Monetary Policy Determination

Driehaus College of Business; DePaul University
Finance 513 – Money and Capital Markets Lecture
February 5, 2019

Hesna Genay
*Vice President and Monetary and Financial Policy Advisor*
Federal Reserve Bank of Chicago

*The views expressed are those of the author and do not necessarily represent the views of the Federal Reserve System or the Federal Reserve Bank of Chicago.*
Overview

- The Federal Reserve has multiple responsibilities
  - Monetary policy
  - Financial stability
  - Supervision and regulation
  - Financial services

- Focus on monetary policy today

- Offer an institutional, conceptual, and empirical tour
  - Goals
  - Tools
  - Setting optimal interest rate policy
  - Transmission mechanisms
  - Current outlook and implications for policy
Goals – The Dual Mandate

The Federal Reserve Act states the goals of monetary policy

- Price Stability
- Maximum Employment
- Stable Long-term Interest Rates
Goals – The Dual Mandate

How is it different from inflation targeting?

- Primary versus secondary objective
- ECB: “To maintain price stability is the primary objective of the Eurosystem …”
- “Without prejudice to the objective of ‘price stability’, the Eurosystem shall also support the general economic policies …” including “‘full employment’ and ‘balanced economic growth’ ”
- Mandate versus practice

What about other goals?

- Value of the dollar
- Financial stability
What Monetary Policy Can And Cannot Affect

Aggregate Supply: Mostly Immune to Monetary Policy

- Available labor
  - Labor force adjusted for the natural rate of unemployment

- Effective capital stock
  - Plant, equipment, software, housing stock, etc.

- Productivity
  - Technological capabilities
  - Institutions and regulations

Aggregate Demand: Sensitive to Monetary Policy

- Household spending
  - Incentive to save
  - Wealth effects

- Business investment
  - Cost of capital
  - Prospective product demand

- Net exports
  - Effects on dollar

- Government purchases
Balancing Aggregate Demand And Supply

- Aggregate demand brought into alignment with aggregate supply by adjustments in interest rates
- Aggregate demand increases by lower interest rates
  - Relevant rates: Long-run, real interest rates facing households and businesses
- Long-run private-sector real interest rates
  
  \[
  \text{expected average short-term nominal rate} \quad \text{minus} \quad \text{expected average inflation rate} \quad \text{plus} \quad \text{risk premia (duration, credit, inflation uncertainty)}
  \]
Optimal Fed Funds Rate (FFR)

- How do you translate the dual mandate to an operational target?

- FOMC statement on “Longer-Run Goals and Policy Strategy”

- How about meeting-to-meeting decisions?

- Policymakers’ Loss Function
  - One approach to quantifying and assessing policy goals and performance
Loss Function – Inflation Communication

  - Sets 2% objective for PCE inflation
  - Target is for an average over medium term
  - Symmetric target, not a ceiling
  - Explicit statement should help anchor expectations
  - Renewed annually since 2012

- $\pi^* = 2\%$

- $\pi_t = 1.9\%$
  (but had been below 2% during most of the current recovery)
What is so special about 2%?

- ECB: “below, but close to, 2 percent over the medium term”
- BoE: 2 percent
- BoC: “the target range is 1 to 3 per cent, with the Bank's monetary policy aimed at keeping inflation at the 2 percent target midpoint”
- BoJ: 2% since January 2013
- Central Bank of Turkey: no fixed target; 5% in recent years

Why not 0%? 3%? 10%?
- Costs of high inflation vs deflation or low inflation
- Limits of traditional monetary policy tools – the zero lower bound
Policymakers’ Loss Function: Inflation Targeter with Symmetric Losses

- **Minimize** \( L = (\pi - \pi^*)^2 \)
  - \( L \) – size of policy loss
  - \( \pi \) – actual inflation rate
  - \( \pi^* \) – target inflation rate

- **Assume** \( \pi^* = 2\% \)
Policymakers’ Loss Function – Dual Mandate

\[ L = \omega (\pi - \pi^*)^2 + (1 - \omega) (u - u^*)^2 \]
- \( L \) – size of policy loss
- \( \pi \) – actual inflation rate
- \( \pi^* \) – target inflation rate
- \( u \) – actual unemployment rate
- \( u^* \) – equilibrium natural rate of unemployment (NAIRU)
- \( \omega \) – weight placed on inflation gap \((\pi - \pi^*)\)
Conceptually, somewhat different than inflation target

- $u^*$ largely not determined by the central bank

- “Natural rate of unemployment”

- Changes over time as the structure of the economy and demographics change

Source: Congressional Budget Office.
Loss Function – Unemployment Communication

  - The appropriate employment goal may change over time for nonmonetary reasons
  - Seek an economy operating at its level of potential output

- **Based on median December 2018 Projections:**
  \[ u^* = 4.4\% \]
  - Had been as high as 5% - 6% in 2011

- \[ u_t = 4.0\% \]
Loss Function – Weight on Inflation vs Unemployment


- Balanced approach
  - Take balanced approach when shocks push the economy away from objectives
  - Takes account of lags in effects of monetary policy and other limits

- Does this imply $\omega = 0.5$? Maybe for some, but not necessarily for all FOMC participants.
Bull’s-Eye Accountability for Fed’s Dual Mandate

**Loss Function**

\[ L = 0.5(\pi - 2)^2 + 0.5(u - u^n)^2 \]

Inflation (percent)

I. \( \pi > \pi^* \)
   \( u < u^n \)
   \( \rightarrow \) All else equal, raise interest rates

II. \( \pi > \pi^* \)
    \( u > u^n \)
    \( \rightarrow \) Balance inflation and unemployment goals and associated risks

III. \( \pi < \pi^* \)
    \( u < u^n \)
    \( \rightarrow \) Balance inflation and unemployment goals and associated risks

IV. \( \pi < \pi^* \)
    \( u > u^n \)
    \( \rightarrow \) All else equal, lower interest rates
Bull’s-Eye Accountability for Fed’s Dual Mandate

Loss Function

\[ L = 0.5(\pi - 2)^2 + 0.5(u - u^n)^2 \]

Inflation

Unemployment

Current

(\(\pi = 1.9, u = 4.0\))

(\(\pi = 2.4, u = 4.4\))

(\(\pi = 1.6, u = 4.4\))

(\(\pi = 2, u \approx 4.0\))

(\(\pi = 2, u = 4.8\))
Tools

- **Traditional**
  - Reserve requirements ($ banks hold at the Fed against certain deposits)
  - Discount rate (the rate the Fed charges banks when they borrow overnight from the discount window)
  - Federal funds rate (the rate banks charge each other for overnight unsecured loans)
  - New “traditional”: interest on reserves, term deposit facility; reverse repos with additional counterparties

- **Non-traditional**
  - Communications policies (Forward Guidance)
  - Credit and liquidity facilities during the crisis
  - QE I-III; Operation Twist; QT
Traditional Policy Implementation

- The FOMC decides to change the target for the fed funds rate.

- What happens next?
Monetary Policy Operating Regime (2006)

The Market for Reserves

FFR

S₀

FFR*

R₀

S₁

S₀

D

FFR₁

FFR₀

R₁

R₀

A

B
Monetary Policy Operating Regime (2006)

The Market for Reserves

![Graph showing the Market for Reserves](image)

- FFR: Federal Funds Rate
- FFR*: Target Federal Funds Rate
- S₀: Supply of Reserves
- D₀: Demand for Reserves
- S₁: New Supply of Reserves
- D₁: New Demand for Reserves
- R₀: Base Reserve Requirement
- R₁: New Reserve Requirement
- IOER: Interest on Excess Reserves
- Discount Rate: The rate at which the Fed lends to banks that hold reserves.
Evolution of the Fed Balance Sheet

2006 (billions)

Present (Week of 1/2) (billions)
Monetary Policy Operating Regime Today

The Market for Reserves

Diagram showing the relationship between the Federal Fund Rate (FFR) and reserves (R). The diagram compares reserves in 2006 (R_{2006}) and 2019 (R_{2019}). The supply of reserves (S) is shown for the years 2006 and 2019. The dashed line represents the FFR*.
Monetary Policy Operating Regime Today

The Market for Reserves

- FFR
- S_{2019}
- Discount Rate
- IOER
- ON RRP
- Reserves

FFR*
New Tools

- **Traditional tools:**
  - Add liquidity by purchasing/borrowing securities (lending to counterparties)
  - Natural Counterparties: sellers/borrowers in money markets (e.g. broker dealers)

- **New tools:**
  - Address the increase in the size of the balance sheet and the amount of reserves
    - Pre-crisis: ~$10 billion; Today: ~$1.6 trillion
    - Drain liquidity by selling/lending securities (borrowing from counterparties)
  - Natural Counterparties: purchasers/lenders in money markets (MMMs, FHLBs, etc.)
Policy Normalization

- **Target a range for the federal funds rate – at least initially**
  - Implement primarily by raising the Interest on Excess Reserves (IOER)
  - Coordinated decisions between the FOMC and the Board of Governors
  - Use ON Reverse Repurchase Facility (ON RRP), Term RRPs, and Term Deposits as supplementary tools

- **Balance sheet policies**
  - Currently redeeming maturing Treasury securities, MBS, and agency debt
  - Subject to caps: Treasuries $30B/month; MBS and agency $20B/month

- **Longer-term, normalize the size of the balance sheet for efficient and effective conduct of policy**
New Monetary Policy Framework

- **June 2017 Statement:** Adjust balance sheet size to implement monetary policy effectively and efficiently

- **January 30, 2019 statement:**
  - “Ample” reserves;
  - FFR the primary tool; controlled through administered rates (i.e. IOER, ON RRP, primary credit rate) without active management of reserves;
  - Adjust balance sheet normalization if needed;
  - Use all policy tools if reductions in FFR are not sufficient
Transmission to Other Interest Rates

\[ i = r + \pi \]

\[ r_t^h = \sum_{i=t}^{t+h} E[FFR_i] - \sum_{i=t}^{t+h} E[\pi_i] \]

+ term premium
+ default risk premium
+ liquidity premium
+ other risk premia
Overview of ‘Standard’ Transmission Channels

\[ \pi = 1.9\% \text{ and } u = 4.0\%. \text{ Now what?} \]

- Raise rates?
- Depends on economic outlook and developments
- Lots of cross-currents; heightened uncertainty
- Glass half-full/half-empty
Glass Half-Empty

The New York Times  Jan. 25, 2019
Shutdown Sets Off Airport Delays as F.A.A. Announces Staffing Shortages

FINANCIAL TIMES  JANUARY 16, 2019
Theresa May’s Brexit suffers historic defeat

Bloomberg  January 14, 2019
The World’s Biggest Economies Are Moving Deeper Into a Slowdown

npr  December 6, 2018
Huawei Finance Chief’s Arrest Threatens To Inflame U.S.-China Tensions

THE WALL STREET JOURNAL  Jan. 1, 2019
U.S. Indexes Close With Worst Yearly Losses Since 2008
Glass Half-Full

Trump signs bill to open the government, ending the longest shutdown in history

Wall Street notches one of the biggest rallies since 2011 as bulls regain footing

Employers add booming 304,000 jobs in January, marking 100th straight month of employment gains
Recent Developments: Glass Half-Full or Half-Empty?

- Solid Fundamentals on Real Activity and Inflation

- Juxtaposed with Financial Market turbulence
Strong Labor Markets

Monthly Payroll Employment Change (thousands)

Unemployment Rate (percent)

Labor Force Participation Rate (percent)

Trend estimates for LFPR calculated by Chicago Fed staff
Source: Bureau of Labor Statistics from Haver Analytics
Strong Consumption, Solid Business Investment

Real PCE
(quarterly annualized percentage change)

Core Capital Goods Orders and Shipments
($ bil.)

Source: Bureau of Economic Analysis and Census Bureau from Haver Analytics
Softness in Housing Markets Continues

Housing Starts
(millions)

New and Existing Home Sales
(millions)

Source: Census Bureau and National Association of Realtors from Haver Analytics
### Banner 2018, Still Solid Near Term Growth Ahead

<table>
<thead>
<tr>
<th>Source</th>
<th>Q4</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macroadvisers (Feb 4)</td>
<td>2.4</td>
<td>3.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Blue Chip (Jan 9 &amp; Feb 1)</td>
<td>2.6</td>
<td>3.1</td>
<td>2.2</td>
</tr>
<tr>
<td>GDPNow (FRB Atl) (Feb 1)</td>
<td>2.5</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>FRBC Nowcast (Feb 5)</td>
<td>2.4</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>Dec FOMC SEP (Dec 19)</td>
<td></td>
<td>3.0</td>
<td>2.3</td>
</tr>
</tbody>
</table>
Longer Term GDP Outlook Also Still Solid

Real GDP Growth
(Q4/Q4 percentage change)

Source: Bureau of Economic Analysis and FOMC’s December 2018 Summary of Economic Projections from Haver Analytics
Inflation Near Target

PCE Inflation
(year-over-year percentage change)

<table>
<thead>
<tr>
<th>Core CPI</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Yr/Yr</td>
<td>2.1</td>
<td>2.2</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Source: Bureau of Economic Analysis and FOMC’s December 2018 Summary of Economic Projections from Haver Analytics
Mixed Inflation Factors

Wage Growth
(year-over-year percentage change)

TIPS 5/5F Inflation Compensation
(percent)

Source: Board of Governors of the Federal Reserve System and Bureau of Labor Statistics from Haver Analytics
Many Sources of Investor Anxiety

- Concerns over a slow-down in growth abroad
- Disorderly Brexit with significant spill-overs
- Other geopolitical risks
- Concerns over a slow-down in the U.S.
- Uncertainty over trade and other government policies
  - The effects of the prolonged government shutdown
- Concerns that the FOMC will tighten too much
Re-assessment of Risks

S&P 500 Index

Corporate Bond Spreads
(spread over 10yr treasury, percent)

Source: Wall Street Journal and ICE/Merrill Lynch from Haver Analytics
Re-assessment of Risks

10 Year Treasury Rate
(percent)

Foreign Exchange Rates
(index, Jan-2018 = 100)

Source: Board of Governors of the Federal Reserve System from Haver Analytics
Similar Movements in Asset Markets Abroad

**Stock Price Indices**
(index, Dec-31 = 100)

- Nikkei 225 (JP)
- FTSE Share Price Index (Eurozone)
- Hang Seng (HK)

**Volatility Indices**
(index)

- JP
- Euro Area
- HK

Source: Financial Times and Hang Seng Co. from Haver Analytics
Signs of a Global Slowdown I

Global PMI Manufacturing Indicators (index)

Source: Institute for Supply Management(*) from Haver Analytics, China Federation of Logistics and Purchasing (**), and JP Morgan Global Composite PMI (***)

43
Signs of a Global Slowdown II

**Industrial Production Indices**
(3-month moving average, year-over-year percentage change)

Source: Various government statistical agencies from Haver Analytics
International Growth Forecasts Still Solid

**Euro Area**
(annual, %)

**Japan**
(annual, %)

**UK**
(annual, %)

**China**
(annual, %)

Source: IMF Interim World Economic Outlook (Jan 2019) and OECD
Historical Perspective

One-Year-Forward Price/Earnings Ratio, S&P 500 Composite
(Ratio)

Corporate Bond Spreads
(spread over 10-year Treasury rate)

- - Average since 2000 (excl. crisis)

01-Feb-2019

Source: ICE/Merrill-Lynch from Haver Analytics and Bloomberg
Impact on Households

Consumer Loan Rates
(percent)

Household Net Worth
(as a percentage of disposable personal income)

30-Yr Fixed Rate Mortgage

Auto Loan

Source: New York Times and Board of Governors of the Federal Reserve System from Haver Analytics
Overall Financial Conditions Still Accommodative

Chicago Fed National Financial Conditions Index
(relative to average)

<table>
<thead>
<tr>
<th>Period</th>
<th>Change in the NFCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997 Asian Crisis</td>
<td>0.18</td>
</tr>
<tr>
<td>1998 Russian Crisis</td>
<td>0.56</td>
</tr>
<tr>
<td>2010 Greek Crisis</td>
<td>0.19</td>
</tr>
<tr>
<td>2011 Euro Fiscal Concerns</td>
<td>0.46</td>
</tr>
<tr>
<td>2013 Taper Tantrum</td>
<td>0.06</td>
</tr>
<tr>
<td>Nov. 2015-Feb.2016 Episode</td>
<td>0.17</td>
</tr>
<tr>
<td>Current Episode</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Source: Federal Reserve Bank of Chicago
Each shaded circle indicates the value (rounded to the nearest 1/8 percentage point) of an individual participant’s judgment of the appropriate level of the target federal funds rate at the end of the specified calendar year or over the longer run. Red dots indicate the median projection. Inertial Taylor rule uses data from the FOMC’s SEPs.
Investors' Policy Expectations

Distribution of Federal Funds Rate Target at 2019 Year End (percent)

Source: CME
“Patient” with future adjustments to policy

Wait-and-see how the cross-currents resolve

Usual approach during periods of heightened uncertainty