The Anatomy of a Dollar Bill
Dollar Bill Facts

- US currency bills are 2.61 inches wide and 6.14 inches long; they are .0043 inches thick and weigh 1 gram. (All US currency was made smaller in 1928)

- All US Bills are cloth, not paper – 25% Cotton, 75% Linen with red and blue synthetic fibers distributed throughout.

- Currency is printed by the Bureau of Engraving and printing. Each bill, regardless of denomination costs 4.2 cents to make. The BEP prints 16,650,000 $1 bills each day.

- The $1 bill has an average lifetime of 18-22 months. Damaged bills are returned to the Fed and shredded. Last year, the Fed destroyed around $7.5B worth of currency.
Alaska and Hawaii are part of the San Francisco District
Great Seal of the US

“In God We Trust” added by Eisenhower in 1957
The Great Seal (Front)

- 13 leaves in the Olive Branch (Right Talon)
- 13 arrows in left talon
- 13 stars overhead
- 13 Stripes on Shield (Blue Bar represents congress)
- E Pluribus Unum: “From Many Comes One”
The Great Seal (Back)

- The Pyramid had 13 steps
- MDCCLXXV1 = 1776
- The Pyramid is unfinished (the US is an ongoing project)
- The western face is dark (the western US had yet to be explored)
- The deity watches over us
- Annuit Coeptus = “God Has Favored our Undertakings”
- Novus Ordo Seclorum = “A New Order Has Begun”
The US Dollar and the Freemasons?

- The Eagle’s left wing has 32 feathers (number of degrees in Scottish Rite Freemasonry)
- The Eagle’s right wing has 33 feathers (there exists a 33rd degree mason for outstanding service)
- 9 Tail Feathers (number of degrees in York Rite Freemasonry)
- 13 Stars form a five pointed star (A Masonic symbol)
The US Dollar and the Freemasons?

- (Insert your own story here)
The US Dollar as a calendar?

- The pyramid has 13 steps. Suppose each step counts for 13 years (169 years total).
- Starting at the base (1776) the top would represent 1945. (Roosevelt died in 1945)
- The “Gap” represents 1945 – 1974 (resignation of Nixon) – A period of upheaval
- The “Cap” contains an additional 2 levels (26 years) – the Peak is the year 2000.
The Owl and the Spider

Can you find the owl on the US Dollar?.....look closely!
The Owl and the Spider

By the Way, the owl is a Masonic symbol of knowledge! Want a closer look?
The Owl and the Spider

Some argue that its not an owl at all….its a spider!
The $5000 Federal Reserve Note of 1934. James Madison's portrait is on it. There were no 1934 $5000 Gold Certificates, unlike with the $1000, the $10,000 and the $100,000 Gold Certificates (the latter of which was only that one year anyway). $5000 bills seem to be especially unusual, particularly for the year 1934.
Macroeconomics

Money: Definitions, Measures, Time Value + Introduction to Quantity Theory
Money Defined

• Money is anything that can be used as:
  – A medium of exchange
  – A store of value
  – A unit of account / Standard of Value

• Money works best when it meets these criteria:
  – Portable
  – Durable
  – Divisible
  – Acceptable
  – Stable
Money Facts:

• What backs the dollar and makes it valuable?
  – Gold?
  – NO! The dollar is legal tender because the government says it’s money and people willingly accept it. The Dollar is backed by FAITH.
  – This is referred to as an inconvertible fiat standard.
The Supply of Money

• In the United States, the Federal Reserve System is the sole issuer of currency.
  – This means the Fed has monopoly control over the money supply.

• There are two important measures of the Money Supply today.
  – M1
  – M2
M1

- M1 serves primarily as a medium of exchange. It includes:
  - Currency and Coin
  - Demand Deposits
M2 serves as a store of value. It includes:

- The M1
- Time Deposits
- Money Market Mutual Funds
- Overnight Eurodollars
The transaction demand for money is very closely associated with money’s use as a
(A) store of value
(B) standard unit of account
(C) measure of value
(D) medium of exchange
(E) standard of deferred payment
(D) medium of exchange
M1 & M2

• As we go from M1 to M2
  – The measure becomes larger
  – Money becomes less liquid

• As we go from M2 to M1
  – The measure becomes smaller
  – Money becomes more liquid
Time Value of Money

• Is a dollar today worth more than a dollar tomorrow?
  – YES

• Why?
  – Opportunity cost & Inflation
  – This is the reason for charging and paying interest
Time Value of Money

- Let \( v \) = future value of $ 
  
  \( p \) = present value of $ 
  
  \( r \) = real interest rate (nominal rate \(-\) inflation rate) expressed as a decimal 
  
  \( n \) = years 
  
  \( k \) = number of times interest is credited per year 

- The Simple Interest Formula

  \[ v = (1 + r)^n \cdot p \]

- The Compound Interest Formula

  \[ v = (1 + \frac{r}{k})^{nk} \cdot p \]
• Assume that inflation is expected to be 3% and that the nominal interest rate on simple interest savings is 1%. Calculate the future value of $1 after 1 year.

• Step 1: Calculate the real interest rate

\[ r\% = i\% - \pi\% \]
\[ r\% = 1\% - 3\% = -2\% \text{ or } -0.02 \]

• Step 2: Use the simple interest formula to calculate the future value of $1

\[ v = (1 + r)^n \times p \]
\[ v = (1 + (-0.02))^1 \times $1 \]
\[ v = (0.98) \times $1 \]
\[ v = $0.98 \]
Assume that inflation is still expected to be 3% but that the nominal interest rate on simple interest savings is 4%. Calculate the future value of $1 after 1 year.

Step 1: Calculate the real interest rate

\[ r\% = i\% - \pi\% \]

\[ r\% = 4\% - 3\% = 1\% \text{ or } .01 \]

Step 2: Use the simple interest formula to calculate the future value of $1

\[ v = (1 + r)^n \times p \]

\[ v = (1 + .01)^1 \times $1 \]

\[ v = $1.01 \]
Time Value of Money
FUN!!!

- Assume that annual inflation is expected to be 2.5% and that the annual nominal interest rate on a 10 year certificate of deposit is 5% compounded monthly. Calculate the future value of $1,000 after 10 years.

- Step 1: Calculate the real interest rate
  
  \[ r\% = i\% - \pi\% \]
  
  \[ r\% = 5\% - 2.5\% = 2.5\% \text{ or } 0.025 \]

- Step 2: Use the compound interest formula to calculate the future value of $1,000
  
  \[ v = (1 + \frac{r}{k})^{nk} \times p \]
  
  \[ v = (1 + 0.025/12)^{10 \times 12} \times 1,000 \]
  
  \[ v = (1 + 0.002083)^{120} \times 1,000 \]
  
  \[ v = $1,283.69 \]
Relating Money to GDP

- Economist, Irving Fisher postulated that:

\[ \text{Nominal GDP} = \text{The Money Supply} \times \text{Money’s Velocity} \]
The Monetary Equation of Exchange

- $MV = PQ$ or $MV = PY$

- $M =$ money supply ($M1$ or $M2$)
- $V =$ money’s velocity ($M1$ or $M2$)
- $P =$ price level (PL on the AS/AD diagram)
- $Q =$ real GDP (sometimes labeled Y on the AS/AD diagram)
- $P \times Q$ or $PQ =$ Nominal GDP
The relationship between V, the MS, the PL, and output is represented by the equation \( M \times V = P \times Y \) where \( M \) is the money supply, \( V \) is the velocity, \( P \) is the price level, and \( Y \) is the quantity of output. \( P \times Y \), the price level multiplied by the quantity of output, gives the nominal GDP. This equation can thus be rearranged as \( V = \frac{\text{nominal GDP}}{M} \). Conceptually, this equation means that for a given level of nominal GDP, a smaller money supply will result in money needing to change hands more quickly to facilitate the total purchases, which causes increased velocity.
The Velocity of Money

• Velocity of money is defined simply as the rate at which money changes hands. If velocity is high, money is changing hands quickly, and a relatively small money supply can fund a relatively large amount of purchases. On the other hand, if velocity is low, then money is changing hands slowly, and it takes a much larger money supply to fund the same number of purchases.
The Monetary Equation of Exchange

- \( MV = PQ \)
  - \( M1 = $2 \text{ trillion} \)
  - \( V \text{ of } M1 = 7 \)
  - \( PQ = $14 \text{ trillion} \)
In the crude equation of exchange where $MV = PY$:

A. Monetarists believe $V$ is stable.
B. Classical economists believe $V$ is unstable.
C. Keynesians believe $V$ is stable.
D. Monetarists believe that $P$ is stable.
E. Keynesians believe that $P$ is stable.
A. Monetarists believe $V$ is stable.
A quick primer on the number TRILLION:

- $1 trillion = $1,000 billion or $1,000,000,000,000 (that's 12 zeros)
- How hard is it to spend a trillion dollars? If you spent one dollar every second, you would have spent a million dollars in 12 days. At that same rate, it would take you 32 years to spend a billion dollars. But it would take you more than 31,000 years to spend a trillion dollars.
- And now, some scary facts about the debt and the deficit -- some basics:
  - Deficit = money government takes in -- money government spends
  - 2012 US deficit = $1.33 trillion
  - 2013 Proposed budget deficit = $901 billion
  - National debt = Total amount borrowed over time to fund the annual deficit
  - Current national debt = $15.3 trillion (or $49,030 per every man, woman and child in the US or $135,773 per taxpayer)
$1 Trillion
$1,000,000,000,000,000