "quantity of goods."

vertical line (AS measure) is where price levels must stabilize. If prices are below this level, people will try to purchase more goods than are available driving prices up. If prices are above this level, people will not purchase all that is produced leading producers to reduce their prices.

Figure 34
AS and AD in the Classical
Model, increase in money supply

If the money supply increases, the MV curve will shift upward raising the price level (Figure 33).

Conversely, If more goods came onto the market (say by an improvement in production methods), The AS=PQ line would move to the right, and the additional goods would go unsold until prices were lowered so that the available money supply would be sufficient to purchase all goods on the market (figure 34). Competition would insure that prices would fall.
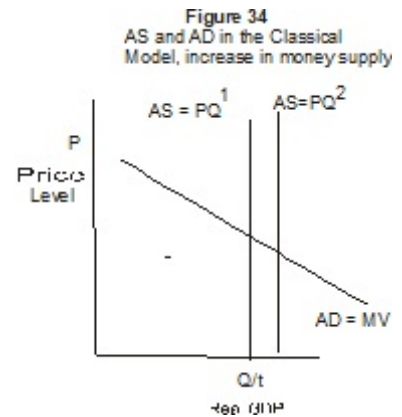
We will learn later that the two basic assumptions of classical economics, i.e., the assumptions of fixed output and stable velocity of money, do not hold up in a modern industrialized world. I do not think anyone doubts that a major increase in the supply of money will eventually drive up prices. But we know that neither Q nor V is fixed , today, and the economy does not automatically move toward full employment and stable prices. In consequence, today, we are concerned with *both* unemployment levels and the price level (the price level was almost the sole focus of many classical economists). The issue is not that the classical economists were wrong. But the world changed so that the classical assumptions no longer are val id.

Figure 25
Axes for Aggregate Demand and
Supply Curves
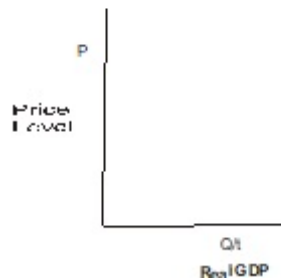
5. The Aggregate Demand/Aggregate Supply Model

In this section, we will expand on the aggregate demand/aggregate/supply model that we described earlier and was used to help explain different types of unemployment and inflation.

The AS/AD model, as noted before, is simply an macroeconomic application of supply and demand analysis. Remember our two axes. The vertical axis represents the price level, and the horizontal axis represents **real GDP**. In the AD/AS model, **real GDP means the actual physical output of goods and services**, i.e., the real economy. If you find this confusing after our discussion of measuring changes in real GDP *over time*, just remember that the further you proceed to the right, the greater the *real output* of the nation as determined by the quantity of cars, refrigerators, haircuts, etc, but we do not measure quantity of output in (real GDP)the prices of a base year, as we did when estimating changes in real output over time.

Do not be confused. The text defines real GDP in the AS/AD chart in dollar terms as nominal GDP adjusted for price changes (prices are held constant). However, since, by definition there are no price effects, the further you move to the right, the greater the **physical** output of goods and services so it amounts to the same thing - kinda. I prefer to use real GDP in the graph to refer to actual physical output as this emphases the similarity between AS and AD curves, and supply and demand curves where the quantity of a good or service is always stated in quantitative physical terms. In any event, it does not seem sensible to hold prices constant on the horizontal axis when price is one of the variables to be determined.

. Let us review the term, SIPS.

• The first S refers to slope, in this case, the extent to which the AD curve slope downward as the price level falls and the AS curve slope upward as the price level rises?
• The third term, P, refers to the position of the two curves, in this analysis, what determines how far the AD and AS curves are to the right.

- The final S refers the factors that can cause either curve to shift to the right or left, which will be critical when we discuss (once again) stabilization methods. Remember, these curves are governed by the assumption of *ceteris paribus* and they only shift when *ceteris paribus* is violated.
- The I stands for the independence of the two curves, i.e., that the slope, position, or shifts of the AD curve have nothing to do with the AS curve. Failure to remember the independence of these curves from one another has led to a great deal of confusion (and wrong answers on examinations)

5A. The Aggregate Demand curve: **We begin with the AD curve.** There are three crucial questions that we must address with respect to the AD and the AS curve. A**. Its slope; b. its position; and c. factors which make it shift.**

Factors affecting the Slope of the AD curve: The AD curve shows the sum total of goods and services in real terms that are purchased at different price levels, *if* all other things are unchanged (e.g., no change in factor prices, no change in tastes, etc.). Remember the components of these purchases as described in the circular flow of resources and the components of estimates of GDP used in national income accounting. They are:

- Consumption, e.g., the purchase of goods such as clothing, food, lodging, and services such as haircuts, medical care, attorney consultations;
- Government, ,e.g., spending on things such as schools, national defense, roads, mass transit;
- *Gross* investment, (includes investment used to replace depreciated equipment), e.g., spending on new construction of plants, purchases of machinery, personnel training, etc. Unlike national income accounting procedures, *gross investment includes only intended inventory change when used in the AD curve - it does not include unintended inventory change since these did not influence initial spending decisions[2]; and*
- Excess (or shortage) of exports over imports.

Recall that a basic assumption of both the AD and AS curves is the assumption of *ceteris paribus*, i.e., wages, rent, interest, consumer tastes, consumer expectations, etc. do not change, regardless of the level of GDP, at least in the very short run. If they do change, the curves will shift. How many times should I repeat this.

5Ai. Let us begin with how aggregate consumption is affected as price levels change, i.e., we move along the slope of consumption expenditures. We consider three factors .

- **Price level effect:** We assume, based on logic and introspection, that people will spend more if prices fall, just like the demand curves we discussed earlier.

- **Wealth effect:** We also assume, as set forth in the text, that since many people have savings in the bank or bonds that are fixed in dollar price as part of their wealth, that lower price levels will cause them to feel wealthier and to spend more.   If you have a thousand dollars in the bank or a fixed amount of annuity, these assets will purchase more if prices fall. You may feel wealthier and will spend more (e..g.,take that long anticipated cruise). This is termed the "wealth effect" and has a long history in economics. Remember this effect. It played an important role in monetary policy during the recent recession.

- **Interest rate effect:** If prices decline, the text assumes that people will not immediately spend all the money that they save on additional goods. The funds will then be saved, possibly driving down interest rates, and encouraging consumer spending and borrowing.

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[2]In other words, if inventory rises because a business didn't sell as much as it hoped to, that part of the change in inventory is not counted as investment when visualizing the AD curve, but if a piece of capital equipment is replaced, say an obsolete computer, that is counted as part of AD. Wow, no wonder students get confused.

5Aii *Now lets turn to investment*. Would investment rise (or fall) as the price level falls ? It seems reasonable to assume that if falling price levels reduce the cost of machines and equipment, and other resources needed to carry on business (e.g., energy supplies, buildings), entrepreneurs will be encouraged to increase their physical investments and *vice versa.*[1] Remember, once more, the critical assumption of *ceteris paribus*, which means that expectations of continued business prosperity (and everything else) do not change.

5Aiii. Now lets turn to government: I suppose some government spending in **real terms** will rise if price levels fall. It shouldn't, for reasons that may be explained later, but it probably does, particularly as bureaucrats make sure that they spend their entire allotted budgets rather than take a chance on having their budgets cut the following year (because a surplus could indicate that the budget was too generous and could be slashed).

5Aiv. **Finally, let us consider exports minus imports**. Remember that exports stimulate domestic AD and imports reduce purchases of domestic production. It should be obvious that if the price of U.S. goods decline, this will encourage exports of U.S. goods, *given the assumption* that the exchange rate is unchanged (that pesky *ceteris paribus* again).

5B. **Now let us consider factors affecting the position of the AD curve?** In the preceding section, we described reasons why the AD curve is drawn to reflect increasing expenditures as prices fall, i.e., why it slopes downward and to the right. Now we must consider what causes people to spend as much as they do ***at each price level, i.e., the position of the AD curve.***   The following are the more important factors which determine the **position** of the AD curve. As before, we will consider the AC, AX, AI and AG components separately.

5Bi Position of aggregate consumption Curve

- *Personal disposable income*, i.e., personal income minus taxes plus transfers (Social Security Payments, Supplemental Security Income payments, Unemployment Compensation and similar programs) - remember national income accounting. The level of personal disposable income is the **primary** determinate of the demand for goods and services for consumption purposes.

- *Wealth/assets*: The richer people are, the more they are likely to spend, regardless of the price level. Ask yourself, if you own stocks and they triple in value, do you think you would spend more. Conversely, if they fell in value, would you spend less. For example, consider the rapid rise in real estate values that we witnessed up until 2009. It is believed that this encouraged some people to increase spending because they felt richer and were able to borrow using their homes as collateral. After 2009, we saw a substantial downward correction in the real estate market. You may remember that some economists expressed concern that the lowering of the prices of homes might cause some people to reduce their spending, reducing aggregate demand and increasing unemployment. A similar situation exists in regard to stocks. A major downturn in the stock market will clearly make some individuals feel less able to maintain spending. *Note that this wealth/asset effect on the position of consumption curve depends upon the total value of net assets whereas when we discussed the wealth effect on the slope of the consumption curve we were referring only to the increase in real buying power as prices fall - similar, but not quite the same concepts.*

- *Expectations*: If households expect inflation, they will be reluctant to *not* spend their money, or if they expect hard times ahead, they may be reluctant to spend. If they do not trust economic policies to curtail unemployment, or to continue to promote growth in income, this will certainly affect their spending behavior and probably cause them to save more. Watch what happens if

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[1]Of course, falling prices could reduce profits which would discourage investment so this is an iffy assumption.

unemployment or interest rates rise slightly in the near future.

- *Demographics:* Younger people and/or, large families usually spend more, older people may be more willing to spend their savings while they can. In addition, the greater the population, the greater the level of AD. During the great depression, when the country was primarily concerned with long-term unemployment, some economists advocated a rapidly growing population in order to keep aggregate demand high - heaven help us.

- *Interest rates*: At low interest rates, people will be encouraged to borrow and buy, lets say, a car, or a household durable good, or take a vacation, etc.. Conversely, if interest rates are high, people may defer purchases and may be encouraged to increase savings.

5Bii. Factors affecting the Position of Aggregate government curve: Obviously, the higher the level of government spending, the further to the right is the AG curve.

5Biii. Factors affecting the Position of the Aggregate investment curve: Some specific factors affecting the position of the investment curve are:

- Interest rates, i.e,.lower interest rates will lower cost and raise profit.
- Tax rates, i.e., low taxes will enhance profits and encourage investment.
- Technology, i.e., an efficient technology will lower costs or enhance profits or both.
- Expectations, i.e., if investors and businesses are optimistic, they will invest more, and if pessimistic, they will invest less.
- Capacity utilization, i.e., the more excess capacity that firms have, the less likely they are to invest. If excess capacity is small, interest in investing is increased.

5cD. Finally, how do we construct the AD curve?

Figure 28
Aggregate Demand Curve
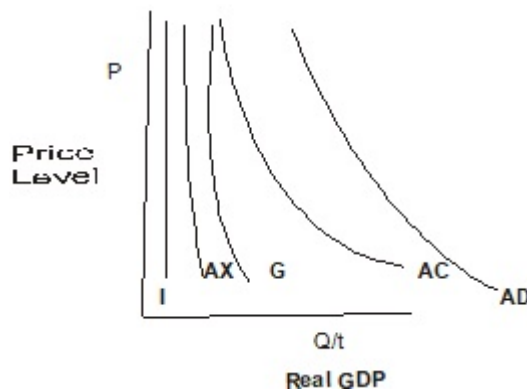
Now that we have described the variables affecting the slope and position of each of the components of the AD curve, we show each of these separate components of AD in figure 28 - AI, AX (net exports), AG, and AC (figure 28).

How do we get to AD. Simple, We simply add each of these curves **horizontally**. Remember the ***assumption of ceteris paribus***, which means factor prices, total income, tastes, and other relevant variables are unchanged. We can draw a curve showing how much, in ***real terms***, will be purchased at each possible price level (AD in figure 28). To be precise since it depends up which prices change and their effects on purchases, we cannot actually predict an exact amount, but ***we can predict the direction of the change in the demand for real goods and services if average prices fall or rise.*** *Optional: Unlike demand curves for an individual product or service, the slope of this curve depends not only on the price level, but also on composition of the price level. After all, you can have the same price level with different individual prices and quantities sold. This curve (and the AS curve) is more hypothetical than empirically based.*

Why is this AD curve so important in macroeconomics. The reason is simply that there are methods, some of which were described above, and which we will be discussing shortly in greater detail, by which we can change the position of AD, i.e., cause a shift in AD, and thereby influence the number of jobs, the price level, economic growth, and foreign trade. Remember, any change that violates the assumption of ***ceteris paribus*** will cause these curves to

shift, affecting price levels and employment.[2]

5D. Now let us consider what causes shifts in the AD curve and how can we cause the AD curve to shift? Obviously, there must be some change in *ceteris paribus*. Again, lets consider each component of AD separately. Anything that shifts a component of the AD curve will also shift the AD curve in the same direction

5Di. Consumption: The AC component of the AD curve will shift if there is any change in the factors which determine peoples' spending habits. What is important for macroeconomic policy is that the Federal government sometimes attempts to affect the level of consumption through changes in disposable income, largely through changes in taxation, or interest rates, or unemployment benefits, or retirement benefits, etc.. Methods of doing so will be explored in greater detail in subsequent classes .

5Cii. Investment: Almost always, people invest because they expect/hope to profit by their investments. We can cause the investment component of the AD curve to shift by such policies as:
- raising or lowering interest rates;
- raising or lowering tax rates;
- accelerating depreciation. ;
- changing expectations; if investors and businesses become more optimistic they will invest more, and if less pessimistic, they will invest less.

Remember that the investment component of the AD curve includes:

- only physical goods, research, or training of workers. It does not include transfers of stock and bonds since they are merely paper transfers among people. These transfers are not additions to the stock of building and machinery, skills, or knowledge although these transfers are meaningful investments *for individuals*;

- both new investment **and** expenditures to replace machinery and buildings that have been depreciated (CC), since replacing obsolescent or depreciated equipment increases the demand for current production (follows from our previous point);

- only intended investment. When we studied national income accounting, we included unintended inventory buildup as a component of investment and total output. However, when measuring the impact of investment on AD, we exclude unintended inventory buildup. In fact, unintended increased inventory buildup will probably discourage investment.

5Diii. Government: The level of government spending is determined largely through political decisions. Remember, increases in government spending on roads, tanks, uniforms, and thousands of other items directly increases the demand for goods and services and can be a way of shifting AD to the right and reducing unemployment. Reductions in government spending will have the opposite effect. Note that lowering taxes does not count as part of government spending (it will increase *consumer* spending). Only government spending that results in a increase in public purchases or public production of goods or services is counted. This would not include social security or other transfer payments although these expenditures do raise disposable income, which raises consumption.

5Div. Exports minus imports: Consumers in other countries react to the exact same variables as consumers in the U.S., i.e., the lower the price of U.S. goods, the more that they will buy.   There is, however, one other variable that must be considered and that is the exchange rate, i.e., the price that citizens in other countries must pay to obtain U.S. dollars in order to purchase U.S. goods. If the dollar is devalued, that is, if foreign buyers

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[2]We can also change the slope but save this for an more advanced curse.

can get more dollars for a unit of their currency, then U.S. good are less expensive and they will buy more, causing a rightward shift of the AX curve There are ways of devaluing currency that will shift the AX and AD curves, but this usually involves poor public policy which we will later discuss. Also remember that if tariffs are increased, prices increase, and exports are discouraged. Consider the Trump tariffs You might want to note that the more prosperous other countries are, the more that they will import from the United States, the more jobs will be created, and the more money that our businesses will earn. Too bad that many people and politicians do not understand this.

5E. **Synopsis:** It is important to observe that we have distinguished between three interrelated concepts in the above discussion. First, we described reasons why the AD curve sloped downward and to the right, i.e., why the demand for real output rises as price levels fall. The second concept described the variables which determine how much will be spent at each price level on consumption, investment, government, and the excess of exports over imports, i.e., the position of the AD curve. Finally, we described some methods of causing the AD curve to shift.   If we want to increase employment, we takes steps to shift it to the right. If we want to dampen down inflation, we cause it to shift to the left.

5F. Why so many curves: Unlike the text, I have assumed that we can draw separate demand curves for each of the components of AD. I do so because stabilization policy is largely implemented by causing the AD curve to shift to the right (to deal with unemployment), or to the left (to deal with inflation). There are numerous possible ways of doing so, each of which will usually affect one (or more) of the four components of AD.   Remember, the AD curve is composed of consumption, investment, government, and the excess of exports over imports (which may be negative).

The AD curve is not normally constructed showing these separate curves. However, in some youtube videos, the AD curve is described as defined as AD = C+I+ G+X, which is basically exactly what I have described above.

REPETITIVE: Another important point is that, despite the fact that the AD and AS curves look precise and crisp, as do normal supply and demand curves, they are in fact quite mushy. Consider normal supply and demand curves. In general they refer to a specific good or service, with, at least in theory, a precise change in the quantity supplied or demanded for a given change in price. In the case of AD and AS however, a change in the price level can result from a change in the price of any one of thousands of different goods and services. The effect on the amount produced or supplied of real GDP will vary depending on how buyers and suppliers respond to prices changes of different goods. The only conclusion we can definitely draw is a reduction in the price level should increase the amount purchased, and decrease the amount supplied, and vice versa. The effects on changes in the direction of employment or inflation can be reliably predicted, but not the absolute amounts.

6. What determines the aggregate supply (AS)) Curve?

The aggregate supply curve (AS) refers to the total amount of goods and services that will be produced to meet the demand for consumption, investment, government and the foreign demand for goods and services at different price levels.   As before, we must ask three questions based on the acronym SIPS.

6A. Why does the AS curve slope upward and to the right? As previously explained, we intuit that it slopes upward and to the right. The main reason is obviously that higher prices will cause producers to send more goods and services to the market in the expectation/hope of increasing their profits.

6B. What determines how much (position of the AS curve) will be produced at each price level? There are many variables which influence total output at each price level.   Some of the more important are the following which should be familiar to you from notes 2. For the most part, variables that affect the production possibility frontier will also change the AS curve and vice versa.

- Quantity of resources

- Quality of resources.
- Prices of factor payments, e.g., wages, rent, and interest;
- Level of technology
- Expectations of future sales
- interest rates, i.e. what it costs to borrow money to maintain business operations
- Degree of Competition: Economists argue that competition stimulates efficiency and the development of new products
- Infrastructure: Underdeveloped countries are often handicapped by a lack of roads, electricity generating capacity, educational/training facilities, et cetera.
- Taxes, generally, the more revenues that producing units are allowed to keep, the higher their profits, and the greater the incentive to produce.
- governmental regulations, often(but not always) the greater the public control, the less that is produced

We have discussed these variables previously. Why are they important? It should be obvious that the further to the right that the AS curve is, the higher the potential GDP, and the higher the potential standard of living of the population.
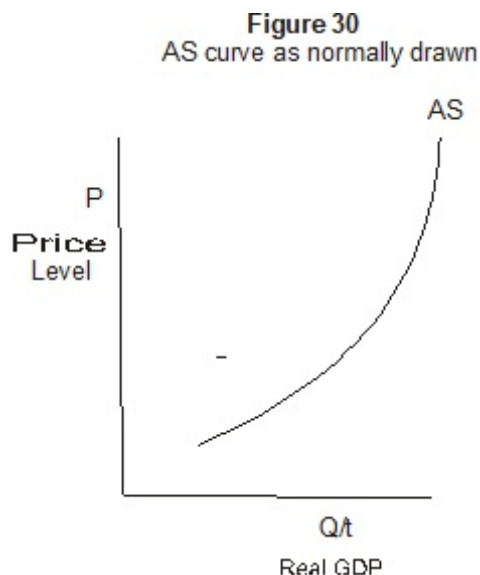
6C. How can we cause the AS curve to shift? It should be obvious that changes in any of the above variables in section 6B will cause the AS curve to shift - i.e., *ceteris paribus* will be violated. There are numerous steps that can be taken to cause the AS curve to shift to the right, e.g., fund research to improve technology, lower taxes, reduce barriers to commerce, etc. Shifts of the AS curve to the right are needed for economic growth.

Once again, I remind you of the critical assumption of this AD/AS model, *ceteris paribus,* which means that the prices of resources remain constant, e.g., wages, rents, interest, as well as all other variables such as expectations, consumer tastes, etc. This is a tough concept to fully grasp so please think about it, particularly since macroeconomic policies usually involve violating **ceteris paribus**..
Start

What is the general shape of the AS curve?

In most texts, The AS curve is drawn in the usual way of all supply curves as shown in figure 30. Let consider what happens to the level of prices as producers increase output (*All other things remaining equal*). Obviously, if we begin at a point of significant GDP and moderate inflation, say midway in the business cycle, then if the demand for goods and/or services rises, producers will begin to produce more and probably strengthen (i.e., raise) their prices. But, eventually, producers will come up against the reality that as prices continue to rise, they begin to run out of capacity as well as the ability to employ more resources *at current factor prices*. Necessarily, the AS curves turns steeply upward, eventually turning almost vertical as output cannot be increased regardless of price, and the economy comes closer to its production possibility frontier. The conventional wisdom is correct on this point.

Now let us return to the AS curve.. The text assumes a curve that slopes fairly steeply downward to the left meaning that as prices fall, they will continue to cut back production, but they must maintain a core staff. However, on reflection, although they may lay off some workers as sales falter, it is probable that the unit cost of production for most firms will decline quite slowly because factor costs, e.g., wages,, rents, interest are, *by assumption (which is consistent with empirical observant)*, fixed, at least in the short run. Presumably, they will continue to produce as long as they can cover their variable costs (in microeconomics you will learn that even when producers are losing

Figure 30
AS curve as normally drawn

AS

P

Price
Level

Q/t

Real GDP

money they will continue to produce if they can cover their variable costs - at least until their creditors chase them into bankruptcy court).

In consequence, there should be a broad band of output over which they will be reluctant to make significant price drops because the costs of production per unit are relatively stable. The AS curve will continue to decline, but slowly. But at some point, additional reductions in prices will probably cause a large reduction in output as increasing numbers of producers are no longer able to cover their variable costs. Remember the assumption of ceteris paribus, which, among other things, means that factor payments (e.g., wage levels) do not decline.

Figure 18
Aggregate Demand and Supply Curves
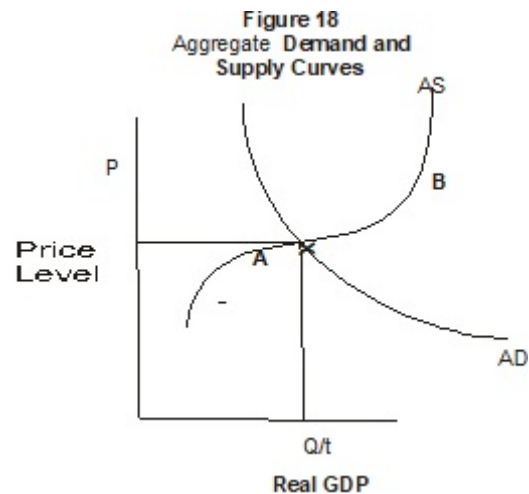
In consequence, I draw the shape of the AS curve a little differently from the text. It is, I believe, realistic, and will enable us to incorporate Keynesian and modern monetary theory into our use of this graph. There is a long gently sloping portion consistent with the Keynesian assumption of wages being rigid downwards and then a sharp drop off as companies become unable to cover their variable costs as prices fall. Figure 18, reproduced from our earlier notes, shows the shape of the AS and AD curves given the above discussion.

**6. Using this graph, what is the equilibrium level of real GDP and the corresponding price level?**

This is just an elementary exercise in supply and demand analysis. Stability occurs where the AS and AD curves intersect If the price level is above this point, the supply of goods and services and prices will increase and the amount demanded will decrease, causing inventories to build up. Eventually producers will begin cutting prices and production. The opposite occurs when prices fall below this equilibrium level, eventually leading to the equilibrium predicted by the AD/AS graph, if *ceteris paribus* continues to hold.

7. Does the intersection of the AS and AD curves mean that all resources are employed in a noninflationary way?

Absolutely not. It predicts the equilibrium level of GDP, but does not mean that all people who want jobs will find them, or that price levels will not rise. Depending upon where the equilibrium fell, we could have a bouncing healthy economy, or one suffering massive unemployment, or one suffering runaway inflation, and all points in between.

8. Can the AS and AD curves shift changing the equilibrium points of GDP and price levels?

Of course, we have already described factors that can cause these curves to shift, and they frequently do shift In fact, the so-called equilibrium described by these curves is rarely attained. The equilibrium determined by AS and AD may be best viewed as the level of real GDP and prices towards which the economy is tending at a particular moment in time, but in fact, it will never quite get there. Long before it reaches that point, other variables will change, *violating ceteris paribus*, and changing the equilibrium level of output and prices. In fact, one of the crucial aspects of the AS and AD curves, it that not only is *ceteris paribus* often being violated, but that one violation of ceteris paribus will usually cause multiple changes.

Figure 28
Shifts of Aggregate Demand and Supply Curves
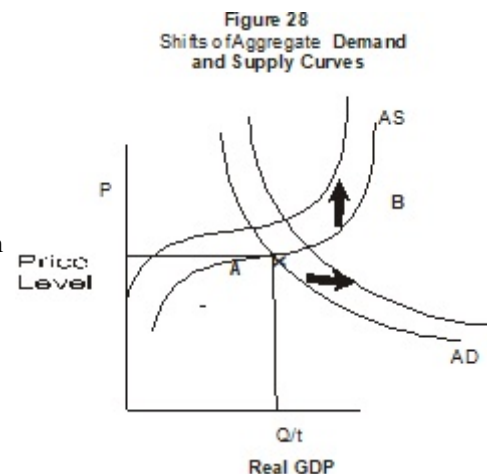
Suppose, for example, there is moderate inflation, say 2 percent. Then workers and others will try to keep up with inflation. They will bargain for higher wages. Moreover, some pensions and labor contracts contain COLA provisions. This means that factor prices, in particular wages, are no longer constant. So what will happen. If wages rise, *ceteris paribus* is violated and the AS curve will shift *upward* (or to the left which is the same thing) as it will require higher prices to justify a given output because labor costs have risen. At the same time, the AD curve will shift to the right because people have more income (remember, disposable income is one factor determining the position of the AD curve). Clearly, prices will rise. Unemployment may or not change depending upon how much the AD curve shifts. We can envision a graph something like figure 28.

But then what happens. Because prices have risen, we can expect pressure to increase wages and COLAs to kick in, again raising the AS curve and shifting the AD curve to the right. We can envision an ongoing series of shifts. We can envision this happening year after year with a steadily rising inflation, and continuing relatively high employment. Interestingly, this almost exactly describes what has occurred since WWII.

Figure 29
Shifts of Aggregate Demand and
Supply Curves in downturn
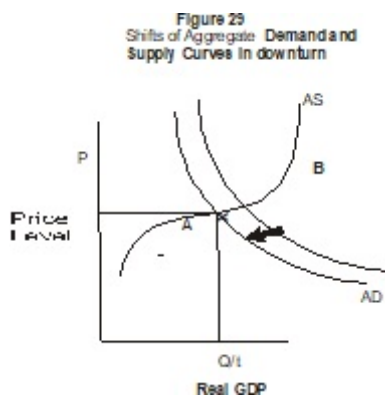
Now, let us suppose that the economy begins to decline, causing output to decline and unemployment to rise. Do you think that wages would decline causing the AS curve to shift downward and the AD curve to shift to the left. This is just the reverse of what we described as prices rise. Sorry, it doesn't appear to work that way, *at least not in the short run*. Consider, most union contracts are set for one to three years. COLAs do not work in reverse, and in any event, there is great resistance to lowering wages. In consequence, the AS curve remains pretty much in the same place as we have drawn it since it is heavily dependent on the costs of production and wages are usually the principal cost. Thus, the effect of a declining AD is to *create unemployment but to have relatively little effect on prices*, at least in the short run (say 1-3 years). Figure 29 shows how the AD and AS curves might react in a downturn. This appears to be what happens in short recessions. Of course, given enough time, workers will begin to accept lower wages, causing the AS curve to shift downward, increasing employment. This pretty much describes the recent great recession in which prices remained stable even as unemployment rose significantly. This is consistent with the Keynesian approach.

As we have noted, many things can cause shifts of these curves, causing changes in employment and price levels. In fact, these curves are shifting constantly. For example, sudden pessimism about the economy can cause **both** the AD and AS curves to shift to the left as occurred on the onset of the recent great recession.

We must confront the fact that in the real world, the assumption of *ceteris paribus* is often not tenable in the case of AD/AS analysis. In AD/AS analysis, any change that affects one curve is likely to cause other changes, sometimes a series of changes. As noted above, a rise in wages will not only affect the AS curve (by raising costs to producers), but also the AD curve (by increasing the amount that consumers have to spend). As another example, note that lowering interest rates to increase output and employment will affect both the AS curve (by lowering costs of production, and the AD curve (by encouraging buyers to increase purchases). Raising the interest rate would have the opposite effect. *Aside: We will shortly learn that changes in the interest rate is a major tool used by the Federal Reserve to control inflation and employment.* In fact, any significant change is likely to cause reverberation througho0ut the economy.

Our approach using the assumption of ceteris paribus allows us to clearly see the effect of a single violation of ceteris paribus. But, unlike the case of supply and demand analyses of a single product or service, in the case of AD/AS analyses, we must anticipate multiple violations of ceteris paribus, and, when proposing public policy estimate the joint effect of these multiple violations, a difficult task. I need to further consider this issue.

## 9. What happens over long periods? The Neoclassical Approach

Before the end of this course, you will discover that, in spite of our seeming exactness of their theories, economists have many deep disagreements over policy. As described by the text, the neoclassical approach assumes that the level of GDP over time, will closely correspond to a high level of GDP, i.e., the level of output that would occur at the normal rate of unemployment. In other words, any unusual inflation or unemployment that occurs will be self correcting. In this case, the long-term level of aggregate supply can be represented by a vertical line, indicating the same level of real output, which approximates optimal output, regardless of the price level. In figure 31, this is shown by the long run AS curve (LRAS). Of course, economic growth will cause the LRAS to increase over time, but this does not invalidate the basic argument.

Figure 31
Long Run AS curve as described by test

LRAS

P
Price
Level

Q/t
Real GDP
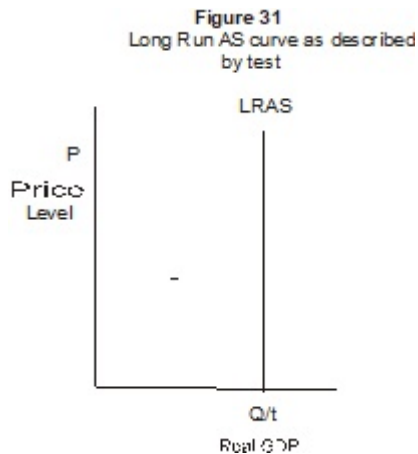
Now, suppose there is significant unemployment so that actual GDP is not at its natural level. The text indicates that over longer time periods, wages (and some other factor prices) adjust, downward. They assume that most workers will eventually accept lower wages if there is no other way to obtain work.[3] Eventually union contracts would be renegotiated (as happened in car manufacturing during the great recession), landlords cut rents to lease out idle properties rather than let properties lie idle, and interest rates will fall as banks become impatient to make something off idle funds. As resource prices fall, the short run AS curve, STAS1 - note this stands for *short term aggregate supply curve* - will shift downward/rightward *raising the amount that would be produced at a given price level (figure 264). .* The text assumes that eventually the short run AS curve would fall enough to bring real GDP back to its natural level. There are three problems with this happy scenario.

Figure 264
Adjustment of Long Term AS Curve and Short Term AS curves

STAS1
STAS2
LTAS

P
Price
Level

A
B

STAD

Real GDP

- As factor prices fall, disposable income is diminished as wages fall, causing short term AD to shift to the left, making the net effect on employment uncertain.

- it may take a very long time for factor prices and the AS curve to adjust back to a point where real GDP rises enough for unemployment to fall to its natural level. I suspect that few people are patient enough to wait years for these happy events to occur.

- In any event, we are unlikely to have to deal with the consequences of the assumptions of this long term model. The strict *ceteris paribus* conditions of the long-term model will not be long endured. If there is excessive unemployment, and wages, interest rates and other variables are slow to adjust, it is almost certain that public action will be taken (unless the political system falls into total gridlock). Using methods that we will shortly talk about, it is likely that the government will take action to reduce unemployment and not wait for a hypothetical long-run correction. Note that in the

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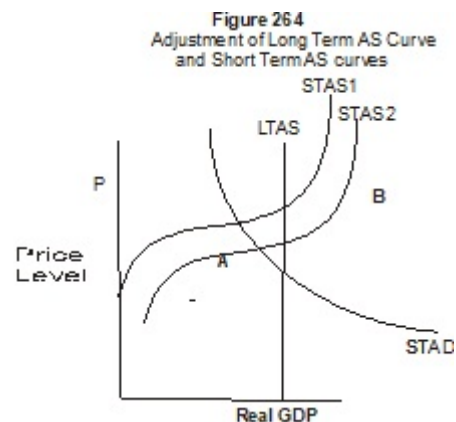
[3]If wages do not keep pace with inflation, this amounts to a reduction in real wages and would have the same effect.

recent great recession and 2016 national recent election, both parties frequently argued for government action to increase employment, but the type of government actions advocated differ significantly between and within the two parties. Note Trumps effort to force the Federal Reserve to lower interest rates.

But now assume that the intersection of the STAD and STAS curves predict an equilibrium higher than potential GDP. The economy is booming and resources are scarce. When resources are tight, factor prices are not sticky as assumed in our STAD and STAS model, but can change rapidly upward, again as is shown by experience. In fact, wages can rise very quickly (probably causing some retirees, housewives, people with disabilities and others to accept jobs). When this happens, the entire STAS curve will shift immediately upward as producers bid up the prices of scarce resources. and create a new floor on prices. Eventually, (at least in theory) it will return to the level of potential (or perhaps I should say sustainable) GDP without significant **further** inflation or employment, although at a higher price level. Of course, it could overshoot the equilibrium point and the economy go into rapid, or even hyper, inflation.

Basically, this neoclassical approach appears, to me, to be a restatement of the classical theory.

10. What are Leading Indicators?

Of course, the best way to smooth out the business cycle, assuming you do not want to wait for the economy to correct itself naturally, would be to take action to stimulate employment or moderate prices *before* unemployment or prices rise. Economists try to predict such future macroeconomic troubles by looking at such items as:

- increases in new building permits,
- new plant and equipment orders,
- unemployment claims,
- the Producer Price Index,
- peoples' expectations,
- Inventory changes
- etc.

Looking at the first two of the above indices, it should be obvious that increases in new building permits or plant and equipment orders will generate productive activities that will soon require hiring workers and thus they indicate a coming upsurge in economic activity. But if these variables decline, or unemployment claims rise, or some other indicator indicates a reduction in consumer spending (such as pessimism about the economy), then production and employment are likely to subsequently fall. Similarly, a rise in wholesale prices (the Producer Price Index) usually indicates a future rise in retail prices, i.e., inflation. In these events, congress could (perhaps) take action to moderate the adverse effects predicted by these leading indicators.

9. What happened to cause the Great Depression?

There have been several explanations proposed.

One possibility is that up to 1929, the stock market was in a classic bubble. Then, all of a sudden, the stock market collapsed. Business expectations plummeted. Production dwindled. Income and wealth declined. People began cutting back on purchases. Widespread layoffs occurred. A multiplier effect quickly took place. Unemployment reached almost unimaginable levels.

Another probable contributing factor was the Smoot-Hawley tariff act passed in 1930. This bill raised tariffs to all-time highs on some 70 agricultural products and 900 manufactured items. Economists had warned that S-H would raise prices to consumers, damage export trade, hurt farmers, promote inefficiency, and result in foreign reprisals. It could be argued that this caused major disruption of production, particularly exports as other countries

retaliated, creating unemployment, loss of income, and causing a leftward shift of the AD curve. Thus, instead of protecting jobs, high tariffs reduced the number of jobs by reducing the overall aggregate demand for goods and services aand initiating a negative multiplier effect.   Some analysts fear that the current tariff war will lead to a similar recession in this country.

It has also been argued that the Federal Reserve caused the Great Depression when its wise men made a series of cumulative mistakes that contracted the money supply by one-third and wiped out purchasing power in an unprecedented fashion leading to a major decline in production and employment.

Different economists attach different importance to the above factors. However, all three were happening and the great depression was probably a consequence of all of them combined, and undoubtedly others. It should be noted that many economists put primary responsibility for the great depression on the unwise actions of the Federal Reserve.

It is worth observing that the number of people who made their living by farming had declined drastically by the early 1900's and the percentage of workers who were hired in the manufacturing sector had correspondingly risen. Farm workers may be underemployed (especially family farm workers), but are much less likely to be fired or unemployed than workers in a factory (unless the farmers become bankrupt). Craft workers may make less money, but are likely to resist firing themselves. Thus, the U.S. had become quite vulnerable to a massive rise in unemployment because of the great growth in wage earners.

The nation was totally unprepared for such a calamity as the great depression. Although there were leaders, including President Herbert Hoover, who advocated public projects to increase employment, there were others who felt that if you just waited (the classical theory of macroeconomics that we discussed), the economy would recover. But recovery was not forthcoming. In the early 1930's, it appeared as if the economy was permanently mired in unemployment and misery. Patience was no longer a virtue. New approaches were needed.

Review questions

1. What is meant by the term "business cycle?" Explain briefly how a business cycle might occur.
2. Give one example of a leading indicator and how economists might use it.
3. Briefly identify two factors which improve the productivity of workers. Identify one factor which raises the productivity of capital.
4.   What are the four main components of GDP?
5. Distinguish a depression from a recession. Describe hyperinflation.
6. Can inflation occur at the same time that there is cyclical or demand unemployment in the economy? Describe how.
7. What is AS and what are the main factors that determine it?
8. What is AD and what are the main factors that determine it?
9. Will AS and AD intersect at a level that necessarily means unemployment and inflation are controlled at acceptable levels?
10. Distinguish gross investment from intended investment. Which is relevant in determining AD?
11. Does investment include transfers of stocks or bonds when measuring AD?
12. If the value of imports equals the value of exports, what is the net effect on AD?
13. Why will falling interest rates cause AD to rise?
14. If AD is very high, which is like to increase sharply, employment or prices?
15. Are the AS and AD curves drawn in the text and the notes based primarily on the short or the long run? What fundamental assumption is incorporated into drawing these curves?
16. How does the Wealth effect influence consumption?
17. Why did the classical theory of macroeconomics predict that the economy always tended toward full employment? Was this a short-run or a long-run theory?
18. What do the terms, M, V, P, and T stand for in classical economic theory? Which of these terms were assumed to be fixed? Which terms were assumed to be variable? What was the primary determinate of the price level?