Topic 4: Schools of Macroeconomic Thoughts

Reference: **Robert J. GORDON,**
Macroeconomics
Chapter 17 : **New Classical Macro and New Keynesian Macro**

Lecture Notes
INTERMEDIATE MACROECONOMICS-II
B.A.(H) Economics, Semester-IV
SHRI RAM COLLEGE OF COMMERCE

Introduction: Classical and Keynesian Economics

- Prior to the 1930's, the ideas of classical economists dominated macroeconomics.
- Classical economists believed that the price level was flexible and would shift by the amount necessary to eliminate any deficiency in aggregate demand.
- In a way they advocated that the economy possessed strong self-correcting properties, in the form of price-flexibility that would automatically correct any tendency for real aggregate demand to be too high or too low.
- In the 1930s, the Great Depression brought a decade-long economic slump accompanied by double-digit unemployment rates.

- The Great Depression discredited the old classical approach based on flexible prices and self-correction and created a receptive audience for the Keynesian revolution, based on John Maynard Keynes's influential book, 'The General Theory of Employment, Interest, and Income'.
- The book's timing was one of the reasons for its immediate success.
- The Keynesian approach dominated macroeconomics until the late 1960s. The big event that undermined its dominance was the emergence at that time of significant inflation.
- The Keynesian theory based on rigid nominal wages could not provide an explanation for the causes of inflation.

New Classical Macroeconomics Versus New Keynesian Economics

- Since the early 1970s, macroeconomics has been split between two basic explanations of business cycles.
- First to emerge was, the New Classical approach originated by the late Milton Friedman, then at the University of Chicago, and Edmund S. Phelps of Columbia University. This approach was further developed by Robert E. Lucas, and Edward Prescott.
- The second strand to emerge later was, New Keynesian Approach.

New Classical Macroeconomics

- These models were based on the assumption of continuous equilibrium in labour and product markets.
- These markets 'clear' in the sense that each worker and firm is acting as desired at the prices and wages expected to prevail.
- Business cycles occur because people may be acting on incorrect information or because there may be supply shocks.

Imperfect Information and the **Fooling Model** : Friedman's version

Main distinctive features of Friedman's model are:

- Markets clear continuously; all actions of firms and workers are voluntary.
- Business cycles occur only if workers inaccurately perceive the price level, hence the name \fooling model". This feature is called imperfect information.
- Friedman's model is asymmetric: Firms always know the current value of the price level but workers only learn the actual price level with a time lag.

- The economy is initially in equilibrium with the actual real GDP (Y) equal to natural real GDP (Y^N).
- They consider the effects of an increase in aggregate demand (*AD*) caused by monetary or fiscal expansion.
- Firms are willing to produce more because of the high level of aggregate demand is accompanied by a higher price level.
- The price level may rise by 10% and nominal wages by 5%, resulting in a 5% reduction in real wages, which induces firms to hire more workers.
- But the workers do not know that the price level has increased; therefore, workers feel that real wages have increased by 5%, and are willing to work more. *Y* will differ from Y^N and the business cycle happens only because the workers are *fooled*.

- Sooner or later, any expectational errors will be corrected.
- So actual GDP cannot be different from natural real GDP for long.
- That's why Friedman's model is sometimes called the "natural rate" model.
- It is common to describe a model with a vertical long-run supply curve as obeying the **natural rate hypothesis**.

Phelps Version of the Fooling Model

- In this model, everyone is equally fooled.
- Both firms and workers see the price rise in their industry and produce more.
- They do not realize that the general price level in the economy has risen.
- Phelps developed one model in which the firms are fooled but the workers are not.
- Firms see that the price of their product has increased and this makes them willing to hire more workers. Not realizing that all other firms in the economy are experiencing the same increase in prices.

- In the other model, workers do not know what is happening in the rest of the economy.
- Normally there is a turnover of employment as workers regularly move from one job to another in search of higher pay.
- But in a situation in which their own firm raises the wages, they stay with that firm instead of quitting.
- Thus the unemployment rate decreases even though, without their knowledge, all other firms in the economy have raised the wage by the same amount at the same time.
- The workers are fooled into a reduction in turnover unemployment, and the macroeconomic data register a decline in the unemployment rate.

Friedman and Phelps' justifications

- Friedman justification towards worker holding incorrect expectations for any significant length of time:
(1) Firms have an informational advantage because they have concentrated interest in a small number of prices of particular products and monitor them continuously.
(2) Workers are interested in a wide variety of prices and do not have the time to keep a careful track.
- The Phelps version of the fooling model does not assume any particular informational advantage of firms over workers. *Everyone* is ignorant of what is happening in the general economy, as if they were stranded on small islands completely cut off from the rest of the world

Criticisms of Friedman and Phelps versions of the Fooling Model

Three criticisms against the assumption of imperfect information under both the models:

- (1) Workers buy goods on a weekly or daily basis and discuss price changes.
- (2) News about the prices and wages are published by the Government every month. So any ignorance could last no longer than one month, far too short to explain multiyear business cycles.
- (3) If periods of high real GDP and a prosperous period of economic activity were *always* accompanied by an increase in the aggregate price level, workers and firms would learn from past episodes and realize that any period of current prosperity is doubtless accompanied by higher prices.

Lucas Model and the Policy Ineffectiveness Proposition

The assumptions of Rational Expectations:

- Robert Lucas took Friedman's model one step further by introducing an improved treatment of the way workers form their view of the expected price level (P^e).
- Instead of following Friedman's rather unsatisfactory assumption that workers only gradually adapted their expectations of the price level (P^e) to the actual value of the price level, allowing themselves to be fooled for weeks or even months, Lucas introduced the theory of rational expectations.

LUCAS MODEL

- Three basic assumptions of Lucas Model are:
  (1) Market clearing.
  (2) Imperfect Information.
  (3) Rational Expectations.
- Expectations are rational when people make the best forecasts they can with the available data.
- It is important to recognize that forecasts need not have to be correct; the theory of rational expectations argues that people do not consistently make the same forecasting errors.
- For instance, the errors (or fooling) of the Friedman-Phelps model are not rational.

- If in the past, workers observed that an increase in employment had always been accompanied by a reduction in the actual real wages, then workers would learn that an offer of extra employment in the future would also be accompanied by a reduction in the actual real wages, causing these smart workers to refuse any such job offers.
- This model makes output depend positively on a **price surprise**, that is, a rise in the actual price level (P) relative to the expected price level (P^e)

The Policy Ineffectiveness Proposition

- The startling prediction that follows is that anticipated monetary policy cannot change real GDP in a regular or predictable way.
- This is referred to as the **policy ineffectiveness proposition(PIP**).
- The Central Bank can change output only if it can find some method of creating a price surprise.
- However, if the public knows that an increase in money raises the price level, then whenever the central bank raises the money supply there will be an increase by the same amount in both the actual and expected price.
- Therefore, no surprise will occur ($P = P^e$) and output will remain at the natural level of real GDP ($Y = Y^N$)

The Real Business Cycle (RBC) Model

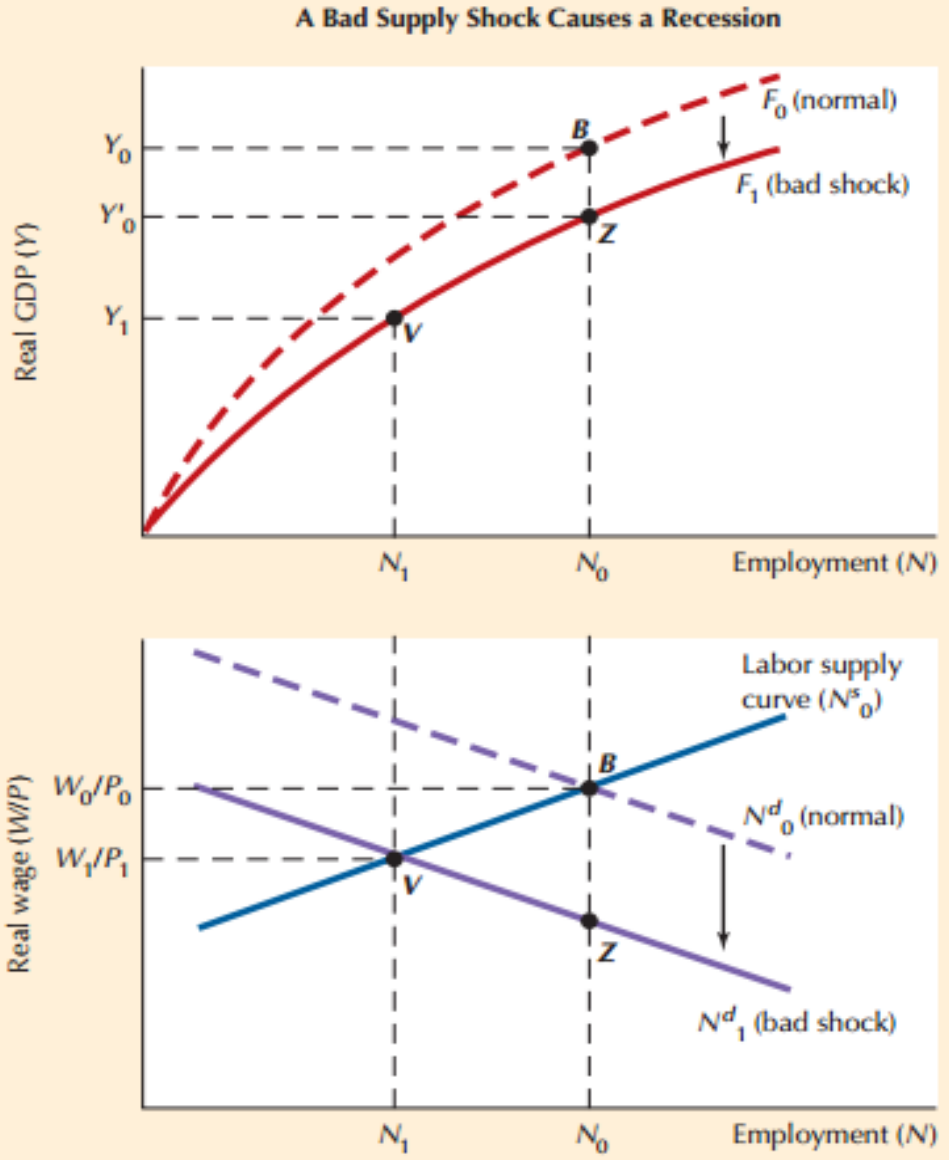
- The RBC model assumes that the origins of business cycles lie in real (or supply) shocks rather than monetary (or demand) shocks.
- The main source of shifts in output lies in swings in the aggregate supply curve (both long-run and short-run), and not the aggregate demand curve.
- The RBC model argues that fluctuations in output (Y) are caused by fluctuations in natural real GDP (Y^N) itself.
- Supply shocks can occur due to new production techniques, new products, bad weather, new source of raw materials, and price changes in raw materials.

- The RBC model assumes that the supply shocks are highly persistent, meaning that a favourable supply shock lasts several years, dies away smoothly and is replaced by an adverse shock that lasts several years.
- In short, the RBC theory simply assumes and does not explain the persistence of business cycles that was the main criticism against the Lucas model.
- In the RBC model, the economy responds to these persistent supply shocks based on the new classical assumption of continuous equilibrium.
- Firms produce the amount they desire at prices and wages that respond flexibly to changing economic conditions, and hire the number of workers they want; workers obtain exactly the number of hours of work that they desire at the market-determined real wage.

The Labour Market in the RBC Model

Figure 1 Effect of an Adverse Supply Shock on Output and Employment in the Real Business Cycle Model

In the top frame, F_0 is the normal production function. In the bottom frame, N_0^d is the normal labor demand curve. An adverse movement in supply conditions, like bad weather for growing crops, shifts the production function down to F_1 and the labor demand curve down to N_1^d. In normal times the economy operates at point B in the upper and lower frames, and in bad times at point V. The decline in employment depends on the slope of the labor supply curve; if the labor supply curve were a vertical line instead of a positively sloped line like N_0^s, the economy would move to Z instead of V. Employment would remain fixed and output would fall only from Y_0 to Y_0'.



- The top frame in the Figure 1, exhibits the production function (F), which shows how much output can be produced by each additional worker.
- An adverse supply shock leads to a downward shift in the production function, for instance from the usual curve F_0 to the bad shock curve F_1, implying a decline in the productivity of each worker.
- In the lower frame of the Figure 1, the labor demand curve N^d, which shows the marginal product of labor, shifts down in response to the adverse supply shock from the line labeled N^d_0 to the line N^d_1 .
- The effect of the adverse supply shock on both output and employment depends on the slope of the labor supply curve.

- If the slope of the labor supply curve is positive, as along the line labeled N^s_0, then a lower real wage induces workers to supply less labor.

- Since the economy is always in equilibrium in the RBC model, the demand for labor shifts as a result of the supply shock from point *B* to point *V* .

- Employment falls from N_0 to N_1, while output falls from Y_0 to Y_1, seen in the upper frame of the Figure.

- If the labor supply curve, is a vertical line rising above N_0 through points *Z* and *B*. Then the economy's equilibrium point would be shifted downward by the adverse supply shock from *B* to *Z*. The shock would cause no change in employment, and in the upper frame, there would be a much smaller decline in output, from Y_0 to Y'_0.

Labor Supply Behavior and Intertemporal Substitution

- Two conflicting effects of an increase in the real wage:
(1) A higher real wage increases the reward for work as compared to leisure (the substitution effect).
(2) But a higher real wage also raises real income and makes people want to consume more of all normal goods, including leisure, which means reducing work (the income effect).
- While drawing a positively sloped labor supply curve in the Figure, we simply assume that the substitution effect dominates the income effect.
- The RBC approach not only assumes that the substitution effect is dominant, but stresses a particular dimension of substitution that takes place over time, referred to as **intertemporal substitution**.

New Classical Macroeconomics: Limitations and Positive Contributions

Assessment of the RBC Model

The criticisms of the RBC model are based on its unique components:
(1) The emphasis on technological shocks as the primary cause of business cycles,
(2) The failure to include prices or money,
(3) The interpretation of what happens in labour markets during business cycles.

- **Nature of technology shocks**
Critics focus on two aspects of the RBC model's treatment of
technology shocks.
- Firstly, the fact that recessions are caused by retreats (backward movement or decay) in technology seems implausible. Advocates of the RBC model suggest that bad harvests, oil price shocks and some kind of government regulation to reduce air and water pollution can constitute such backward movement.
- Second criticism is based on the distinction between the aggregate economy and the behavior of individual industries. At an industry level, one would expect technological shocks (good and bad) to occur randomly and cancel out. Any bad shock large enough to cause an economy-wide recession would be highly visible in industry data. But there is no data in support of this argument (except oil price shocks).

Both demand and supply shocks matter

- The basic RBC model is based on alternating good and bad supply shocks, each persisting by about as long as an average US business cycle.
- This implies that if business cycles occur when the aggregate supply curve shifts back and forth but the aggregate demand curve remains fixed, then prices should rise in recessions and fall in booms.
- The key problem is that sometimes prices are positively related to output changes (Great Depression) and sometimes negatively related (supply shocks of the 1970s and early 1980s).
- This suggests that business cycles are caused by both demand and supply shocks.

Positive Contributions of the New Classical Macroeconomics

- **Rational Expectations: linking micro and macroeconomics**.
The rational expectation approach, which has a grounding in microeconomics, requires that people do not repeat their mistakes and make use of all available information.

- **The theory of efficient financial markets**.
The assumption of continuous market clearing is applied in financial markets, including stock market, bond market, foreign exchange market, etc. And the theory of efficient markets incorporates the assumptions of rational expectations.

- **Greater understanding of economic policy**
  The idea that individuals in the private part of the economy have rational expectations has improved our understanding of economic policy. As a result, workers who negotiate wage-contracts attempt to do so with full information on what policymakers are likely to do.

- **Pervasive effect on economic research**
  New techniques of analysis introduced by these theories have had a major influence on the way economists study variables such as consumption, investment, and the foreign exchange rate. The distinction between anticipated policy changes and policy **surprises** has improved our understanding of policy changes in general.

Essential features of the New Keynesian Economics

- The original Keynesian model combines a theory of shifts in aggregate demand and with a theory of aggregate supply (based on the arbitrary assumption of a fixed nominal wage).
- Unlike the old and new classical models, the Keynesian approach assumes that markets do not clear continuously.
- Therefore, both old and new Keynesian are **non-market clearing models** i.e. prices fail to adjust rapidly enough to clear markets within a relatively short interval after a demand and supply shock.
- Also workers and firms do not act as if they were making a voluntary choice to cut production and hours worked.
- The history of business cycles is punctuated by recessions and depressions lasting several years, during which workers and firms could not sell all the labor and output desired at the going wages and prices.

The New Keynesian Model

- The New Keynesian economics explains rigidity in prices and wages as consistent with the self-interest of firms and workers, all of which are assumed to have rational expectations.
- Unlike the original model, which assumes a fixed nominal wage, the new Keynesian approach attempts to explain the slow adjustment of both wages and prices.

- Two distinctions are essential to the new Keynesian model. (1) The distinction between wage setting in labour markets and price setting in product markets.
(2) The distinction between **nominal rigidity** and **real rigidity**.

- The first group of the new Keynesian theories explains nominal wage or price stickiness as the result of factors that make prices costly to adjust such as **menu costs** and overlapping **staggered contracts**.
- A **menu cost** is any expense associated with changing prices, including the costs of printing new menus or distributing new catalogues.
- **Staggered contracts** are wage contracts that have different expiration dates for different groups of firms or workers.
- New Keynesian theories also explain real rigidities, the stickiness of a wage relative to another wage, of a wage relative to a price, or of a price relative to another price. Theories that explain real rigidities in labor markets include the efficiency wage model.

Why Small Nominal Rigidities have Large Macroeconomic Effects

- The New Keynesian Model shows how rational profit-maximizing decisions by business firms may have adverse consequences for society.
- In contrast to the neoclassical model, which assumes perfectly competitive **price takers**, the new Keynesian approach assumes that small menu costs will stop imperfectly competitive firms from constantly changing their prices.
- And these menu costs do not have to be large to explain this price stickiness.

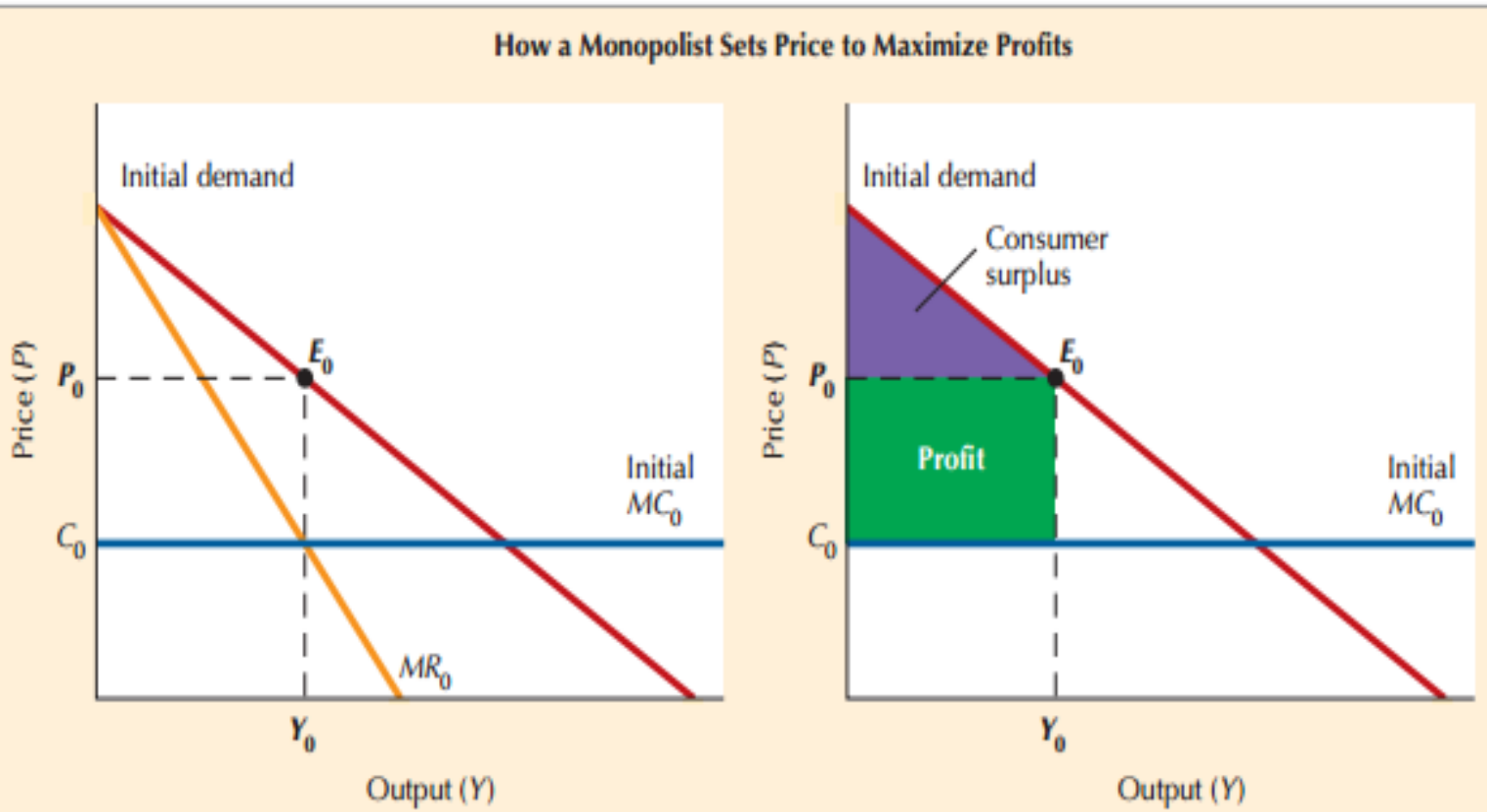


Figure 2 The Price-Setting Decision of a Monopolist

In the left frame the red slanted line is the initial demand curve and the orange MR_0 line is the marginal revenue curve. The horizontal blue line is the initial marginal cost schedule MC_0. Output is chosen where MR equals MC. Price (P_0) is shown at point E_0, the intersection of the demand curve with the quantity produced. In the right frame the purple area shows the consumer surplus, the area below the demand curve and above the price level P_0. Profit is the green rectangle, the area to the left of Y_0 between P_0 and C_0.

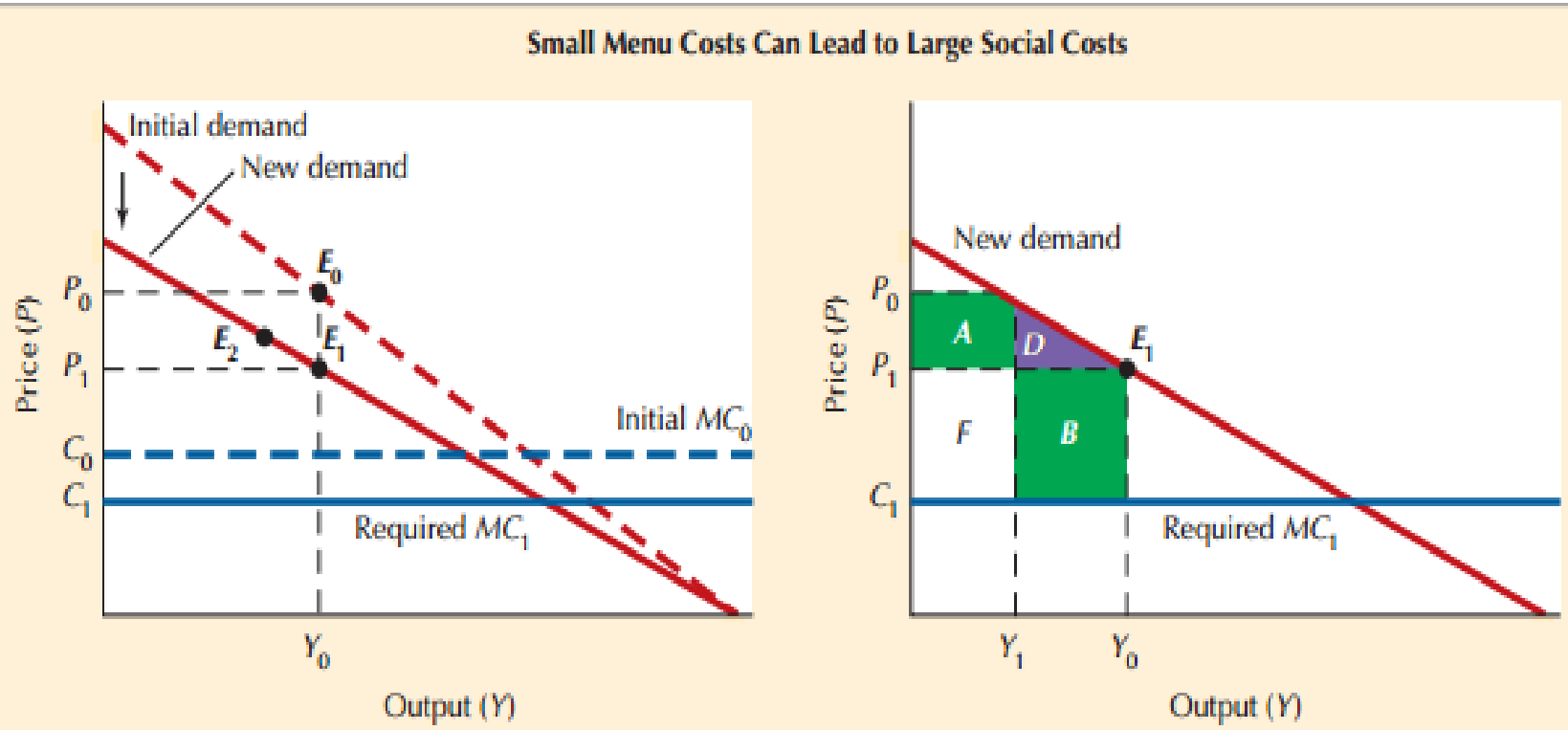


Figure 3 The Price-Setting Choice of a Monopolist Facing a Decline in Demand

In the left frame a decline in demand shifts the demand curve down from the initial demand line to the new demand line. To maintain fixed output at Y_0, the price must fall from P_0 to P_1 and marginal cost must fall to required MC_1. To decide whether or not to reduce price to the profit-maximizing level P_1, the firm weighs the gain in profit (area B minus area A in the right frame) against any menu cost that may be involved in changing price. If the firm fails to cut price below P_0, the level of output falls from Y_0 to Y_1, and society loses the area D plus B, which is much larger than B minus A.

The firm's response to a decline in demand

- To understand how recessions in real output may occur, we examine the effects of a decline in the demand for the product.
- To avoid the recession, the firm must continue to produce the same output as before, Y_0, which intersects the new demand curve at E_1.
- For unchanged output to be chosen by the profit-maximizing firm at point E_1, it is necessary that marginal cost decline by the amount shown between the initial MC_0 and required MC_1 lines.
- The lower blue line is called **required *MC*** because a decline in *MC* is needed to avoid a recession.

- Firms in order to avoid cutting output, may not reduce the price from P_0 to P_1 as far as there exist menu costs, because of which the gain in profit by cutting price may not be sufficient to cover the menu costs.
- From the right frame of Figure 3, the profit box is a rectangle lying above the *MC* line with its upper right corner at the equilibrium point E_0 or E_1. Comparing the two profit boxes, by lowering the price from P_0 to P_1 the firm gains the profit area marked *B* and loses the profit area marked *A*.
- Despite the gain in profit from cutting price, the firm may choose not to cut price if the menu cost, which we can call *z*, is large enough. The firm cuts price if the gain in profit (*B* - *A*) exceeds *z*, but not if *z* exceeds (*B* - *A*).
- But if the firm decides not to cut price. Output drops from Y_0 to Y_1, and society loses the consumer surplus area *D* and the profit area *B*. The amount society loses could be many times that the firm would have lost if the price was reduced.

Macroeconomic externality and the effects of sticky Marginal Cost

- **Macroeconomic externality** refers to society's loss from the firm's profit-maximizing decision no to cut price.
- This is treated as an externality because the firm does not bear this cost. Society would be better off if all firms cut their price together. Since they fail to do so, it is referred to as a **coordination failure**.

- Marginal costs may not decline in proportion to the decline in demand.
- It may not decline at all because of the contracts that fix wages, and the contracts that fix the prices of materials purchased from suppliers.
- Due to this, if the wage paid to labor and the price paid to all suppliers remain fixed, then in Figure 3 the *MC* line would stay fixed as well. In this case, the profit-maximizing price is at E_2, not E_1.
- As an implication, Menu costs are not needed at all to explain how recessions occur.

Coordination Failures and Indexation

- Following a negative demand shock, output must fall if *MC* declines less than *MR*.

- There are two reasons why firms may rationally expect *MC* to move differently than *MR*:
1) *MR* may move with aggregate nominal demand but MC may not. This would occur if a firm believes that its costs depend on many specific factors other than the perceived level of AD (like, price changes for imported materials, etc.)
2) With fixed nominal AD, MC would also remain fixed, while a local shift in demand could reduce MR.

The Input-Output Approach and the Absence of Full Indexation to Nominal Demand

- The input-output model emphasizes the importance of multiple buyer-seller relations; each firm is simultaneously a buyer and a seller.
- With only two firms, each supplying the other, firms could easily disentangle the local-versus-aggregate components of their costs.
- But with thousands of components, containing ingredients from many other firms, the typical firm has no idea of the identity of its full set of suppliers.

Coordination Failure

- The information problem of trying to guess the effect of a demand shift on the average MC of all these suppliers is impossible, the sensible firms just waits for the news of a cost increase.
- There is nothing to guarantee that the supplier firms will adopt any aggregate indexation formula.
- No single supplier has any incentive to do so alone since the rewards are too small and penalties of acting alone too great.
- *MC* will drop if all workers and firms cut wages and prices together by the same percentage as nominal demand.
- For instance, to avoid coordination failure the daylight saving time rule comes in play.

Long-Term Labor Contracts as a Source of the Business Cycle

- Long-term labour contracts are an important source of sticky *MC* faced by business firms. Just as monopolistic firms impose costs on society while maximizing profits, so do firms and workers that enter into long-term contracts.
- However, the New Keynesian model emphasizes, there are good reasons why workers and firms desire such contracts.

Characteristics of Labour Contracts

- In the US, with few exceptions, formal labour contracts are negotiated in the union sector (that is, the sector which is organized in trade unions who have bargaining power in the labour market), which covers about 10% of the labour force.
- This sector sets the pattern for the rest 90% non-union workers.
- This is because the nonunionized firms do not want their employees to quit and join rival unionized firms.

Scheduled wage changes and COLAs

- Wages negotiated in the labour contracts are not completely rigid.
- With labor contracts, nominal wages are set at the time of negotiation for the duration of the contract.
- Wage changes during the lifetime of the contract are allowed, but they are set in advance at the time of the negotiation.
- There are two types of prenegotiated changes.
  (1) A scheduled change that takes place each year in a multi-year contract,
  (2) There is sometimes a **cost-of-living agreement (COLA)**
  that sets in advance the change in nominal wage that will be allowed for each percentage change in inflation. This helps workers maintain their real wages..

Analysis of the New Keynesian Models

- The advantage of the New Keynesian Models over other approaches is that the latter fails to provide an adequate theory of the business cycle, partly because they do not distinguish between the private interest (for instance, signing contracts) and the collective interest in avoiding business cycles.

- However, the new Keynesian model has been criticized for suggesting too many reasons why wages and prices are sticky.

- Business cycles were common even before the rise of labour unions in the US in the 1930s and 1940s.

DSGE Models

- New macro models have been developed under the label Dynamic Stochastic General Equilibrium (DSGE).
- Dynamic refers to any model in which the passage of time is explicit.
- Stochastic means any model that contains random variables.
- General Equilibrium describes any model that provides an explanation of the behavior of the entire economy instead of just a part of the economy.

Main ingredients of the DSGE models

The simplest of these models include three equations:

- A version of the rational expectation theory of consumption - this allows consumption to depend on the interest rate and is sometimes nicknamed the IS equation of the DSGE model.
- A version of the Phillips Curve in which expectations of inflation are forward-looking and formed rationally, and actual inflation depends only on expected future inflation and output or unemployment gap.
- The third equation is a version of the Taylor Rule which allows the short-term interest rate to respond to deviations of the actual inflation rate from the Fed's inflation target and also to the output gap.