Monetary Policy Implementation in the US

ECON 40364: Monetary Theory & Policy

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Readings

Mishkin Ch. 15, sections 15.1 and 15.2

Late 20th Century Monetary Policy

For the last three or four decades, central banks around the world have moved away from paying much attention to monetary aggregates and instead focus more directly on interest rates

Think (roughly) of central banks as wanting to stabilize nominal expenditure

- Not quite right (there are calls for explicit nominal GDP targeting), but rough approximation to "dual mandate"

From the quantity equation:

$$M_t V_t = \overline{PY}$$

If V_t is stable, targeting M_t makes sense

But if it's not, paying attention to money supply is not that useful and may be counterproductive

Instability of Velocity: Movement Away from Focusing on Monetary Aggregates

Paul Volcker and the Fed experimented with targeting monetary aggregates in the early 1980s

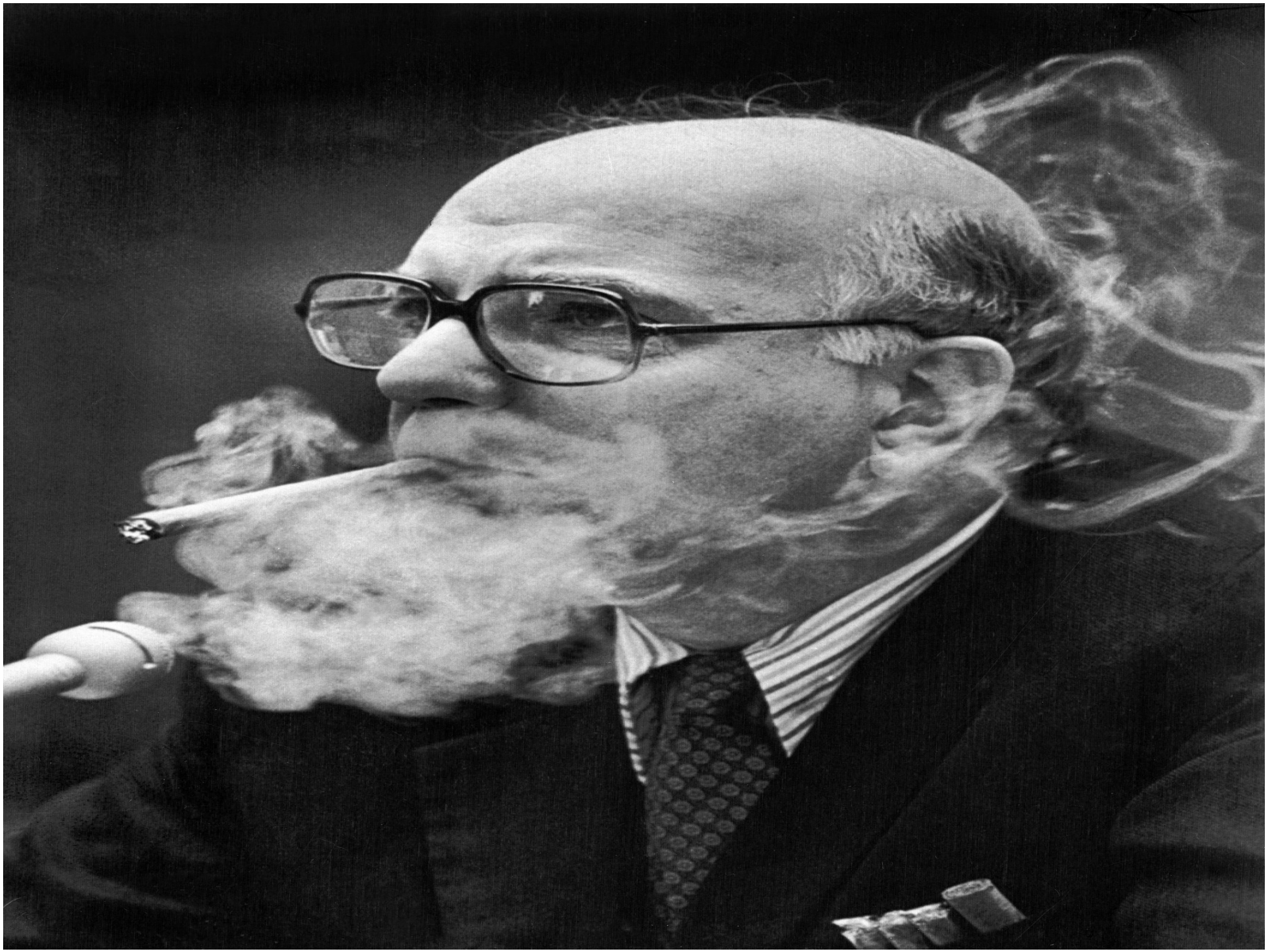
This brought inflation down from the 1970s, but led to high and variable interest rates

Most monetary economists concluded that the demand for money is not in fact stable, i.e., a rejection of monetarism

If the money supply is not closely and predictably connected to aggregate spending, targeting the money supply probably not a good policy

This has led most monetary economists to instead favoring focusing on short-term interest rates as the target of monetary policy

Paul Volcker



The Federal Funds Rate

Since the early 1980s, the Fed focuses more on the Federal Funds Rate than monetary aggregates

Federal Funds Rate: interest rate on short-term (overnight) borrowing and lending of reserves between banks

Since 1994, Fed has formally announced target FFR (level or range)

From 1982-1994, this was implicitly done by the Federal Open Market Committee (FOMC)

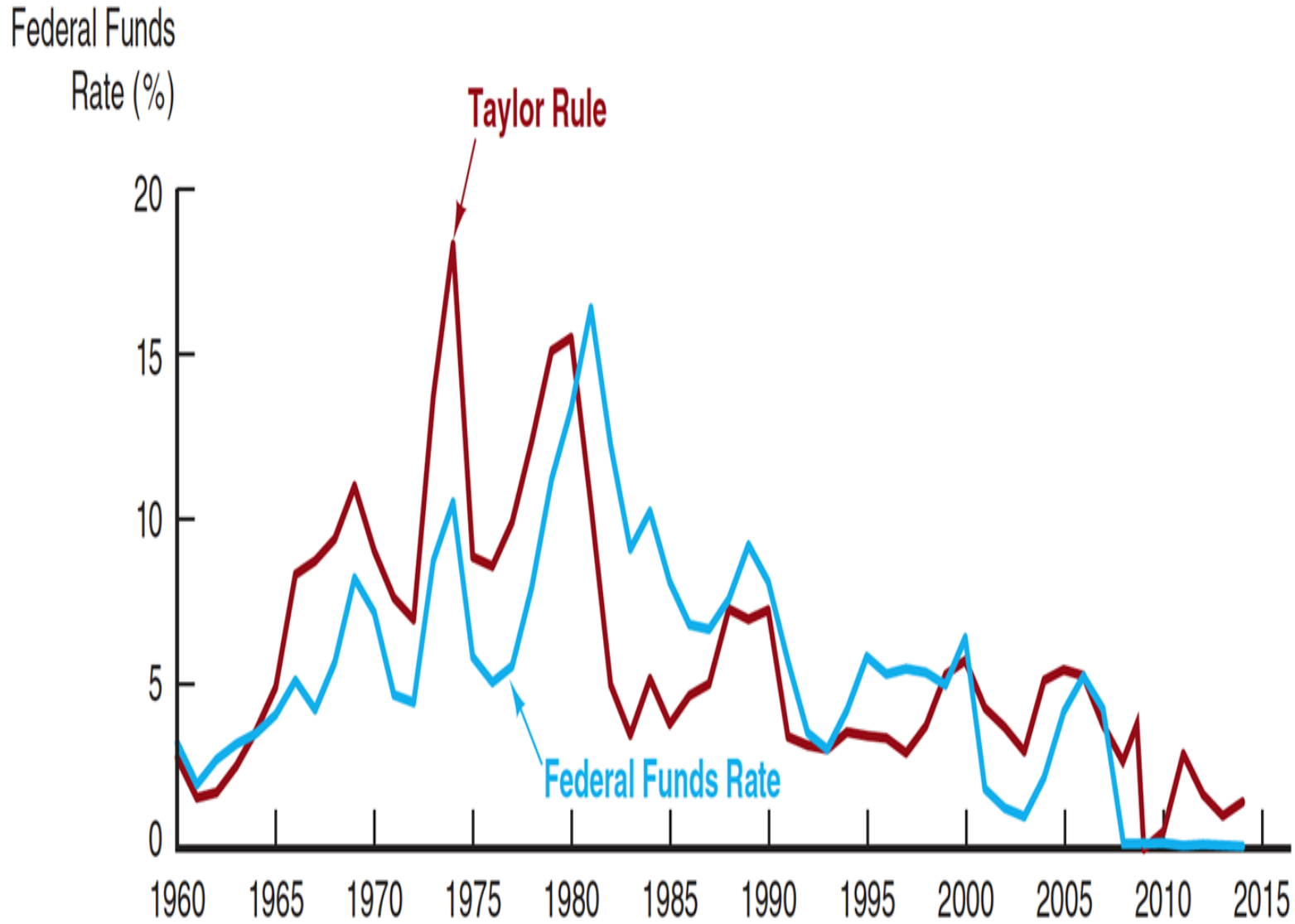
The Taylor Rule

John Taylor (1993) posited that the Fed sets interest rates (the Federal Funds rate) as a function of the deviations of inflation from target and output from "potential":

$$i_t = r^P + \pi_t^* + \phi_\pi(\pi_t - \pi_t^*) + \phi_Y(Y_t - Y_t^*) + e_{i,t}$$

r^P is the natural rate of interest (think about this as long run average real interest rate), π_t^* is an exogenous inflation target, Y_t^* is "potential output," and $e_{i,t}$ is an exogenous shock (0 on average)

Taylor argued that roughly: $r^P = 2$, $\pi_t^* = 2$, $\phi_\pi = 1.5$, and $\phi_Y = 0.5$


Federal Funds
Rate (%)
Taylor Rule
Federal Funds Rate
20
15
10
5
0
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015

How Does Fed Target FFR?

The FFR (i.e., the "policy rate") is not directly relevant for households and firms. It's an interbank rate.

But it's relevant for all sorts of other rates (which are "priced" off of it)

The FFR is an equilibrium interest rate that balances supply and demand of reserves in the interbank market

Fed therefore does not literally set this rate; rather, it targets it

Interbank Market for Reserves

Historically, banks faced a minimum required reserve ratio (now it's zero)

Banks have to meet this daily

If they have too few reserves to meet liquidity needs, they can borrow in the interbank market

Too many reserves, they can lend in the interbank market (and potentially earn interest)

Alternatively, if a bank needs reserves, it can borrow directly from the Fed (via the discount window) at the discount rate

Since 2008, the Fed pays interest on excess reserves held by banks (interest rate on reserve balances, IORB)

Demand for Reserves Federal Funds market

Excess reserves are insurance against unexpected withdrawals or other liquidity needs

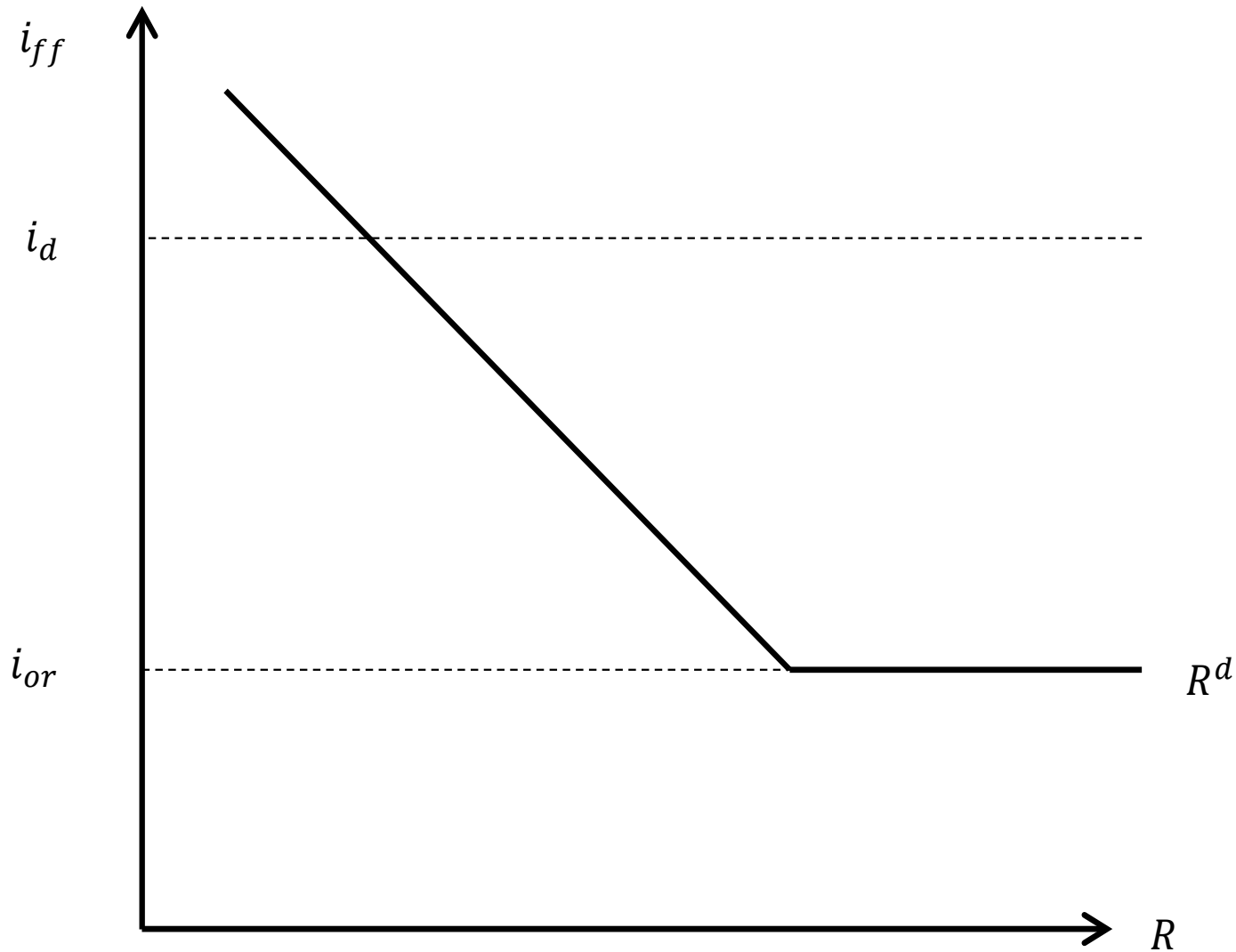
The FFR represents an opportunity cost of holding excess reserves – the higher it is, the more interest a bank is giving up by holding excess reserves

Hence, the demand for excess reserves (and hence the total demand for reserves) is decreasing in the FFR

The demand for reserves is bound from below by the interest rate on reserves (IORB)

- If IORB is higher than FFR, banks would want to borrow funds in the interbank market to earn the higher rate on holding reserves, which would drive up the FFR to the interest rate on reserves
- Notation: i_{ff} is the FFR, i_d is the discount rate, and i_{or} is the interest rate on reserves

Demand in the Federal Funds Market



Supply for Reserves Federal Funds market

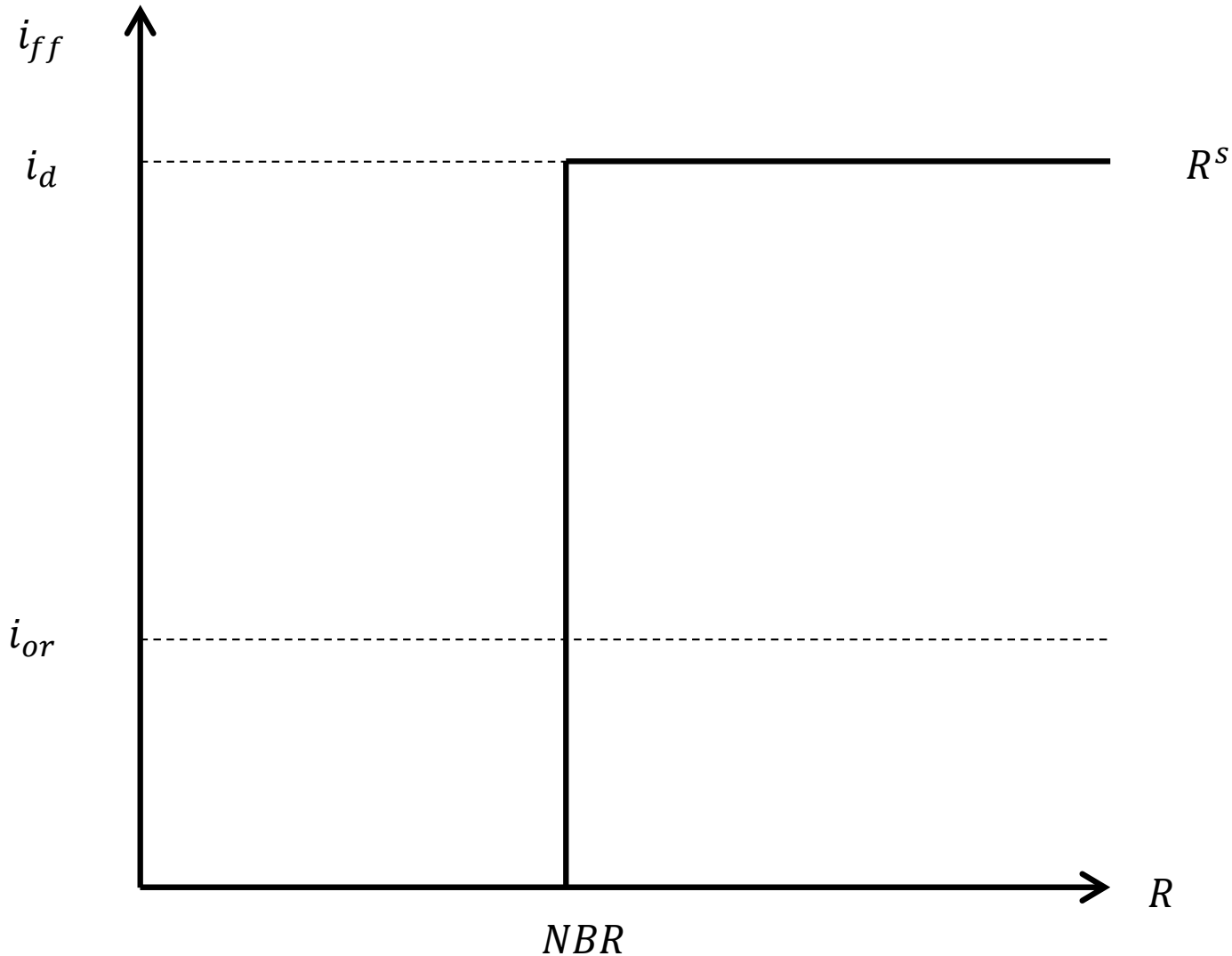
If $i_{ff} < i_d$, banks will not borrow from the Fed. Hence, the supply of reserves just equals non-borrowed reserves, which the Fed can set

Hence, the supply curve for reserves is vertical at $i_{ff} < i_d$

But i_d places a ceiling on i_{ff}. If $i_{ff} > i_d$, then banks would borrow from the Fed to lend in the interbank market (i.e., engage in arbitrage). Hence, borrowed reserves would rise infinitely with $i_{ff} > i_d$

Therefore, the supply curve of reserves, which is the sum of non-borrowed reserves (NBR, which the Fed sets) and borrowed reserves (BR, which is determined by banks borrowing at the discount window), is horizontal at $i_{ff} = i_d$.

Supply in the Federal Funds Market



Equilibrium Pre-2008

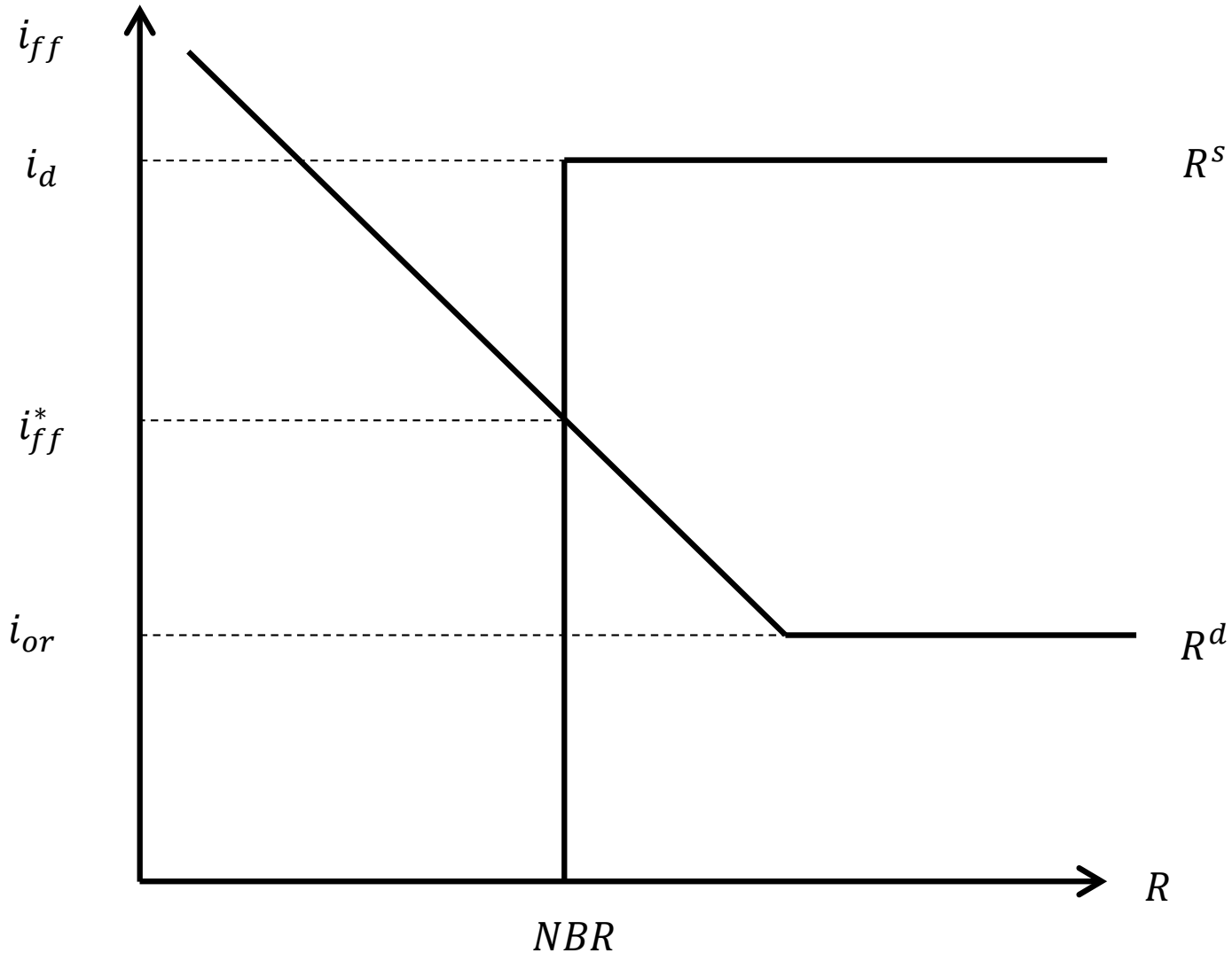
Prior to the Great Recession, we had $i_{or} = 0$ and $i_{ff} < i_d$.
"Corridor system"

Reserves were scarce

The equilibrium FFR was determined where the downward-sloping demand for reserves intersects the vertical supply of reserves set by the Fed

Call this equilibrium FFR i^*_{ff}

Equilibrium in the Federal Funds Market



How Does Fed Target FFR?

The Fed formulates its target monetary policy through a target (range) for the FFR, i_{ff}^{*}

Four ways to do this:

1. Open market operations: change position of supply of non-borrowed reserves
2. Discount rate: changes upper bound on reserve supply
3. Reserve requirement: changes demand for reserves
4. Interest on reserves: changes lower bound on reserve demand

Tools Continued

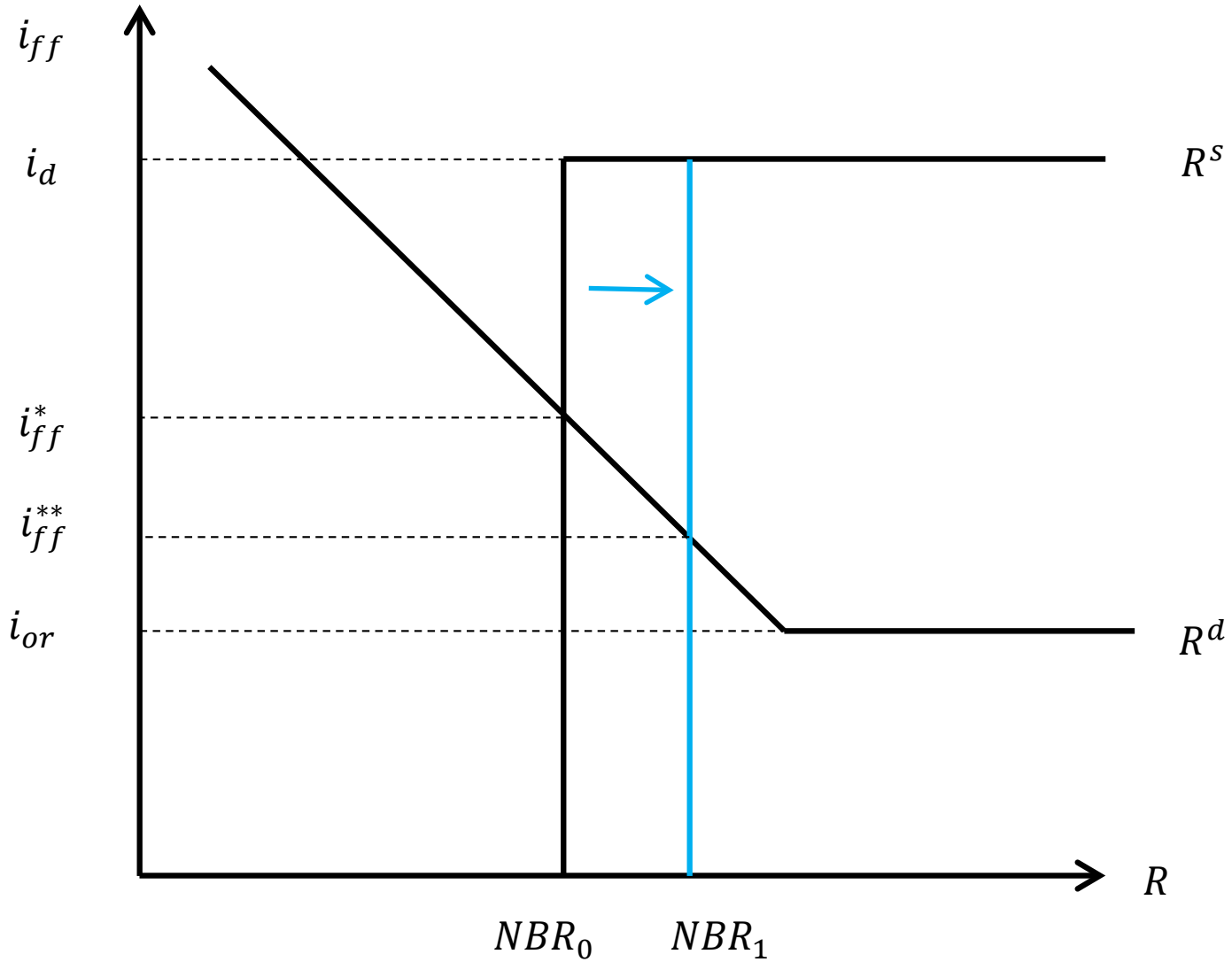
Open market operations and discount rate affect reserve supply

Prior to 2008, discount rate and interest rate on reserves do not affect the FFR

In practice, prior to 2008 open market operations the most important tool ("corridor system"). Post 2015, interest on reserves ("floor system")

Note: we've talked about how open market operations affect the money supply. Now we're thinking about how operations affect interest rates

Open Market Purchase



Open Market Purchase

An open market purchase shifts the supply curve of reserves to the right, which lowers the FFR in a corridor system

More reserves results in more money supply via the standard money multiplier argument

Hence, can think of lowering the FFR as equivalent to increasing the money supply

And vice-versa

Changes in Discount Rate

In corridor system, changes in the discount rate have no effect on the FFR

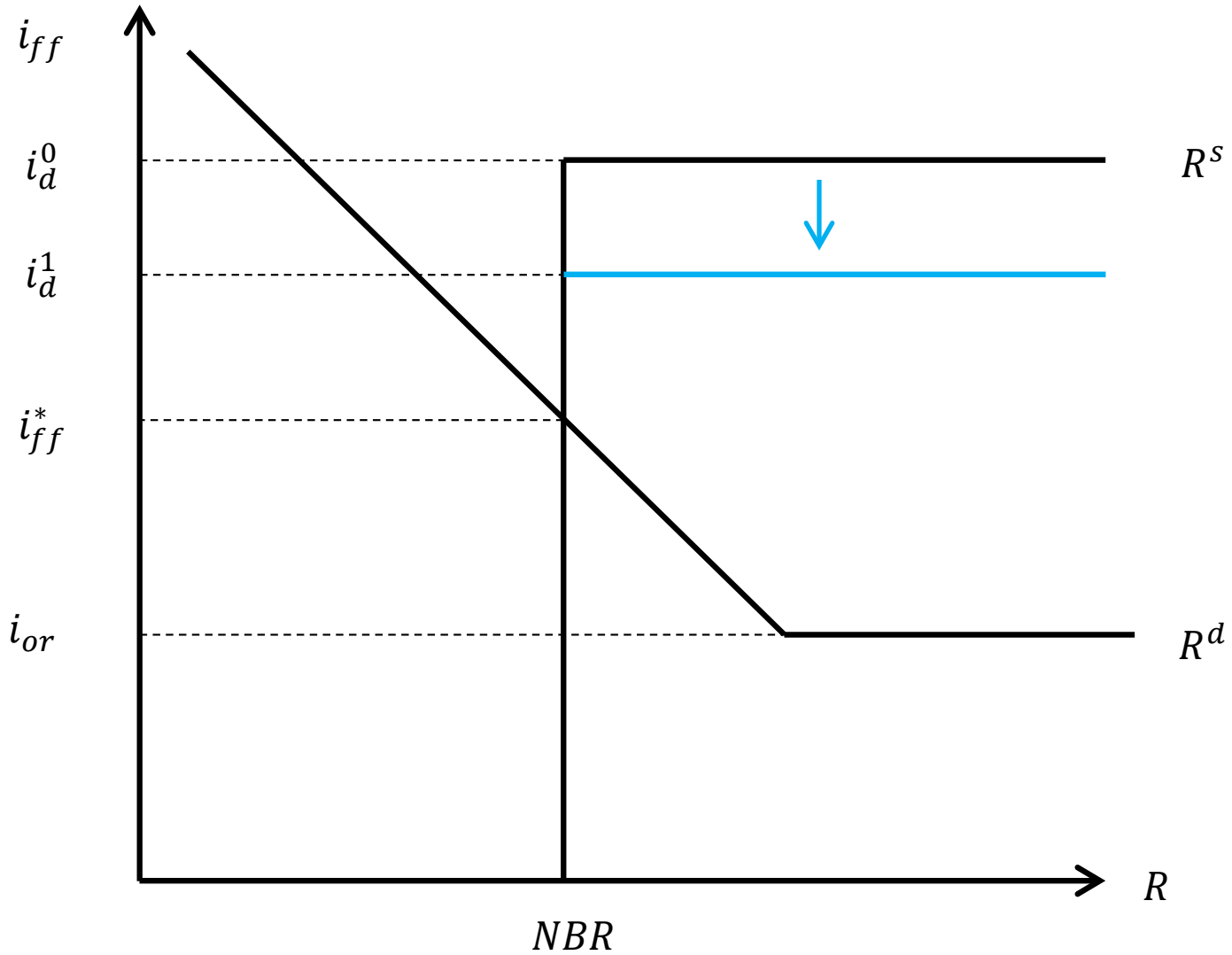
For example, a (sufficiently small) cut in the discount rate shifts the flat portion of the supply curve down, but this does not affect the FFR

But if demand intersects supply at the flat portion, a cut in the discount rate results in the FFR falling

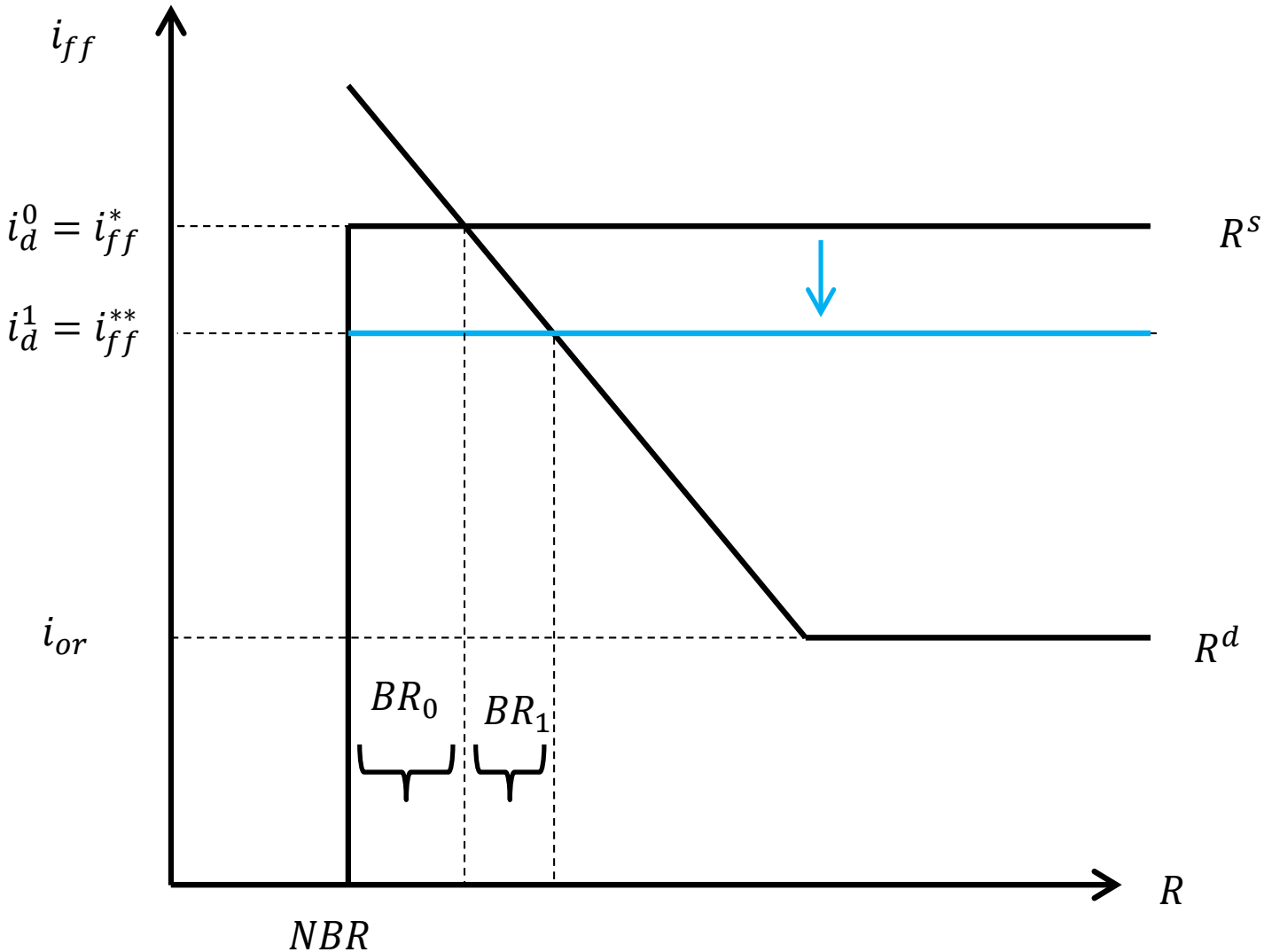
If $i_{ff} = i_d$, then there will be some borrowed reserves, BR

A cut in the discount rate will lead to an increase in borrowed reserves and therefore an increase in total reserves and an expansion in the money supply

"Non-Binding Cut" in Discount Rate



"Binding" Cut in Discount Rate



Changes in Required Reserve Ratio

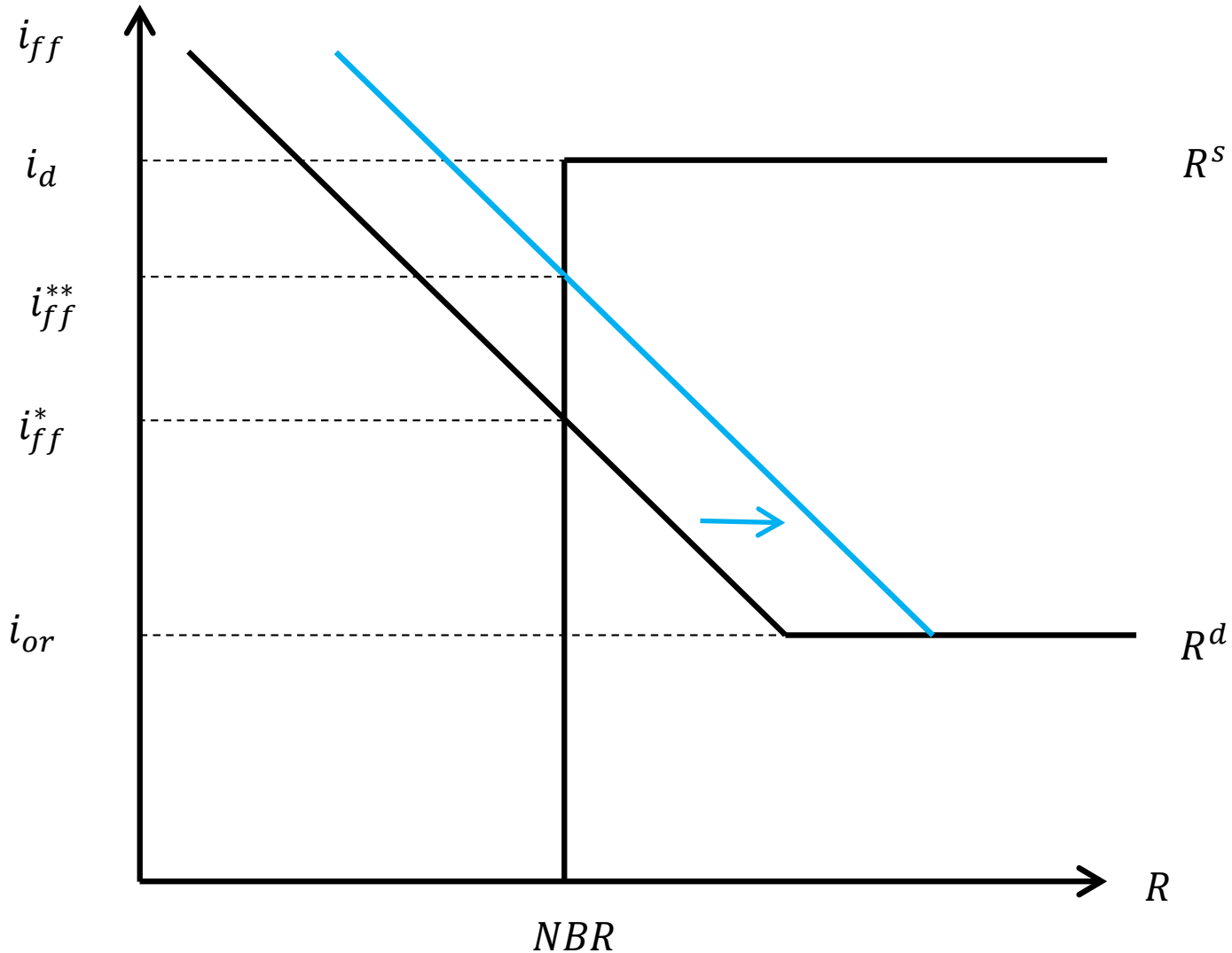
A higher reserve requirement means banks will want more reserves, other things being equal

Increase in the reserve requirement increases the demand for reserves

The rightward shift of the demand curve will result in the FFR rising

Though total reserves don't change (in corridor system), the money multiplier will be smaller, so the money supply falls

Increase in the Required Reserve Ratio



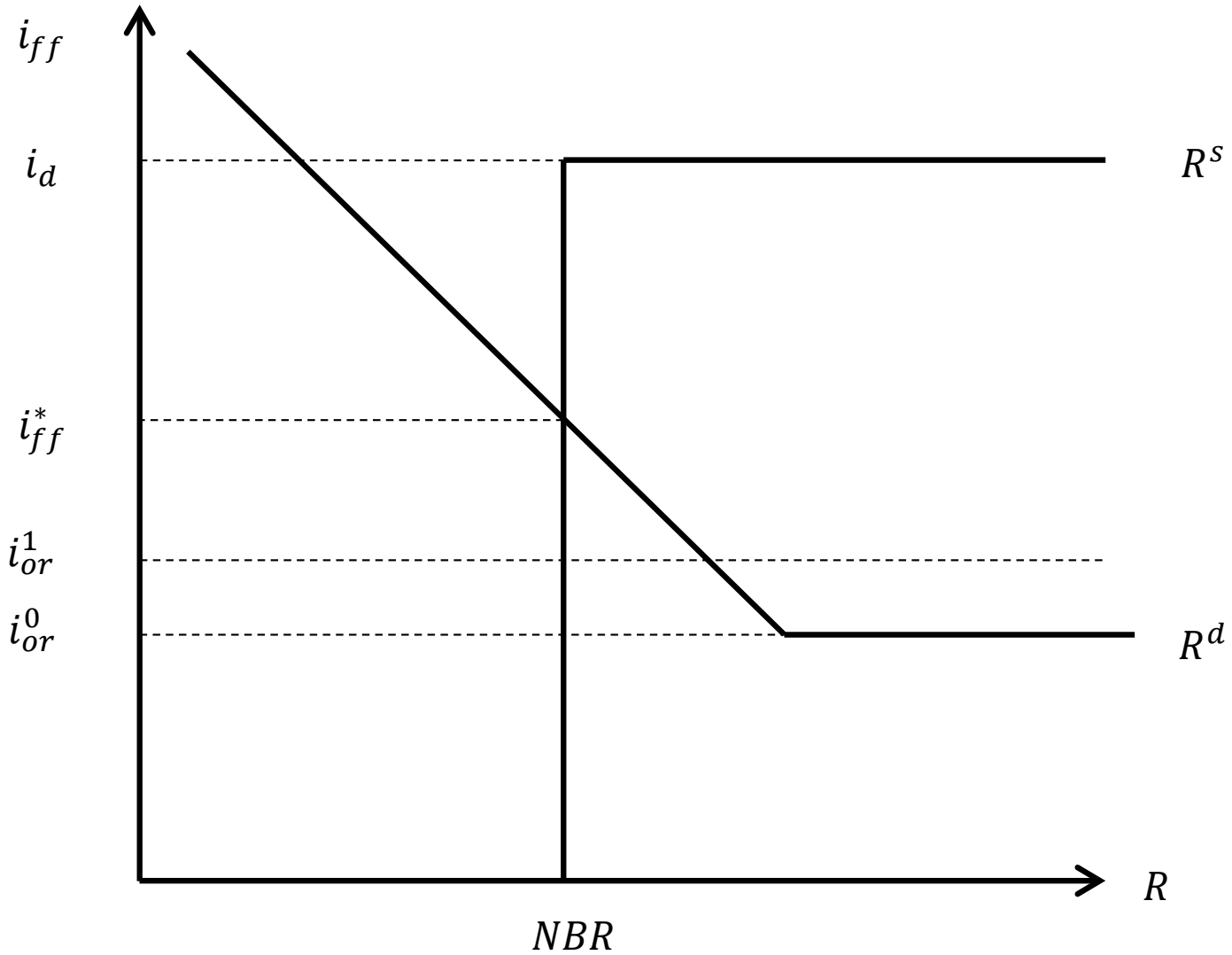
Changes in Interest on Reserves

In corridor system, increasing the interest on reserves does not affect the FFR

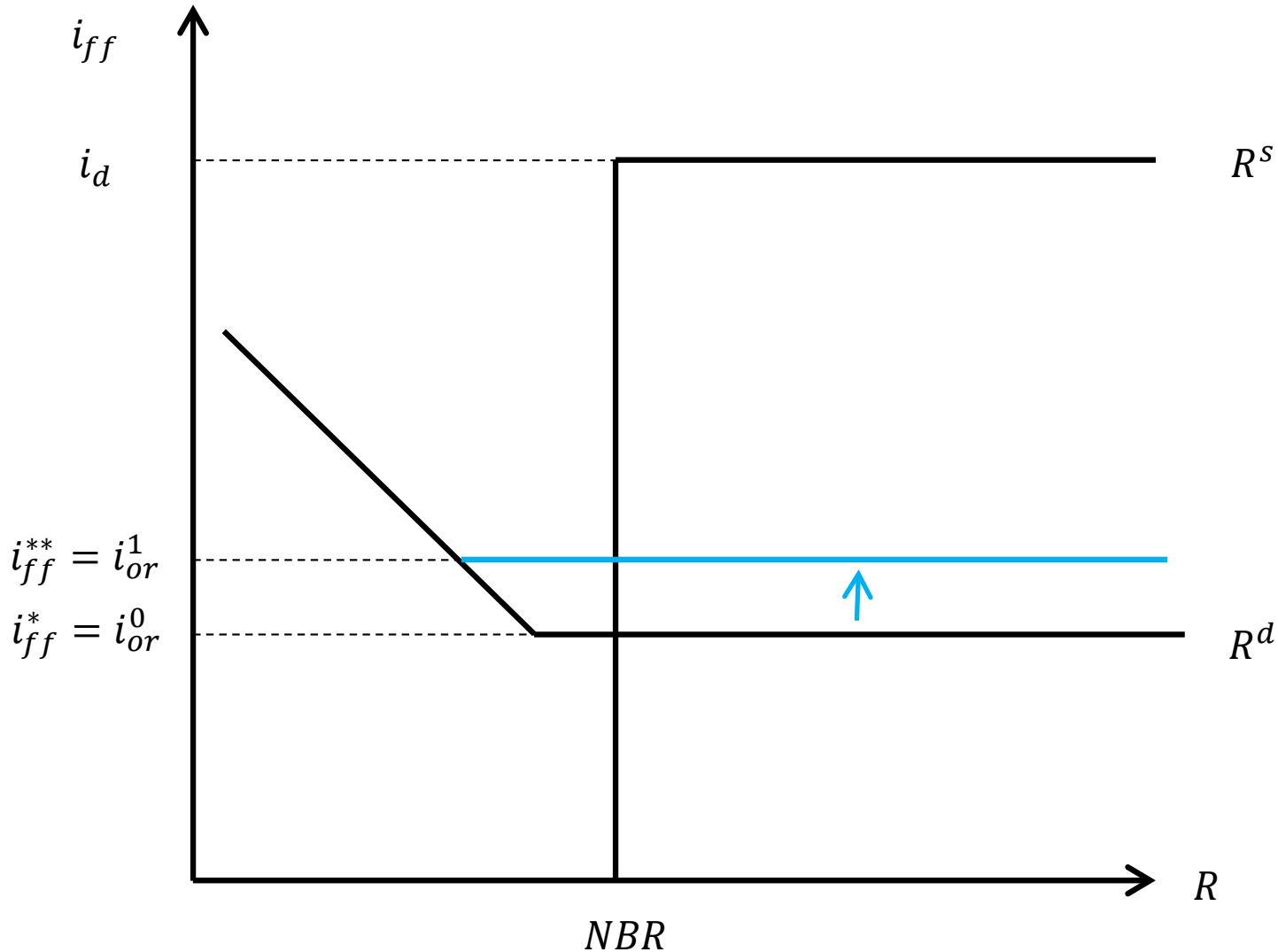
But if equilibrium initially occurs on the flat portion of the demand curve, an increase in the interest rate on reserves raises the FFR

Relevant for thinking about "post-crisis" monetary policy – reserves have been increased so much that equilibrium is now on the flat portion of the demand curve ("floor system")

"Non-Binding" Increase in Interest on Reserves



"Binding" Increase in Interest on Reserves



Target FFR on Interest on Reserves Post-Crisis

Summary: Tools of Managing Money Supply

In practice, Fed tends to target interest rates (the FFR) rather than monetary aggregates (M1 or M2)

1. Open market operations
2. Required reserve ratio
3. Discount rate
4. Interest on reserves

These move the money supply and FFR in opposite directions – (1)-(3) by changing monetary base (reserve supply), (2)-(4) by impacting multiplier (reserve demand)

"Expansionary" monetary policy: raising money supply / cutting FFR