The classical theory of the price level is sometimes called the quantity theory of money or the classical theory of aggregate demand. It was developed in the latter part of the nineteenth century and the early part of the twentieth century, although early versions of the theory can be found in the work of David Hume, an eighteenth-century Scottish economist.

Why be interested in a theory that is now almost 200 years old? First of all, there are some questions to which the classical theory still provides very good answers. The most important of these is the classical explanation for the cause of inflation, particularly where the rate of inflation is, or has been very high, such as in Brazil, Bolivia, Argentina, or Israel. Classical theory works well in high-inflation countries for the same reason that Newton’s theory of gravity works well at velocities that are well below the velocity of light. Both theories are wrong in some dimensions, but sometimes those dimensions are not important.

The second important reason for studying the classical theory is that it can help you understand how modern intertemporal equilibrium theories work. These theories build on the classical theory by being explicit about the factors that lead households and firms to vary their demands and supplies for labor through time. The classical theory makes some
unrealistic simplifications, but it is a good idea to start with simple concepts and learn about the complicated ones later.

Last but not least, learning the classical theory of aggregate demand and supply is worthwhile because the classical theory has been incorporated into the neoclassical synthesis, the theory used by almost all economic journalists and policymakers to understand today's economy. The neoclassical synthesis developed as economists tried to merge two alternative lines of research. One line was initiated by John Maynard Keynes, who proposed an alternative to the classical theory to explain how output and employment fluctuate during booms and recessions. A second line of analysis, called neoclassical growth theory, developed the classical theory of aggregate demand and supply, and it was used to determine the economy's long-run trend level of output. According to the neoclassical synthesis, Keynesian economics should be used to describe year-to-year fluctuations in employment, output, and inflation, but neoclassical growth theory applies in the long run.

**The Theory of the Demand for Money**

The classical theory of the price level, or classical theory of aggregate demand, is a hybrid that adds a theory of money to the classical theory of aggregate supply, which we studied in Chapter 4. To integrate money into this theory, we begin with the budget constraint of a family in a static, one-period economy, and we show how this constraint is altered when a family engages in repeated trade through time, using money as a medium of exchange.

**The Historical Development of the Theory**

The classical theory of aggregate demand is a modern name for the quantity theory of money. The quantity theory of money was an attempt to explain how the general level of prices is determined. It has a long history, dating back at least as far as David Hume (1711–1776), whose delightful essay, *Of Money*, is still relevant to modern economics. Later economists who worked on the quantity theory include the American Irving Fisher (1867–1947) and the English economist Alfred Marshall (1842–1924). The approach taken in this chapter is based on Marshall’s work because it was Marshall who first argued for an explicit treatment of money using the framework of demand and supply.

**The Theory of the Demand for Money**

To understand why people use money, the classical theorists extended their static theory of the demand and supply of commodities by constructing a theory of the demand for money. Just as a household demands goods up to the point where the marginal benefit of an additional purchase of a commodity equals its marginal cost, so the classical theory of the demand for money argues; people 'demand money' up to the point where its marginal benefit equals its marginal cost. Money is a durable good that is not consumed the way butter or cheese is consumed. Money is more like a television set or a refrigerator; it yields a flow of services over time. A television set yields a flow of entertainment services, and
An Interview with Milton Friedman

The most influential modern figure in monetary economics is Milton Friedman, formerly a professor at the University of Chicago and now a fellow of the Hoover Institution at Stanford University. In the period immediately following World War II, the dominant paradigm was Keynesian economics. Many of Keynes' followers argued that money was relatively unimportant as a determinant of inflation and that, instead, inflation was caused by strong trade unions. Friedman was largely responsible for reviving the classical idea that inflation is caused by increases in the quantity of money. His ideas on money and inflation appear in “The Quantity Theory of Money—a Restatement,” in *Studies in the Quantity Theory of Money* (University of Chicago Press, 1956).

You can find an interview with Milton Friedman, in which he discusses contemporary economic issues ranging from the role of government in society to monetary union in Europe, in *The Region*, the magazine of the Federal Reserve Bank of Minneapolis. The interview is available at http://www.federalreserve.gov; search: “Milton Friedman.”

Money yields a flow of exchange services that increase the convenience of buying and selling goods. The cost of holding money is the opportunity cost of foregoing consumption of some other commodity; the marginal benefit is the additional usefulness gained by having cash on hand to facilitate the process of exchange.

Let us examine both the costs and benefits of holding money, beginning with the costs. Our first task is to show how holding money can reduce the household’s ability to buy other commodities; we will examine the household’s budget constraint in a monetary economy. If households continue to use money when holding money is costly, they must be gaining some benefit. The classical theorists assumed this benefit to be proportional to the volume of trade.

**Budget Constraints and Opportunity Cost**

Money imposes an opportunity cost because the decision to use money reduces the resources available for other goods. In Chapter 9, we discuss the opportunities for borrowing and lending, and modify our analysis of the opportunity cost of holding money. But for the moment, we assume that money is the only asset available to households as a store of wealth. In our simple model, the opportunity cost of holding money arises from the fact that if the household chooses not to hold money, it will be able to purchase additional commodities. We will illustrate this idea by contrasting the budget constraint in a static model (in which all exchange takes place at a single point in time) with the budget constraint in a dynamic model (in which exchanges take place at different points in time). The purpose of this examination is to show how the use of money imposes a cost on consumers by reducing the resources available for purchasing other commodities.
Chapter 5 Aggregate Demand and the Classical Theory of the Price Level

BUDGET CONSTRAINTS IN A STATIC BARTER ECONOMY

The type of economy we studied in Chapter 4 is called a static barter economy. The word “barter” means that commodities are directly exchanged for one another without the use of money. The word “static” means that the economy lasts for only one period of time; agents exchange labor for commodities they produce and consume, then the world ends.

We can rewrite the budget constraint faced by families in the static barter economy by measuring everything in terms of dollars instead of real commodities. Recall that \( P \) refers to the money price of commodities, and the symbol \( w \) is the money wage.

### Equation 5.1

\[
P_Y = P \pi + wL
\]

Demand for commodities

Profit

Labor income

Equation 5.1 represents the household budget constraint in a static barter economy. In this economy, no money changes hands and no family uses money for trade, but money can be used as an accounting unit. To illustrate how this accounting device works, suppose that you offered your labor services to a farmer who owns an orchard. The farmer offers to pay you $5.00 per hour, and he sells his apples for $0.20 each. Rather than accept $5 an hour, you could well agree to accept 25 apples per hour. The real wage \( (w/P) \) in this economy is 25 apples per hour; the money wage \( (w) \) is $5.00 per hour; and the price of commodities \( (P) \) is $0.20 per apple. The budget constraint in the barter economy, given in Equation 5.1, expresses relative prices by quoting labor and commodities in terms of money, even though money is never used in exchange.

BUDGET CONSTRAINTS IN A DYNAMIC MONETARY ECONOMY

How would this budget constraint be altered in a world in which money must be used in exchange? The classical theorists argued that since the typical household does not buy commodities at the same time that it sells its labor, during an average week the household has a reserve of cash on hand to facilitate the uneven timing of purchases and sales.

Consider a household that starts the week with some cash on hand. We call this the household’s supply of money. The household earns income each week and makes routine purchases, such as groceries, movie tickets, or restaurant meals. Perhaps the household is also saving a little money each week to pay for a vacation in July. Because of the coming vacation, the household ends the week holding more cash than it began with. We call the cash held at the end of the week the household’s “demand for money.” If we measured the cash held by this particular household, we would see that it increases steadily from August through June as the household saves for its vacation and then decreases again in July as the household spends its savings.

The economy as a whole consists of many households just like the one we described. Some of these households accumulate cash to buy cars, some pay for Christmas gifts, and others finance weddings. Because these households all plan to spend their accumulated
cash at different points in time, on average we see that the cash held across the whole
economy at the end of the week is equal to the cash held at the beginning.

By separating purchases and sales at points in time, the classical theory explicitly
models production and exchange as an ongoing dynamic process rather than as static
episodes. To formally model this idea, we need to make a change to the household’s bud-
get constraint.

\[ M^D + P Y^D = P \pi + w L^s + M^s \]

Equation 5.2 adds two additional terms to the budget constraint of a barter economy. \( M^s \)
represents the money that the household owns at the beginning of the week; we call this
the household’s supply of money because it will be supplied by the household during the
week to other households in the economy in exchange for commodities. \( M^D \) is the
money that the household owns at the end of the week. We call this the household’s demand for money because it represents cash that the household chooses to keep on hand
at the end of the week—money that will be used to buy and sell commodities in the
future. The supply of money owned by the household at the beginning of the week is
like additional income that is available to be spent on commodities. The demand for
money at the end of the week is like a demand for any other commodity because the de-
cision to keep cash on hand from one week to the next reduces the funds that the house-
hold has available to spend on produced goods. Because the household’s supply of
money could be used to purchase additional commodities, the decision to hold money
imposes an opportunity cost on the household. The lost opportunity that arises from
holding money is the additional utility that could have been gained by purchasing addi-
tional commodities.

The Benefit of Holding Money

If households continue to hold money, and if that money imposes a cost, then money must
also yield a benefit. To classical theorists, this benefit was the advantage that comes from
being more easily able to exchange commodities with other households in the economy;
in other words, money is a generally acceptable medium of exchange.

Consider the process of exchange in a barter economy. Suppose that an individual is a
seller of good X and a buyer of good Y; we will call him Mr. Jones. For example, good X
might be an economics lecture and good Y might be a haircut. In the barter economy, Mr.
Jones must find a second individual, Mr. Smith, who wants both to sell good Y and to buy
good X. This problem is called the double coincidence of wants; it implies that in a barter
economy, it would be necessary for Mr. Jones, if he wants a haircut, to find a barber who
wants to hear an economics lecture. Exchange is greatly simplified if everyone agrees on a
commodity that they will accept in exchange, not for its own sake, but because by conven-
tion others will also accept this commodity. This is the purpose of money.
Chapter 5 Aggregate Demand and the Classical Theory of the Price Level

Classical theorists argued that the stock of money that the average household needs at any point in time is proportional to the dollar value of its demand for commodities. Households that purchase a higher value of commodities each week will on average need to keep more cash on hand. The constant of proportionality between the average stock of cash held by the household during the week and the value of its flow demand for commodities is called the propensity to hold money, and it is represented in the demand for money equation by the symbol $k$.

\[ M^D = k \times py^D \]

Demand for money Propensity to hold money Nominal value of commodities demanded

Notice that the demand for money in the classical theory is the relationship between a stock (money on hand) and a flow (weekly purchases of commodities). The theory predicts that a person who earns $200 per week will on average carry half as much cash and keep half the checking account balances as a person who earns $400 dollars per week. Because the theory describes the relationship between a stock and a flow, the constant $k$ has units of time: the number of weeks of income that the average family carries in the form of money. Using a measure of money called $M1$ (mainly cash and checking accounts), the propensity to hold money in the postwar United States has been equal to 10 weeks (of income) on average, although $k$ has been falling since the end of World War II.

**Aggregate Demand and the Demand and Supply of Money**

The classical theorists used the classical theory of the demand for money to explain more than the use of cash in exchange. By putting a theory of the demand for money together with the assumption that the quantity of money demanded is equal to the quantity of money supplied, they explained the quantity of commodities demanded by households at a given price level. This relationship between the aggregate demand for commodities and the price level is called the "classical theory of aggregate demand."

**From Money Demand to a Theory of the Price Level**

A critical step in the development of the classical theory of aggregate demand is the assumption that the quantity of money demanded is always equal to the quantity of money supplied. To understand the logic behind this assumption, suppose instead that, on average, households hold more cash each week than they need to buy and sell commodities. When a household finds that it has more money on hand than it needs, it can plan to buy more commodities than it would purchase during a normal week. But although a single household can reduce its money holdings by planning to buy more commodities, the community as a whole cannot reduce its money holdings in this way. Every attempt to buy a commodity by one household must necessarily lead to an accumulation in the cash held...
The Classical Aggregate Demand Curve

The classical aggregate demand curve is a relationship between the average price of commodities and the quantity of commodities demanded.

At every point on the aggregate demand curve, the quantity of money demanded is equal to the quantity of money supplied.

**Figure 5.1**

\[ P = \frac{M^s}{kY^D} \]

**Equation 5.4**

\[
P = \frac{M^s}{kY^D}
\]

Price level = \( \frac{M^s}{kY^D} \)

Supply of money

Propensity to hold money \( x \)

Aggregate demand for commodities

Equation 5.4 illustrates the classical aggregate demand curve. It is derived from Equation 5.3 by making the assumption that the demand for money is equal to its supply. The fact that the demand for money must equal its supply can be used to develop a theory of how the aggregate demand for commodities varies with the nominal price. This relationship between price and the flow of GDP demanded is called the classical aggregate demand curve.

Part B The Classical Approach to Aggregate Demand and Supply

by another. For the community as a whole, the demand for money must always be equal to its supply. The fact that the demand for money must equal its supply can be used to develop a theory of how the aggregate demand for commodities varies with the nominal price. This relationship between price and the flow of GDP demanded is called the classical aggregate demand curve.
portional to nominal GDP, each point along the aggregate demand curve is associated with
the same demand for money. The position of the curve is determined by the quantity of
money demanded at each point on the curve being exactly equal to the nominal money supply. At every point on the classical aggregate demand curve, the quantity of money de-
manded and the quantity of money supplied are equal.

To understand why the aggregate demand curve slopes downward, suppose that the price
is at $P_1$ and the quantity of commodities demanded is at $Y_D$. If the price were to fall to $P_2$,
the average family in the economy would have more cash on hand than it needed to buy
commodities during the week because excess dollars would now be able to finance a greater
flow of transactions. Each family would try to eliminate its excess cash by planning to purchase
additional commodities. Thus, the economy experiences an increase in the aggregate
quantity of commodities demanded, and the aggregate demand curve slopes downward.

**IRVING FISHER AND THE VELOCITY OF CIRCULATION**

The theory of aggregate demand, as we have described it so far, was developed in Cam-
bridge, England, by Alfred Marshall. At about the same time, Irving Fisher of Yale Uni-
versity worked on a parallel development that led to similar conclusions. A key compo-
nent of Fisher's version is a concept called the velocity of circulation. This measures the
average number of times that the stock of money circulates in the economy, and it is de-
 fined as the ratio of the average value of transactions per unit of time to the nominal stock
of money. In the following formula, $V$ is the velocity of circulation, $P$ is the price level, $T$
is the number of transactions per unit of time, and $M$ is the stock of money.

\[
5.5 \quad V = \frac{PT}{M}\]

The velocity of circulation can be approximated by $Y_D$ for goods and services. The second is that $V$ is a constant. Using these additional assumptions, we can write Fisher's version of the quantity theory as follows:

\[
5.6 \quad P = \frac{VM}{yD}\]

If you compare Equation 5.6, which comes from Fisher's version of the quantity theory,
with the Cambridge version of the theory from Equation 5.4, you will see that if we let $V = 1/k$, the two theories lead to the same equation for aggregate demand. We will now explore this equation and see how it can be used to explain the classical theory of the price
level.