The Global Economy

Monetary Policy
Tonight’s questions

1. What are the objectives of monetary policy?

2. In practice, how does the Fed try to accomplish those objectives?

3. What are the long–run effects of monetary policy?

4. What are the short–run effects of monetary policy?
Objectives of Monetary Policy
Objectives of Monetary Policy – United States

Federal Reserve Act of 1913 The Board of Governors of the Federal Reserve System and the Federal Open Market Committee shall maintain long run growth of the monetary and credit aggregates commensurate with the economy’s long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long–term interest rates.

SECTION 2A - Monetary Policy Objectives
Statute of the ESCB/ECB, 1992 In accordance with Article 105(1) of this Treaty, the primary objective of the ESCB shall be to maintain price stability. Without prejudice to the objective of price stability, it shall support the general economic policies in the Community [now Union] with a view to contributing to the achievement of the objectives of the Community as laid down in Article 2 of this Treaty...
Objectives of Monetary Policy – United Kingdom

BoE Monetary Policy Framework The Bank’s monetary policy objective is to deliver price stability – low inflation – and, subject to that, to support the Government’s economic objectives including those for growth and employment. Price stability is defined by the Government’s inflation target of 2%... The Government’s inflation target is announced each year by the Chancellor of the Exchequer in the annual Budget statement.

www.bankofengland.co.uk
Effects of money growth in the long run
Budget Constraints

- Central Bank’s budget constraint:

\[ B_{t+1}^{CB} - B_t^{CB} = i_t B_t^{CB} + [H_{t+1} - H_t] \]

- Recall the government’s budget constraint:

\[ B_{t+1} - B_t = G_t + V_t + i_t B_t - T_t \]

- The consolidated public sector’s constraint:

\[ [B_{t+1}^{NB} - B_t^{NB}] + [H_{t+1} - H_t] = G_t + V_t + i_t B_t^{NB} - T_t \]
Notation

$B_t$ Treasury bonds outstanding

$B_{t}^{CB}$ Treasury bonds in the central bank’s portfolio

$B_{t}^{NB}$ Treasury bonds in the hands of the public (everybody else but the central bank)

$H_t$ Monetary base
Wall Street Journal Remittances from the Federal Reserve to the Treasury Department fell to $92 billion last year, the U.S. central bank said Tuesday, a long-anticipated decline that officials have said was likely once interest rates start to rise. In total, the Feds net income declined by $7.6 billion last year to $92.7 billion, primarily as a result of higher interest payments it made to banks on the reserves they park at the central bank. Those payments increased by $5.2 billion last year. The Fed also earned $2.5 billion less in interest income as a result of changes in the composition of securities held in its System Open Market Account.

... The payments are likely to continue to shrink in the coming years as the Fed raises short-term interest ratesa process that involves paying banks higher interest in reserves they keep at the Fedand when it eventually shrinks its balance sheet.

The Fed also said it sent no money to its surplus account due to new limitations under the 2015 federal highway bill, which capped the Feds surplus at $10 billion.

January 10, 2017
Seigniorage as pct of GDP
Average over 2001–2015

Source: IMF
The Quantity Theory of Money

- Recall that we postulated a demand for money
  \[ M^d = P \times f(Y, i) \]

- The Quantity Theory of Money assumes that
  \[ f(Y, i) = \frac{1}{V} \times Y, \]
  with \( V = \) velocity, a constant

- Then, the equilibrium of the market for money calls for
  \[ MV = PY \]

- Taking logarithms: \( \gamma_M - \gamma_Y = \pi \)

- The growth rate in money supply in excess of the growth rate in real GDP equals the inflation rate
United States – The Quantity Theory in the Long Run

Series in Logarithms

Source: Federal Reserve and Bureau of Labor Statistics
Daily Mail  *Runaway inflation* in Venezuela has reached the point where bank notes are being weighed rather than counted. The country’s currency, the bolivar has devalued so much that traders have given up counting the huge wads of banknotes handed over by their customers. Last month it emerged that new 20,000 bolivar notes will be produced to keep up with the rate of inflation. At the moment the highest bank note in circulation is 100 bolivars.

Describing the situation at his delicatessen counter in Caracas, Humberto Gonzalez told Bloomberg that the sheer volume of bills needed to pay for everyday items makes life hard for traders. He said: *It’s sad. At this point, I think the cheese is worth more.* The inflation rate in Venezuela is expected to reach 480 per cent this year, and 1,600 per cent by 2017.

... Jesus Casique, financial director at consulting firm Capital Market Finance, told Bloomberg: *When they start weighing cash, it’s a sign of runaway inflation.* But Venezuelans don’t know just how bad it is because the government refuses to publish figures.

November 24, 2016
Hyperinflation

- October 1923: 20 USD = 100 billion DM
Hyperinflation

- Progression of stamps in Weimar Germany 2
Hyperinflation in Zimbabwe

- Harare, August 2008. Three eggs were worth...
Hyperinflation in Zimbabwe

- A restaurant meal looks pricey, but it is not
Hyperinflation in Zimbabwe

- Did you forget your credit card? Too bad...
### Hyperinflation

<table>
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<th>Argentina</th>
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<th>Brazil</th>
<th>Nicaragua</th>
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Source: IMF – Data are percent annual inflation rates
Monetary Policy Conduct
What does the Fed actually do?

- Modern translation of the mandate:
  - Keep inflation low and stable
  - Try to soften the adverse effect of economic recessions
  - Guarantee the smooth functioning of the payment system

- The Federal Reserve operates by means of three instruments
  - It trades with banks, exchanging securities for reserves
  - It lends reserves directly to banks
  - It is responsible for regulating the banking industry

- The Fed uses its instruments in order to achieve intermediate objectives stated in terms of
  - Federal Fund Rate
  - Liquidity of the banking system
The Federal Fund Market is the market for overnight lending and borrowing of reserves among banks.

The Federal Fund Rate is the average rate at which banks lend to each other reserves overnight.

The FOMC sets a target for the Federal Fund Rate.

The Domestic Trading Desk of the NY Fed engineers open market operations to push the Federal Fund Rate as close as possible to its target.

- When the Federal Fund Rate is above target, the Desk buys bonds in exchange of reserves.
- When the Federal Fund rate is below target, the Desk sells bonds in exchange of reserves.
A recession caused by monetary tightening
The 1981-82 recession

• For most of the 1970s, the United States lived with double-digit inflation
• Towards the end of the decade, the Federal Reserve (under the lead of Paul Volcker) decided to bring it down
• Starting in July 1980, the Federal Fund target was quickly raised from 10% to near 20%
• Volcker was successful, in that eventually inflation expectations adjusted to the new, low-money-growth regime
• In the interim period though, real yields shot up, causing a large recession
Countercyclical monetary policy
The Fed Fund Rate and real yields at different maturities

- The only market rate under direct control of the Federal Reserve is the Federal Fund Rate.
- However, aggregate demand for consumption and investment goods does not depend on the Federal Fund Rate.
- Aggregate demand for consumption and investment goods depends on longer-maturity real yields.
- How does the Fed manage to affect real yields at different maturities?
The Fed Fund Rate and yields on short–term securities

- For banks, other short–term securities are close substitutes for reserves.
  - If nominal yields on other securities were lower than the federal fund rate, banks would short those securities and buy reserves until the profit opportunity were eliminated.
  - If nominal short-term yields on other securities were higher than the federal fund rate, banks would sell their reserves and buy those securities until the profit opportunity were eliminated.

- Bottom line: The Fed has a very tight grip on nominal yields of other short–term securities.

- With sticky prices, an innovation in money supply is unlikely to impact short–term inflation expectations. It follows that a decline – say – in the fed fund rate will imply a drop in short–term real yields as well, as $r = i - \pi_e$. 

The Fed Fund Rate and real yields at longer maturity

- Consider the following example:
  - $i_{1,t}$: Spot rate on one-year contracts starting at time $t$ – Assume it under direct Fed control
  - $i_{2,t}$: Spot rate on two-year contracts starting at time $t$ – Assume it not under direct Fed control
  - $f_t$: Forward rate on one-year contracts

- No arbitrage implies: 
  \[(1 + i_{2,t})^2 = (1 + i_{1,t})(1 + f_t)\]

- How can the Fed (try to) affect the forward rate?
  \[f_t = E(1 + i_{1,t+1}) + RP_t\]

- Two recent experiments: Forward Guidance and Quantitative Easing

- If long-term inflation expectations are stable, a drop in nominal rates – say – translates in a drop in real rates, as $r = i - \pi^e$. 
Forward Guidance – Example

**FOMC**  ...The Committee also reaffirmed its expectation that the current exceptionally low target range for the federal funds rate of 0 to 1/4 percent will be appropriate at least as long as the unemployment rate remains above 6-1/2 percent, inflation between one and two years ahead is projected to be no more than a half percentage point above the Committee’s 2 percent longer-run goal, and longer-term inflation expectations continue to be well anchored.

...The Committee now anticipates, based on its assessment of these factors, that it likely will be appropriate to maintain the current target range for the federal funds rate well past the time that the unemployment rate declines below 6-1/2 percent, especially if projected inflation continues to run below the Committee’s 2 percent longer-run goal.

Statement of 12/18/2013
Quantitative Easing – Summary

- QE1. From Nov 2008 to March 2010. Massive purchase of Mortgage-Backed Securities (roughly $1.25 trillion) and long-term Treasury Securities (roughly $300 billion)


- QE3. From Sep 2012 to Oct 2014. An open-ended purchasing program of agency mortgage-backed securities and treasury bonds, which ended up totaling $1.6 trillion
Zero Lower Bound
Financial Times The ECB cut its deposit rate on Thursday by 10 basis points to minus 0.4 per cent...

... The ECB raised the amount of bonds the eurozone’s central bankers buy each month under QE from €60bn to €80bn – a greater sum than many analysts had expected. It also expanded the range of assets it will buy to include high-quality corporate bonds....

To help banks, it will provide liquidity through so-called targeted longer-term refinancing operations, with rates as low as minus 0.4 per cent – in effect paying them to borrow money.

March 10, 2016
The Fed at work

The Fed Fund Rate and Unemployment
Monthly Data

Source: Federal Reserve and Bureau of Labor Statistics
Unemployment, Inflation, and the Fed

Monthly Data

Source: Federal Reserve and Bureau of Labor Statistics

Unemployment, Inflation, and the Fed

- Unemployment
- Inflation
- Fed Fund Rate

Source: Federal Reserve and Bureau of Labor Statistics
The Taylor Rule

- Until recently, the Fed’s behavioral rule was well summarized by the simple linear equation known as Taylor Rule

\[ i_t = r^* + \pi_t + a_1(\pi_t - \pi^*) + a_2 \log\left(\frac{Y_t}{\bar{Y}}\right) \]

- Estimate the equation

\[ i_t = \phi_0 + \phi_1 \pi_t + \phi_2 \log\left(\frac{Y_t}{\bar{Y}}\right) \]

- Our estimates:
  - \( \hat{a}_1 = \hat{\phi}_1 - 1 = 0.3321 \)
  - \( \hat{a}_2 = \hat{\phi}_2 = 0.6072 \)
  - \( \hat{\phi}_0 = \hat{r}^* - \hat{a}_1 \hat{\pi}^* \)
The Taylor Rule

United States – The Taylor Rule at work

Taylor Rule Federal Fund Rate

United States − The Taylor Rule at work
Takeaways

1. What are the objectives of monetary policy?
   - All central banks are in charge of containing inflation and ensuring the smooth functioning of the payment system
   - Some (the Fed among these) are asked to foster growth as well

2. How does the Fed try to accomplish these objectives?
   - The intermediate policy objective of the Fed is a target for the Federal Funds rate
   - The desk of the New York Fed pursues the target by orchestrating open market operations and regulating access to the discount window
3. In the long run, real GDP growth is determined by productivity growth. Money growth in excess of real GDP growth simply leads to inflation.

4. When the central bank monetizes the budget deficit – i.e. purchases bonds issued by the Treasury – it exchanges intrinsically worthless pieces of paper for goods and services. The gain from this activity is called seignorage revenue.

5. Hyperinflations occur when (i) governments run large budget deficits, issuing bonds to finance them and (ii) the central bank purchases them by increasing the amount of money in circulation.
6. In the short run, as long as corporations are slow adjusting prices, monetary policy can affect GDP growth.

7. Everything else equal, a monetary expansion (decline in the Federal Fund Rate) leads to a temporary decline in real yields at different maturities, which in turn affects aggregate demand for consumption and investment goods.

8. The effect is temporary, because eventually producers adjust prices upwards and real rates return to the initial level.