Changes in Fed Tools: Classroom Implications

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Outline

Introduction

- Fed tools changed in Great Recession
- How can we adapt the changes in the classroom?
- New regime of ample or abundant reserves
- Open-market operations have different effects than before
- Daily model of reserves market
- Danger: students misled about longer-run implications of Fed policy decisions
- How to combine short-run and long-run models of Fed policy actions?

Historical developments

- Key changes to monetary policy presentations over time in textbooks
- money demand vs supply
- interest-rate targeting
- quantitative easing and tightening

Historical developments

- money demand became less predictable in 1990s, so Fed switched to targeting interest rates
- led to interest-rate based models, equilibrium real-interest rate models, Taylor rule
- danger of not recognizing shifts in equilibrium real interest rate

Reserves market diagram before 2003

- Reserves market prior to 2003
- Scarce reserves
- Discount rate below fed funds rate target
- Fed daily meeting to forecast demand curve that day and move supply to hit interest-rate target
- Historical reference: bank reserves at Fed between 1975 and 2003 peak at $39 billion in 1988, except for 9/11 effect for two weeks when they are larger
- Graph reference: Mugel (1985)

Reserves market diagram before 2003

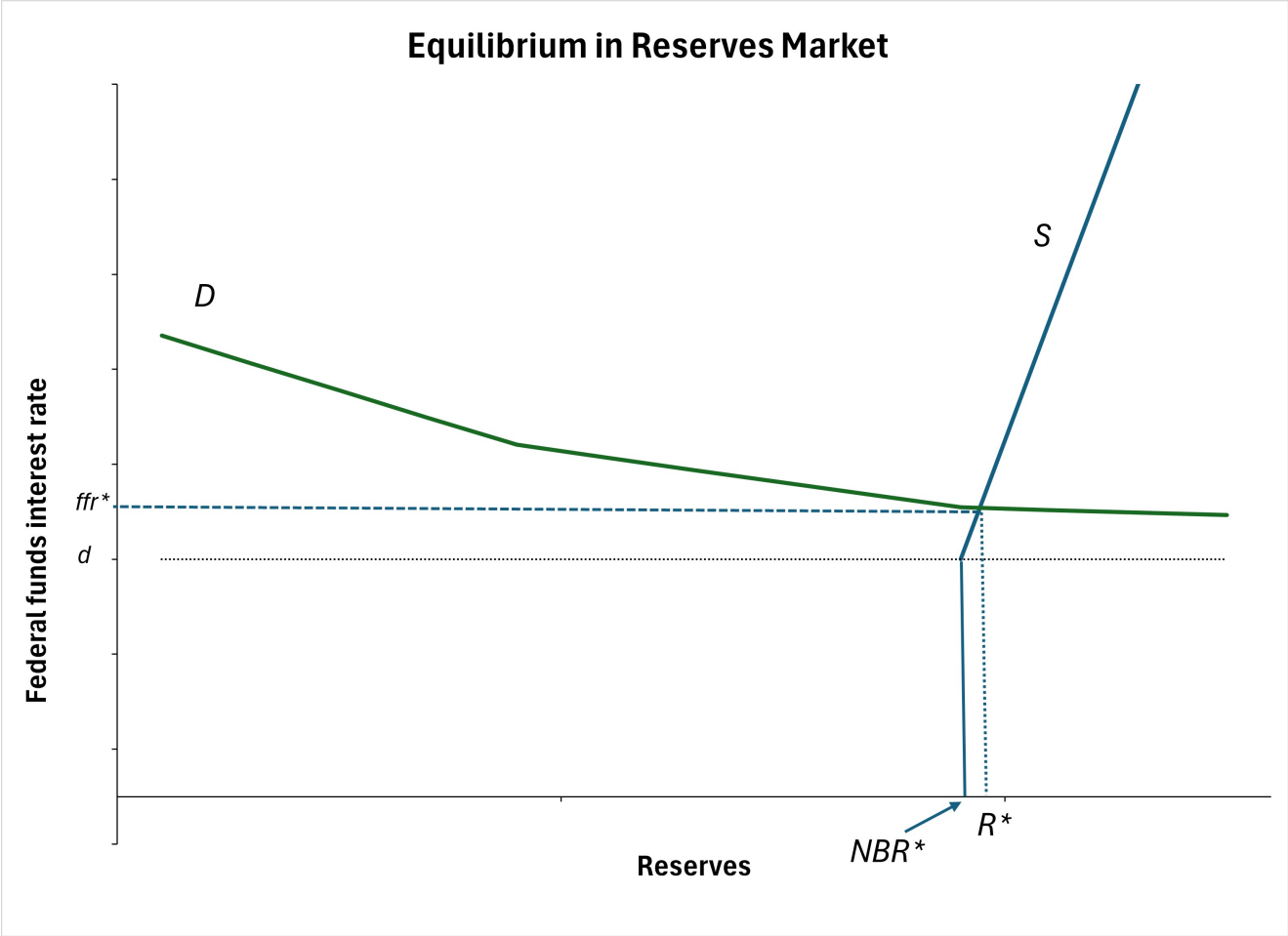

Figure: Equilibrium in Reserves Market Before 2003

Reserves market diagram before 2003

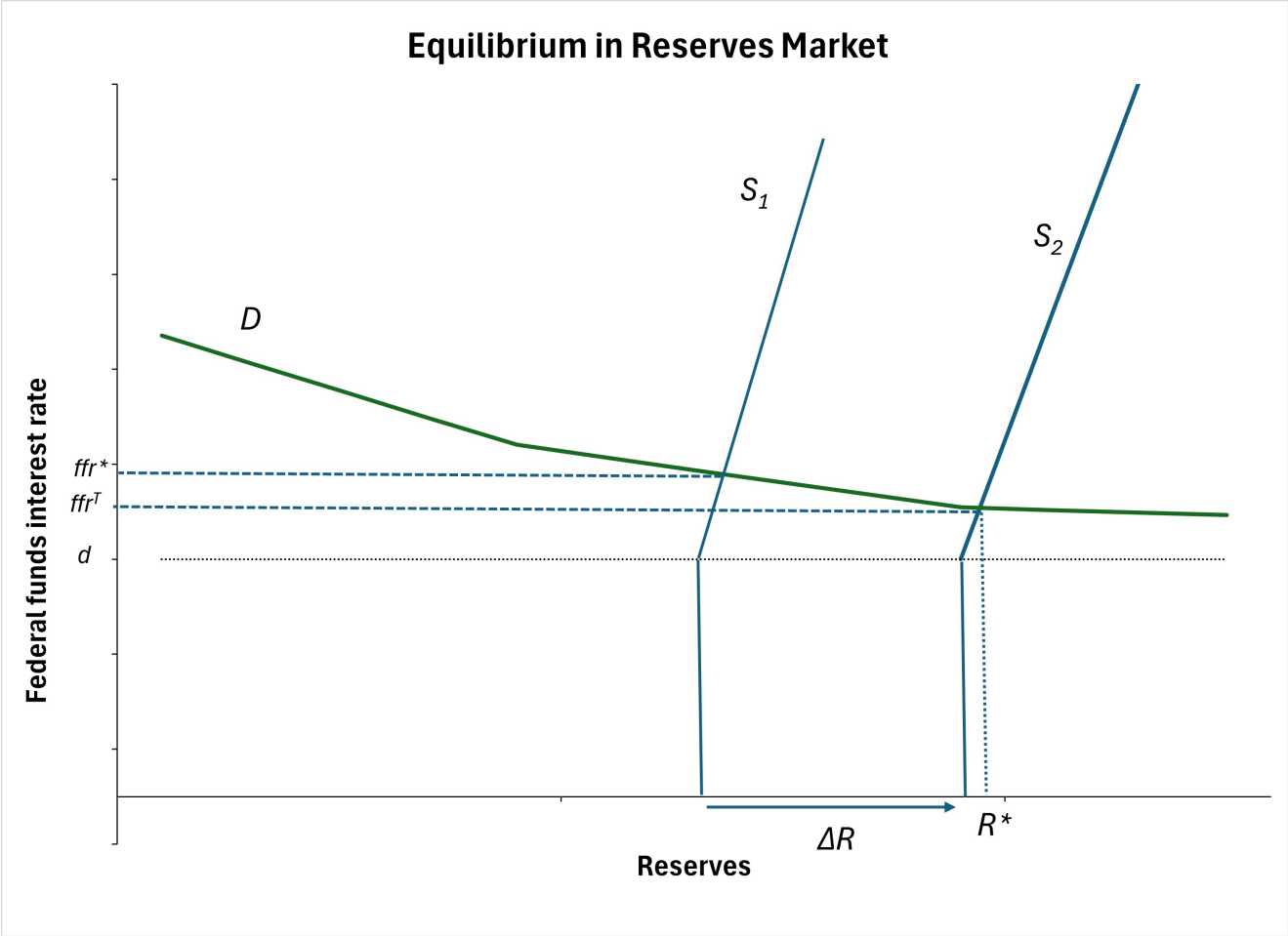

Figure: Add Need in Reserves Market Before 2003

Reserves market diagram before 2003

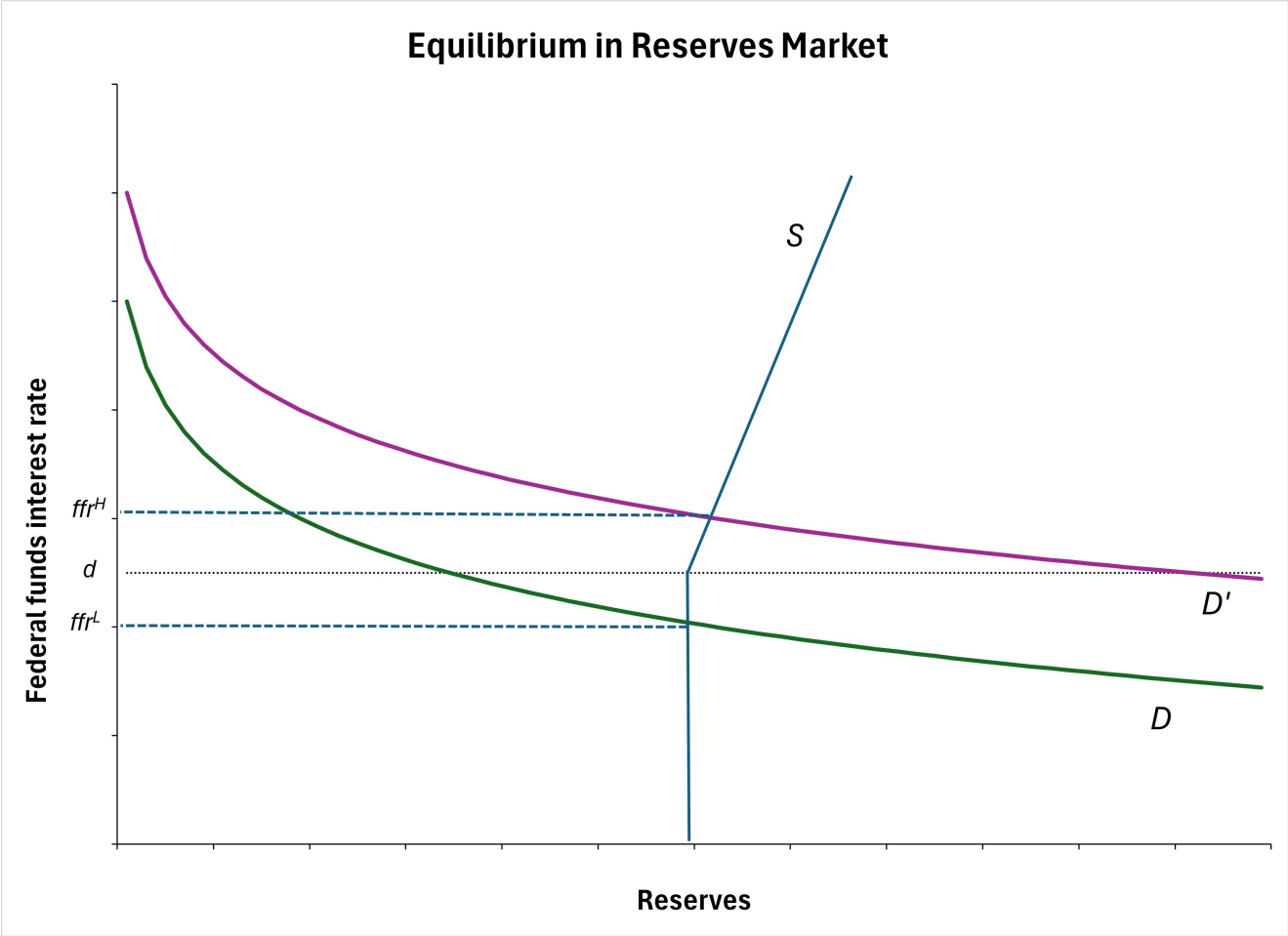

Figure: Volatility of Fed Funds Rate in Reserves Market Before 2003

Reserves market diagram from 2003 to 2008

- Fed concerned about volatility of fed funds rate with very scarce reserves
- Historical reference: bank reserves at Fed vary from \$6.5 billion to \$16.8 billion from 2003 to late 2007
- Discount rate above fed funds rate, large banks encouraged to borrow at discount window to put ceiling on fed funds rate
- Costs of using discount window reduced to put horizontal kink in supply curve

Reserves market diagram from 2003 to 2008

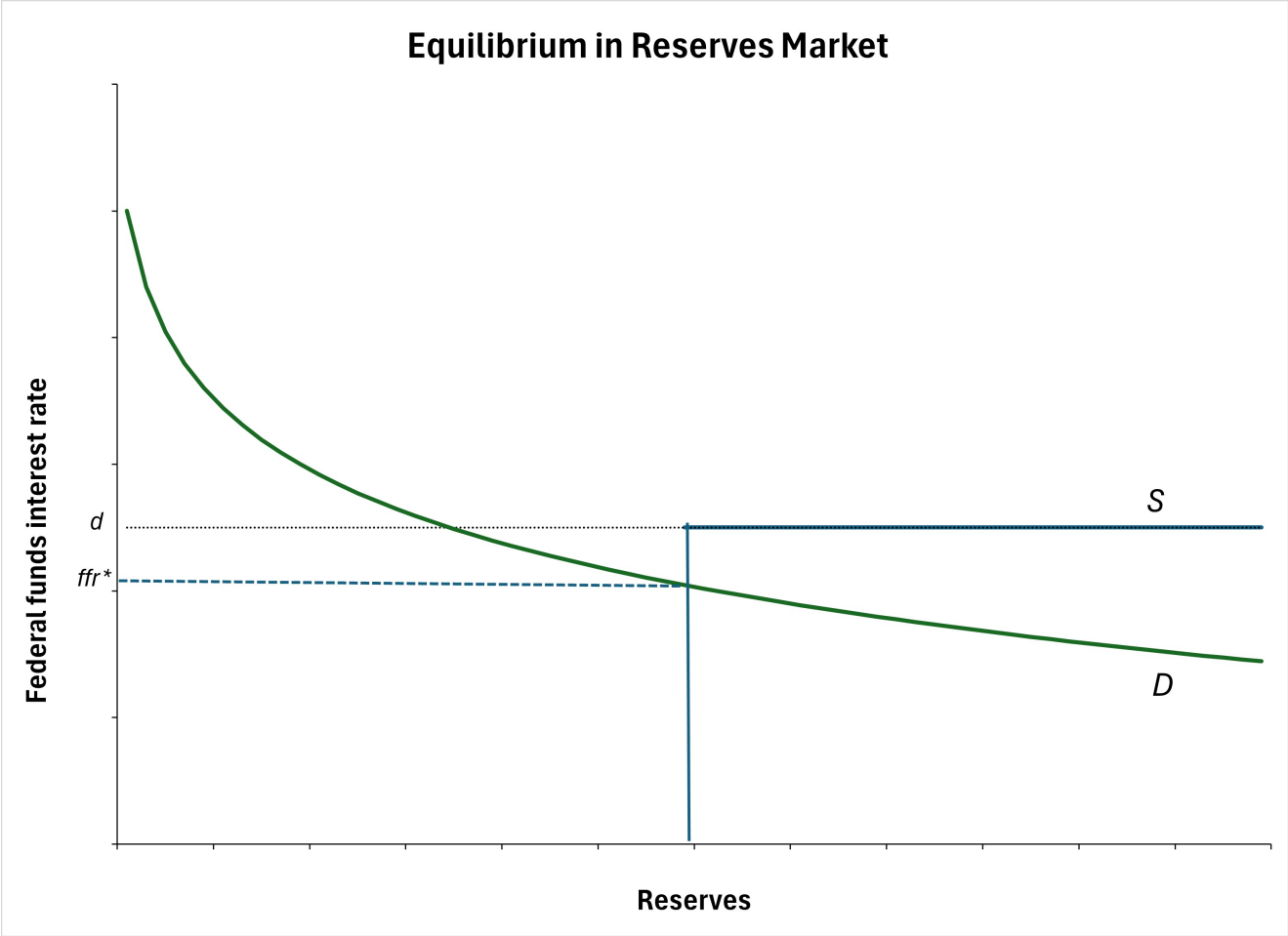

Figure: Equilibrium in Reserves Market 2003 to 2008

Reserves market diagram from 2003 to 2008

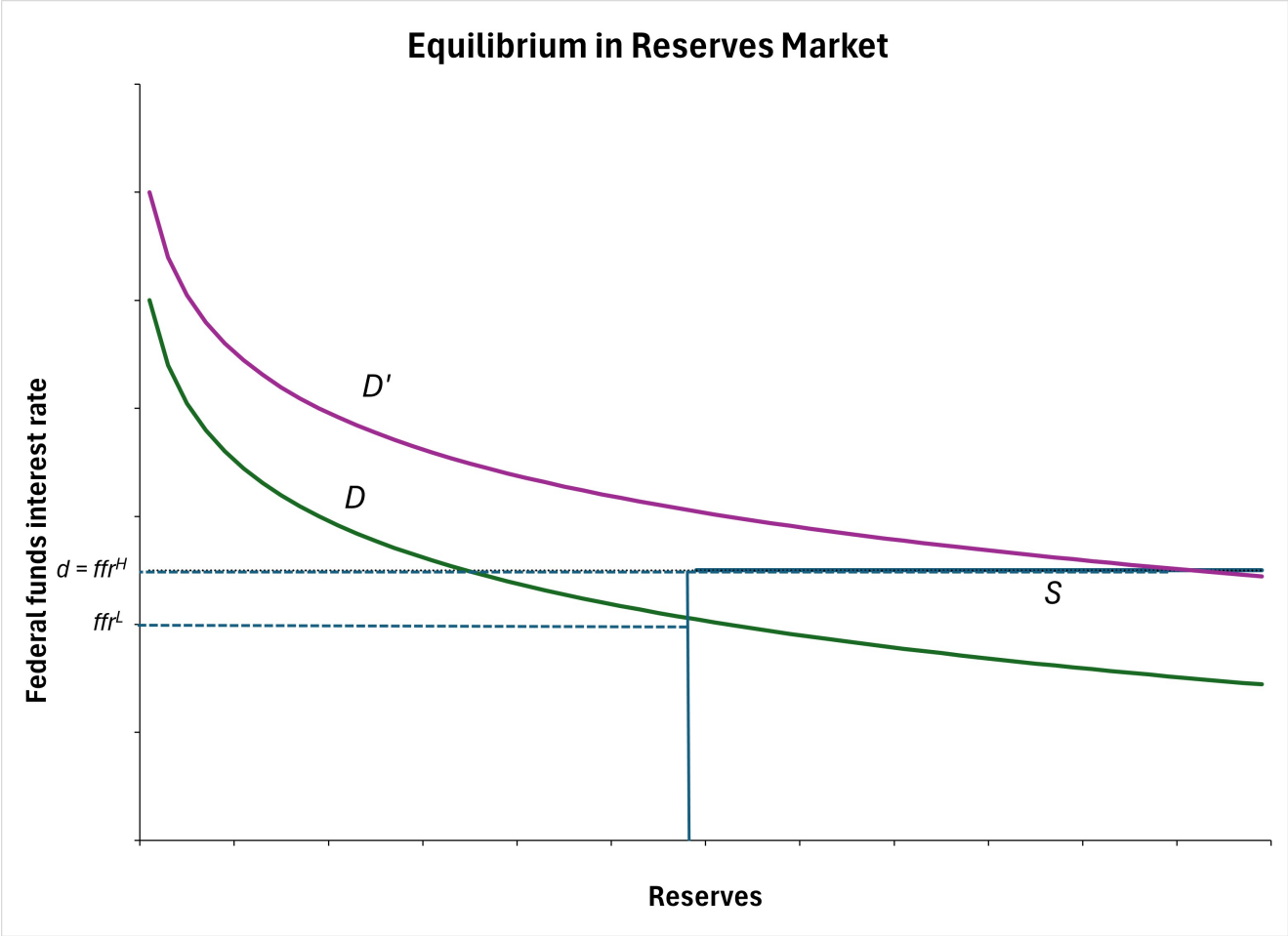

Figure: Volatility of Fed Funds Rate in Reserves Market 2003 to 2008

Reserves-market diagram after Great Recession

- Great Recession: Fed drives interest rates to zero and begins quantitative easing
- Requires return to modeling quantities not interest rates
- But how to change model if changes in monetary base have no effect on interest rates?
- Historical reference: bank reserves at Fed are only \$9 billion in early 2008 but finish year at \$816 billion

Reserves-market diagram after Great Recession

- Initially, the Fed reduced the interest rate on reserve balances and the discount rate
- Reserves initially remained scarce

Lowering the Fed Funds Rate 2003 to 2008

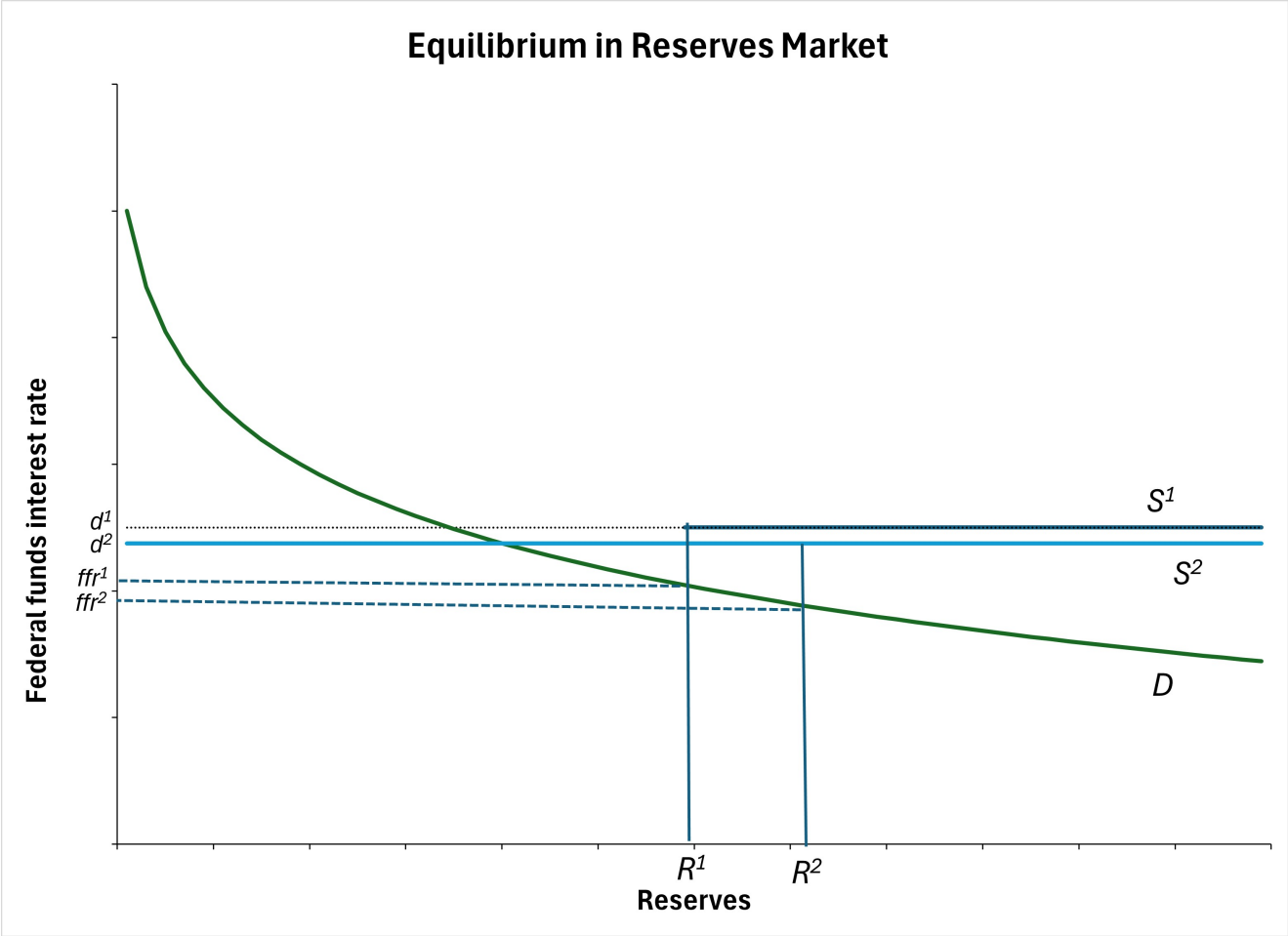

Figure: Lowering the Fed Funds Rate 2003 to 2008

Reserves-market diagram after Great Recession

- Recession turns into full-blown financial crisis in 2008
- Fed begins paying interest on reserves on October 1, 2008
- IORB becomes lower bound for demand curve (if ffr $<$ IORB, banks borrow at ffr, hold reserves to earn arbitrage profit)
- Fed moves to abundant-reserves regime with fed funds rate equal to IORB near zero

Fed Funds Rate Near Zero in Great Recession

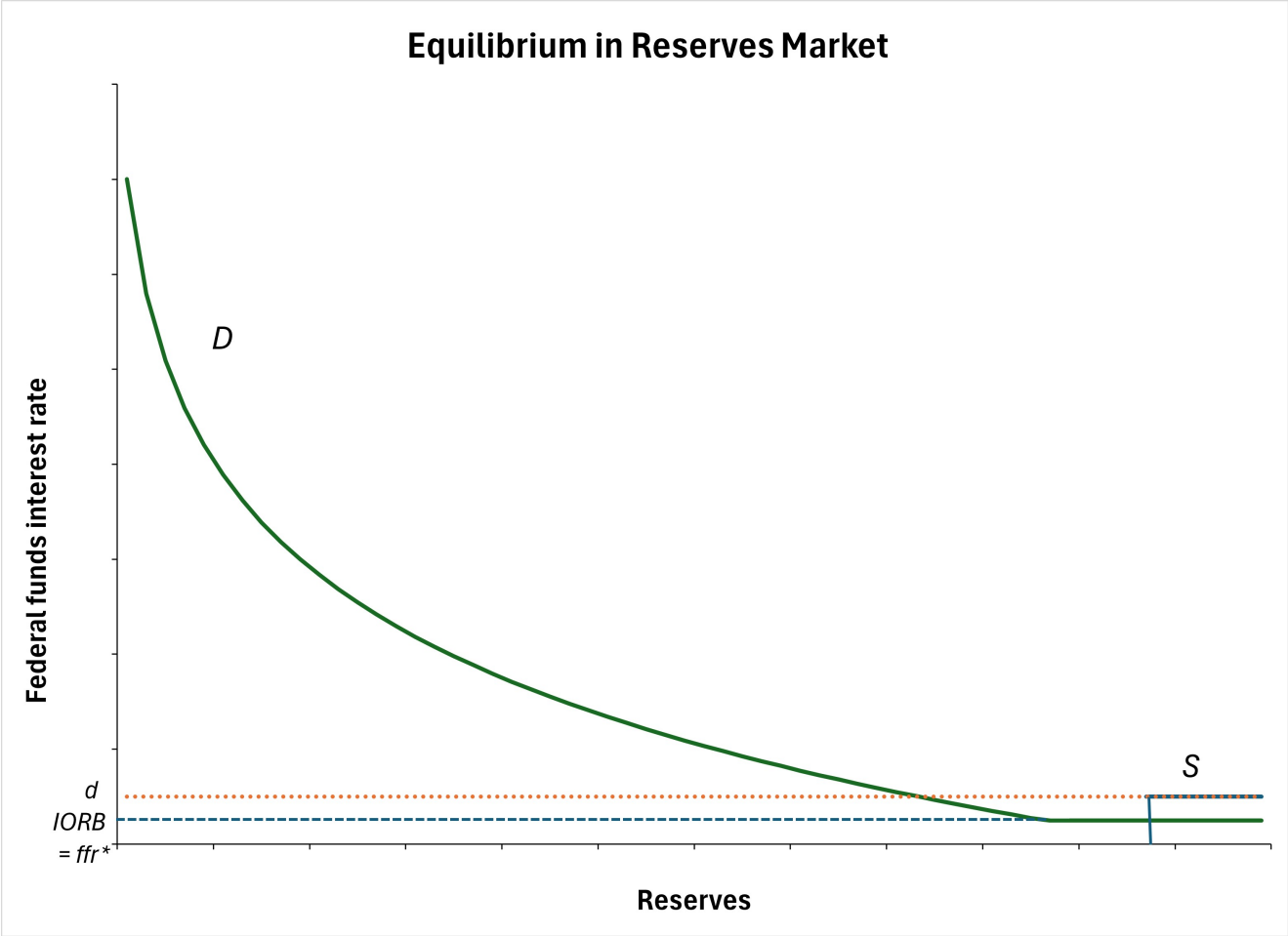

Figure: Fed Funds Rate Near Zero in Great Recession

Reserves-market diagram after Great Recession

- Fed uses many other tools, including forward guidance and many lending programs
- Fed keeps fed funds rate target near zero from late 2008 to late 2015

The Federal Funds Interest Rate Since 1990

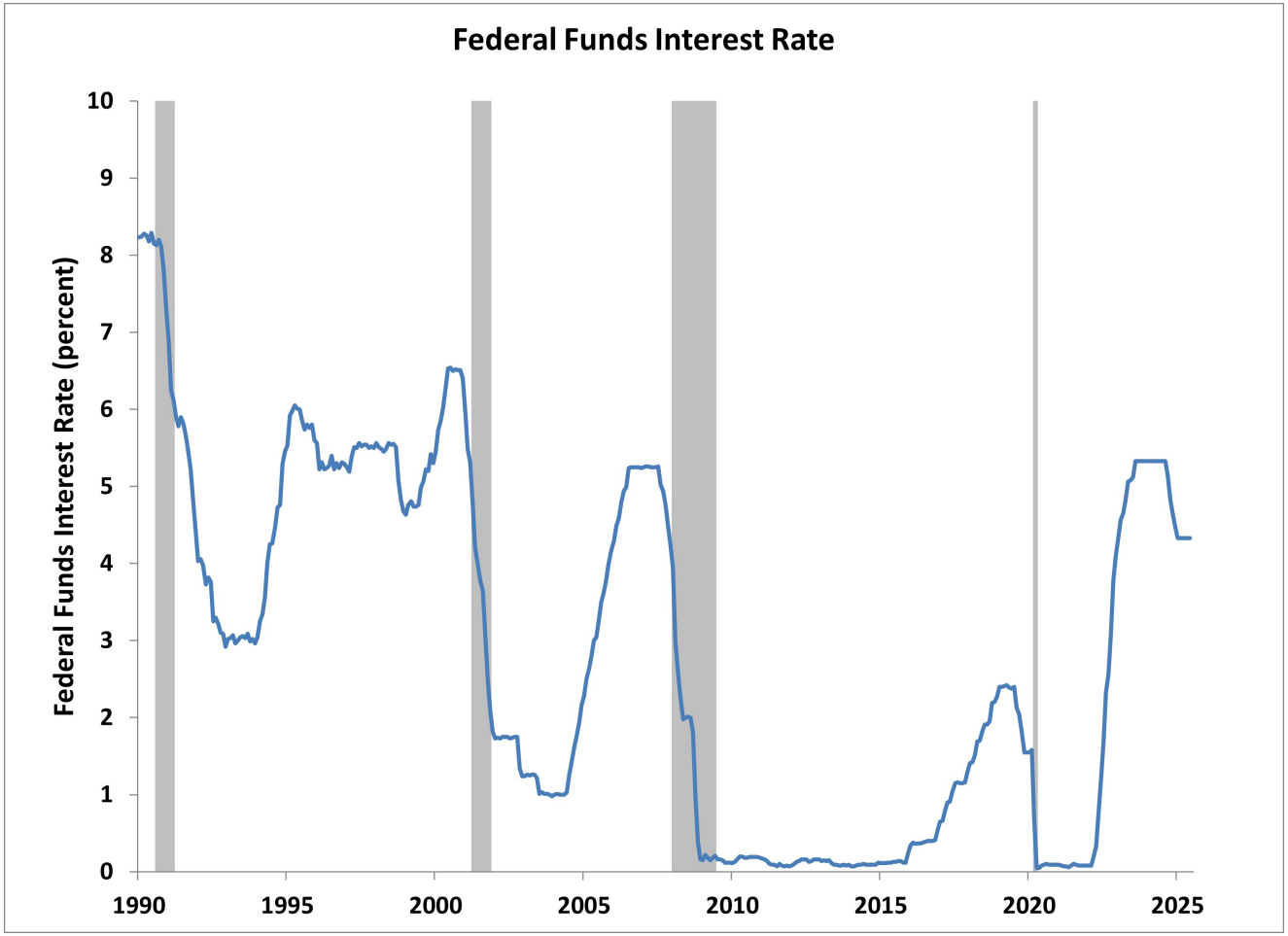

Figure: The Federal Funds Interest Rate Since 1990

Reserves-market diagram after Great Recession

- Fed stimulates economy further with LSAPs (QE) and MEP (Operation Twist)
- Fed asset level reaches $4.5 trillion in early 2015

The Federal Reserve's Asset Holdings Since 2003

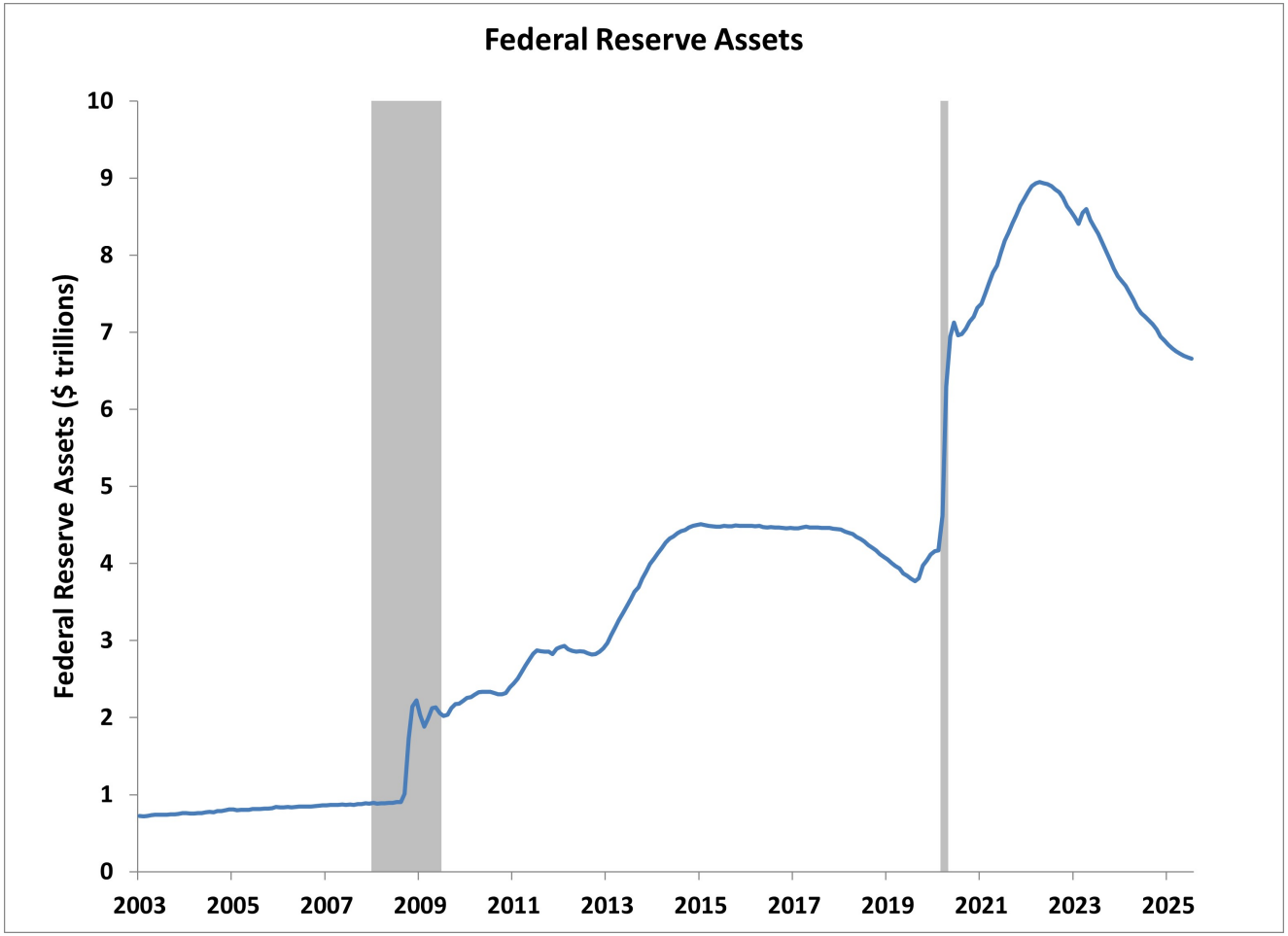

Figure: The Federal Reserve's Asset Holdings Since 2003

Abundant Reserves

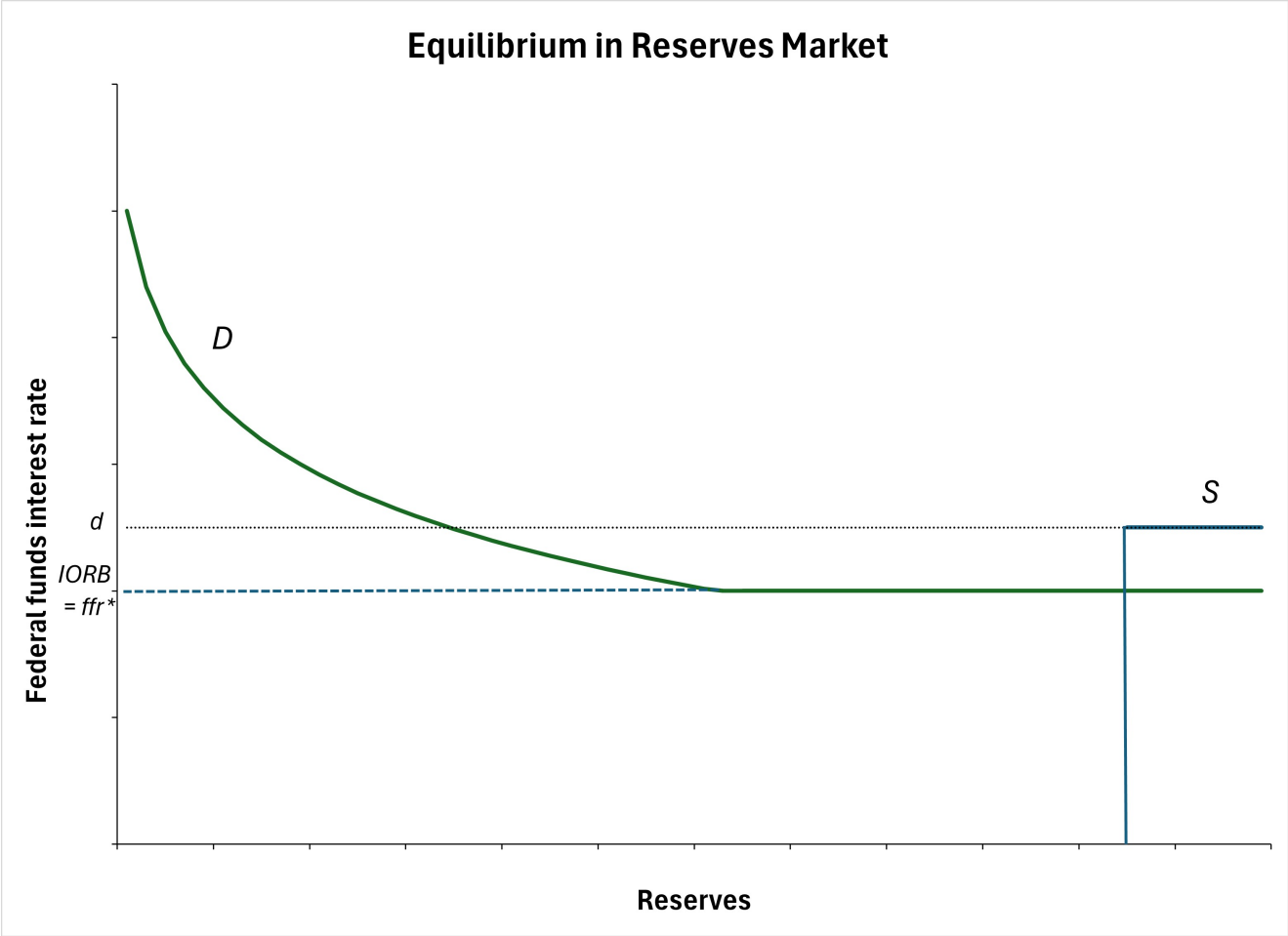

Figure: Abundant Reserves

Monetary policy with abundant reserves

- Change in S does not affect *ffr*
- To raise *ffr*, must raise *IORB*, usually raising d at same time

Abundant Reserves–Alternative Treatment of Discount Rate

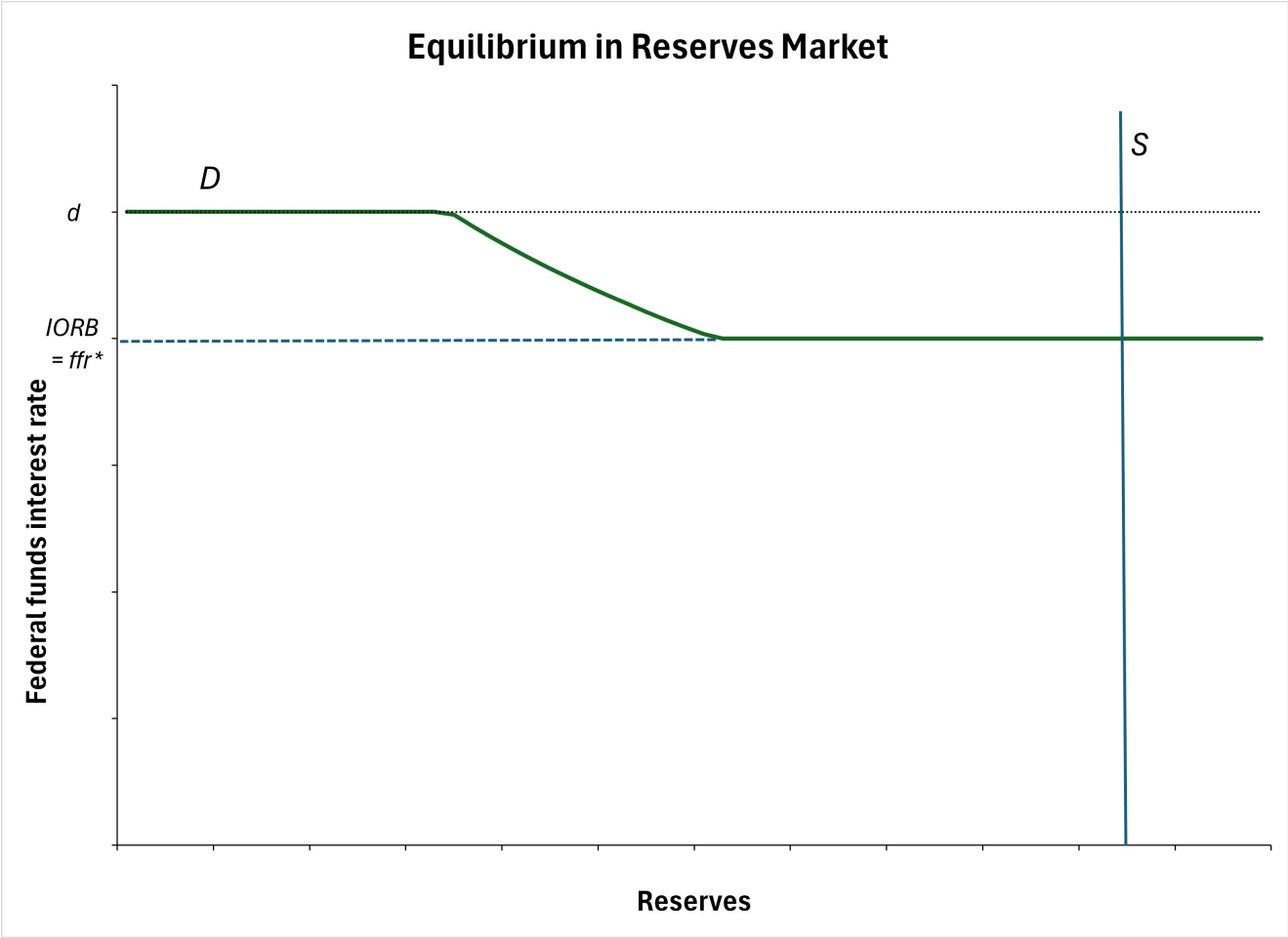

Figure: Abundant Reserves

Aftermath of Great Recession

- Abundant versus ample reserves
- Abundant: S intersects D on flat part of demand curve
- Ample: S intersects D on slightly sloped part of demand curve
- Fed quantitative tightening and raising fed funds target 2016 to 2019
- Fed moves from abundant reserves regime to ample reserves regime

Ample Reserves

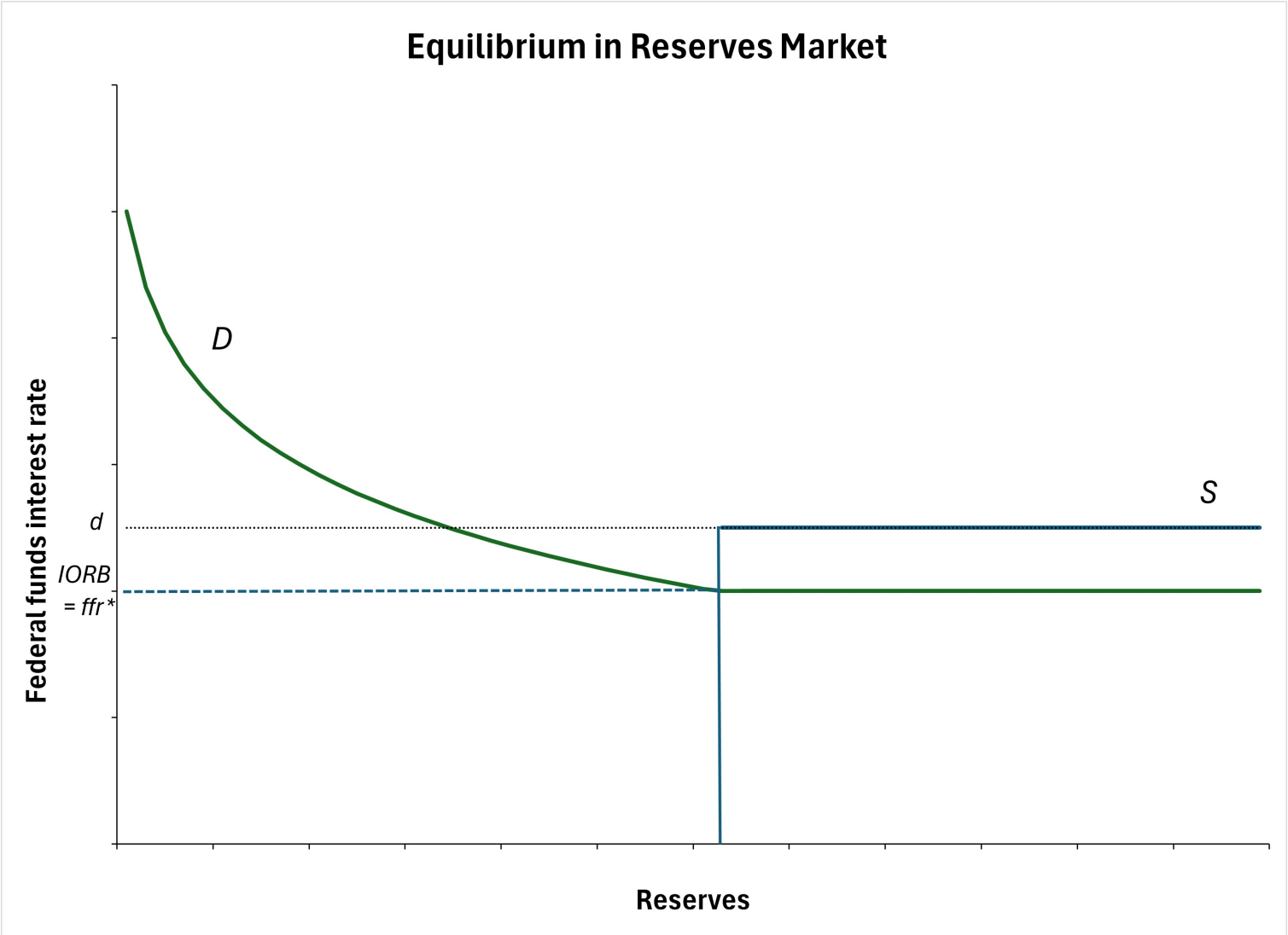

Figure: Ample Reserves

Reserves Market Complications

- Complications: non-bank lenders in reserves market
- They (FHLBBs, MMMFs) can lend in fed funds market but can't earn interest on reserves held at Fed
- Is it worth bringing up with students?

Reserves Market Complications

- Complications: Fed actions in repo markets to put floor and ceiling on fed funds rate
- ON RRP, ON RP markets
- Is it worth bringing up with students?

Long-run model

- But what developments occur in model that make short-run model inadequate?
- Examples: fiscal policy, structural shocks, that change equilibrium real short-term interest rate
- Fundamental model of current real short-term interest rate versus equilibrium real short-term interest rate

Long-run model

- Do students get it?
- Do policymakers get it?
- Evidently not in 2021, leading to high inflation

Long-run model

- Return to fundamentals
- IS-LM-FE model when shocks hit LM curve
- Then targeting interest rate works well

Interest-rate targeting

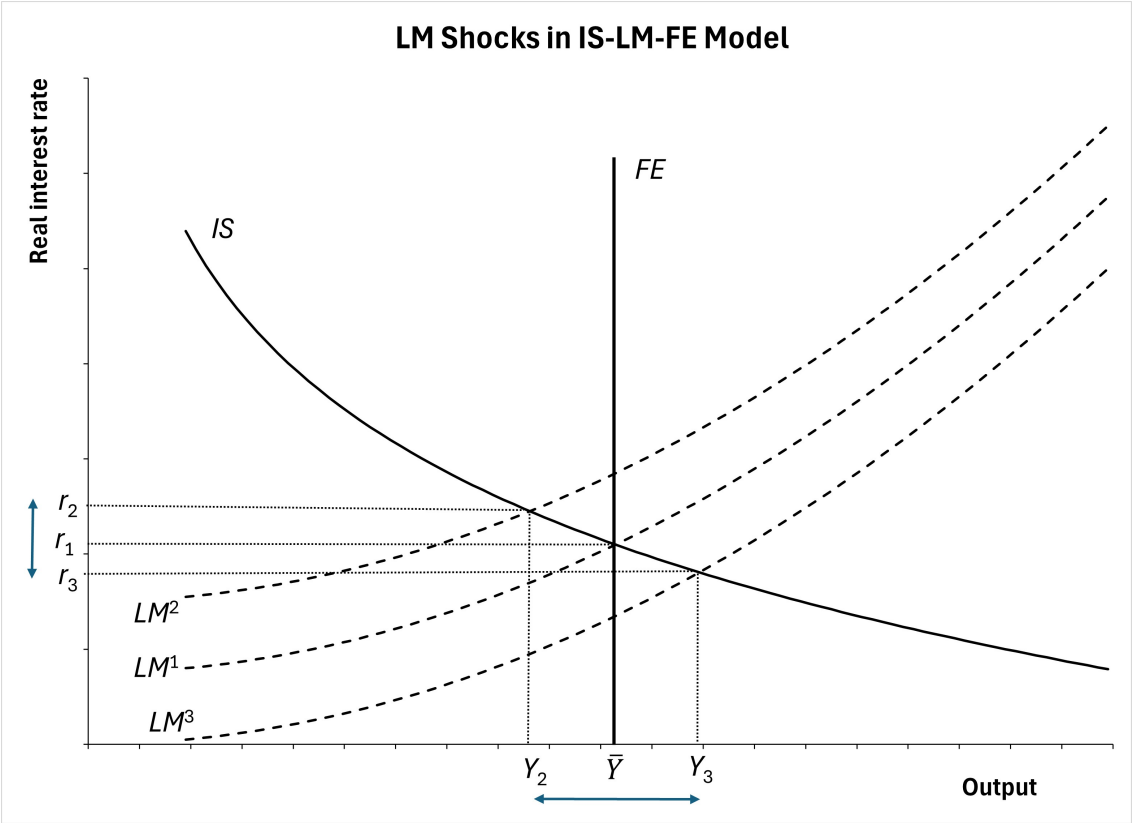

Figure: Interest-rate targeting with *LM* shock; from Abel-Bernanke-Croushore *Macroeconomics* Figure 14.5

Interest-rate targeting

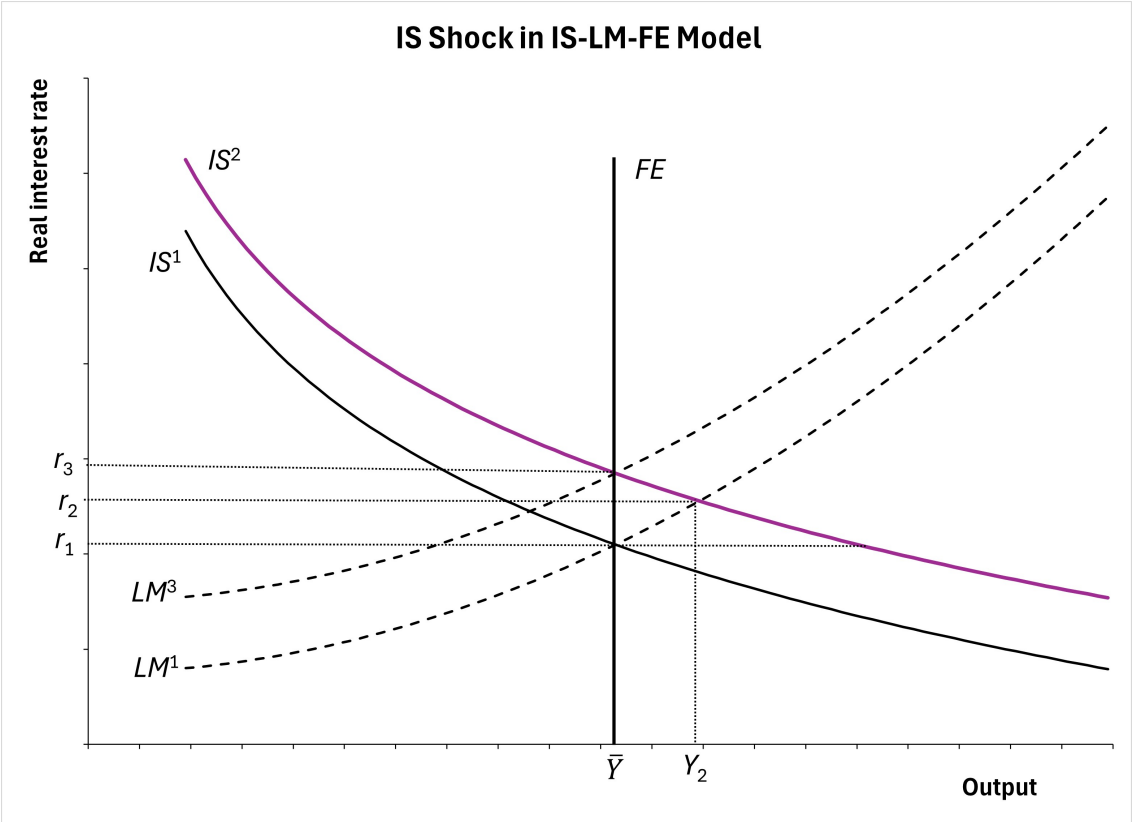

Figure: Interest-rate targeting with *IS* shock; from Abel-Bernanke-Croushore *Macroeconomics* Figure 14.6

Interest-rate targeting

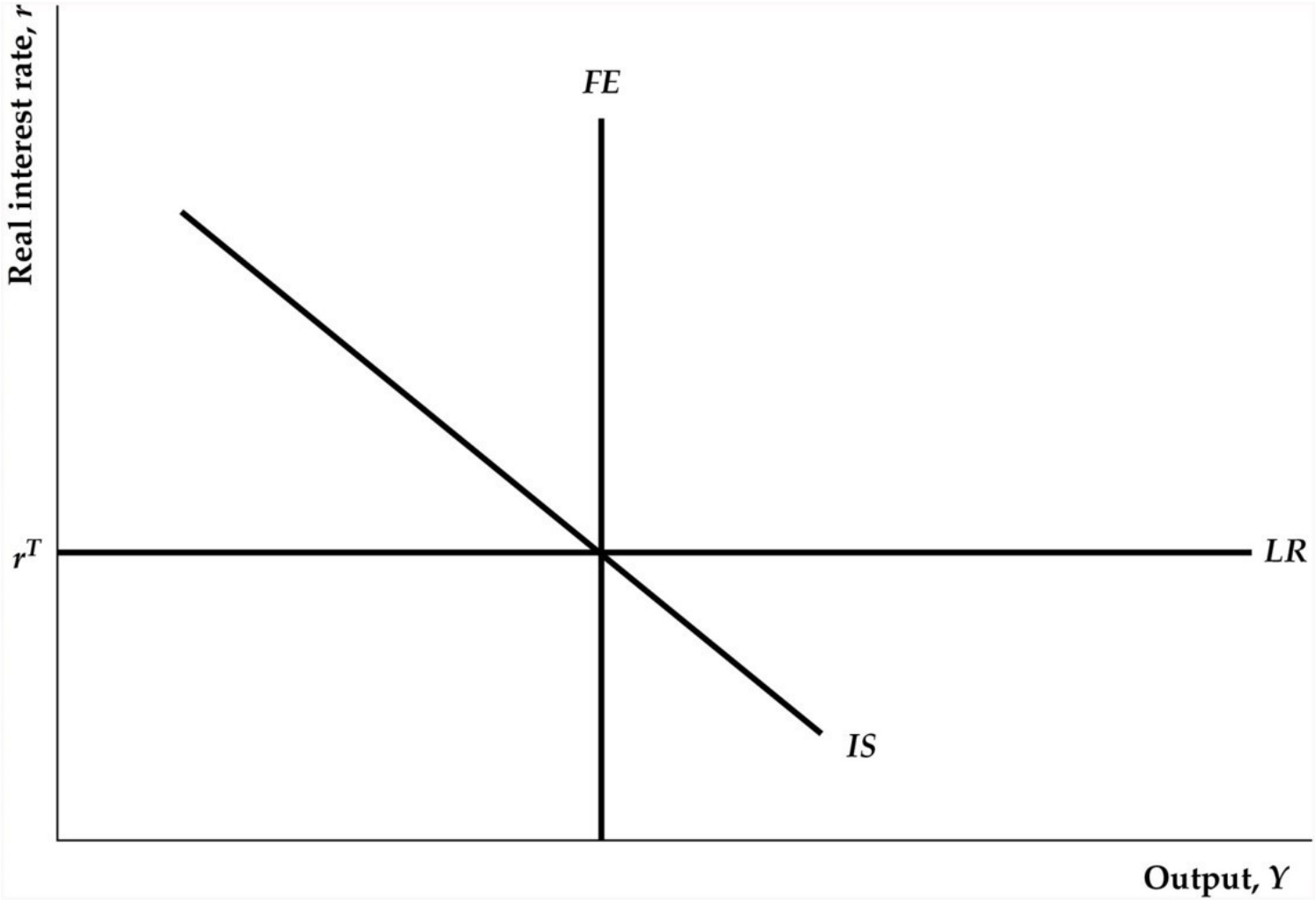

Figure: Interest-rate targeting with *LR* curve; from Abel-Bernanke-Croushore *Macroeconomics* Figure 14.7

Combining Short-Run Model and Long-Run Model

- Equilibrium real fed funds interest rate
- Issue: how to calculate in real time

Combining Short-Run Model and Long-Run Model

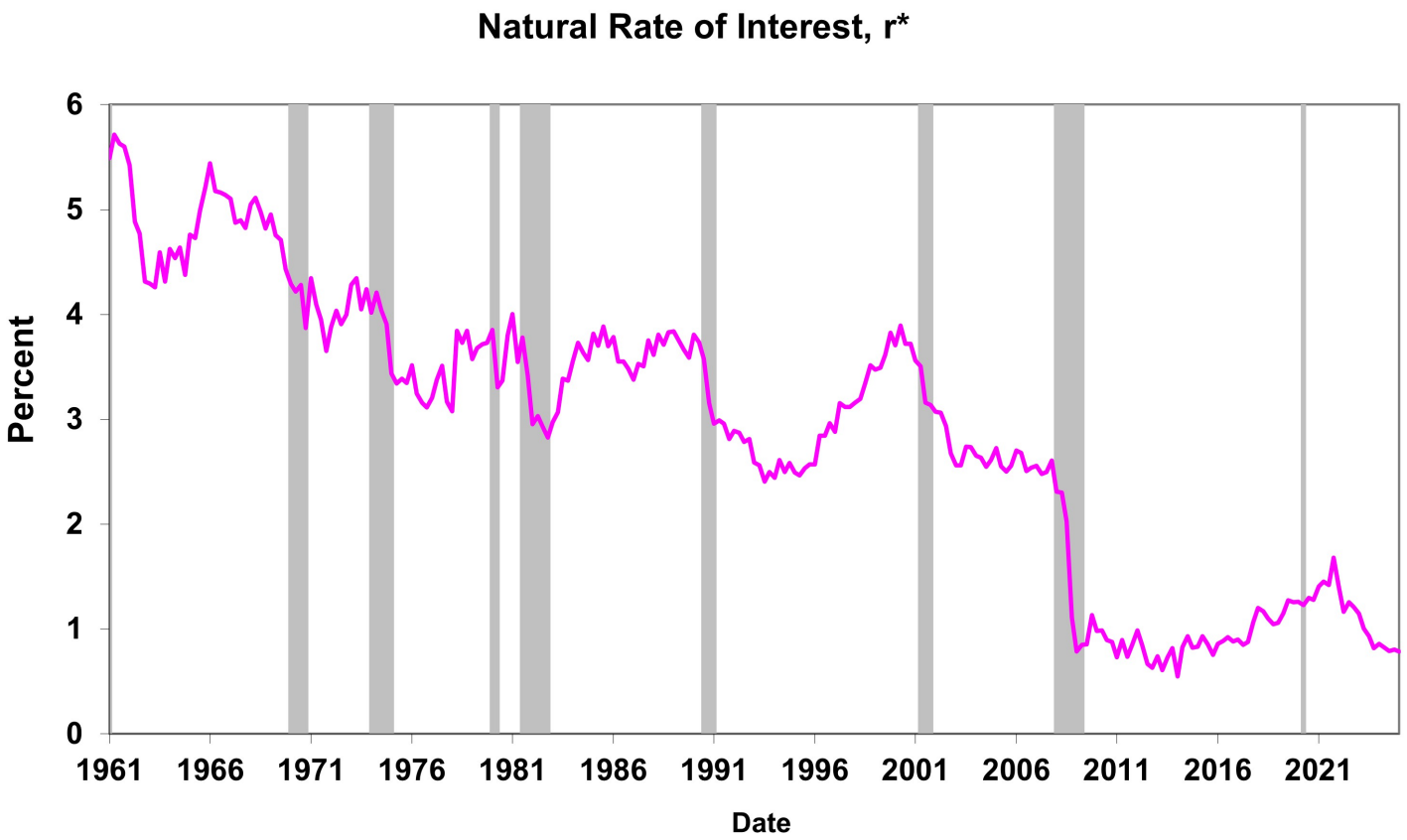

Figure: Holston-Laubach-Williams r*

Summary and Conclusions

- Historical development of short-term model of fed-funds rate model
- Monetary policy issue of scarce versus abundant versus ample reserves
- Bigger issue is long-run one of adjusting interest-rate target in response to shock
- Danger for students is missing the long-run forest (of interest-rate determination) for the short-run trees