CHAPTER NO 8

The Keynesian System (IV): Aggregate Supply and Demand

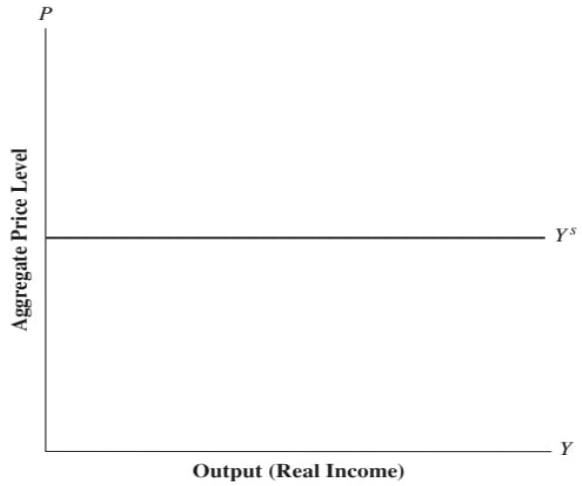
Sure! This chapter explores how output is determined in Keynesian economic models by considering both demand and supply factors. It contrasts this with classical economics, which primarily emphasizes supply-side determinants. It begins by illustrating the demand-driven nature of output in Keynesian models, constructing an aggregate demand schedule. Then, it integrates this schedule with the classical supply side, highlighting that under classical assumptions, output remains independent of demand. However, it discusses how modifications to these assumptions allow for a role of aggregate demand in output determination. Further, it analyzes Keynesian assumptions about the supply side, introducing the Keynesian aggregate supply function and examining how shifts in it affect price and output. The chapter concludes by comparing the classical and Keynesian systems, emphasizing their differing approaches to output determination.

8.1 The Keynesian Aggregate Demand Schedule

Keynesian economics emphasizes the role of aggregate demand in determining output and employment levels in the economy. According to Keynes, for an economy to be in equilibrium, aggregate demand must equal aggregate supply. In Keynesian analysis, aggregate demand consists of consumption, investment, government spending, and net exports. When aggregate demand falls short of aggregate supply, there is involuntary unemployment and underutilization of resources.

They discusses the Keynesian Aggregate Demand Schedule, which is a fundamental concept in Keynesian economics. It begins by reaffirming Keynes's theory that aggregate demand must equal output for the economy to be in equilibrium. This idea is crucial because it underscores the importance of overall demand in determining economic activity.

FIGURE 8-1 Aggregate Supply Schedule in the Fixed-Price Keynesian Model



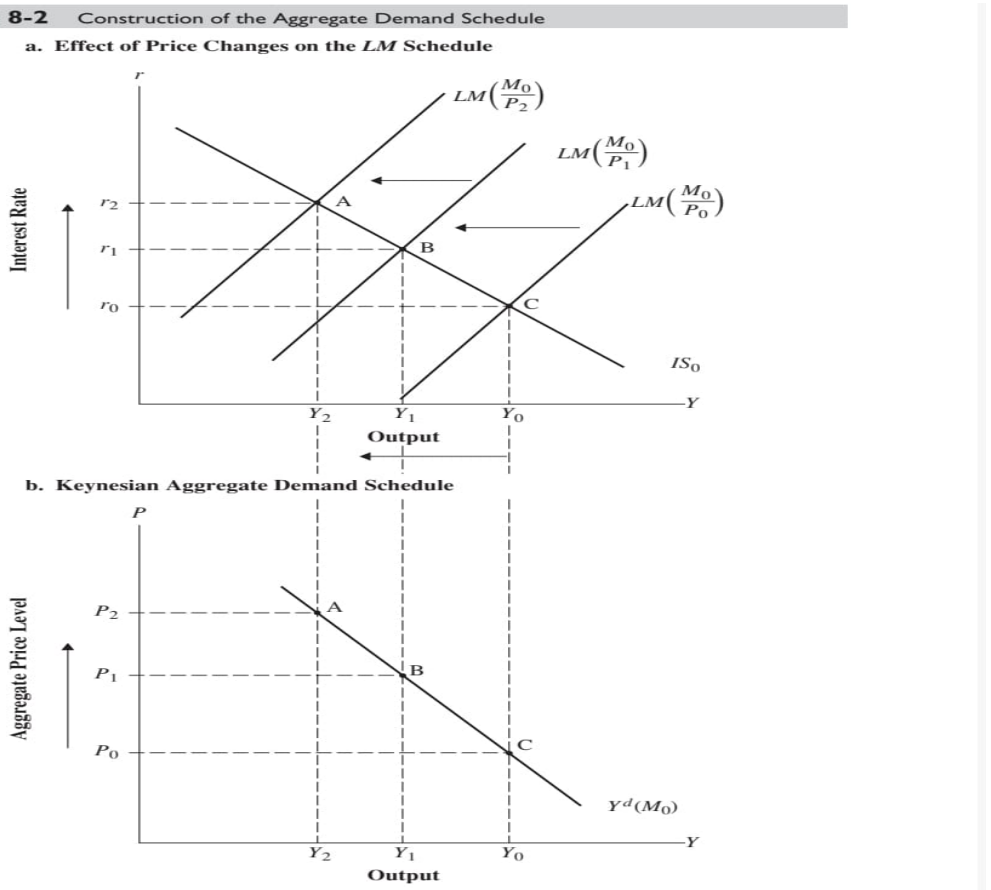
In previous chapters on the Keynesian model, where the price level was fixed and output determined by aggregate demand, we assumed that the aggregate supply schedule horizontal.

The text illustrates this concept with the help of Figure 8-1, which depicts the aggregate supply schedule in the fixed-price Keynesian model. In previous chapters, where the price level was fixed, output was determined solely by aggregate demand. This assumption led to a horizontal aggregate supply curve, indicating that any level of output demanded would be met at the given price level.

This graph helps visualize the concept of aggregate supply and demand in the Keynesian framework. It shows that when the price level is fixed, output is determined solely by aggregate demand. However, the text acknowledges that this assumption might not hold in all situations, especially when the economy approaches full capacity. In such cases, an upward-sloping aggregate supply curve is more plausible, indicating that changes in output will affect both wage and price levels.

The text explains the impact of changes in the price level on the real money supply and the LM (Liquidity-Money) schedule using Figure 8-2a. It describes how holding the nominal money supply fixed while considering three price levels (P0, P1, P2), where P2 > P1 > P0, results in a leftward shift of the LM schedule as the price level increases. This shift occurs because a higher price level reduces the real money supply, analogous to a decrease in the nominal money supply. Consequently, the LM schedule shifts leftward, leading to higher interest rates, reduced investment, and lower aggregate demand.

FIGURE 8-2 Construction of the Aggregate Demand Schedule

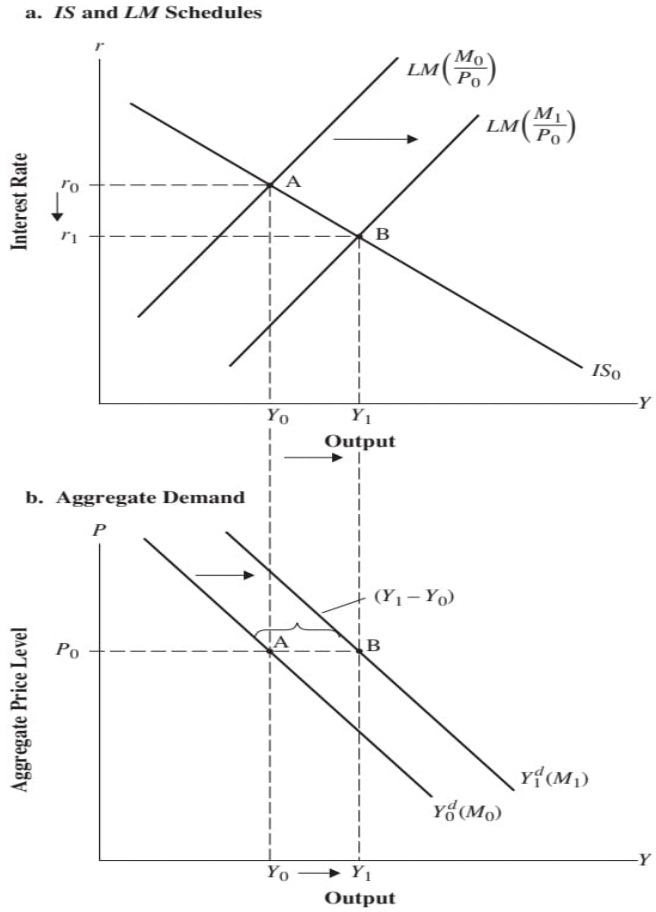


At successively higher price levels, P_0, P_1, P_2, the LM schedule in part a is shifted farther to the left. This shift results in successively lower levels of aggregate demand Y_0, Y_1, Y_2. These combinations of price and aggregate demand are plotted to give the negatively sloped aggregate demand schedule

Additionally, the text emphasizes that the aggregate demand schedule reflects both monetary influences, which affect the LM schedule, and direct influences on aggregate demand, affecting the IS schedule. Factors that increase equilibrium income in the IS–LM model shift the aggregate demand schedule to the right, while those causing a decline shift it to the left. This underlines the interconnectedness of various economic factors in determining aggregate demand and output levels in the Keynesian framework.

The text describes the impact of an increase in the money supply, from M0 to M1, as illustrated in Figure 8-3. Initially, at equilibrium point A, with LM curve labeled LMaM0, and price level P0, the economy operates. However, with the increase in the money supply, the LM schedule shifts to the right to LMaM1, still at price level P0. This shift leads to a new equilibrium point, denoted as B in Figure 8-3a. At this point, equilibrium income for the given price level P0 rises from Y0 to Y1. Consequently, the aggregate demand schedule, depicted in Figure 8-3b, shifts to the right from Yd0 to Yd1. This horizontal shift represents the increase in income and aggregate demand resulting from the change in the IS–LM schedule model at the given price level. Additionally, the text notes that similar shifts in the IS schedule due to changes in government expenditures or taxes would lead to corresponding shifts in the aggregate demand schedule, maintaining the equilibrium income in the IS–LM model.

FIGURE 8-3 Effect on Aggregate Demand of an Increase in the Money Supply



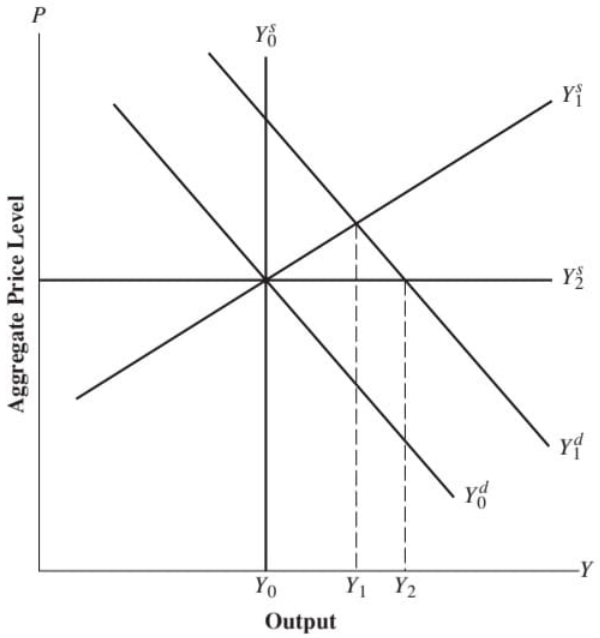
An increase in the money supply shifts the LM schedule in part a to the right, from $LM(M_0/P_0)$ to $LM(M_1/P_0)$, and shifts the aggregate demand schedule to the right, from $Y^d{}_0$ to $Y^d{}_1$, in part b.

8.2 The Keynesian Aggregate Demand Schedule Combined with the Classical Theory of Aggregate Supply

The combination of Keynesian aggregate demand analysis with classical assumptions about aggregate supply yields some significant implications.

Firstly, when the classical assumptions prevail, particularly regarding the labor market dynamics where supply and demand depend solely on the real wage, and wages are perfectly flexible, the aggregate supply schedule becomes vertical. This means that changes in government spending, taxes, or the money supply, which typically shift the demand schedule in Keynesian analysis, do not impact the equilibrium output. Output is essentially determined by factors affecting the supply side, such as technology, resources, and the efficiency of production.

FIGURE 8-4 Role of Aggregate Supply in Determining the Output Response to a Policy Shock



An increase in government spending shifts the aggregate demand schedule from Y^d_0 to Y^d_1. If the aggregate supply schedule is horizontal (Y^s_2), output increases from Y_0 to Y_2. If the aggregate supply schedule slopes upward (Y^s_1), output increases only to Y_1. If the supply schedule is vertical (Y^s_0), output is unchanged at Y_0.

This leads to a fundamental incompatibility between the classical and Keynesian views. In the classical framework, aggregate demand does not play a role in determining output and employment levels. Instead, the focus is on the supply side of the economy. This contradicts the Keynesian perspective, which emphasizes the significance of aggregate demand in influencing economic activity.

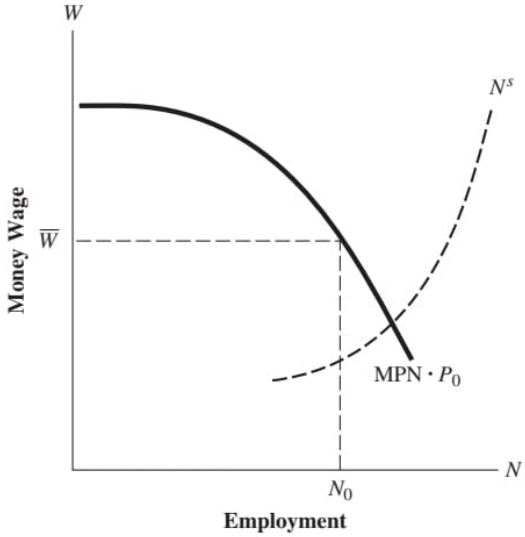
To reconcile this disparity, Keynes and his followers had to challenge the classical assumptions and develop a Keynesian theory of the supply side. In doing so, they aimed to incorporate elements that were missing in the classical analysis, such as the role of aggregate demand shocks in driving fluctuations in output and employment.

In summary, while the Keynesian framework emphasizes the role of aggregate demand in shaping economic outcomes, classical assumptions about aggregate supply suggest that output is determined independently of demand factors. This discrepancy underscores the need for a comprehensive analysis that integrates both demand and supply-side considerations to understand the complexities of economic dynamics.

8.3 A Contractual View of the Labor Market

Keynes introduced the idea that the money wage would not adjust quickly enough to maintain full employment in the economy. Unlike the classical model, where labor supply and demand are solely functions of the real wage and equilibrium is quickly achieved, Keynesian theory posits that wage adjustments are not immediate or complete. This viewpoint arises from several reasons for wage rigidity:

FIGURE 8-5 Employment with a Fixed Money Wage



With the money wage fixed at $\overline{W}$, employment will be at N_0, the amount of labor demanded.

Sources of Wage Rigidity:

1.Relative Wage Concerns:

Keynes argued that workers are not only concerned about their absolute wage level but also about their wage relative to others. Wage differentials exist among workers of different trades and skills, and negotiations often focus on maintaining an acceptable relative wage structure. Consequently, workers may resist wage cuts, even during periods of decreased labor demand, viewing them as unfair changes in relative wages.

2.Institutional Factors:

Institutional arrangements, such as labor contracts in unionized sectors, often fix wage levels for extended periods. Even without explicit contracts, implicit agreements between

employers and employees can lead to wage rigidity. Employers may refrain from cutting wages to maintain a reputation as good employers or to avoid labor relations issues.

3. Employer-Employee Relations:

Employers may prefer to adjust employment levels rather than wages to maintain positive relationships with employees and avoid difficulties in recruitment. Keynesians argue that firms are inclined to reduce work hours or implement layoffs rather than wage cuts to respond to decreased demand.

These factors suggest that wage adjustments are slow and incomplete, leading to a situation where wages do not promptly clear the labor market. Keynes observed this phenomenon during the Great Depression in Britain, where despite high unemployment rates, wage adjustments did not occur swiftly enough to restore equilibrium in the labor market.

Keynesian economics adopts a contractual view of the labor market, contrasting with the frictionless auction market perspective of classical economists. This view emphasizes that wages are not immediately responsive to short-term market forces but are instead influenced by longer-term factors such as employer-worker relations. Consequently, adjustments in employment and output, rather than wages, become the primary mechanisms through which the economy responds to shifts in aggregate demand.

In the Keynesian framework, a fixed money wage model is often used to understand short-run dynamics, assuming that while prices are flexible, wages remain fixed. This assumption helps capture the sluggishness in wage adjustments and allows for an analysis of how changes in demand affect employment levels in the economy.

Figure 8-6 illustrates the Keynesian aggregate supply schedule under conditions of a fixed money wage. Let's delve into each part of the figure:

Labor Demand: This section depicts the relationship between the price level and the level of employment. As the price level rises from P0 to P1 and then to P2, the money value of the marginal physical product of labor (MPN·P) increases. Consequently, labor demand also rises, leading to higher levels of employment (N0 to N1 to N2).

Production Function: Here, the figure illustrates how changes in employment affect the level of output. As employment increases from N0 to N1 and then to N2, the level of output (Y0 to Y1 to Y2) also rises. This reflects the positive relationship between input (labor) and output (goods and services produced), as captured by the production function.

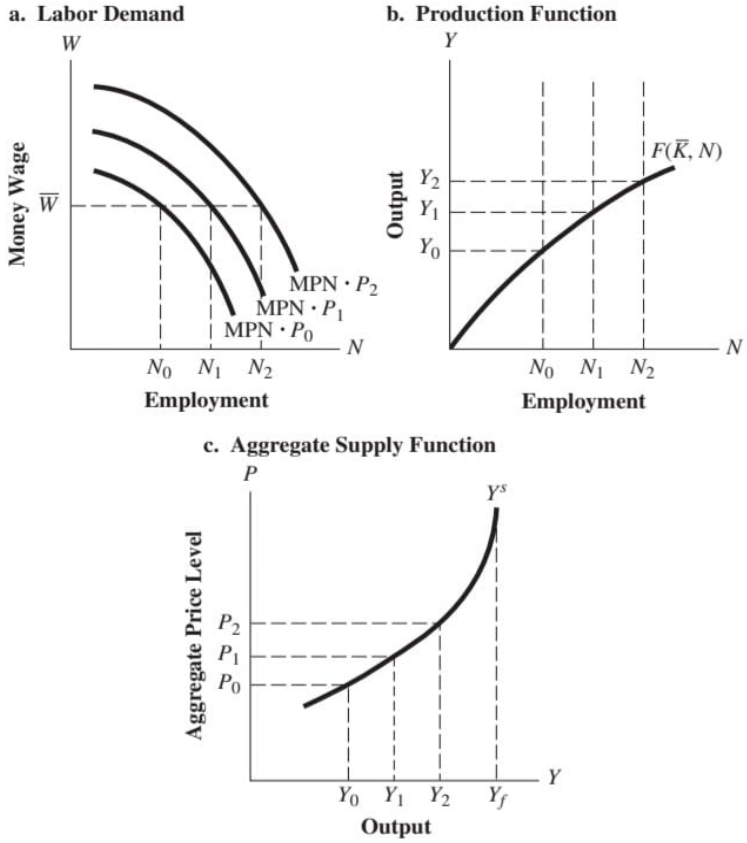
Aggregate Supply Function: This part of the figure combines the information from parts (a) and (b) to show the relationship between the price level and the quantity of output supplied by the economy. As the price level increases, both employment and output rise, leading to an upward-sloping aggregate supply curve (Ys). This indicates that higher price levels result in higher levels of output supplied by firms in the economy.

The figure illustrates that when the money wage is fixed, increases in the price level lead to higher levels of employment and output, resulting in an upward-sloping aggregate supply

curve. However, this relationship is limited by full employment (Yf), beyond which further increases in the price level do not lead to additional output. Below full employment, shifts in the aggregate demand schedule can influence the level of output in the economy.

Overall, Figure 8-6 captures how changes in the price level affect employment, output, and the behavior of the economy in a Keynesian framework where the money wage is assumed to be fixed.

FIGURE 8-6 The Keynesian Aggregate Supply Schedule When the Money Wage Is Fixed



Part *a* shows the levels of employment N_0, N_1, N_2 for three successively higher price levels, P_0, P_1, P_2. Part *b* shows the levels of output, Y_0, Y_1, Y_2, that will be produced at these three levels of employment. In part *c*, we put together the information in *a* and *b* to show output supplied at each of the three price levels. Notice that at higher price levels, employment, and hence output supplied, increase; *the aggregate supply curve* (Y^s)*is upward-sloping.*

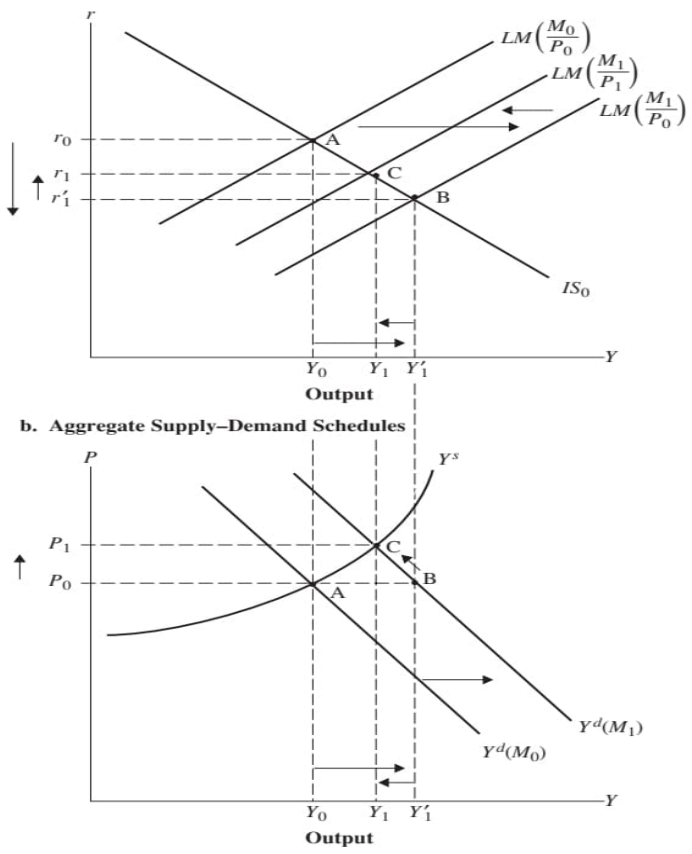
Figures 8-7 and 8-8 depict the consequences of altering economic policies, specifically increasing the money supply and government spending, under conditions of flexible price levels:

In Figure 8-7a, an augmented money supply prompts a shift in the LM curve from LM(M0/P0) to LM(M1/P0). This transition in the LM curve stems directly from the alteration in the money supply. Correspondingly, Figure 8-7b displays an outward shift in the aggregate demand curve from Yd(M0) to Yd(M1). Initially, at the price level P0, output ascends to Y1.

However, to realize this output increase, the price level must elevate, establishing a new equilibrium at Y1 and P1. Consequently, the LM schedule advances to LM(M1/P1).

Figure 8-8 delineates the effects of escalated government spending. As shown in Figure 8-8a, heightened government expenditure displaces the IS curve from IS(G0) to IS(G1). Yet, this fiscal action does not directly affect the LM curve, which retains its position at LM(M0/P0).

FIGURE 8-7 Effects of an Increase in the Money Supply When the Price Level Is Flexible

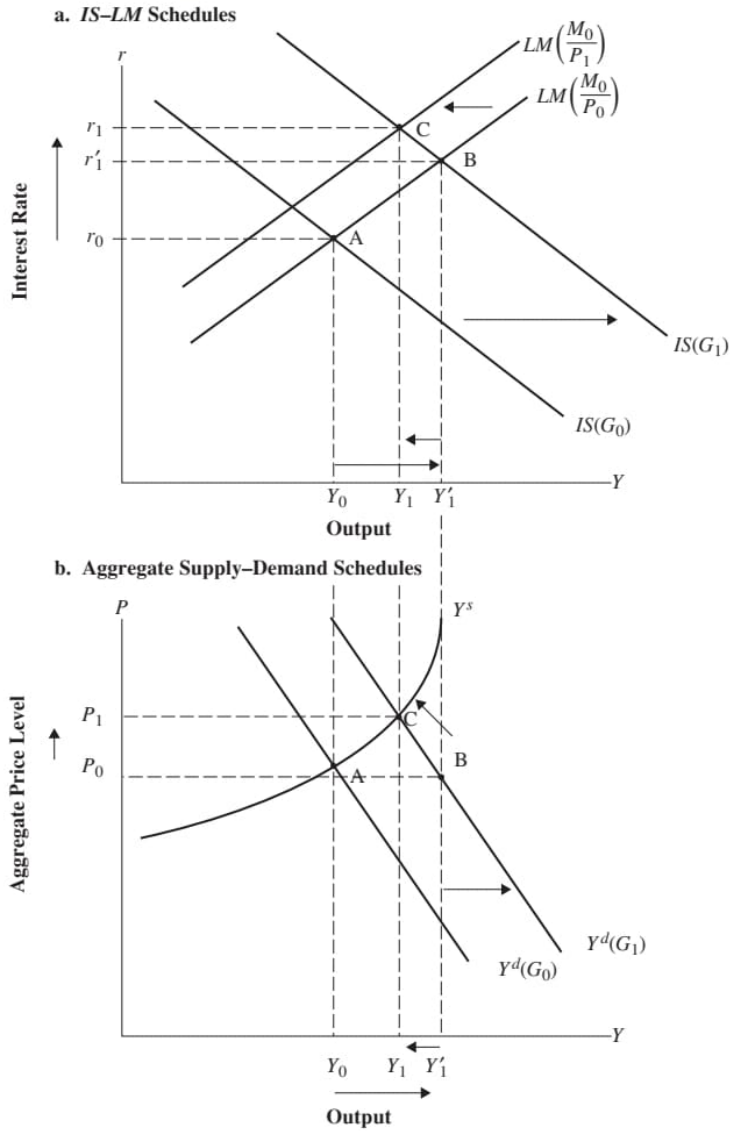


An increase in the money supply shifts the *LM* schedule from $LM(M_0/P_0)$ to $LM(M_1/P_0)$ (part *a*) and shifts the aggregate demand schedule from $Y^d(M_0)$ to $Y^d(M_1)$ (part *b*). The increase in aggregate demand causes output to rise from Y_0 to Y_1 and the price level to rise from P_0 to P_1. The increase in the price level shifts the *LM* schedule from $LM(M_1/P_0)$ to $LM(M_1/P_1)$.

In Figure 8-8b, the surge in aggregate demand is represented by a shift from Yd(G0) to Yd(G1). This leads to output augmentation to Y1, alongside a price level escalation to P1. Subsequently, the LM curve shifts to LM(M0/P1), as the price level upsurge diminishes the real money supply, counteracting the boost in output.

In both scenarios, the policy actions yield Keynesian outcomes—augmented output and employment. However, the impact is more subdued compared to fixed-price scenarios. Price level fluctuations attenuate the effect of monetary and fiscal policy actions on output. Additionally, economic shocks, such as shifts in investment or liquidity preference, continue to influence output and employment, albeit with adjustments to accommodate variations in the price level.

FIGURE 8-8 Effects of an Increase in Government Spending When the Price Level Is Flexible



An increase in government spending shifts the *IS* schedule from $IS(G_0)$ to $IS(G_1)$ (part *a*) and shifts the aggregate demand schedule from $Y^d(G_0)$ to $Y^d(G_1)$ (part *b*). The increase in aggregate demand causes output to rise from Y_0 to Y_1 and the price level to rise from P_0 to P_1. The increase in the price level shifts the *LM* schedule from $LM(M_0/P_0)$ to $LM(M_0/P_1)$.

8.4 Labor Supply and Variability in the Money Wage

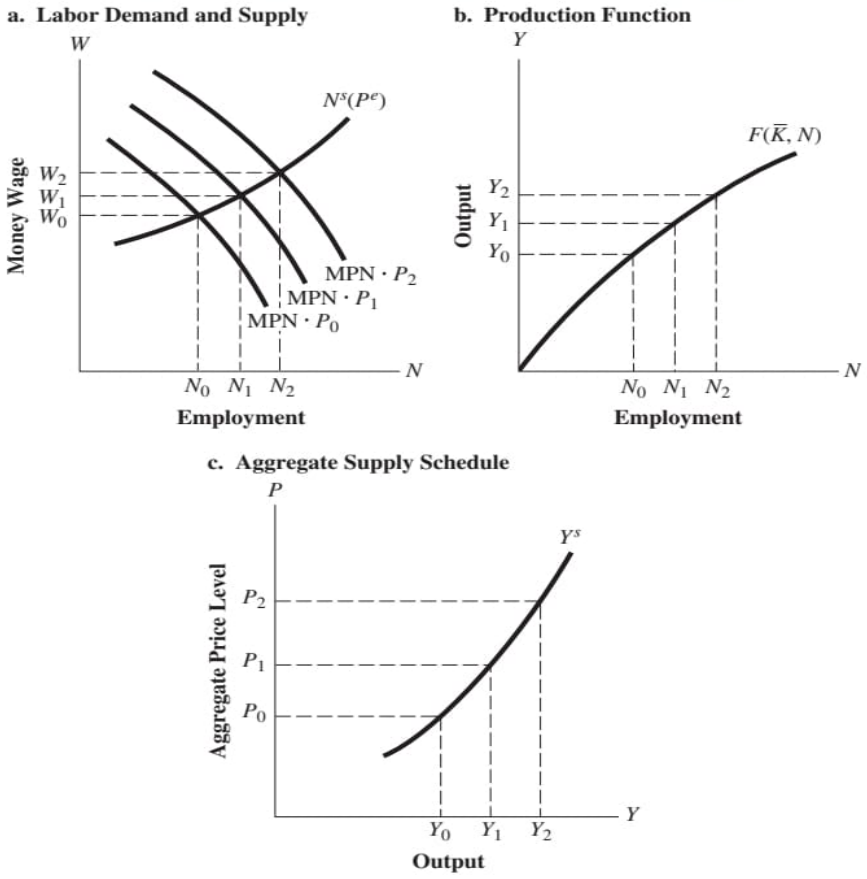
This section delves into the interaction between labor supply and the variability of the money wage, comparing the classical and Keynesian perspectives.

Classically, labor supply is positively related to the real wage, meaning higher real wages lead to increased labor supply. In contrast, Keynesians argue that wage bargains are set in terms of the money wage, and workers base their decisions on current wages and their expectations of future price levels, which are largely shaped by past price behavior.

Keynesian theory assumes workers' price expectations are backward-looking and slow to adjust to present economic conditions. Price expectations are derived from past price levels. In this framework, labor supply depends on the current money wage and expected price level.

Figure 8-9 illustrates the Keynesian aggregate supply schedule under variable money wages. Labor demand increases with the price level, leading to higher employment levels. Increased employment results in higher output levels. The aggregate supply curve is upward-sloping, indicating higher price levels correspond to increased output supplied.

FIGURE 8-9 The Keynesian Aggregate Supply Schedule When the Money Wage Is Variable

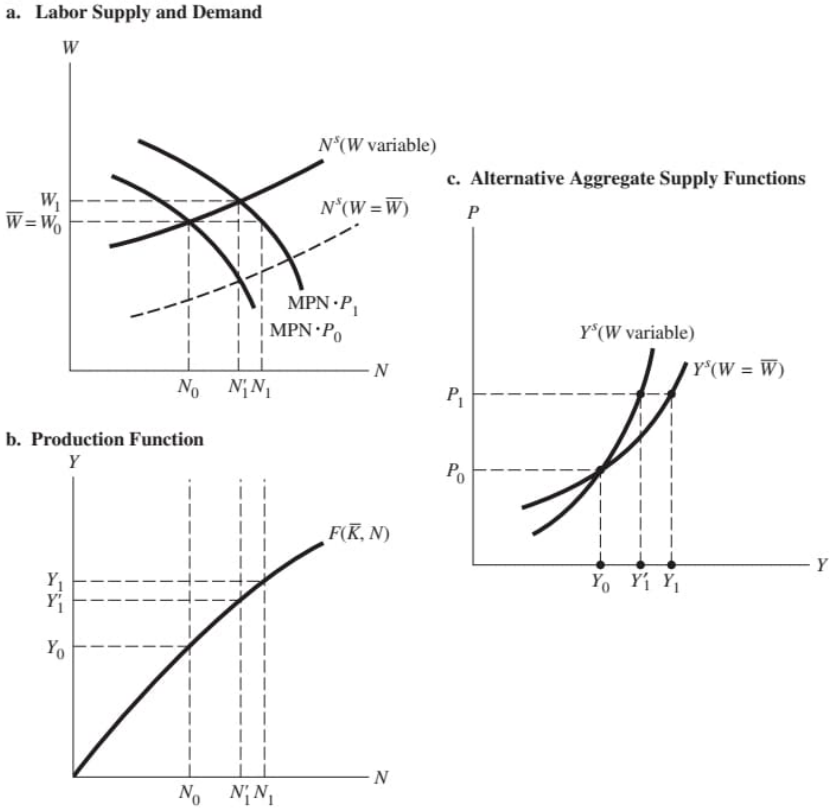


Part *a* shows equilibrium levels of employment N_0, N_1, N_2, corresponding to successively higher values of the price level, P_0, P_1, P_2. Part *b* gives the level of output, Y_0, Y_1, Y_2, that will be produced at each of these employment levels. Part *c* combines the information in parts *a* and *b* to show the relationship between the price level and output supplied. At higher values of the price level, output supplied increases; as in the fixed-wage case, *the aggregate supply curve* (Y^s) *is upward-sloping.*

In this variable-wage Keynesian model, policy effects resemble those in fixed-wage scenarios. Increases in aggregate demand shift the demand curve, affecting output and price levels. However, when the money wage is variable, the impact of a given increase in aggregate demand on output is less pronounced, while the effect on the price level is more significant due to the steeper aggregate supply curve.

In Figure 8-10, the difference in the steepness of the aggregate supply schedule between the fixed- and variable-money-wage cases is explained. When the money wage is fixed and the price level increases, labor demand shifts, leading to increased employment and output. However, in the variable-money-wage case, the increase in the money wage dampens the effect of the rise in labor demand. Consequently, employment and output increase less compared to the fixed-wage scenario, resulting in a smaller rise in output supplied. This relationship is reflected in the steeper aggregate supply schedule for the variable-money-wage case.

FIGURE 8-10 Keynesian Aggregate Supply Schedules for the Fixed- and Variable-Money-Wage Cases



The aggregate supply schedule in part *c* for the case when the money wage is variable [Y^s(*W* variable)] is steeper than when the money wage is fixed [$Y^s(W = \overline{W})$] because the increase in employment (part *a*) with a rise in price and therefore the increase in output (part *b*) are smaller when the money wage is variable than when it is fixed. This outcome follows because the rise in the money wage in the variable-wage case dampens the effect on employment and output from an increase in the price level.

Moving forward, it's insightful to draw conclusions from the preceding sections regarding how price and wage flexibility impact the policy implications of the Keynesian system. In section 8.3, where the price level was allowed to vary while the money wage remained fixed, policy multipliers were reduced compared to the simple IS–LM model where both the price level and the money wage were fixed. This reduction in multipliers occurred because, with a fixed money wage, firms would supply more output only at a higher price, resulting in a less responsive aggregate supply schedule.

When both the price level and the money wage are allowed to vary, the aggregate supply schedule becomes steeper. As output increases, not only does the marginal product of labor

decline, leading to higher unit costs, but also the rise in the money wage needed to induce more labor supply further increases unit costs. Consequently, any increase in output supplied necessitates a larger increase in price, resulting in a steeper aggregate supply schedule. These adjustments indicate that changes in aggregate demand have even smaller effects on output when both prices and wages are flexible.

Comparing with classical and simple IS-LM models, where output was either completely supply or demand determined respectively, introducing price and wage flexibility in the Keynesian system brings its results closer to those of the classical model.

8.5 The Effects of Shifts in the Aggregate Supply Schedule

The Keynesian theory of aggregate supply elucidates the interplay between shifts in aggregate demand and aggregate supply schedules and their ramifications on output, employment, and price levels within an economy. Traditionally, Keynesian economics emphasized the dominance of aggregate demand in determining output and employment levels, positing that changes in aggregate demand would lead to corresponding adjustments in output and prices.

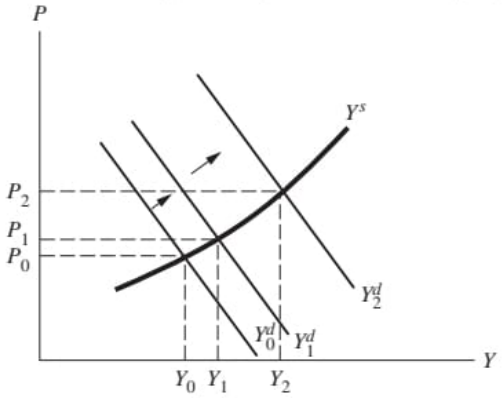
However, the Keynesian framework acknowledges the independent influence of supply factors, which can significantly impact economic outcomes. Shifts in the aggregate supply schedule represent alterations in the economy's capacity to produce goods and services at various price levels, stemming from changes in production costs, technological advancements, labor market dynamics, and resource availability.

Unlike the predominantly demand-focused traditional Keynesian perspective, the Keynesian analysis of supply shifts recognizes their substantial role in shaping economic conditions. Supply shocks, characterized by sudden increases in production costs (such as oil price spikes) or disruptions in resource availability, can instigate stagflation—a condition marked by simultaneous inflation and stagnation.

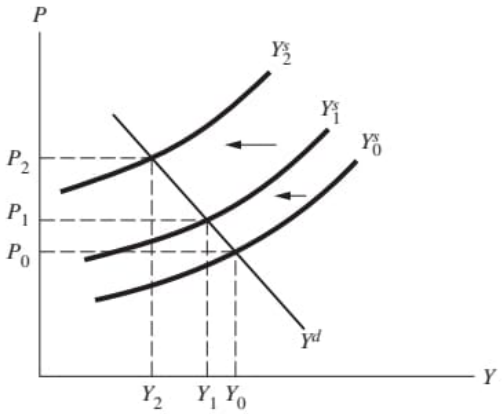
In such scenarios, prices escalate alongside declines in output and employment levels, challenging conventional Keynesian forecasts. The provided graphs visually illustrate these theoretical concepts. In Figure 8-11, Part (a) depicts the conventional Keynesian relationship between aggregate demand, output, and prices, while Part (b) demonstrates the effects of shifts in the aggregate supply schedule, showing that supply shocks result in higher prices and lower output levels.

FIGURE 8-11 Price and Output Variations with Shifts in Aggregate Demand and Supply

a. Price and Output Changes with Shifts in Aggregate Demand



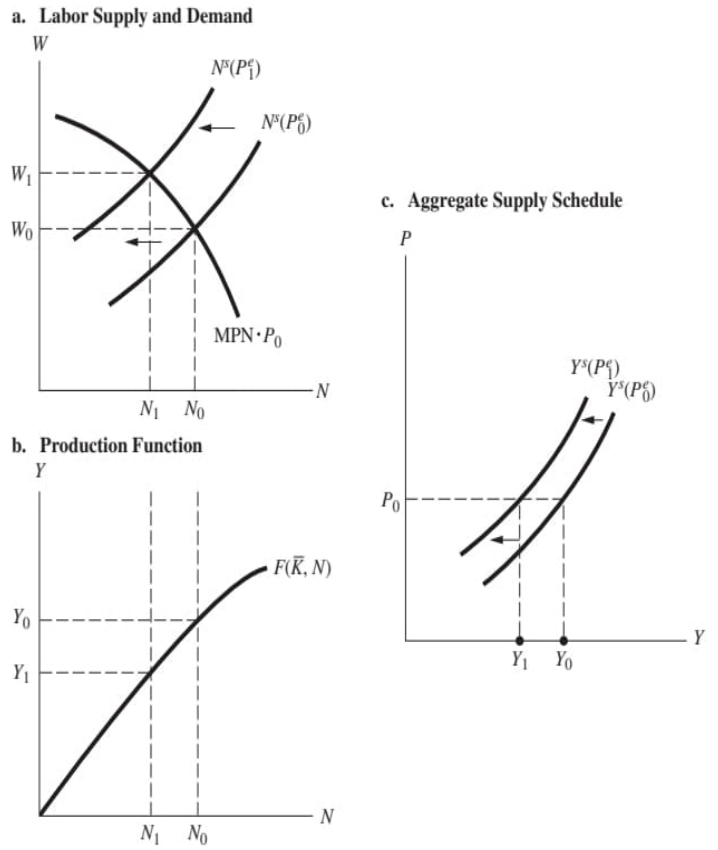
b. Price and Output Changes with Shifts in Aggregate Supply



If changes in output were the result of shifts in the aggregate demand schedule along a fixed supply schedule, as in part *a*, we would expect a positive relationship between price and output changes. On the other hand, if output changes resulted from shifts in the aggregate supply schedule along a fixed demand schedule, as in part *b*, we would expect a negative association between price and output changes.

Meanwhile, Figure 8-12 illustrates graphically how changes in workers' expectations about the aggregate price level affect labor supply and, consequently, aggregate supply and output levels. These visual representations aid in understanding the intricate dynamics between shifts in aggregate demand, aggregate supply, and their impacts on the economy's performance within the Keynesian framework.

FIGURE 8-12 Shift in the Aggregate Supply Schedule with an Increase in the Expected Price Level



An increase in the expected price level shifts the labor supply schedule to the left from $N^s(P^e_0)$ to $N^s(P^e_1)$ in part *a*. At a given price level, P_0, employment declines from N_0 to N_1, and output falls from Y_0 to Y_1 (part *b*). This decline in output for a given price level is reflected in a shift to the left in the aggregate supply schedule from $Y^s(P^e_0)$ to $Y^s(P^e_1)$ in part *c*.

8.6 Conclusion: Keynes versus the Classics

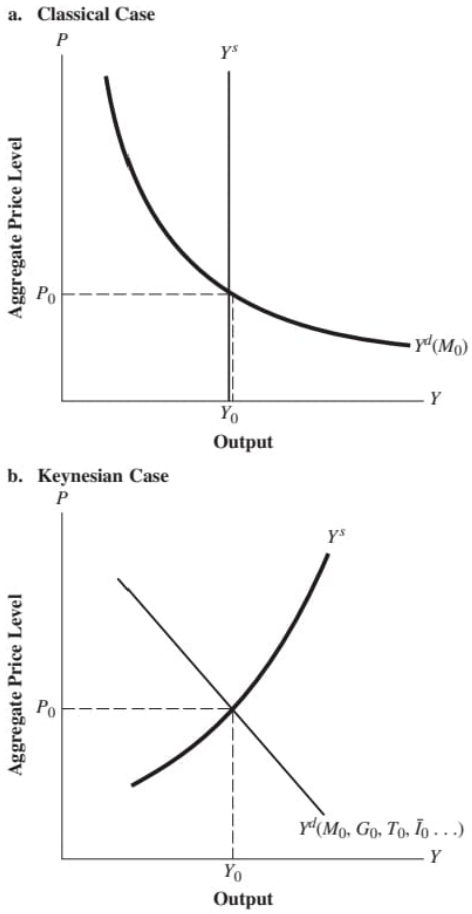
The Keynesian and classical macroeconomic theories diverge significantly in their approaches to understanding the economy's functioning and the appropriate policy responses to economic fluctuations. Chapters 5 through 8 have extensively explored the Keynesian perspective, contrasting it with classical economic thought, which Keynes vehemently criticized. The major disparities between these theories can be elucidated by examining the disparities in their respective aggregate demand and aggregate supply relationships.

In the classical model, aggregate demand lacks explicit theorization, with the quantity theory of money serving as its implicit foundation. The classical aggregate demand schedule is represented by a rectangular hyperbola, determined solely by the quantity of money (M0). Sectoral demands, such as government spending or autonomous investment, have no direct influence on aggregate demand in the classical system; instead, adjustments in the interest rate stabilize sectoral changes, rendering them ineffective in altering aggregate demand. Conversely, the Keynesian aggregate demand schedule, depicted in Figure 8-15b, is

influenced not only by the quantity of money but also by fiscal variables (such as government spending and taxation) and autonomous investment expenditures. Any variation in these factors results in shifts in the aggregate demand schedule, signifying a departure from the classical model's reliance solely on monetary factors.

Moreover, while the classical aggregate supply schedule, as shown in Figure 8-15a, is vertical, reflecting the belief in wage flexibility and market-clearing mechanisms, the Keynesian aggregate supply schedule slopes upward and to the right in the short run. Keynesians emphasize the stickiness of wages and imperfect information about real wages, leading to deviations from full employment equilibrium. Unlike the classical model, where output and employment are completely determined by supply factors, shifts in the Keynesian aggregate demand schedule drive changes in output levels. Keynesians argue that monetary and fiscal policies should be actively employed to stabilize the economy, countering undesirable fluctuations in aggregate demand that lead to output and employment instability in the short run.

FIGURE 8-15 Classical and Keynesian Aggregate Supply and Demand Schedules



The classical aggregate supply schedule is vertical, whereas the Keynesian aggregate supply schedule slopes upward to the right. The classical aggregate demand schedule depends only on the level of the money supply (M_0); in the Keynesian system, aggregate demand depends also on fiscal variables (G_0, T_0), autonomous investment (I_0), and other variables.

In summary, classical economists advocate for noninterventionist policies, relying on the self-adjusting tendencies of the economy to achieve full employment equilibrium. In

contrast, Keynesians perceive the economy as inherently unstable due to fluctuations in aggregate demand, particularly private investment. They assert that active monetary and fiscal policies are necessary to offset these fluctuations and stabilize output and employment levels in the short run.