I. AGGREGATE DEMAND (AD)

- by definition, aggregate demand is a curve or schedule that shows the quantity of goods and services that households, firms, the government, and customers abroad want to buy at each price level
- an important change from the Aggregate Expenditures model is the fluctuation of the price level
- also important to note, since this model refers to an economy as a whole, there are no substitutes for an entire market
- AD is composed of the same components of GDP as AE: Consumption (C), Investment (Ig), Government Spending (G), Net Exports (Xn)
- an important understanding here is that G is fixed by government policy, that is, no matter what happens in the economy, the government sets its *fiscal policy* or budget for the year
- the other components are subject to fluctuations in the economy, particularly the price level

A. The Downward-Sloping AD Curve

- the following three factors explain why the AD curve is downward sloping
- they also are used to show how a change in the price level will change the real domestic output (GDP) – not move the entire AD curve

1) The Real-Balances Effect

- impacts C
- changes in the price level effect the purchasing power of money
- when the price level falls, money can buy more real output, consumers are encouraged to buy more
- on the other hand, when the price level rises, money can buy less real output, consumers are discouraged from buying as much

2) The Interest-Rate Effect

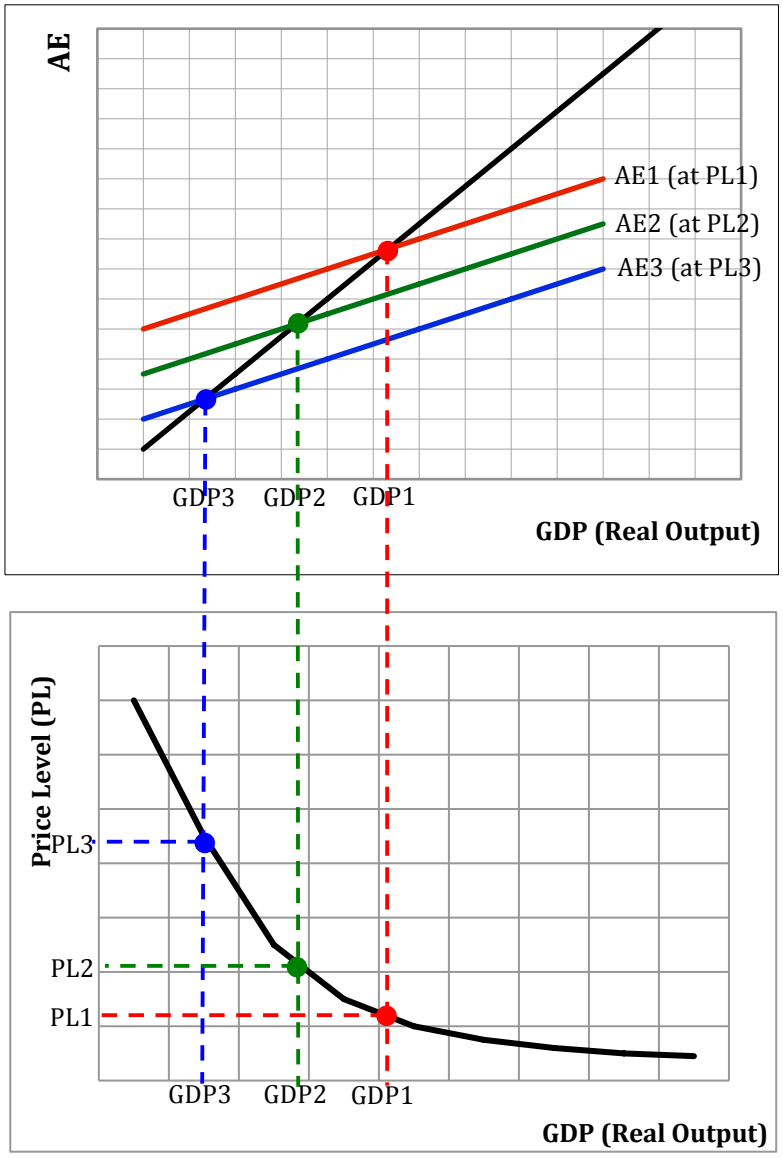
- impacts Ig
- Mankiw argues that interest rates are the result of consumer reactions to the wealth effect, when the price level falls and consumers can spend less to get claim the same amount of real output, they will convert some of their money to interest-bearing assets – more money available for banks to loan, therefore lower interest rates
- while this is one factor that can drive down interest rates, government policies alter interest rates as well
- regardless, as per last unit, as interest rates fall relative to the expected rate of return on investment, firms will invest more
- as interest rates rise relative to the expected rate of return on investment, firms will invest less

3) The Exchange-Rate Effect (Foreign Purchases Effect)

- impacts Xn
- remember X=eXports and M=iMports
- while Mankiw attempts to explain the exchange rates by discussing investing in foreign monetary assets, such as government bonds and mutual funds, we have not yet learned about exchange rates, there is an easier way to think about it for now
- if the price level falls, the value of the $US increases relative to a foreign currency – the $US *appreciates* – it can buy more foreign goods for the same amount of money (M increases) while making domestic goods more expensive abroad (X decreases)
- if the price level rises, the value of the $US decreases relative to a foreign currency – the $US *depreciates* – foreign currency can buy more US goods (X increases) while foreign goods command more $US (M decreases)

B. From AE to AD

- focus primarily on the *wealth effect* above
- in the AD model, we must now include the price level
- price level impacts the wealth effect – i.e. as PL falls, more real output can be purchased
- beginning with AE1, an output of GDP1 will be purchased – this is the initial price level, PL1
- when the price level rises (to PL2), less real output can be purchased with the same amount of money because the value of the currency has fallen – AE2 is the result of a decrease from AE1 – GDP2 will be purchased
- one step further, if the PL rises (to PL3), decreasing buying power yet again, AE3 is the result corresponding with GDP3



- the graphs above demonstrate how as the price level rises AE decreases which results in lower and lower real output
- the result is a downward sloping AD curve that is derived from the AE model when changes in the price level are introduced

C. Determinants of Aggregate Demand

- other things equal, a change in the PL will change the amount of aggregate spending and therefore change the amount of Real GDP demanded by the economy – represented by movements along a fixed AD curve, when one or more of the "other things" change, the curve itself shifts
- these determinants will impact the four components of GDP (C, Ig, G, or Xn), and will therefore move the AD curve either to the left (representing a decrease in AD) or to the right (representing an increase in AD)

1) Consumer Spending

- if consumers decide to buy more or less at each price level, the AD curve will shift to the right or left respectively
- there are several things that would cause consumers to change their behavior in this way

a) <u>consumer wealth (*wealth effect*)</u>

- consumer wealth includes financial assets (stocks, bonds) and physical assets (houses, land)
- a sharp increase in the real value of consumer wealth will prompt consumers to save less and spend more (AD shifts to the right)
- a decrease in the real value of consumer assets will cause consumers to save more and spend less (AD shifts to the left)

b) <u>consumer expectations</u>

- consumers will respond to what they believe will happen in the future to their real incomes and to the price level

  i) REAL INCOMES
  - when households expect their future real income will rise, they will spend more ahead of that raise – current consumption increases and current savings falls – AD shifts to the right
  - when households expect their future real income to fall, they will spend less ahead of that drop – current consumption decreases and current savings increases – AD shifts to the left

  ii) INFLATION
  - when households expect inflation to surge in the future they will increase AD today
  - when households expect deflation in the future they will decrease AD today to hold of their purchases to the future when prices will be lower

c) <u>household indebtedness</u>
- if household indebtedness from past spending *rises beyond normal levels*, consumers may be forced to cut current spending in order to the interest and principle on their debt – consumption will decline, the AD curve will move to the left
- if household indebtedness is *unusually low*, consumers are in a better position to borrow and spend today – consumption will rise, the AD curve will move to the right

d) <u>taxes</u>
- taxes impact personal income, remember, that is both Consumption AND Savings
- the change in Consumption = T x MPC
- the change on Savings = T x MPS
- an increase in taxes will reduce consumption and lower AD – the AD curve moves rightward – savings will fall also
- a decrease in taxes will increase consumption and raise AD – the AD curve moves leftward – savings will rise also

2) Investment Spending
- remember, this refers to the planned spending on capital goods; it is the planned spending by firms
- more investment means a greater AD – AD moves to the right
- less investment means a lesser AD – AD moves to the left

a) <u>real interest rates</u>
- the interest rate is the "price" of borrowing money
- when we refer to a change in the interest rate here we are not talking about the "interest-rate effect" we are talking about a change in the interest rate due to a change in the money supply, for instance
- the higher the interest rate, the less money that will be borrowed and invested, AD decreases
- the lower the interest rate, the more money that is borrowed and invested, AD increases

b) <u>expected returns</u>
- the greater the expected return on investment projects will increase the demand for capital goods and shift the AD curve to the right
- a lower rate of return in investment projects will decrease the demand for capital goods and shift the AD curve leftward

  i) EXPECTATIONS ABOUT FUTURE BUSINESS CONDITIONS
  - if firms are optimistic about future business conditions, they are more likely to forecast higher rates of return on current investment and will invest more today – AD increases, moves right
  - pessimism about future business conditions will bring lower rates of investment due to an expected lower future rate of return – AD decreases, moves left

  ii) TECHNOLOGY
  - in most cases, new technologies enhance expected returns on investment – AD increases, moves right
  - occasionally, a new mandated technology will make production more expensive and lower returns on investment – AD decreases, moves left

  iii) DEGREE OF EXCESS CAPACITY
  - "excess capacity" refers to unused capital

- if there is a rise in unused capital, investment in new capital is not necessary thus reducing the expected rate of return on investment – AD decreases, moves left
- in there is a fall in unused capital, firms will need to invest in new capital which will produce a greater expected rate of return on investment – AD increases, moves right

iv) BUSINESS TAXES
- business taxes impact after-tax profits which impact the expected rate of return on investments
- increases in business taxes will lower the expected rate of return (less investment, lower AD) while decreases in business taxes will raise the expected rate of return (more investment, higher AD)

3) Government Spending
- an important caveat to this component of AD, here we are assuming that changes in government spending are not accompanied by changes in tax collections or interest rates
- increases in government purchases will increase AD, move the curve rightward
- decreases in government purchases will decrease AD, move the curve leftward

4) Net Export Spending
- here we are looking at the difference between eXports and imports, that is Net Exports (Xn) = X – M
- as long as the balance of trade favors greater exports, AD will increase, move rightward
- if the balance of trade favors more imports, AD will decrease, move leftward

a) <u>national income abroad</u>
- when foreign nations' incomes increase (NI) they will be able to afford to buy more products, some of which will be made in the US, therefore net exports will rise, AD increases
- when foreign nations' incomes decrease they can afford to buy fewer products, some of which were made in the US, AD decreases

b) <u>exchange rates</u>
- here we are referring to the relative value of the $US compared to another specific currency (we will look more closely at this in a later chapter)

i) APPRECIATION
- when the value of the $US rises relative to a specific foreign currency
- appreciation of the $US makes it easier to buy foreign products, imports rise, that is net exports fall, AD decreases

ii) DEPRECIATION
- when the value of the $US falls relative to a specific foreign currency
- depreciation of the $US means that the foreign currency has appreciated making it easier for the foreign consumers to buy more US products, exports rise, that is net exports rises, AD increases

DETERMINANTS OF AGGREGATE DEMAND					
	Event	***Related Effects (if any)***	***Component of AD***	***Impact on AD***	***Additional Notes***
A. Consumer Spending (C)					
	Consumer Spending Increases		C ↑	AD →	
	Consumer Spending Decreases		C ↓	AD ←	
1) "Wealth Effect"					
	Real Value of Consumer Wealth Increases		C ↑	AD →	
	Real Value of Consumer Wealth Decrease		C ↓	AD ←	
2) Consumer Expectations					
	Expect REAL Incomes to Increase		C ↑	AD →	
	Expect REAL Incomes to Decrease		C ↓	AD ←	
	FUTURE Inflation		C ↑	AD →	ahead of the period of inflation
	FUTURE Deflation		C ↓	AD ←	ahead of the period of deflation
3) Household Indebtedness				relative to previous level of indebtedness	
	Household Indebtedness Decreases		C ↑	AD →	

	Household Indebtedness Increases		C ↓	AD ←	
4) Taxes					Primarily Personal Income Taxes
	Tax Cuts		C ↑	AD →	
	Tax Hikes		C ↓	AD ←	
B. Investment Spending (Ig)					
	Investment Increases		Ig ↑	AD →	
	Investment Decreases		Ig ↓	AD ←	
1) Real Interest Rates (i)					
	Real Interest Rates Decrease	*i* ↓	Ig ↑	AD →	
	Real Interest Rates Increase	*i* ↑	Ig ↓	AD ←	
2) Expected Returns (r)					
	Rate of Return Increases	r ↑	Ig ↑	AD →	
	Rate of Return Increases	r ↓	Ig ↓	AD ←	
a) Technology					
	Technology Advances	r ↑	Ig ↑	AD →	
	Technology Retreats	r ↓	Ig ↓	AD ←	
b) Degree of Excess Capacity					
	Unused Capital Decreases	r ↑	Ig ↑	AD →	
	Unused Capital Increases	r ↓	Ig ↓	AD ←	
c) Business Taxes					
	Business Taxes Decrease	r ↑	Ig ↑	AD →	
	Business Taxes Increase	r ↓	Ig ↓	AD ←	
C. Government Spending (G)	assumes tax revenues and interest rates will be unaffected				
(see Fiscal Policy)	Government Spending Increases		G ↑	AD →	
	Government Spending Decreases		G ↓	AD ←	
D. Net Export Spending (Xn)					
	Exports Increase	X ↑	Xn ↑	AD →	
	Exports Decrease	X ↓	Xn ↓	AD ←	
	Imports Increase	M ↑	Xn ↓	AD ←	
	Imports Decrease	M ↓	Xn ↑	AD →	
1) National Income Abroad					
	National Income Abroad Increases	X ↑	Xn ↑	AD →	
	National Income Abroad Decreases	X ↓	Xn ↓	AD ←	
2) Exchange Rates					
	$US Depreciates	X ↑ M ↓	Xn ↑	AD →	
	$US Appreciates	X ↓ M ↑	Xn ↓	AD ←	

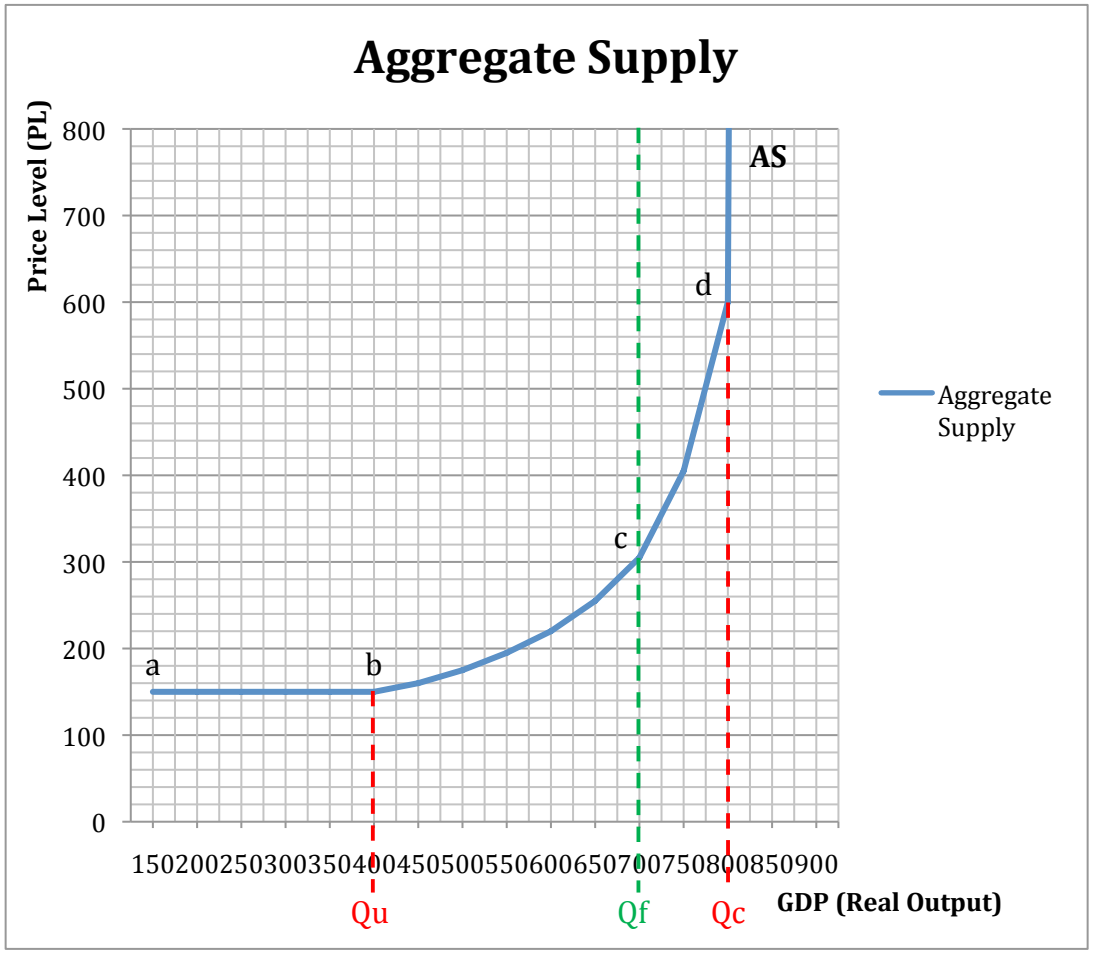
II. AGGREGATE SUPPLY (AS)

- Mankiw begins with Long Run Aggregate Supply (LRAS), however we will begin with Short-Run Aggregate Supply
- we will build to the LRAS from the Short Run

A. Short Run Aggregate Supply (SRAS or just AS)

- the **short run** in the macroeconomy is a period in which nominal wages (and other input prices) remain fixed as the price level increases or decreases
- the level of real domestic output firms will produce at each price level
- the higher the price level the greater the incentive to sell more in order to receive more nominal dollars for their production

1) The AS Curve



Qf = full employment output, or the natural rate of output; that is the amount of real output associated with the natural rate of unemployment.
Qc = full capacity output, the level of output that is reached when all resources are being fully employed, perhaps even *over*-employed
Qu = refers to the level of output where resources are vastly underutilized

a) <u>horizontal range (ab)</u>

- output levels are substantially less than full employment (Qf)
- implies that there is a recession (or depression) where much of the resources (including machinery, tools, and labor) are sitting idle
- because acquiring labor and equipment is easy and at stable prices, the per-unit production costs will stay constant as firms expand up to Qu
- in this range, if real output falls, product and resource prices will not move downward

b) <u>intermediate range (bc)</u>

- this refers to a quantity of output between Qu and Qc
- in this range, an expansion of output is accompanied by rising prices

- the amount of resources, including labor, is becoming more difficult to come by which drives production costs higher which in turn drive prices higher
- per-unit production costs rise and firms must receive higher product prices for their output in order to be profitable

c) <u>vertical range (cd)</u>
- the economy has exceeded the full-employment production (Qf) and has reached the ***full-capacity*** output
- think of full-capacity as when every single resource, including labor, is fully employed and there are no additional resources available to increase production
- firms will bid against each other for the resources, driving up the cost of the resources, including labor
- prices will continue to rise but the economy as a whole will be unable to increase its output
- as wages rise, consumers will demand more and more driving the price level higher and higher

B. Determinants of Aggregate Supply
- an existing AS curve identifies the relationship between the price level and real output, other things equal; when one or more of the "other things" change, the curve itself shifts
- a shift indicates that firms are willing to produce and sell more or less at each price level
- changes in the determinants cause per-unit production costs to be either higher or lower than before *at each price level* affecting profits leading firms to alter their output at each price level
- changes that cause per-unit production costs to decrease will shift the AS curve to the right
- changes that cause per-unit production costs to increase will shift the AS curve to the left

1) Changes in Input Prices
- higher input prices increase per-unit production costs and reduce AS
- lower input prices decrease per-unit production costs and increase AS

a) <u>domestic resource availability</u>
- increases in the supply of domestic resources will lower resource prices, reducing per-unit production costs, thus shifting AS to the right
- the converse is also true

i) LAND
- new supplies of land resources may be discovered lowering the price of said resource lowering the per-unit production cost
- as land resources are depleted, the scarcity will increase the price of the resource thus raising its price and the per-unit production cost

ii) LABOR
- wages and salaries make up about 75% of all business costs
- changes in wages affect the per-unit production costs and thus shift the AS curve
- the availability of labor impacts the equilibrium wage rate for workers earning more than minimum wage which will impact the per-unit production costs

iii) CAPITAL
- stocks of capital goods on-hand impacts AS
- when society improves or adds to its stock of capital goods, AS increases; the converse is also true

iv) ENTREPRENEURIAL ABILITY
- the creative and inventive human resources may change in a society thus impacting the AS
- as fewer entrepreneurs are available the per-unit production costs will increase as their shortage does resulting in a lower AS
- when more entrepreneurs are willing to contribute to production, the surplus will lower the cost of their contribution hence increasing AS
- entrepreneurs are the investors in industry who supply much of the *venture capital* that businesses rely on to get started or expand; when less venture capital is available, or when it is taken out of the business flow, AS will fall, but when more venture capital is available, AS will rise

b) <u>prices of imported resources</u>
- resources added from abroad add to the supply of resources available, as the amount of resources available increases, the cost of the resources falls, driving the per-unit production costs to fall thus increasing AS

- foreign resources may become more available due to the value of the currencies in question, that is to say, the exchange rate – if the $US appreciates relative to a foreign currency, the cost of those foreign resources will become more affordable hence increasing the amount that can be imported (the converse is true for the depreciation of $US relative to a foreign currency)

c) <u>market power</u>
- *market power* refers to the ability of one firm or organization to set prices that are above competitive prices, for example OPEC (Organization of Petroleum Exporting Countries)
- when the market power of a firm or organization grows it will have the ability to set the prices higher than the competitive market price resulting in a higher per-unit production cost reducing AS
- if the market power of an organization or firm is reduced (through increased competition) prices will be closer to competitive market price resulting in lower per-unit production cost increasing AS

2) Productivity
- measure of the relationship between a nation's level of real output and the amount of resources used to produce it
- it is a measure of average real output, or real output per unit of input

$$\text{Productivity} = \frac{\text{total output}}{\text{total inputs}}$$

$$\text{Per-Unit Production Cost} = \frac{\text{total input cost}}{\text{total output}}$$

- an increase in productivity enables an economy to obtain more real output from its limited resources
- by reducing the per-unit production cost, an increase in productivity shifts the AS curve to the right
- the main source of productivity advance is improved production technology
- other sources of productivity increases are better-educated and trained workforce, improved forms of business enterprises, and the reallocation of labor resources from lower- to higher-productivity uses

3) Legal-Institutional Environment
- the general rules under which businesses operate will impact the way firms do business which will impact their per-unit production costs

a) <u>business taxes and subsidies</u>
- higher taxes (sales, excise, payroll) increase per-unit production costs and will shift the AS curve to the left
- conversely, higher government subsidies to businesses (either a payment or a tax break) lowers per-unit production costs shifting the AS curve to the right

b) <u>government regulation</u>
- it is usually costly for businesses to comply with government regulations
- more regulation tends to increase per-unit production costs
- deregulation, on the other hand, will likely decrease per-unit production costs

DETERMINANTS OF AGGREGATE SUPPLY				
	Event	***Related Effects (if any)***	***Impact on AS***	***Additional Notes***
A. Input Prices	Input Prices Rise		AS ←	
	Input Prices Fall		AS →	
1) Domestic Resource Availability				
	Domestic Resources become More Available	Input Prices ↓	AS →	
	Domestic Resources become Less Available	Input Prices ↑	AS ←	
a) Land	Amount of Land Resources Available Increases	Domestic Resources Available ↑ Input Prices ↓	AS →	
	Amount of Land Resources Available Decreases	Domestic Resources Available ↓ Input Prices ↑	AS ←	
b) Labor				
	More Labor Available	Domestic Resources Available ↑ Input Prices ↓	AS →	
	Less Labor Available	Domestic Resources Available ↓	AS ←	

c) Capital		Input Prices ↑	
	Stock of Capital Increases	Domestic Resources Available ↑ Input Prices ↓	AS →
	Stock of Capital Decreases	Domestic Resources Available ↓ Input Prices ↑	AS ←
	Improved Equipment	Domestic Resources Available ↑ Input Prices ↓	AS →
	Poorer Equipment	Domestic Resources Available ↓ Input Prices ↑	AS ←
d) Entrepreneurial Ability			
	More Entrepreneurial Ability	Domestic Resources Available ↑ Input Prices ↓	AS →
	Less Entrepreneurial Ability	Domestic Resources Available ↓ Input Prices ↑	AS ←
2) Prices of Imported Resources			
	Prices of Imported Resources Increases	Input Prices ↑	AS ←
	Prices of Imported Resources Decreases	Input Prices ↓	AS →
a) Exchange Rates			
	$US Appreciates	Prices of Imported Resources ↓ Input Prices ↓	AS →
	$US Depreciates	Prices of Imported Resources ↑ Input Prices ↑	AS ←

3) Market Power

This factor has to be taken on a case-by-case basis. It will depend on how a group or organization uses its market power. In some instances, the exercising of one's power in the market may increase the price of resources, while in other instances, an exercise of market power may lower the prices of resources. However, in general:

Exercise Increases Input Price	AS ←
Exercise Decreases Input Price	AS →

B. Productivity

$$\text{Productivity} = \frac{\text{total output}}{\text{total inputs}} \qquad \text{per-unit production cost} = \frac{\text{total input cost}}{\text{total output}}$$

	Productivity Increases		AS →
	Productivity Decreases		AS ←
1) Per-Unit Production Cost			
	Per-Unit Production Cost Increases	Productivity ↓	AS ←
	Per-Unit Production Cost Decreases	Productivity ↑	AS →
a) "Quality of Labor			
	Better Educated and Trained Workforce	Per-Unit Production Cost ↓ Productivity ↑	AS →
	Worse Educated and Trained Workforce	Per-Unit Production Cost ↑ Productivity ↓	AS ←
b) Technology			
	Improved Production Technology	Per-Unit Production Cost ↓ Productivity ↑	AS →
	Worsening Production Technology	Per-Unit Production Cost ↑ Productivity ↓	AS ←
c) Allocation of Labor Resources			
	Better Allocation of Labor Resources	Per-Unit Production Cost ↓ Productivity ↑	AS →
	Worse Allocation of Labor Resources	Per-Unit Production Cost ↑ Productivity ↓	AS ←

C. Legal-Institutional Environment

1) Taxes and Subsidies			
a) Business Taxes			
	Business Taxes Increase	Per-Unit Production Cost ↑ Productivity ↓	AS ←
	Business Taxes Decrease	Per-Unit Production Cost ↓ Productivity ↑	AS →
b) Subsidies			
	Government Subsidies Increase	Per-Unit Production Cost ↓ Productivity ↑	AS →
	Government Subsidies Decrease	Per-Unit Production Cost ↑ Productivity ↓	AS ←
c) Government Regulation			

More Government Regulation	Per-Unit Production Cost ↑ Productivity ↓	AS ←
Less Government Regulation	Per-Unit Production Cost ↓ Productivity ↑	AS →

C. Long Run Aggregate Supply (LRAS)

- the **long run** in the macroeconomy is the period in which nominal wages are fully responsive to previous changes in the price level
- since the LRAS reflects the response of wages, it shows different information that SRAS
- the LRAS is vertical because higher price level will result in higher nominal wages which will shift the AS to the left, conversely, a decrease in the PL will result in lower nominal wages