

The ability to pay interest on reserves can be a critical tool for a central bank. By paying interest on reserves, a central bank can create two separate tools – the policy rate target *and* the quantity of aggregate reserves supplied – out of the one tool (the rate target) that otherwise exists. As a result, a central bank can target a policy rate virtually without regard to the level of reserves that it supplies, increasing its policy flexibility. The ability to pay interest on reserves is especially important when a central bank wishes to tighten policy after a period of quantitative easing (QE – see the Chapter 18 module: Quantitative Easing).

To understand the impact of interest payments on reserves, let's start with the simple (and historically common) situation in which commercial bank deposits at the central bank are uncompensated, so the interest rate on reserves is zero. As we learned in Chapter 12, banks hold both *required* reserves and *excess* reserves, which sum to *total* reserves. In the aggregate, the level of required reserves depends only on the volume of deposits in the banking system, but the level of excess reserves that banks choose to hold will vary with their reserve needs and with the opportunity cost (Chapter 4) of holding reserves.

If reserves are uncompensated, then the opportunity cost of holding reserves is high when interest rates are high. A bank could make an extra loan at this high rate instead of holding reserves that pay no interest. In contrast, the opportunity cost is low when interest rates are low, because the extra loan will yield only a small return. High interest rates prompt banks to economize on reserves in order to make extra loans. Their incentive to economize declines as interest rates fall. As a consequence, aggregate demand for reserves is downward-sloping when interest rates are positive, as seen in Figure 18.1 and in Figure 1 below.

However, as the loan rate approaches zero, banks become indifferent about the level of reserves that they are willing to hold, because the opportunity cost is zero. Consequently, the demand curve for aggregate reserves becomes flat at a zero interest rate, as the black line in Figure 1 shows.

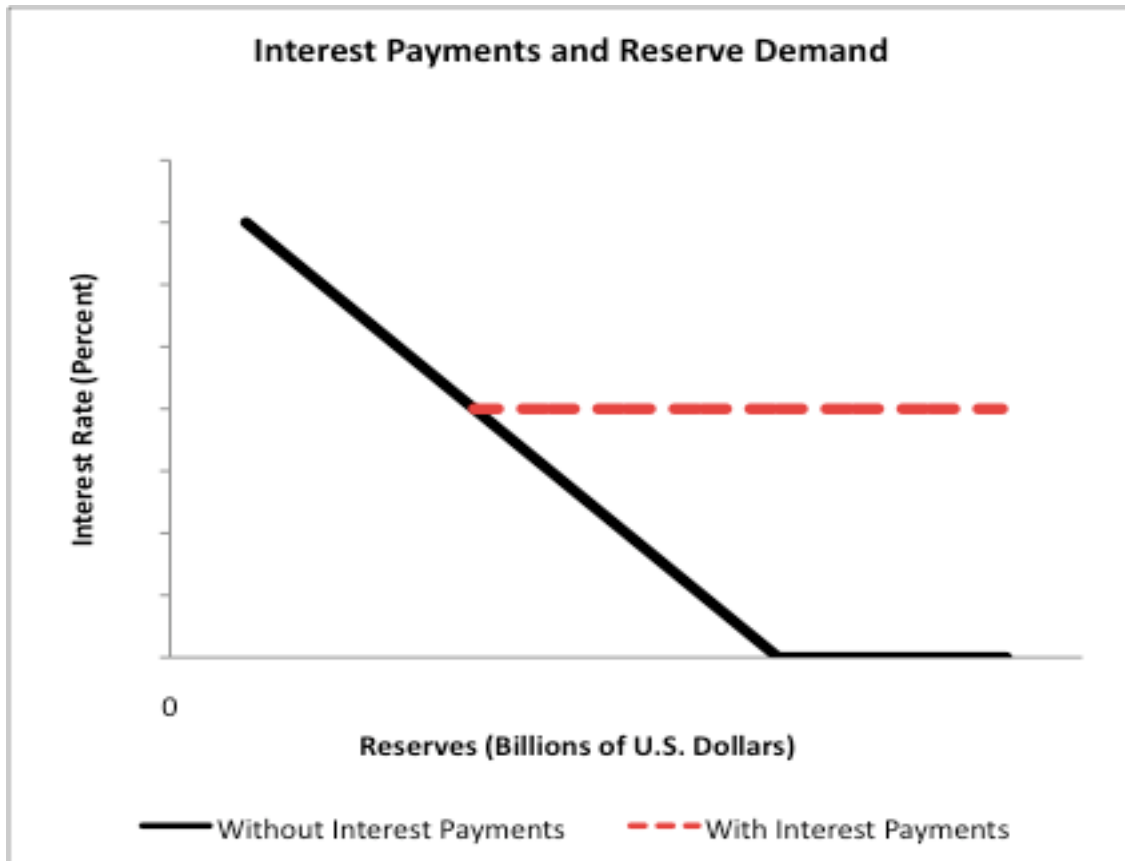
The situation changes when the central bank pays interest on reserves. Imagine that the central bank pays 4% (rather than zero) on any excess reserves. Then, unless loans can be made at a rate higher than 4%, a bank will be satisfied depositing its excess reserves at the central bank and earning 4%. Consequently, the kink in the aggregate reserve demand curve – where it suddenly turns flat – occurs at 4% rather than zero. In Figure 1, the dashed red line highlights this change.

This simple shift in policy has major implications. First, the payment of interest on reserves allows the central bank to set an interest rate floor in the overnight interbank market that many central banks target. Figure 18.3 shows that the federal funds rate often fell well below the target funds rate. Had the Federal Reserve paid interest on reserves below, but close to, the target rate, such deviations in normal

times likely would have been fewer or smaller. Clear evidence for this view comes from looking at the money market for euros, where interest has been paid on reserves since the beginning of the European Monetary Union in 1999. As shown in Figure 18.5, the deposit rate at the European Central Bank provided a reliable floor for the target interest rate.

Second, the payment of interest on reserves means that there is no longer a one-to-one relationship between the level of reserves demanded by the banking system and the level of interest rates, even at positive rates. When the overnight market interest rate sinks to the floor at which the central bank pays interest on reserves, banks are willing to hold any level of excess reserves that the central bank chooses to supply. Without interest payments on reserves, this pattern only occurs when overnight interbank interest rates sink to zero.

Figure 1. Impact of Interest Payments on Aggregate Reserve Demand



Consequently, when a central bank pays interest on reserves, it can utilize two independent tools: the interest rate target and the quantity of reserves supplied. In contrast, when there is no interest paid on reserves, the central bank has only one tool at a positive target rate because there is only one level of reserves that banks will demand at that rate.

How might central banks use the extra reserve-supply tool? In a crisis when banks have difficulty finding reserves, policymakers may wish to increase the quantity of reserves in the economy as a whole well beyond the level needed to achieve the policy target rate. The availability of these excess reserves increases the chance that they will reach those financial institutions that need reserves most.

The central bank can also be more flexible in using special mechanisms – such as discount window loans – to deliver reserves to individual banks, directing liquidity where it is in greatest need. Because the interest rate paid on reserves sets an effective floor for the market, the monetary authorities need not worry that an overabundant supply of reserves will depress market rates below the policy target. Whenever market interest rates sink to the floor set by the central bank's interest payments on reserves, banks will deposit the excess funds at the central bank.

The Federal Reserve began utilizing the authority to pay interest on reserves as soon as Congress authorized it to do so in October 2008. The Fed's rapid response highlights the importance of this tool in a financial crisis.

When a financial crisis abates, payment of interest on reserves allows the central bank to tighten its monetary stance even if it wishes to keep the supply of reserves abundant. In this case, the central bank can hike both its policy target rate and the rate paid on reserves. If both rates are the same, the central bank can adjust the supply of reserves flexibly. In the aftermath of a period of QE, the central bank also may wish to hike its target rate before it is able to reduce the extraordinary supply of reserves. The payment of interest on reserves makes this possible because it creates two policy tools that can be used independently.