Saving, Investment and Capital Markets I
The World of Finance and its Macroeconomic Significance
October 2nd, 2019
SAIS comes to Homewood
Two events today:

**American Foreign Policy in the Trump Era and Beyond**

lunch beginning at 1130 am (Levering Hall)
speakers: 12 pm to 1:15 pm
Speakers: Hal Brands, Adria Lawrence, Matthias Matthijs, Andrew Mertha
*Four Spring 2021 SAIS taught undergrad courses at Homewood, introduced*

**America and the Future of Great Power Competition**

Bloomberg 272  5:00pm to 6:30pm
Moderator: Hal Brands; Speakers: Richard Fontaine and Robert Work
Automakers Resort to $4,100 Discounts to Clear Old Inventory (1)

- Average incentive spending set 3Q record, J.D. Power says
- September sales pace is expected to slow due to holiday timing

By Gabrielle Coppola

(Bloomberg) -- Automakers probably avoided a quarterly decline in U.S. retail sales for the first time in almost two years, but only by spending big on incentives to clear old cars and trucks from dealers’ lots.

- Retail sales were likely flat during the three-month period, according to researchers J.D. Power and LMC Automotive, but average incentive spending rose an estimated 6% to more than $4,100 per vehicle, a third quarter record. Old model-year vehicles accounted for 90% of quarterly sales, the slowest sell-down on record.

Key Insights
What is finance?
Finance describes...

- The management, creation and study of:
  - Money.
  - Banking
  - Credit
  - Investments
  - Assets and Liabilities
Matching Savers and Borrowers

Banks, bond markets, stock markets and all the other avenues for financial transactions provide the arena in which deals are struck between those with extra cash and those in need of cash.

Risk-sharing

Investors can spread their money over different assets, reducing their risk while maintaining a high expected return on their investment.

Liquidity

The financial system allows savers to convert their investments into cash.

Information

The prices of financial securities represent beliefs about the future. This aggregation of information makes funds flow to the right firms.
We begin with our output/income equation

\[ Y = C + I + G + NX \]

We assume a closed economy, so no net exports:

\[ Y = C + I + G \]

We rearrange terms:

\[ I = Y - C - G \]

We define two new terms:

\[ S_{\text{PRIVATE}} = Y + TR - C - T \]

\[ S_{\text{PUBLIC}} = T - G - TR \]

Note: \ TR \equiv \text{transfer payments} \quad T \equiv \text{Taxes}
Let’s consider the Government budget balance

Government money flows:

gov’t collects taxes ≡ T

gov’t buys goods and services ≡ G

gov’t transfers funds to retirees etc. ≡ TR

Government balance: \( S_{\text{public}} = T - (G + Tr) \)

Gov’t Budget Surplus: \( T > G + Tr \)

Gov’t Budget Deficit: \( T < G + Tr \)
OUR FLOW MODEL:
SAVING = INVESTMENT

\[ S = S_{Private} + S_{Public} \]

\[ S_{PRIVATE} = Y + TR - C - T \]
\[ S_{PUBLIC} = T - G - TR \]

\[ S = Y + TR - C - T + T - G - TR \]

\[ S = Y - C - G \]
(recall that \( I = Y - C - G \))

\[ S = I \]
SAVING = INVESTMENT
\[ S = I \quad \text{But recall that } I = I_p + I_u \]

If we all save more, we may finance great investment

OR

We may generate a surge in unwanted inventory accumulation

- Suppose entrepreneurs want funds to finance building factories that make zinc air batteries?
- We will soon see that their willingness to pay higher interest rates for investment funds will lift both \( S \) and \( I \): GOOD NEWS
- Suppose, instead, that consumers become very pessimistic, amid news that suggest the world may soon go to war
- In this bearish case, as consumers save more of their income and spend less, companies’ sales would be below expectations and \( I_u \) would rise: BAD NEWS
- Note: in both cases \( S = I \)
Firms borrow from households.

Households supply loanable funds to firms.

Households also supply loanable funds to the government.

Governments, through their saving or dissaving, affect the quantity of funds that “pass through” to firms.

The equilibrium real interest rate and quantity of loanable funds is determined by this supply and demand.
Don’t Miss this!!! The Y axis: **Real Interest Rates**

- Ernie has $1,000, wants to buy a Moped.
- Bert asks Ernie to lend him the $1,000.
- ‘I’ll repay the $1,000 plus $50 in interest. (5%)
- Ernie decides he can get a helmet, if he waits.
- So Ernie lends Bert $1,000 for one year.
Inflation Can Destroy Purchasing Power

• One year later Ernie collects $1050
• He goes to buy the Moped.
• But its now priced at $1,100
• Ernie’s lament:
  • I got less than nothing for lending to Bert!
• The moral: when you lend money you want to be paid ‘real’ interest.
The Fisher equation

\[ i = r + \pi \]

Interest rate = real interest rate + inflation rate
## Ex-Ante vs. Ex-Post

### Real Interest Rates

<table>
<thead>
<tr>
<th>Year</th>
<th>10-year Yield</th>
<th>12-month Core CPI</th>
<th>Actual 10 year rate of inflation</th>
<th>Ex-ante Real 10-year Rate</th>
<th>Ex-post Real 10-year Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>6.4</td>
<td>4.6</td>
<td>7.9</td>
<td>1.8</td>
<td>-1.5</td>
</tr>
<tr>
<td>1980</td>
<td>12.8</td>
<td>9.6</td>
<td>4.8</td>
<td>3.2</td>
<td>8.0</td>
</tr>
<tr>
<td>2019</td>
<td>1.6</td>
<td>2.4</td>
<td>???</td>
<td>-0.8</td>
<td>???</td>
</tr>
</tbody>
</table>
**Simple Credit Market Instruments:**

**A Simple Loan:**

- Simple loan:
  - (e.g., one-period bank loan)
  - Principal: the borrower receives a specific amount.
  - Interest: Borrower repays the principal amount plus an interest payment.

<table>
<thead>
<tr>
<th>Period</th>
<th>Year</th>
<th>(pays 10,000 + interest)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Receives $10,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Coupon Bond

<table>
<thead>
<tr>
<th>Maturity Date</th>
<th>0</th>
<th>1000</th>
<th>1000</th>
<th>...</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face Value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coupon Rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borrower gets $10,000</td>
<td>1</td>
<td>2</td>
<td>19</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

**Coupon Rate**

\[
\text{Coupon Rate} = \frac{\text{Yearly Coupon Payment}}{\text{Face Value}} = \frac{1,000}{10,000} = 10\%
\]
What do people expect inflation will be? TIPS Bonds give us a good sense of that.

- U.S. Treasury, and other treasuries around the world, offer inflation ‘protected’ bonds

- You can buy:
  
  10-year Treasury Inflation Protected Security  
  (A TIPS bond)

  The bond will pay you its YIELD Plus the year-on-year CPI %change, over the life of the bond.
By subtracting the TIPS Yield from the regular bond yield, we derive break-even inflation rates.

<table>
<thead>
<tr>
<th></th>
<th>Dec-1999</th>
<th>Dec-2006</th>
<th>Sept. 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-year TIPS (yield)</td>
<td>4.3%</td>
<td>2.4%</td>
<td>0.1%</td>
</tr>
<tr>
<td>10-year T-note (yield)</td>
<td>6.4%</td>
<td>4.7%</td>
<td>1.6%</td>
</tr>
<tr>
<td>10-year breakeven Inflation rate</td>
<td>2.1%</td>
<td>2.3%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>
The 10-year breakeven inflation rate, 2010-2018 readings. (Vertical axis spans 1.2% to 2.8%)
What do Lenders Demand, ex-ante, as a **Real Rate**, To lend for **10-years**, to the U.S. Government? Around **2%**, 2001-2005: Around **0%** today!
Expectations: the Centerpiece of Economic Decision-Making

• We assume people are rational consumers:
  Two six packs, $10/six pack
  One twelve pack, $22/twelve pack
  People will buy two six packs

• In most cases, we assume rational investors:
  A U.S. government bond, 8%/year for 10 years
  A U.S. government bond, 3%/year for 10 years
  People will buy the bond that pays them 8%
Markets: arbitrage eliminates any perfectly riskless wagers

<table>
<thead>
<tr>
<th>Date Of Issuance</th>
<th>Years Remaining For Instrument</th>
<th>Coupon Rate</th>
<th>Date Of Maturity</th>
<th>Bond Price</th>
<th>Yield-to-Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/15/2007</td>
<td>10</td>
<td>4 5/8</td>
<td>2/15/2017</td>
<td>100</td>
<td>4.57</td>
</tr>
<tr>
<td>5/15/1987</td>
<td>10</td>
<td>8 3/4</td>
<td>5/15/2017</td>
<td>132</td>
<td>4.64</td>
</tr>
</tbody>
</table>
What clearly happens to the price of the two-year note, in October of 2018?

<table>
<thead>
<tr>
<th></th>
<th>Oct. 17</th>
<th>Oct. 18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A SNAPSHOT WITH NO CHANGE IN INTEREST RATES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-year note, price</td>
<td>$100</td>
<td>$100</td>
</tr>
<tr>
<td>2-year note, annual coupon payment</td>
<td>$10</td>
<td>$10</td>
</tr>
<tr>
<td>1-year note, price</td>
<td>$100</td>
<td></td>
</tr>
<tr>
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<td>2-year note, price</td>
<td>$100</td>
<td>???</td>
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<tr>
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<td>$10</td>
<td>$10</td>
</tr>
<tr>
<td>1-year note, price</td>
<td>$100</td>
<td>$100</td>
</tr>
<tr>
<td>1-year note, annual coupon payment</td>
<td>$10</td>
<td>$5</td>
</tr>
</tbody>
</table>
‘A Theory of Interest.
J. R. Hicks

• The essential **characteristic of a loan** transaction is that its execution is divided in time.

• **The money rates of interest paid for different loans at the same date differ from one another for two main reasons:**
  
• (1) because of differences in the **length of time** for which loans are to run

• (2) because of differences in the **risk of default** by the borrower.
What is Hicks Saying?

• The interest rate a lender charges depends on:
  • DURATION
    HOW LONG THE LOAN LASTS
  • DEFAULT
    HOW MUCH RISK OF BANKRUPTCY EXISTS
## A Menu of Government and Company Borrowing Costs:

<table>
<thead>
<tr>
<th></th>
<th>9/30/13</th>
<th>9/30/18</th>
</tr>
</thead>
<tbody>
<tr>
<td>German 2-year:</td>
<td>0.00%</td>
<td>-0.55%</td>
</tr>
<tr>
<td>U.S. 2-year:</td>
<td>0.30%</td>
<td>1.50%</td>
</tr>
<tr>
<td>German 10-year:</td>
<td>1.75%</td>
<td>-0.60%</td>
</tr>
<tr>
<td>U.S. 10-year:</td>
<td>2.65%</td>
<td>1.60%</td>
</tr>
<tr>
<td>Brazil 10-year:</td>
<td>9.90%</td>
<td>7.05%</td>
</tr>
<tr>
<td>High Quality Firm:</td>
<td>4.60%</td>
<td>3.10%</td>
</tr>
<tr>
<td>Risky Firm:</td>
<td>5.40%</td>
<td>3.90%</td>
</tr>
<tr>
<td>Junk Firm:</td>
<td>6.10%</td>
<td>5.40%</td>
</tr>
</tbody>
</table>
A Barebones Description of the World of Finance

• Banks
  Borrow from depositors, lend to homebuyers and businesses

  Bond Market
  Bond buyers provide loans for businesses and governments

Stocks
  When companies issue new equity, they receive funds from the buyers of issued shares
Key Differences

• Banks: We will evaluate in about 8 lectures

• Bonds: DURATION AND DEFAULT DRIVE BORROWING COSTS

• Stocks: share buyers are not promised a guaranteed interest payment.
  they own a piece of the gain if good times
  They can lose everything if things go awry
Expectations: the Centerpiece of Economic Decision-Making

• We assume people are rational consumers:
  Two six packs, $10/six pack
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  People will buy two six packs

• In most cases, we assume rational investors:
  A U.S. government bond, 8%/year for 10 years
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  People will buy the bond that pays them 8%
BUT: **Rational Expectations Swim Against Pervasive Uncertainty**

- Rational investors pick the higher paying bond

- But for many investment decisions, it is not obvious which will deliver the better payoff

- ‘Nobody Knows, but Everybody Has to Guess’
Neo’s World: Stare at a Bloomberg
And See Opinion about the Future Evolve

Box I

The Real World/Financial Market Processing Of Information

Corporations
Households
Governments
Central Banks

Evolving Consensus Opinion

The Green Screen
On Going Financial Market Repricing
Duration and Default: Consider Rates, One Year Ago:

- U.S. Federal Government Borrowing:
  - For 3 months: 2.25% annualized
  - For 2 years: 2.80% per year
  - For 10 years: 3.10% per year
Borrowing Rates
As a Window on future rates

- You can lend to the federal government, by buying 2-year notes
- Do that every 2 years for 5 years, and you have lent to the federal government for 10 years.
- Alternatively, buy a 10-year note, and lend for 10 years, in one step.
- But if EXPECTATIONS are that two year rates will be rising, you want a higher rate, to lend for 10 years.
Default risks and bond spreads

• We can look at promised interest payments on bonds of the same duration:

• U.S. gov’t 7-yr note: 3.0%/year

• Tesla Company 7-yr note: 7.62%/year

• If you lend to Tesla for 7 years, you get more than TWICE the interest, relative to US t-note
Interest rate differences: Investors’ Collective opinion about the FUTURE

Duration:
Spreads between short-term notes and long term bonds: they tell us whether investors think short-term rates are going up or down

Default:
Spreads between government bonds and company bonds: they tell us how much risk of bankruptcy investors see in the world
Firms borrow from households.

Households supply loanable funds to firms.

Governments, through their saving or dissaving, affect the quantity of funds that “pass through” to firms.

The equilibrium real interest rate and quantity of loanable funds is determined by this supply and demand.
An increase in the demand for loanable funds

Suppose that technological change occurs, so that investments become more profitable for firms. This will increase the demand for loanable funds. The real interest rate will rise, as will the quantity of funds loaned.
“Crowding out” in the market for loanable funds

Suppose the government runs a budget deficit. To fund the deficit, it sells bonds to households, decreasing the supply of funds available to firms. This raises the equilibrium real interest rate, and decreases the funds loaned to firms.

This is referred to as crowding out: the decline in investment spending that occurs as a result of increases in government purchases.
Circling Back to our Model: Saving = Investment

Hubbard text, rejects the idea that the surge in saving in 2009 played a big role in the recession:

• ‘An increase in saving, by increasing the supply of loanable funds, should lower the real interest rate and increase the level of investment spending’

• ‘this increase in investment spending might offset some or all of the decline in consumption.’
Keynes and the Paradox of Thrift

• Saving equals investment.
• But if everyone tries to save more
  DEMAND PLUNGE

When demand plunges UNPLANNED INVENTORIES SOAR

Our Aggregate Expenditure Model can be used to Show how big cuts in output/income, occur
In reaction to soaring inventories
As Everyone Tries to Save more Saving Actually Goes Down!

• Big cuts in employment, in reaction to surging inventories,
Slashed jobs = sharp declines for income

A sharp fall for output and income and all values, including SAVING, FALL

That is Keynes's PARADOX OF THRIFT
Our more detailed look at the world of finance allows us to reject the simplistic loanable funds model!

- Hubbard points to ‘falling real interest rates’, as saving increases.
- But did THE RIGHT INTEREST RATES FALL?

- We will build a model that has 3 interest rates
- We will show how it is quite possible for government borrowing rates to fall and for company borrowing rates to rise.
COMPANY BORROWING COSTS WERE AT RECORD HIGHS IN 2009

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>2006</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-Year Treasury</td>
<td>5.5</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>Junk Bond</td>
<td>8.0</td>
<td>7</td>
<td>17.5</td>
</tr>
<tr>
<td>Spread (10-Year-Junk)</td>
<td>2.5</td>
<td>2</td>
<td>15</td>
</tr>
</tbody>
</table>
Investment in 2009: A Collapse
Reflecting Plunging Risk-Free Interest Rates
And Soaring Interest Rates Demanded of Risky Companies