

Supply and Demand in the Market for Money: The Liquidity Preference Framework

Whereas the loanable funds framework determines the equilibrium interest rate using the supply of and demand for bonds, an alternative model developed by John Maynard Keynes, known as the **liquidity preference framework**, determines the equilibrium interest rate in terms of the supply of and demand for money. Although the two frameworks look different, the liquidity preference analysis of the market for money is closely related to the loanable funds framework of the bond market.⁴

The starting point of Keynes's analysis is his assumption that there are two main categories of assets that people use to store their wealth: money and bonds. Therefore, total wealth in the economy must equal the total quantity of bonds plus money in the economy, which equals the quantity of bonds supplied (B^s) plus the quantity of money supplied (M^s). The quantity of bonds (B^d) and money (M^d) that people want to hold and thus demand must also equal the total amount of wealth, because people cannot purchase more assets than their available resources allow. The conclusion is that the quantity of bonds and money supplied must equal the quantity of bonds and money demanded:

$$B^s + M^s = B^d + M^d \quad (2)$$

Collecting the bond terms on one side of the equation and the money terms on the other, this equation can be rewritten as:

$$B^s - B^d = M^d - M^s \quad (3)$$

The rewritten equation tells us that if the market for money is in equilibrium ($M^s = M^d$), the right-hand side of Equation 3 equals zero, implying that $B^s = B^d$, meaning that the bond market is also in equilibrium.

Thus it is the same to think about determining the equilibrium interest rate by equating the supply and demand for bonds or by equating the supply and demand for money. In this sense, the liquidity preference framework, which analyzes the market for money, is equivalent to the loanable funds framework, which analyzes the bond market. In practice, the approaches differ, because by assuming that there are only two kinds of assets, money and bonds, the liquidity preference approach implicitly ignores any effects on interest rates that arise from changes in the expected returns on real assets such as automobiles and houses. In most instances, however, both frameworks yield the same predictions.

The reason that we approach the determination of interest rates with both frameworks is that the loanable funds framework is easier to use when analyzing the effects from changes in expected inflation, whereas the liquidity preference framework provides a simpler analysis of the effects from changes in income, the price level, and the supply of money.

Because the definition of money that Keynes used includes currency (which earns no interest) and checking account deposits (which in his time typically earned little

⁴Note that the term *market for money* refers to the market for the medium of exchange, money. This market differs from the *money market* referred to by finance practitioners, which is the financial market in which short-term debt instruments are traded.

or no interest), he assumed that money has a zero rate of return. Bonds, the only alternative asset to money in Keynes's framework, have an expected return equal to the interest rate i .⁵ As this interest rate rises (holding everything else unchanged), the expected return on money falls relative to the expected return on bonds, and as the theory of asset demand tells us, this causes the demand for money to fall.

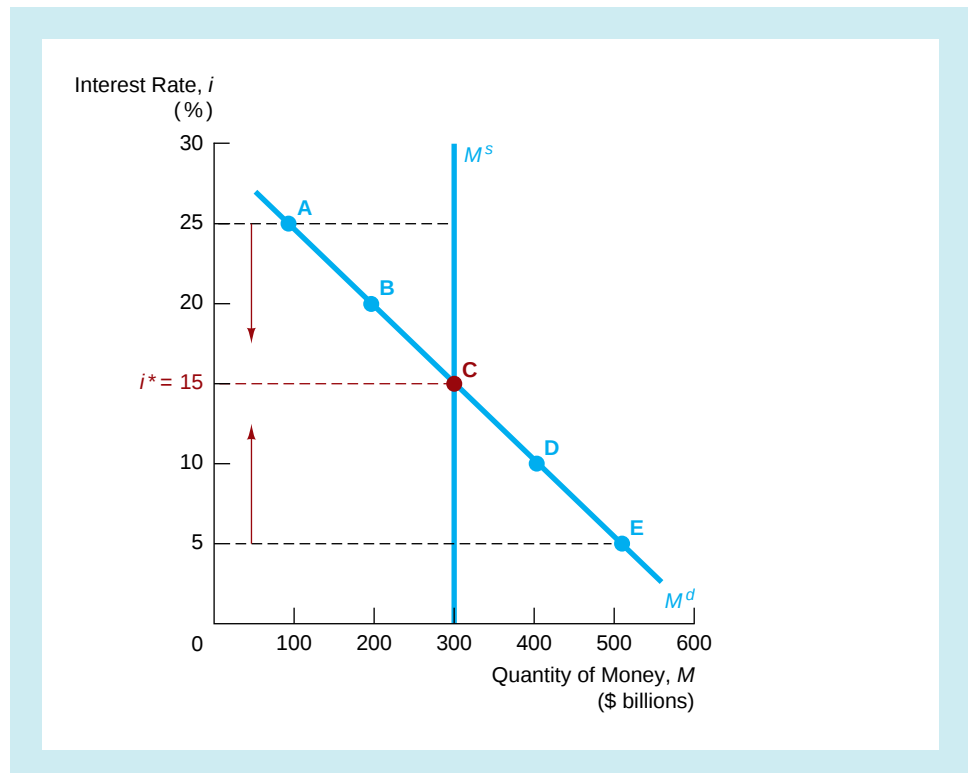
We can also see that the demand for money and the interest rate should be negatively related by using the concept of **opportunity cost**, the amount of interest (expected return) sacrificed by not holding the alternative asset—in this case, a bond. As the interest rate on bonds, i , rises, the opportunity cost of holding money rises, and so money is less desirable and the quantity of money demanded must fall.

Figure 9 shows the quantity of money demanded at a number of interest rates, with all other economic variables, such as income and the price level, held constant. At an interest rate of 25%, point A shows that the quantity of money demanded is \$100 billion. If the interest rate is at the lower rate of 20%, the opportunity cost of money is lower, and the quantity of money demanded rises to \$200 billion, as indicated by the move from point A to point B. If the interest rate is even lower, the quantity of money demanded is even higher, as is indicated by points C, D, and E. The curve M^d connecting these points is the demand curve for money, and it slopes downward.

At this point in our analysis, we will assume that a central bank controls the amount of money supplied at a fixed quantity of \$300 billion, so the supply curve for



FIGURE 9 Equilibrium in the Market for Money



⁵Keynes did not actually assume that the expected returns on bonds equaled the interest rate but rather argued that they were closely related (see Chapter 24). This distinction makes no appreciable difference in our analysis.

money M^s in the figure is a vertical line at \$300 billion. The equilibrium where the quantity of money demanded equals the quantity of money supplied occurs at the intersection of the supply and demand curves at point C, where

$$M^d = M^s \quad (4)$$

The resulting equilibrium interest rate is at $i^* = 15\%$.

We can again see that there is a tendency to approach this equilibrium by first looking at the relationship of money demand and supply when the interest rate is above the equilibrium interest rate. When the interest rate is 25%, the quantity of money demanded at point A is \$100 billion, yet the quantity of money supplied is \$300 billion. The excess supply of money means that people are holding more money than they desire, so they will try to get rid of their excess money balances by trying to buy bonds. Accordingly, they will bid up the price of bonds, and as the bond price rises, the interest rate will fall toward the equilibrium interest rate of 15%. This tendency is shown by the downward arrow drawn at the interest rate of 25%.

Likewise, if the interest rate is 5%, the quantity of money demanded at point E is \$500 billion, but the quantity of money supplied is only \$300 billion. There is now an excess demand for money because people want to hold more money than they currently have. To try to obtain more money, they will sell their only other asset—bonds—and the price will fall. As the price of bonds falls, the interest rate will rise toward the equilibrium rate of 15%. Only when the interest rate is at its equilibrium value will there be no tendency for it to move further, and the interest rate will settle to its equilibrium value.

Changes in Equilibrium Interest Rates in the Liquidity Preference Framework

Analyzing how the equilibrium interest rate changes using the liquidity preference framework requires that we understand what causes the demand and supply curves for money to shift.

Study Guide

Learning the liquidity preference framework also requires practicing applications. When there is an application in the text to examine how the interest rate changes because some economic variable increases, see if you can draw the appropriate shifts in the supply and demand curves when this same economic variable decreases. And remember to use the *ceteris paribus* assumption: When examining the effect of a change in one variable, hold all other variables constant.

Shifts in the Demand for Money

In Keynes's liquidity preference analysis, two factors cause the demand curve for money to shift: income and the price level.

Income Effect. In Keynes's view, there were two reasons why income would affect the demand for money. First, as an economy expands and income rises, wealth increases and people will want to hold more money as a store of value. Second, as the economy

expands and income rises, people will want to carry out more transactions using money, with the result that they will also want to hold more money. The conclusion is that **a higher level of income causes the demand for money to increase and the demand curve to shift to the right.**

Price-Level Effect. Keynes took the view that people care about the amount of money they hold in real terms; that is, in terms of the goods and services that it can buy. When the price level rises, the same nominal quantity of money is no longer as valuable; it cannot be used to purchase as many real goods or services. To restore their holdings of money in real terms to its former level, people will want to hold a greater nominal quantity of money, so **a rise in the price level causes the demand for money to increase and the demand curve to shift to the right.**

Shifts in the Supply of Money

We will assume that the supply of money is completely controlled by the central bank, which in the United States is the Federal Reserve. (Actually, the process that determines the money supply is substantially more complicated, involving banks, depositors, and borrowers from banks. We will study it in more detail later in the book.) For now, all we need to know is that **an increase in the money supply engineered by the Federal Reserve will shift the supply curve for money to the right.**

Application

Changes in the Equilibrium Interest Rate Due to Changes in Income, the Price Level, or the Money Supply



To see how the liquidity preference framework can be used to analyze the movement of interest rates, we will again look at several applications that will be useful in evaluating the effect of monetary policy on interest rates. (As a study aid, Table 4 summarizes the shifts in the demand and supply curves for money.)

Changes in Income

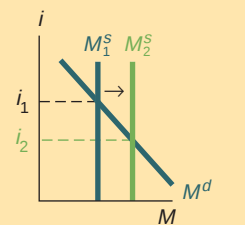
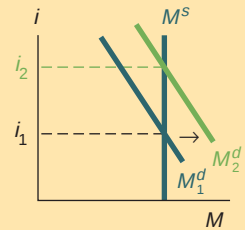
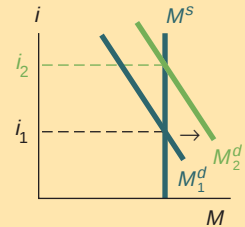
When income is rising during a business cycle expansion, we have seen that the demand for money will rise, shown in Figure 10 by the shift rightward in the demand curve from M_1^d to M_2^d . The new equilibrium is reached at point 2 at the intersection of the M_2^d curve with the money supply curve M^s . As you can see, the equilibrium interest rate rises from i_1 to i_2 . The liquidity preference framework thus generates the conclusion that **when income is rising during a business cycle expansion (holding other economic variables constant), interest rates will rise.** This conclusion is unambiguous when contrasted to the conclusion reached about the effects of a change in income on interest rates using the loanable funds framework.

Changes in the Price Level

When the price level rises, the value of money in terms of what it can purchase is lower. To restore their purchasing power in real terms to its former level, people will want to hold a greater nominal quantity of money. A higher price level shifts the demand curve for money to the right from M_1^d to M_2^d (see Figure 10). The equilibrium moves from point 1 to point 2, where the equilibrium interest rate has risen from i_1 to i_2 , illustrating that **when the price level increases, with the supply of money and other economic variables held constant, interest rates will rise.**

SUMMARY Table 4 Factors That Shift the Demand for and Supply of Money

Variable	Change in Variable	Change in Money Demand (M^d) or Supply (M^s)	Change in Interest Rate
Income	↑	M^d ↑	↑
Price level	↑	M^d ↑	↑
Money supply	↑	M^s ↑	↓



Note: Only increases in the variables are shown. The effect of decreases in the variables on the change in demand would be the opposite of those indicated in the remaining columns.

Changes in the Money Supply

www.federalreserve.gov/releases/H6/Current

The Federal Reserve reports money supply data at 4:30 p.m. every Thursday.

An increase in the money supply due to expansionary monetary policy by the Federal Reserve implies that the supply curve for money shifts to the right. As is shown in Figure 11 by the movement of the supply curve from M^s_1 to M^s_2 , the equilibrium moves from point 1 down to point 2, where the M^s_2 supply curve intersects with the demand curve M^d and the equilibrium interest rate has fallen from i_1 to i_2 . **When the money supply increases (everything else remaining equal), interest rates will decline.**⁶

⁶This same result can be generated using the loanable funds framework. As we will see in Chapters 15 and 16, the primary way that a central bank produces an increase in the money supply is by buying bonds and thereby decreasing the supply of bonds to the public. The resulting shift to the left of the supply curve for bonds will lead to a decline in the equilibrium interest rate.



FIGURE 10 Response to a Change in Income or the Price Level

In a business cycle expansion, when income is rising, or when the price level rises, the demand curve shifts from M_1^d to M_2^d . The supply curve is fixed at $M^s = \bar{M}$. The equilibrium interest rate rises from i_1 to i_2 .

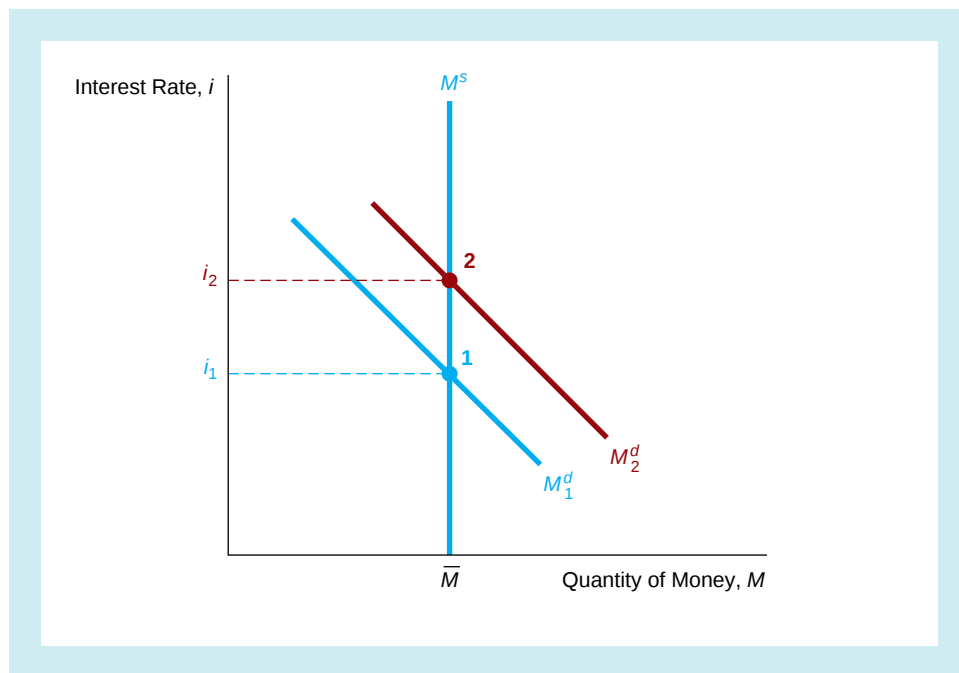
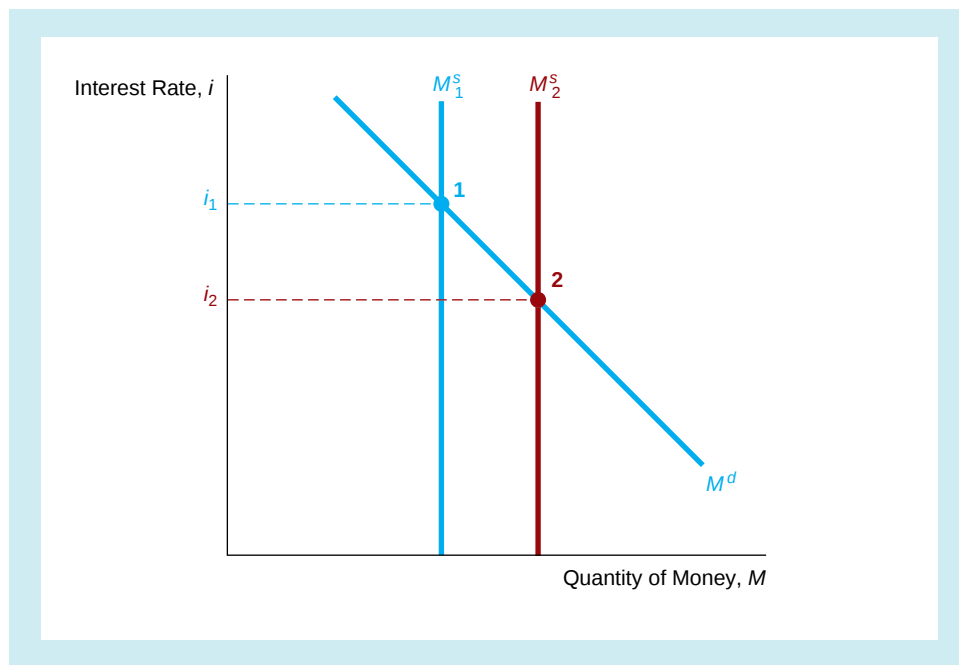


FIGURE 11 Response to a Change in the Money Supply

When the money supply increases, the supply curve shifts from M_1^s to M_2^s , and the equilibrium interest rate falls from i_1 to i_2 .



Following the Financial News

Forecasting Interest Rates

Forecasting interest rates is a time-honored profession. Economists are hired (sometimes at very high salaries) to forecast interest rates, because businesses need to know what the rates will be in order to plan their future spending, and banks and investors require interest-rate forecasts in order to decide which assets to buy. Interest-rate forecasters predict what will happen to the factors that affect the supply and demand for bonds and for money—factors such as the strength of the economy, the profitability of investment opportunities, the expected inflation rate,

and the size of government budget deficits and borrowing. They then use the supply and demand analysis we have outlined in this chapter to come up with their interest-rate forecasts.

The *Wall Street Journal* reports interest-rate forecasts by leading prognosticators twice a year (early January and July) in its “Economy” column or in its “Credit Markets” column, which surveys developments in the bond market daily. Forecasting interest rates is a perilous business. To their embarrassment, even the top experts are frequently far off in their forecasts.

The *Wall Street Journal* Forecasting Survey for 2003

In percent except for dollar vs. yen and dollar vs. euro

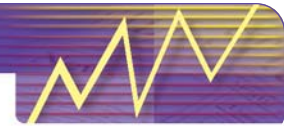
	JULY 2002 SURVEY						NEW FORECASTS FOR 2003											
	3-MO.	10-YR.	GDP-b	CPI-c	S.U.S.	UNEMPL.	3-MO.	10-YR.	GDP-b				CPI-c	S.U.S.	S.U.S.	UNEMPL.		
	TREASURY				vs.		TREASURY											
	BILL-a	NOTE	Q1-Q3	Nov.	YEN	Nov.	BILLS-a	NOTE	Q1	Q2	Q3	Q4	May	YEN	EURO	May		
	Dec.	Dec.	2002	Nov.	Dec.	Nov.	June	June	2003	2003	2003	2003	June	June	June	June		
Susan M. Sterne, Economic Analysis	2.50	5.30	2.9	2.1	125	5.8	2.25	5.50	4.6	4.0	4.2	4.3	2.5	115	1.10	5.6		
Gail Fosler, The Conference Board	2.30	5.35	2.2	2.7	132	6.1	1.50	5.10	4.2	3.1	4.1	5.2	2.5	131	0.87	5.9		
Stephen Gallagher, Societe Generale	2.15	5.60	2.4	2.7	120	5.9	1.25	4.50	4.0	3.0	3.5	3.5	2.3	125	1.00	5.7		
Ian Shepherdson, High Frequency Economics	2.00	5.25	3.3	N.A.	135	6.5	1.25	4.75	4.0	4.0	5.0	5.0	2.2	N.A.	N.A.	6.5		
James F. Smith, University of North Carolina	2.45	4.30	4.8	1.8	143	5.2	1.48	4.00	3.8	4.3	3.2	2.8	1.5	137	0.89	5.6		
Lawrence Kudlow, Kudlow & Co. LLC	1.90	5.30	3.7	2.2	130	5.8	1.50	5.00	3.6	4.5	4.5	5.0	2.1	130	1.00	5.8		
D. Malpass/J. Ryding, Bear Stearns	2.00	5.10	1.6	1.9	132	6.1	1.60	4.80	3.6	3.9	4.1	4.1	1.8	130	0.95	5.9		
Michael K. Evans, Evans Carroll & Assoc.	1.75	5.00	1.0	2.1	130	6.1	1.30	4.30	3.5	2.0	3.5	2.5	3.0	135	1.00	6.2		
Tracy Herrick, Jefferies & Company Inc.	2.60	5.40	2.3	1.8	118	5.4	1.20	4.00	3.5	3.0	3.5	4.0	2.7	125	1.05	5.7		
David L. Littman, Comerica Bank	2.42	5.50	3.4	1.2	117	6.0	1.60	4.80	3.5	4.0	4.0	4.0	2.2	130	0.97	5.7		
Paul McCulley, PIMCO	1.70	5.20	2.3	1.5	130	6.0	1.20	4.15	3.5	2.5	3.0	2.5	2.3	125	1.03	5.8		
Henry Willmore, Barclays Capital	2.40	5.60	4.2	2.3	135	6.2	1.40	4.40	3.5	4.5	4.5	2.0	2.3	135	0.92	5.9		
J. Meil/A. Raha, Eaton Corp.	2.80	5.40	N.A.	2.8	130	5.6	1.50	4.30	3.3	3.5	3.4	3.4	2.2	123	1.00	6.0		
A. Hodge/W. Mak, Global Insight	2.30	5.60	1.2	2.0	125	6.0	1.30	5.60	3.2	3.3	3.9	4.5	2.2	123	0.98	6.1		
Kurt Karl, Swiss Re	2.70	5.40	0.4	2.5	120	6.0	1.60	5.00	3.2	3.6	4.2	3.9	1.9	128	1.00	5.8		
Richard D. Rippe, Prudential Securities	2.25	5.20	3.3	2.4	115	6.0	1.30	4.50	3.2	3.5	3.9	4.3	2.3	120	1.05	6.1		
Daniel Laufenberg, American Express	2.30	5.15	3.1	2.5	125	5.6	1.50	4.50	3.1	3.0	4.1	3.8	2.0	120	1.04	5.7		
John D. Mueller, LBMC LLC	2.50	5.60	4.7	1.6	115	5.5	1.50	4.90	3.1	5.5	6.7	6.0	0.9	118	0.96	5.6		
Diane C. Swonk, Bank One, NA	3.00	5.10	2.5	2.0	123	5.7	1.44	4.00	3.1	2.9	3.3	3.3	2.9	123	0.98	6.1		
David Wyss, Standard and Poor's	1.80	4.90	2.1	2.4	115	5.7	1.20	4.30	3.1	3.1	4.5	3.8	2.2	130	1.02	6.4		
James W. Coons, Huntington National Bank	1.85	5.00	1.5	2.5	120	5.7	1.50	4.35	3.0	3.5	3.5	3.5	2.4	130	1.00	5.8		
Richard DeKaser, National City Corporation	2.69	5.05	2.5	2.3	135	5.7	1.27	4.53	3.0	3.2	4.3	4.4	2.4	118	1.04	5.8		
Neal Soss, CSFB	1.70	4.25	2.0	2.6	122	5.5	1.25	3.40	3.0	2.7	2.9	2.7	2.4	112	1.07	6.1		
Brian S. Wesbury, Griffin Kubik Steph. & Thomp.	2.32	5.80	1.8	2.1	126	5.4	1.25	4.50	3.0	3.0	4.8	5.2	2.6	125	1.05	5.8		
Stuart Hoffman, PNC Financial Services Group	2.00	5.30	1.3	2.3	125	5.7	1.25	4.05	2.8	3.0	3.5	3.5	2.4	125	1.02	5.8		
John Lonski, Moody's Investors Service	2.30	5.40	2.4	1.8	125	5.5	1.53	4.40	2.8	2.9	3.5	3.7	2.3	122	1.04	5.7		
R. T. McGee/T.W. Synnott, US Trust Co.	2.00	5.40	1.8	2.2	125	5.7	1.20	4.30	2.8	2.9	3.5	3.8	2.2	125	1.05	5.8		
David Lereah, National Association of Realtors	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	1.80	4.40	2.7	3.0	3.6	3.2	2.4	125	0.98	5.7		
Maria Florini Ramirez, MFR Inc.	2.00	5.00	1.7	1.7	123	5.9	1.25	4.00	2.6	2.0	2.5	2.7	2.1	128	1.05	6.2		
J. Prakken/C. Varvares, Macroeconomic Adv.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	1.20	4.32	2.6	3.4	3.7	3.7	2.0	121	1.01	5.7		
David W. Berson, Fannie Mae	2.00	5.20	2.2	2.6	121	5.5	1.30	4.40	2.5	3.5	3.7	3.6	2.0	135	1.05	5.8		

(continued)

N.A. Not Available; a Treasury bill rates are on a bond-equivalent basis; b Real gross domestic product, average annualized rate for first three quarters, based on January and July surveys; c Year-to-year change in the consumer price index; d David Rosenberg replaces Bruce Steinberg at Merrill Lynch; e Averages are for analysts polled at time of survey

Source: *Wall Street Journal*, Thursday, January 2, 2003, p. A2.

Following the Financial News



The Wall Street Journal Forecasting Survey for 2003 (continued)

In percent except for dollar vs. yen and dollar vs. euro

	JULY 2002 SURVEY						NEW FORECASTS FOR 2003									
	3-MO.	10-YR.	GDP-b	CPI-c	S.U.S.	UNEMPL.	3-MO.	10-YR.	GDP-b				CPI-c	S.U.S.	S.U.S.	UNEMPL.
	TREASURY				vs.		TREASURY							vs.	vs.	
	BILL-a	NOTE	Q1-Q3		YEN		BILLS-a	NOTE	Q1	Q2	Q3	Q4		YEN	EURO	
	Dec.	Dec.	2002	Nov.	Dec.	Nov.	June	June	2003	2003	2003	2003	May	June	June	May
Maury Harris, UBS Warburg	2.00	5.00	1.7	2.0	120	5.9	1.60	4.60	2.5	4.5	3.5	3.5	2.3	115	1.05	5.7
William B. Hummer, Wayne Hummer Invest.	2.21	5.05	2.2	2.4	119	5.5	1.31	4.14	2.5	3.1	3.6	3.8	2.1	125	1.05	5.8
R. Shrouds/R. Fry, DuPont Co.	1.80	5.00	2.9	2.1	110	5.8	1.30	4.50	2.5	3.0	3.5	3.5	1.9	128	1.05	6.0
Allen Sinai, Decision Economics Inc.	1.82	4.94	0.8	1.9	123	6.0	1.27	4.17	2.5	2.2	2.9	3.2	2.2	135	1.06	6.5
Sung Won Sohn, Wells Fargo & Co.	2.05	5.20	1.8	3.0	115	5.7	1.30	4.40	2.5	3.7	3.8	3.8	1.5	125	0.99	5.8
Gary Thayer, A.G. Edwards	2.20	5.60	2.0	1.8	120	5.5	1.40	4.50	2.5	3.5	3.0	4.5	2.1	119	1.06	5.7
Mark Zandi, Economy.com	2.20	5.25	1.1	2.2	125	6.0	1.70	4.50	2.4	2.7	3.2	3.8	2.2	125	1.00	6.3
R. Berner/D. Greenlaw, Morgan Stanley	2.00	5.30	1.9	2.6	124	5.8	1.50	4.50	2.3	3.8	3.9	3.5	1.9	120	1.05	5.9
David Resler, Nomura Securities International	1.90	5.10	3.2	2.4	120	5.9	1.25	4.25	2.3	3.0	3.5	3.8	1.8	125	1.04	6.0
Edward Leamer, UCLA Anderson Forecast	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	2.03	4.00	2.2	2.3	2.7	3.2	2.4	N.A.	1.10	6.1
David Rosenberg, Merrill Lynch[d]	2.25	5.25	2.3	2.0	125	5.8	1.20	4.00	2.2	3.3	3.0	3.5	2.4	125	1.07	6.5
Saul Hymans, RSQE, University of Michigan	2.30	5.30	1.9	2.7	122	5.6	1.72	4.03	2.1	4.3	4.2	4.2	2.4	N.A.	N.A.	6.1
Nicholas S. Perna, Perna Associates	2.62	5.53	1.3	2.1	122	5.7	1.47	4.53	2.1	3.0	2.9	3.1	2.3	114	1.03	5.5
Richard Yamarone, Argus Research	3.00	5.65	3.1	2.8	128	4.7	1.70	4.60	2.1	2.5	3.0	2.5	3.3	128	1.00	5.6
Ram Bhagavatula, The Royal Bank of Scotland	2.45	5.35	3.8	2.4	121	5.4	1.10	3.75	2.0	2.8	4.1	4.3	21	127	1.06	6.1
J. Dewey Daane, Vanderbilt University	2.00	5.00	0.8	2.0	121	6.0	1.60	4.50	2.0	2.2	2.4	2.6	2.0	118	1.00	5.9
Peter Hooper, Deutsche Bank Securities	2.25	5.40	2.7	2.3	130	5.7	1.75	4.50	2.0	4.0	4.0	3.9	1.4	130	1.05	6.1
William T. Wilson, Ernst & Young	2.50	6.25	2.0	2.5	115	5.5	1.60	5.40	2.0	5.0	4.0	4.1	1.4	120	1.00	5.6
Robert DiClemente, Citibank SSB	1.90	5.30	2.6	1.9	125	5.8	1.30	4.60	1.8	2.7	3.3	4.1	1.9	132	0.93	5.9
Mike Cosgrove, Econoclast	2.00	5.30	2.1	2.3	130	6.0	1.30	4.30	1.6	2.9	3.5	4.0	2.4	125	1.00	6.0
William C. Dudley, Goldman Sachs	2.00	5.00	1.5	2.4	132	6.0	1.00	4.20	1.5	2.5	3.0	3.5	2.1	120	1.08	6.4
Ethan S. Harris, Lehman Brothers	N.A.	4.85	N.A.	2.2	116	6.1	1.20	4.20	1.5	3.0	3.5	4.0	2.3	124	1.07	6.2
Donald H. Straszheim, Straszheim Global Adv.	2.25	5.15	N.A.	1.9	114	5.9	1.40	4.40	1.0	2.0	4.0	4.0	2.0	127	1.04	6.1
A. Gary Shilling, A. Gary Shilling & Co.	1.50	4.00	-1.1	0.5	130	6.4	0.75	3.50	-2.0	-2.0	2.0	3.0	1.2	130	0.94	7.3
AVERAGE [e]	2.20	5.20	2.3	2.2	122	5.8	1.41	4.42	2.7	3.2	3.7	3.7	2.2	125	1.02	6.0
ACTUAL NUMBERS as of Dec. 31, 2002	1.21	3.82	3.4	2.2	119	6.0										

N.A. Not Available; a Treasury bill rates are on a bond-equivalent basis; b Real gross domestic product, average annualized rate for first three quarters, based on January and July surveys; c Year-to-year change in the consumer price index; d David Rosenberg replaces Bruce Steinberg at Merrill Lynch; e Averages are for analysts polled at time of survey

Source: Wall Street Journal, Thursday, January 2, 2003, p. A2.

Application

Money and Interest Rates



The liquidity preference analysis in Figure 11 seems to lead to the conclusion that an increase in the money supply will lower interest rates. This conclusion has important policy implications because it has frequently caused politicians to call for a more rapid growth of the money supply in order to drive down interest rates.

But is this conclusion that money and interest rates should be negatively related correct? Might there be other important factors left out of the liquidity preference analysis in Figure 11 that would reverse this conclusion? We will provide answers to these questions by applying the supply and demand analysis we have used in this chapter to obtain a deeper understanding of the relationship between money and interest rates.

An important criticism of the conclusion that a rise in the money supply lowers interest rates has been raised by Milton Friedman, a Nobel laureate in economics. He acknowledges that the liquidity preference analysis is correct and calls the result—that an increase in the money supply (*everything else*