CHAPTER 3  
THE LOANABLE FUNDS MODEL

The next model in our series is called the **Loanable Funds Model**. This is a model of interest rate determination. It allows us to explore the causes of rising and falling interest rates and to evaluate the wisdom of policy measures designed to influence credit and monetary growth rates and interest rates. In this chapter the model’s structure will explained and the use of the model illustrated through some examples.

The Relevance of the Loanable Funds Model

Here are some important questions we can ask about interest rates:

1. Why, generally, do interest rates rise and fall? What causal factors come into play, and how do they interact?
2. What effects do budget deficits have upon interest rates?
3. How does monetary policy, and in particular, expansionary open market operations, have upon interest rates?
4. How does the formation of inflationary expectations influence interest rates?
5. When evaluating policies designed to affect interest rates or other financial variables, do we need to distinguish between the long-run effects and the short-run effects of the policy?

Many of these questions will be addressed in this chapter.

The Structure of the Loanable Funds Model

Refer to Figure 3.1, which shows the general configuration of the Loanable Funds Model. As can be seen, the model is similar to the microeconomic model discussed in chapter 1 and the aggregate supply - aggregate demand model from chapter 2. It is a comparative-statics equilibrium model that employs a supply and demand curve to locate a market-clearing equilibrium price. The special price in this model is the cost of credit - the **interest rate**, represented by the variable \( r \). There is, of course, a full spectrum of interest rates in the U.S. economy, ranging from short-term rates on money market assets such as U.S. Treasury Bills to long-term rates, such as the interest rates on 30-year home mortgages. Interest rates throughout this spectrum are never the same - generally on any given day there are as many interest rates as there are securities that represent them. The simple version of the Loanable Funds Model simplifies this complexity by assuming only one “interest rate,” which can be thought of as a proxy average for the entire structure of interest rates. Not much

Figure 3.1
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will include the condition that the Federal Reserve System, as a policy measure, can increase the supply of credit.

In summary, the supply of credit consists of three components: (1) credit directly supplied by lenders to borrowers, such as auto loans provided by banks, (2) the purchases of interest-bearing financial assets, such as the purchase of corporate bonds by consumers, and (3) new credit made available because of open market operations (Federal Reserve policy).

Table 3.1 lists those factors that affect supply and demand in the loanable funds model. Generally, on the demand side all categories of borrowing are included, and on the supply side all variables that are likely to influence the activities of lenders are included.

A few comments need to made about the savings categories on the supply side. First, consumer savings represents voluntary savings from disposable personal income. Consumers may hold such savings either as deposits in financial institutions like banks or through the purchase of interest-bearing financial assets. Business savings, financed by profits, are typically invested in such financial assets as well.

The category labeled mandatory savings is meant to represent the involuntary consumer savings that are mandated by pensions and other mandatory retirement programs. This should be distinguished from voluntary consumer savings because the former is somewhat sensitive to interest rates whereas the latter is not.

As before, any change in the values of any of these variables will cause a shift in the appropriate curve and a movement to a new market-clearing equilibrium.

An example of this is seen in Figure 3.2, which shows the impact of a decline in consumer borrowing. Suppose consumers thought that current consumer debt levels were too high and they react by cutting back on their use of credit. This would be shown as a shift to the left of the demand for credit. This by itself would result in a decline in interest rates and a lower volume of credit, as shown. It should be remembered in this model as in any comparative statics model, the analysis of cause and effect that comes from consideration of a change in a single variable assumes no change in the other variables in the model - the relationship is considered in isolation. Therefore, in this example, we might conclude that a contraction of consumer demand for credit has the tendency of lowering interest rates, or considered in isolation from other factors, would lower interest rates.\(^4\)

\(^4\)This is equivalent to saying mathematically that if \( r = f(x_1, x_2, x_3) \), then we are considering the isolated effect of \( \partial r / \partial x_1 \) and conclude that to be \( >0 \). This means that if \( x_1 \) falls, \( r \) will also fall if the other variables remain unchanged. If we can’t say that about them, then we must be content to say that \( r \) will tend to fall.
The actual empirical or historical movement of interest rates will depend upon the net impact of all variables acting upon them, not just the demand for consumer credit. That is why we cannot make the predictive statement that “a decline in the consumer demand for credit will definitely cause interest rates to fall,” (what if something else, such as corporate borrowing, is rising to offset the decline in consumer borrowing?) but are able to make the qualified statement that “a decline in the consumer demand for credit has a tendency to lower interest rates and cause the volume of credit to fall,” so long as we realize that any number of things can offset that tendency.

Does this severe qualification render us unable to say anything practical or useful about the behavior of interest rates? The answer is no - understanding the impact of key variables is very important in policy analysis and it is the only reasonable basis for trying to figure out what mix of events caused interest rates to rise or fall over any historical period. Likewise, simulation models based upon this kind of structure do allow the analyst to consider multiple variable impacts, and for such models to be accurate, the isolated effect of each single variable must first be known. The reader is merely being cautioned that there is no simple chain of cause and effect between any single variable and interest rates in an economy where a long list of factors are known to act upon rates simultaneously.

Applications of the Loanable Funds Model

One of the most controversial topics in macroeconomic policy in recent years revolves around the economic impact of budget deficits. When the issue was addressed using the Aggregate Supply - Aggregate Demand Model developed in chapter 2, we get the result shown here in Figure 3.3. We remember that taxation tends to move the aggregate demand curve to the left (because it lowers disposable income, reducing the ability of consumers to spend) and government spending tends to shift it to the right. Consequently a balanced budget is likely to have a neutral effect, whereas a budget deficit, which requires spending to exceed tax receipts, is likely to have a stimulating effect in the short run. Whether the stimulating effect is inflationary
depends upon where the stimulation occurs along the aggregate supply curve. Clearly, if the economy is in a recession with the capacity utilization rate well below 80% and high unemployment, deficit spending will likely stimulate the economy into higher levels of real output. Such a short-run stimulation might be well justified in a dormant economy.

What about the long-run effects of persistent, chronic deficits, such as those seen in the U.S. economy in the 1980s? First, it is clear when looking at Figure 3.3 that if a persistent deficit eventually pushed the aggregate demand curve into the inflationary region of the aggregate supply curve, then the very undesirable long-range effect of inflation is going to emerge. This is one reason why large chronic budget deficits year after year are inadvisable - they build a natural tendency toward inflation into the economy. Addressing this same issue with the loanable funds model points out yet another potential problem - large and chronic budget deficits also have a tendency to raise interest rates.

The effect of budget deficits upon interest rates

This effect can be seen in Figure 3.4. When the federal government runs a budget deficit, spending more than is received in revenues, the difference (the deficit) must be financed through the sale of U.S. Treasury Bonds, Notes, and Bills. As was shown above, this constitutes an increase in the demand for credit, and is shown in Figure 3.4 as a shift to the right (from DC₁ to DC₂) in the demand curve. The obvious result is higher interest rates.

This effect of budget deficits upon interest rates introduces the possibility of an economic phenomenon called crowding out. Economy theory tells us that if interest rates are rising because of budget deficits, then the demand for funds in the private sector - corporate, consumer, and mortgage borrowing - might fall because of these higher interest rates. For example, the demand for residential mortgages might be very sensitive to increases in mortgage rates. An increase in the payment of a 30-year fixed rate $150,000 home mortgage that rises from 7% to 9% equals slightly less that $200 per month. One would expect the demand for home loans to fall in an environment of rising interest rates. If private borrowing falls because of rising interest rates caused by government borrowing, then the deficit is said the be crowding out private borrowing. This could further mean, of course, that aggregate demand would fall because of reduced levels of private credit-financed spending, somewhat offsetting the stimulating effects of the deficit. Because this theory employs many complicated chains of cause and effect, it is a suitable candidate for exploration with a computer simulation model. We will therefore return to the controversy in the chapter on simulation models. For the moment, we will merely concede that budget deficits tend to push interest rates up, and this in turn might discourage many categories of private

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5 Why and how this is done is not explained in this chapter. For a complete explanation of this procedure, see Evans, Gary R. Red Ink - The Budget, Deficit, and Debt of the U.S. Government, Academic Press, 1997, Chapter 1.
Again, it should be remembered that this result must be expressed as a tendency - we conclude that large budget deficits have the tendency to raise interest rates. We know that there can be other offsetting factors at work.

The effect of open market operations upon interest rates

**Figure 3.5** provides a good example of such an offsetting tendency. Earlier in this chapter it was explained that the Federal Reserve System has the ability to increase the amount of credit available to the economy through a policy expedient called open market operations. This is shown as a shift to the right in the supply curve (from \( SC_1 \) to \( SC_2 \)), which has the effect of lowering interest rates and increasing the volume of credit. This, in fact, is the desired effect of an expansionary open market operation, which is a policy measure designed to stimulate an economy.

The two combined: budget deficits and expansionary open market operations together

It is clear from inspection that the two cases shown in **Figure 3.4** and **Figure 3.5** tend to offset each other. Deficits tend to raise interest rates and expansionary open market operations tend to lower them. The effect of the two combined is shown in **Figure 3.6**.

By inspection it is clear that the final effect upon interest rates will depend upon which of the two influences is most dominant, the budget deficit or Federal Reserve Policy (the graph is drawn in such a way as to show a relatively neutral effect - it could have been drawn to slow slightly higher rates or slightly lower rates). This combined effect illustrates a point made earlier - either of these two effects considered in isolation influences the final direction of rates, but the actual direction of interest rates will be determined by the net effect of all influences combined. This means that the following two counterintuitive results are logically possible when looking at actual data: (1) historical interest rates can be falling during a period of rising budget deficits (because aggressive expansionary open market operations are
being used to offset the impact of the deficits) and (2) historical interest rates can be rising during a period of expansionary open market operations (because of budget deficits and for other reasons to be introduced next).

This less-than-exact result (in terms of the predictability of interest rates) should not be discouraging. The effects of two different types of economic policy (fiscal policy and monetary policy) are clearly demonstrated by the model and that the two can offset each other with a complex result is simply the truth of the matter.

Far more important, we still gather important information from the model even in this complex case. Although the final impact upon interest rates remains ambiguous, the impact upon the volume of credit is not (refer back to Figure 3.6 to confirm this) Clearly, in a scenario where both large budget deficits and accommodating expansionary monetary policy are both present, credit formation and related variables, such as the growth rate of the money supply, will be very high. This has important implications. Such a policy combination is very stimulating to the economy, might increase aggregate demand considerably, and has the potential to move the economy into the inflationary region of aggregate supply.

The impact of inflationary expectations upon interest rates

Nothing impacts the behavior of interest rates more strongly than the formation of inflationary expectations. With the appearance of inflation or the formation of inflationary expectations (usually one comes with the other, except that latter typically leads the former) interest rates will rise. Moreover, the effect of this variable will typically override all others, including offsetting variables such as expansionary open market operations. This effect is shown in Figure 3.7.

The impact of inflationary expectations is strong because it affects both the supply curve and the demand curve. It shifts the former to the left and up (from \(SC_1\) to \(SC_2\)) and the latter to the right and up (from \(DC_1\) to \(DC_2\)).

The supply curve shifts as shown because lenders are not willing to make loans at negative real interest rates, which are interest rates below the inflation rate. For example, no bond buyer is going to be content to earn 5% interest annually on a bond if the inflation rate is 10%. Such an investor is going to insist upon an interest rate higher than 10%, and as inflation rates rise over time the acceptable level (to lenders) of interest rates are adjusted accordingly. To understand the logic of the shift, look at points \(a\) and \(b\) on the two supply curves, both associated with volume \(Vo\). There we are asking the hypothetical question, “At what interest rate will the volume of credit \(Vo\) be offered to the market.” The answer would be something like, “When inflation is low that volume of credit will be offered at the relatively low rate \(a\); with high inflation that volume of credit will only be offered at the much higher rate \(b\).” Since this would be true for any volume of credit represented, the shift in the curve as shown is justified.

The demand curve shifts for a different reason. Here it is understood that for certain types of credit-financed
spending, the threat of inflation will cause many purchasers to expedite their spending intentions - in effect to try to buy before the price increase. Such an effect would be most common in an area like housing. With an inflationary threat, consumers rush to buy houses before they inflate out of reach, willing to pay much higher mortgage rates to do so. Additionally, consumers are simply willing to pay much higher interest rates in an inflationary environment, if for no other reason than it is understood that they are expected to do so.

By inspection, the impact of inflationary expectations is unambiguous. Interest rates rise in response.

The final spread between interest rates is referred to as the inflation premium on interest rates, and reflects the extent to which inflation drives interest rates higher.

These examples offer an introductory exposure to the loanable funds model. The model can generally be applied for at least introductory analysis anywhere the issue of interest rate determination arises.