

University of Colorado
Colorado Springs


CS4950/5950
Homeland Security & Cybersecurity

Finance Infrastructure

CS 4950/5950
Homeland Security &
Cybersecurity


Lesson 25
The Federal Reserve

Rick White, Ph.D.
University of Colorado, Colorado
Springs



1
Esc

1




University of Colorado
Colorado Springs

CS4950/5950
Homeland Security & Cybersecurity

Introduction

Access to money in whatever
form is essential to facilitating
commerce, the buying and selling
of goods and services, which in
turn, creates wealth, which
enables better living standards.



2
Esc

2



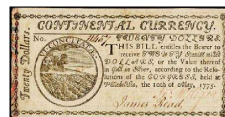
University of Colorado
Colorado Springs

CS4950/5950

Homeland Security & Cybersecurity

US Dollar

- 1775 & 1785, Continental Congress authorized paper dollar, named for Dutch "thaler".
- Both issues failed because they weren't back by gold or silver.
- 1792, Congress established US Mint to make gold & silver coins.
- 1861, Treasury starts printing notes backed by gold & silver.
- 1900, dollar value based on gold.
- 1971, dollar uncoupled from gold.
- Today, dollar is a "fiat" currency, unbacked by any physical asset.



1775 Continental \$1 bill



1797 US \$1 coin



1862 Civil War \$1 "greenback"



1923 \$1 gold-backed legal tender note

3

Esc

3



University of Colorado
Colorado Springs

CS4950/5950

Homeland Security & Cybersecurity

US Banking

- Banks create wealth by lending surplus funds for commerce.
- Because of lending, banks keep a fraction of deposits in reserve.
- A bank panic or "run" occurs when withdrawals exceed deposits.
- Bank panics start when customers fear their deposits will be lost.
- Banks caught in a panic may fail, becoming a self-fulfilling prophecy.
- Bank panics causing economic recessions were frequent in the 19th and early 20th centuries.

Major US Bank Panics & Resulting Recessions

1797

1807

1815

1837

1857

1873

1893

1907

1920

1929

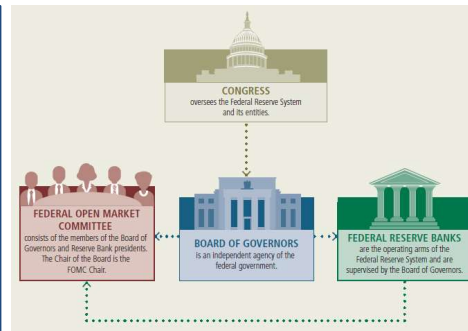
4

Esc

4

US Federal Reserve System

- Created in 1913 as result of 1907 financial panic.
- Independent institution with Congressional oversight.
- Comprised of 12 Federal Reserve Banks.
- Managed by the Federal Reserve Board.
- Policy set by Federal Open Market Committee.
- Self-supported by fees; pays excess profits to Treasury.



5

Esc

5

Five Key Functions

1. Direct US monetary policy.
2. Promote stable financial system.
3. Promote sound financial institutions.
4. Protect consumers & promote community development.
5. Manage payment & settlement system.



6

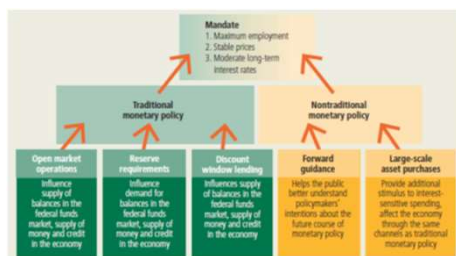
Esc

6



Direct US Monetary Policy

- FOMC sets policy to achieve:
 - Maximum Employment
 - Stable Prices
 - Moderate Long-Term Interest
- Traditional Tools:
 - Control Money Supply
 - Set Federal Interest Rate
- Nontraditional Tools (since 2008):
 - Forward Guidance
 - Quantitative Easing



The Federal Interest Rate, called the “discount rate”, is the interest the Federal Reserve charges member banks for overnight loans. This rate affects all subsequent loans made by banks and financial institutions, creating a rippling effect across the economy.

7

Esc

7



Promote Stable Financial System

- Precludes bank runs by setting minimum reserve levels for member banks.
- Provides overnight loans to member banks who fall short.
- “Lender of Last Resort” authorized to bail out failing banks.
- Expands and contracts the money supply to keep inflation in-check.



Despite its charter, the Federal Reserve failed to prevent the 1929 panic resulting in the Great Depression. In 2002, Chairman Ben Bernanke publicly apologized, admitting that a conflicted Board failed to act to save the banks.

8

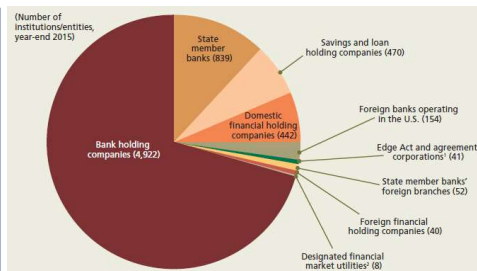
Esc

8



Promote Sound Financial Institutions

- Oversees financial institutions to ensure "prudent practices".
- Fed "regulates" financial industry, establishing rules to implement laws passed by Congress.
- Fed "supervises" financial industry, conducting inspections to ensure compliance with regulations.



By law, the Federal Reserve is responsible for regulating and supervising certain segments of the financial industry to ensure they employ safe and sound business practices and comply with all applicable laws and regulations.

9

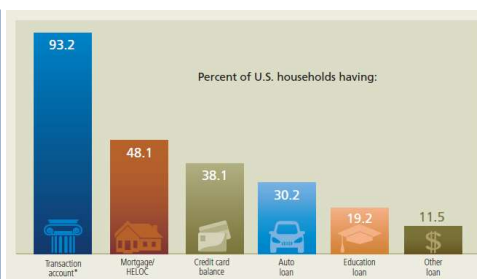
Esc

9



Protect Consumers & Promote Community Investment

- By virtue of regulating and supervising financial institutions, the Fed enforces laws designed to protect consumers from unfair or fraudulent practices.
- The Fed also conducts research to help formulate monetary policy that best promotes community investment.



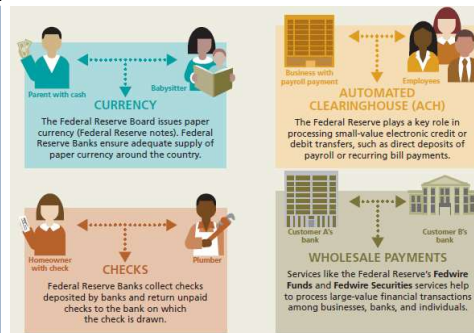
10

Esc

10

Manage Payment & Settlement System

- Currency. Fed manages currency supply to facilitate direct payments; ~1.3T in circulation.
- Checks. Fed accommodates fund transfers between banks related to check payments.
- ACH. Fed accommodates fund transfers between banks related to small-scale electronic payments.
- Fedwire. Fed accommodates fund transfers between banks related to large-scale electronic payments.

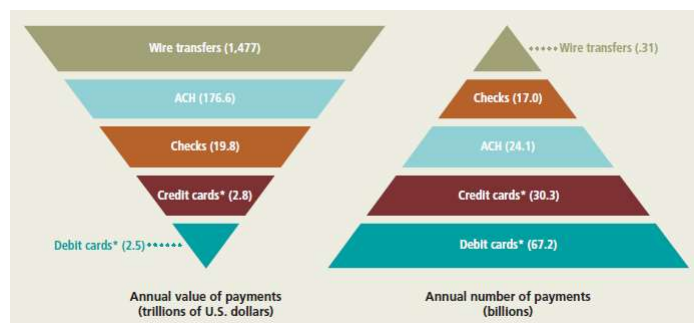


11

Esc

11

Trend Towards Electronic Payments




- Checks and other forms of paper money peaked in the mid-1990s.
- US monetary transactions are trending towards electronic payments.

12

Esc

12



University of Colorado
 Colorado Springs


CS4950/5950
Homeland Security & Cybersecurity

Cashless Society

- The evolution from a cash to a cashless society makes the US monetary system more vulnerable to cyber-attack.
- A successful attack on the Federal Reserve could incapacitate the very system designed to support stable commerce.
- To help preclude this possibility, the Payment Card Industry (PCI) Security Standard is being pushed by credit card companies across all participating financial institutions.

PAYMENT CARD INDUSTRY SECURITY STANDARDS

Protection of Cardholder Payment Data




The diagram illustrates the PCI Security Standards ecosystem. It features three main components in chevron shapes:

- MANUFACTURERS** (blue): PCI PTS (PIN Transaction Security)
- SOFTWARE DEVELOPERS** (red): PCI PA-DSS (Payment Application Vendors)
- MERCHANTS & PROCESSORS** (teal): PCI DSS (Data Security Standard)

 Arrows indicate a flow from left to right. To the right of these is a box labeled **PCI SECURITY STANDARDS & COMPLIANCE**. Below the chevrons is a yellow bar labeled **Ecosystem of payment devices, applications, infrastructure and users**.

13
 Esc

13




University of Colorado
 Colorado Springs

CS4950/5950
Homeland Security & Cybersecurity

Conclusion

Questions?



14
 Esc

14