1. What are the New Keynesian Models?

New **Keynesian economics** is the school of thought in modern macroeconomics that evolved from the ideas of **John Maynard Keynes**. Keynes wrote *The General Theory of Employment, Interest, and Money* in the 1930s, and his influence among academics and policymakers increased through the 1960s. In the 1970s, however, new classical economists such as **Robert Lucas**, Thomas J. Sargent, and Robert Barro called into question many of the precepts of the Keynesian revolution. The label "New Keynesian" describes those economists who, in the 1980s, responded to this new classical critique with adjustments to the original Keynesian tenets.

The primary disagreement between new classical and new Keynesian economists is over how quickly wages and prices adjust. New classical economists build their macroeconomic theories on the assumption that wages and prices are flexible. They believe that prices "clear" markets—balance **supply** and **demand**—by adjusting quickly. New Keynesian economists, however, believe that market-clearing models cannot explain short-run economic fluctuations, and so they advocate models with "sticky" wages and prices. New Keynesian theories rely on this stickiness of wages and prices to explain why involuntary **unemployment** exists and why **monetary policy** has such a strong influence on economic activity.

A long tradition in macroeconomics (including both Keynesian and monetarist perspectives) emphasizes that monetary policy affects employment and production in the short run because prices respond sluggishly to changes in the **money supply**. According to this view, if the money supply falls, people spend less money and the demand for goods falls. Because prices and wages are inflexible and do not fall immediately, the decreased spending causes a drop in production and layoffs of workers. New classical economists criticized this tradition because it lacks a coherent theoretical explanation for the sluggish behavior of prices. Much new Keynesian research attempts to remedy this omission.

Menu Costs and Aggregate-Demand Externalities

One reason prices do not adjust immediately to clear markets is that adjusting prices is costly. To change its prices, a firm may need to send out a new catalog to customers, distribute new price lists to its sales staff, or, in the case of a restaurant, print new menus. These costs of price adjustment, called "**menu costs**," cause firms to adjust prices intermittently rather than continuously.

Economists disagree about whether menu costs can help explain short-run economic fluctuations. Skeptics point out that menu costs usually are very small. They argue that these small costs are unlikely to help explain recessions, which are very costly for society. Proponents reply that "small" does not mean "inconsequential." Even though menu costs are small for the individual firm, they could have large effects on the economy as a whole.

Proponents of the menu-cost hypothesis describe the situation as follows. To understand why prices adjust slowly, one must acknowledge that changes in prices have **externalities**—that is, effects that go beyond the firm and its customers. For instance, a price reduction by one firm benefits other firms in the economy. When a firm lowers the price it charges, it lowers the average price level slightly and thereby raises real income. (Nominal income is determined by the money supply.) The stimulus from higher income, in turn, raises the demand for the products of all firms. This macroeconomic impact of one firm's price adjustment on the demand for all other firms' products is called an "aggregate-demand externality."

In the presence of this aggregate-demand externality, small menu costs can make prices sticky, and this stickiness can have a large cost to society. Suppose General Motors announces its prices and then, after a fall in the money supply, must decide whether to cut prices. If it did so, car buyers would have a higher real income and would therefore buy more products from other companies as well. But the benefits to other companies are not what General Motors cares about. Therefore, General Motors would sometimes fail to pay the menu cost and cut its price, even though the price cut is socially desirable. This is an example in which sticky prices are undesirable for the economy as a whole, even though they may be optimal for those setting prices.

The Staggering of Prices

New Keynesian explanations of sticky prices often emphasize that not everyone in the economy sets prices at the same time. Instead, the adjustment of prices throughout the economy is staggered. Staggering complicates the setting of prices because firms care about their prices relative to those charged by other firms. Staggering can make the overall level of prices adjust slowly, even when individual prices change frequently.

Consider the following example. Suppose, first, that price setting is synchronized: every firm adjusts its price on the first of every month. If the money supply and aggregate demand rise on May 10, output will be higher from May 10 to June 1 because prices are fixed during this interval. But on June 1 all firms will raise their prices in response to the higher demand, ending the three-week boom.

Now suppose that price setting is staggered: half the firms set prices on the first of each month and half on the fifteenth. If the money supply rises on May 10, then half of the firms can raise their prices on May 15. Yet because half of the firms will not be changing their prices on the fifteenth, a price increase by any firm will raise that firm's relative price, which will cause it to lose customers. Therefore, these firms will probably not raise their prices very much. (In contrast, if all firms are synchronized, all firms can raise prices together, leaving relative prices unaffected.) If the May 15 price setters make little adjustment in their prices, then the other firms will make little adjustment when their turn comes on June 1, because they also want to avoid relative price changes. And so on. The price level rises slowly as the result of small price increases on the first and the fifteenth of each month. Hence, staggering makes the price level sluggish, because no firm wishes to be the first to post a substantial price increase.

Coordination Failure

Some new Keynesian economists suggest that recessions result from a failure of coordination. Coordination problems can arise in the setting of wages and prices because those who set them must anticipate the actions of other wage and price setters. Union leaders negotiating wages are concerned about the concessions other unions will win. Firms setting prices are mindful of the prices other firms will charge.

To see how a recession could arise as a failure of coordination, consider the following parable. The economy is made up of two firms. After a fall in the money supply, each firm must decide whether to cut its price. Each firm wants to maximize its profit, but its profit depends not only on its pricing decision but also on the decision made by the other firm.

If neither firm cuts its price, the amount of real money (the amount of money divided by the price level) is low, a recession ensues, and each firm makes a profit of only fifteen dollars.

If both firms cut their price, real money balances are high, a recession is avoided, and each firm makes a profit of thirty dollars. Although both firms prefer to avoid a recession, neither can do so by its own actions. If one firm cuts its price while the other does not, a recession follows. The firm making the price cut makes only five dollars, while the other firm makes fifteen dollars.

The essence of this parable is that each firm's decision influences the set of outcomes available to the other firm. When one firm cuts its price, it improves the opportunities available to the other firm, because the other firm can then avoid the recession by cutting its price. This positive impact of one firm's price cut on the other firm's profit opportunities might arise because of an aggregate-demand externality.

What outcome should one expect in this economy? On the one hand, if each firm expects the other to cut its price, both will cut prices, resulting in the preferred outcome in which each makes thirty dollars. On the other hand, if each firm expects the other to maintain its price, both will maintain their prices, resulting in the inferior solution, in which each makes fifteen dollars. Hence, either of these outcomes is possible: there are multiple equilibria.

The inferior outcome, in which each firm makes fifteen dollars, is an example of a coordination failure. If the two firms could coordinate, they would both cut their price and reach the preferred outcome. In the real world, unlike in this parable, coordination is often difficult because the number of firms setting prices is large. The moral of the story is that even though sticky prices are in no one's interest, prices can be sticky simply because price setters expect them to be.

Efficiency Wages

Another important part of new Keynesian economics has been the development of new theories of unemployment. Persistent unemployment is a puzzle for economic theory. Normally, economists presume that an excess supply of labor would exert a downward pressure on wages. A reduction in wages would in turn reduce unemployment by raising the quantity of labor demanded. Hence, according to standard economic theory, unemployment is a self-correcting problem.

New Keynesian economists often turn to theories of what they call efficiency wages to explain why this market-clearing mechanism may fail. These theories hold that high wages make workers more productive. The influence of wages on worker efficiency may explain the failure of firms to cut wages despite an excess supply of labor. Even though a wage reduction would lower a firm's wage bill, it would also—if the theories are correct—cause worker PRODUCTIVITY and the firm's PROFITS to decline.

There are various theories about how wages affect worker productivity. One efficiency-wage theory holds that high wages reduce labor turnover. Workers quit jobs for many reasons—to accept better positions at other firms, to change careers, or to move to other parts of the country. The more a firm pays its workers, the greater their incentive to stay with the firm. By paying a high wage, a firm reduces the frequency of quits, thereby decreasing the time spent hiring and training new workers.

A second efficiency-wage theory holds that the average quality of a firm's workforce depends on the wage it pays its employees. If a firm reduces wages, the best employees may take jobs elsewhere, leaving the firm with less-productive employees who have fewer alternative

opportunities. By paying a wage above the equilibrium level, the firm may avoid this adverse selection, improve the average quality of its workforce, and thereby increase productivity.

A third efficiency-wage theory holds that a high wage improves worker effort. This theory posits that firms cannot perfectly monitor the work effort of their employees and that employees must themselves decide how hard to work. Workers can choose to work hard, or they can choose to shirk and risk getting caught and fired. The firm can raise worker effort by paying a high wage. The higher the wage, the greater is the cost to the worker of getting fired. By paying a higher wage, a firm induces more of its employees not to shirk, and thus increases their productivity.

A New Synthesis

During the 1990s, the debate between new classical and new Keynesian economists led to the emergence of a new synthesis among macroeconomists about the best way to explain short-run economic fluctuations and the role of monetary and fiscal policies. The new synthesis attempts to merge the strengths of the competing approaches that preceded it. From the new classical models it takes a variety of modeling tools that shed light on how households and firms make decisions over time. From the new Keynesian models it takes price rigidities and uses them to explain why monetary policy affects employment and production in the short run. The most common approach is to assume monopolistically competitive firms (firms that have market power but compete with other firms) that change prices only intermittently.

The heart of the new synthesis is the view that the economy is a dynamic general equilibrium system that deviates from an efficient allocation of resources in the short run because of sticky prices and perhaps a variety of other market imperfections. In many ways, this new synthesis forms the intellectual foundation for the analysis of monetary policy at the Federal Reserve and other central banks around the world.

Policy Implications

Because new Keynesian economics is a school of thought regarding macroeconomic theory, its adherents do not necessarily share a single view about economic policy. At the broadest level, new Keynesian economics suggests—in contrast to some new classical theories—that recessions are departures from the normal efficient functioning of markets. The elements of new Keynesian economics—such as menu costs, staggered prices, coordination failures, and efficiency wages—represent substantial deviations from the assumptions of classical economics, which provides the intellectual basis for economists' usual justification of laissez-faire. In new Keynesian theories recessions are caused by some economy-wide market failure. Thus, new Keynesian economics provides a rationale for government intervention in the economy, such as countercyclical monetary or FISCAL POLICY. This part of new Keynesian economics has been incorporated into the new synthesis that has emerged among macroeconomists. Whether policymakers should intervene in practice, however, is a more difficult question that entails various political as well as economic judgments.

2. What inputs does it require? (Powered by Copilot)

- ✔ **Sticky Prices and Wages**: The assumption that prices and wages do not adjust instantly to changes in economic conditions. This stickiness can result from menu costs, staggered price-setting, and wage contracts.

- ✔ **Menu Costs**: The costs associated with changing prices, such as printing new menus or catalogs. These costs lead firms to adjust prices infrequently, contributing to price stickiness.
- ✔ **Coordination Failures**: Situations where firms and workers do not coordinate their actions effectively, leading to suboptimal outcomes like recessions.
- ✔ **Efficiency Wages**: The concept that higher wages can lead to greater worker productivity by reducing turnover, attracting better employees, and encouraging harder work.
- ✔ **Monopolistic Competition**: The idea that firms have some degree of market power and set prices above marginal cost, which allows for price rigidity and affects how economic shocks influence output and employment.
- ✔ **Aggregate-Demand Externalities**: The impact that one firm's pricing decisions can have on the overall economy, affecting demand for other firms' products.
- ✔ **Intertemporal Optimization**: Households and firms make decisions based on their expectations of the future, balancing current and future consumption and investment.
- ✔ **Expectations and Information**: Expectations about future economic conditions play a crucial role in decision-making. Imperfect information can lead to delayed or suboptimal responses to economic changes.

3. Has it been implemented before?

- ✔ Solving a New Keynesian model with Python
- ✔ DSGEpy Example - Small New Keynesian Model
- ✔ New Keynesian Model using Python and Dynare++

4. Find three related articles about the model:

- ✔ What Is New-Keynesian Economics?
- ✔ The State of New Keynesian Economics: A Partial Assessment
- ✔ A Behavioral New Keynesian Model