Saving, Investment and Capital Markets: Part II

Expectations, Asset Prices, and an Expanded Loanable Funds Model

October 4th, 2019

September 2019 jobs report:
Ex-ante expectation:

24				X			
22				X	x		
20				X	X		
18				X	X		
16				X	X		
14				X	X	x	
12			x	X	X	X	
10			X	X	X	X	
8			X	X	X	X	
6			X	X	X	X	
4			X	X	X	X	
2	x	x	X	X	X	X	x
	85-99	100-114	115-129	130-144	145-159	160-174	175-189

September 2019 jobs report summary:

(net revisions for July august up 45,000)

	1 month	3-mo movavg	12-mo movavg
non farm payrolls			
Sep-19	136	157	179
Sep-18	108	189	219
U3			
Sep-19	3.50%	3.60%	3.70%
Sep-18	3.70%	3.80%	4.00%
	19-Jul	19-Aug	19-Sep
household	157,288	157,878	158,269
month over month		590	391

The 21st Century Cities Initiative at Johns Hopkins invites you to:

"Caught Stealing? The pros and cons for professional sports facilities and their impact on cities"

Brad Humphreys, Professor of Economics at WVU
Wednesday, October 9, Levering Hall Glass Pavilion from 6-7:30pm. Pizza and drinks available. Please RSVP:

https://www.eventbrite.com/e/caught-stealing-the-pros-and-cons-of-subsidies-for-pro-sports-facilities-tickets-73203081387

Sneak Preview:
How do professional sports teams affect Cities' economic development?
Do stadiums boost local employment and small businesses?
Is there a case for cities to offer tax breaks?
Are there better uses for the prime real estate awarded to stadium owners?

Finance: Matching those with cash to those with ideas on how to use the cash.

Borrower → collects cash today → pays back in the future

Lender → Gives up cash today → collects cash in the future

Lender wants to get back more than she lent:

She wants something EXTRA:

Compensation for temporarily foregoing use of the funds

We can model borrowing and lending:
The Loanable Funds Model

Firms borrow from households:(They demand funds)

Households lend to Firms: (They supply funds)

Governments, borrow from households (They demand funds)

Households lend to governments: (They supply funds).

Hubbard: The market for loanable funds

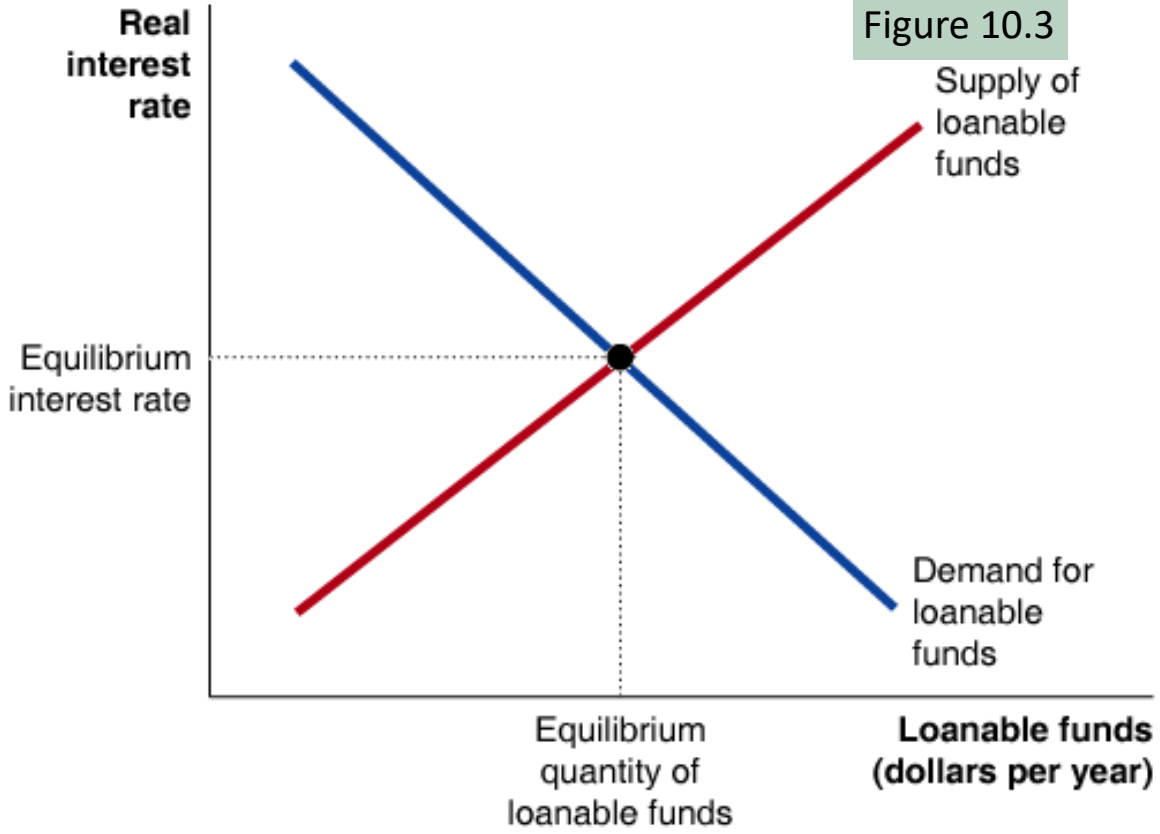
Firms borrow from households.

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.

Figure 10.3



The equilibrium real interest rate and quantity of loanable funds is determined by this supply and demand.

WHY IS THE CORPORATE DEMAND CURVE FOR FUNDS DOWNWARD SLOPING?

The Atlas Cellphone Tower Company analyses investment projects for four counties in Kenya:
The estimated revenues and non-interest costs a different for each county.
All four of the projects, however, require funding of $200,000—IN EACH CASE $200,000 IS BORROWED.
The loans will be paid back over the useful life of the cell towers, 11 years.

A simple bond financing, and the borrower pays interest each year,

and returns the principle at the end of the loan transaction.

Mortgage financing means you pay interest and part of the principle back, paying the same dollar amount for the length of the loan.

	$200,000 mortgage
	11-years of duration
	annual payment:
at 5%	**$23,700**
at 10%	**$30,000**
at 15%	**$37,500**
at 20%	**$45,000**

We consider the revenues and costs (excluding interest) of each African County:

	Estimated Annual Revenues	Estimated Annual Costs (excluding interest payments)	annual profits before interest payments
ATTU	$ 140,000	$ 87,000	$ 53,000
BATTU	$ 130,000	$ 90,000	$ 40,000
DATTU	$ 122,000	$ 91,000	$ 31,000
RATTU	$ 118,000	$ 94,000	$ 24,000

Now lets consider the 4 possible investment projects, including the costs we will incur to borrow the $200,000. Consider a 5% and a 10% cost of borrowed funds.

	Estimated Annual Revenues	Estimated Annual Costs (excluding interest payments)	annual profits before interest payments	annual debt payments at 5% per year	profits after interest payments
ATTU	$ 140,000	$ 87,000	$ 53,000	$ 23,700	$ 29,300
BATTU	$ 130,000	$ 90,000	$ 40,000	$ 23,700	$ 16,300
DATTU	$ 122,000	$ 91,000	$ 31,000	$ 23,700	$ 7,300
RATTU	$ 118,000	$ 94,000	$ 24,000	$ 23,700	$ 300

	Estimated Annual Revenues	Estimated Annual Costs (excluding interest payments)	annual profits before interest payments	annual debt payments at 10% per year	profits after interest payments
ATTU	$ 140,000	$ 87,000	$ 53,000	$ 30,000	$ 23,000
BATTU	$ 130,000	$ 90,000	$ 40,000	$ 30,000	$ 10,000
DATTU	$ 122,000	$ 91,000	$ 31,000	$ 30,000	$ 1,000
RATTU	$ 118,000	$ 94,000	$ 24,000	$ 30,000	$ (6,000)

Lets also consider the 4 investment projects, if we must pay either 15% or 20% to secure the needed $200,000:

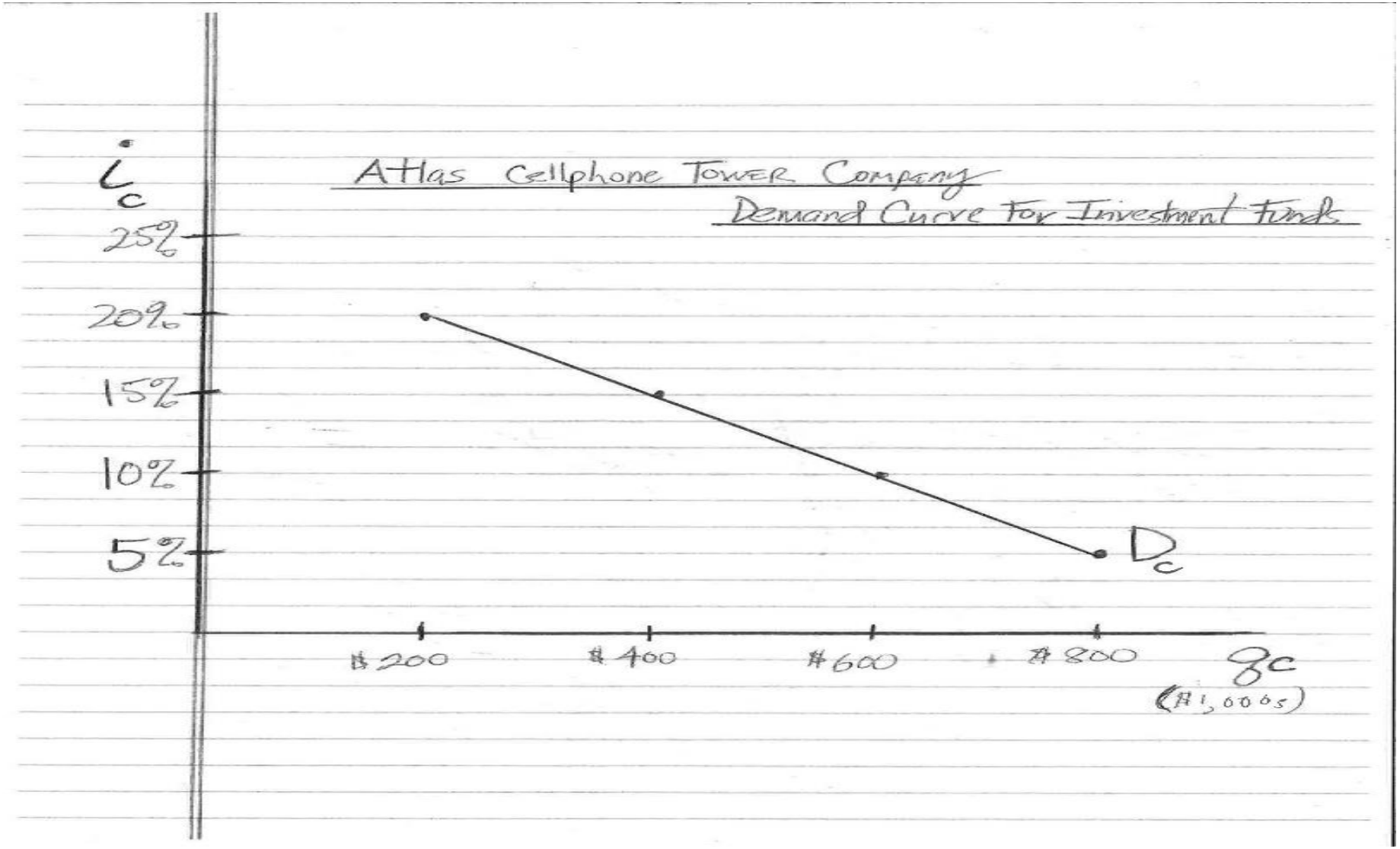
	Estimated Annual Revenues	Estimated Annual Costs (excluding interest payments)	annual profits before interest payments	annual debt payments at 15% per year	profits after interest payments
ATTU	$ 140,000	$ 87,000	$ 53,000	$ 37,200	$ 15,800
BATTU	$ 130,000	$ 90,000	$ 40,000	$ 37,200	$ 2,800
DATTU	$ 122,000	$ 91,000	$ 31,000	$ 37,200	$ (6,200)
RATTU	$ 118,000	$ 95,000	$ 23,000	$ 37,200	$ (14,200)

	Estimated Annual Revenues	Estimated Annual Costs (excluding interest payments)	annual profits before interest payments	annual debt payments at 20% per year	profits after interest payments
ATTU	$ 140,000	$ 87,000	$ 53,000	$ 45,000	$ 8,000
BATTU	$ 130,000	$ 90,000	$ 40,000	$ 45,000	$ (5,000)
DATTU	$ 122,000	$ 91,000	$ 31,000	$ 45,000	$ (14,000)
RATTU	$ 118,000	$ 95,000	$ 23,000	$ 45,000	$ (22,000)

We can now tally up the Cell Tower's demand for funds, a function of the interest rate they must pay for the funds:

annual debt payments at 5% per year	profits after interest payments	demand for funds to build towers
$ 23,700	$ 29,300	$ 200,000
$ 23,700	$ 16,300	$ 200,000
$ 23,700	$ 7,300	$ 200,000
$ 23,700	$ 300	$ 200,000
		$ 800,000
annual debt payments at 10% per year	profits after interest payments	
$ 30,000	$ 23,000	$ 200,000
$ 30,000	$ 10,000	$ 200,000
$ 30,000	$ 1,000	$ 200,000
$ 30,000	$ (6,000)	$ -
		$ 600,000
annual debt payments at 15% per year	profits after interest payments	
$ 37,200	$ 15,800	$ 200,000
$ 37,200	$ 2,800	$ 200,000
$ 37,200	$ (6,200)	$ -
$ 37,200	$ (14,200)	$ -
		$ 400,000
annual debt payments at 20% per year	profits after interest payments	
$ 45,000	$ 8,000	$ 200,000
$ 45,000	$ (5,000)	$ -
$ 45,000	$ (14,000)	$ -
$ 45,000	$ (22,000)	$ -
		$ 200,000

We can draw a demand curve, for funds:

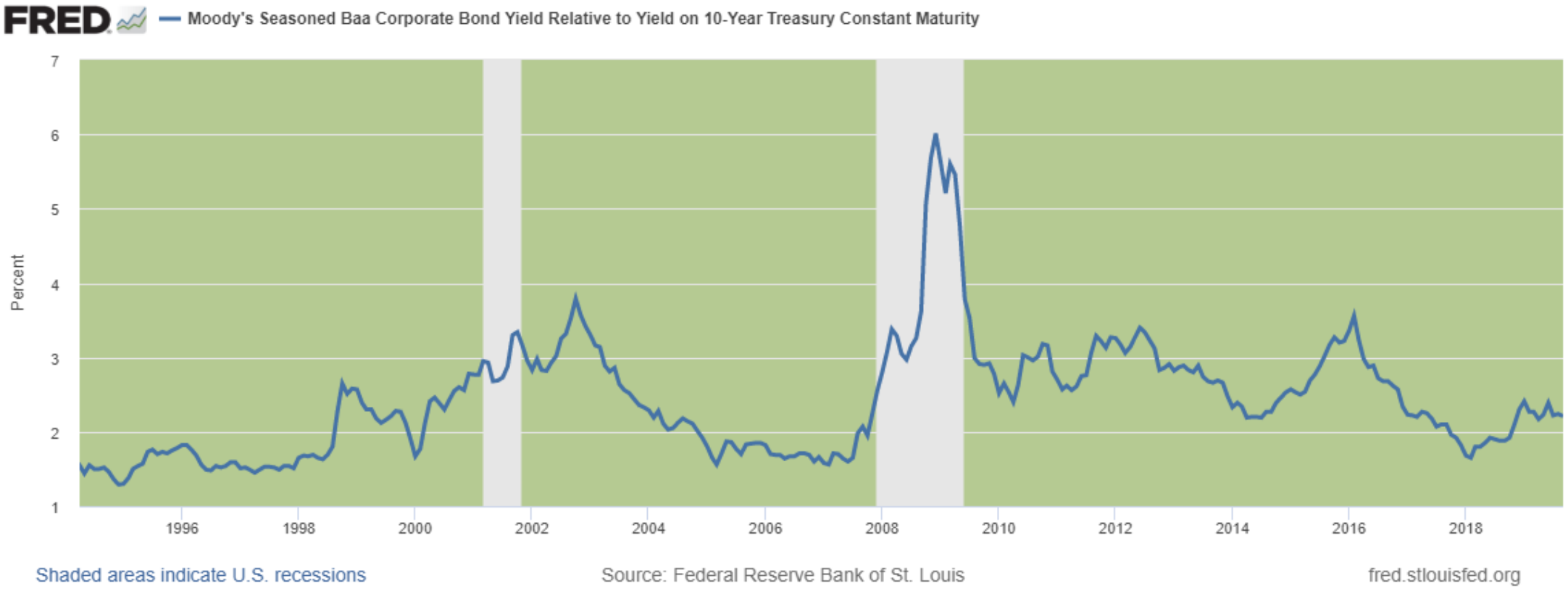


What about households willingness to supply funds?

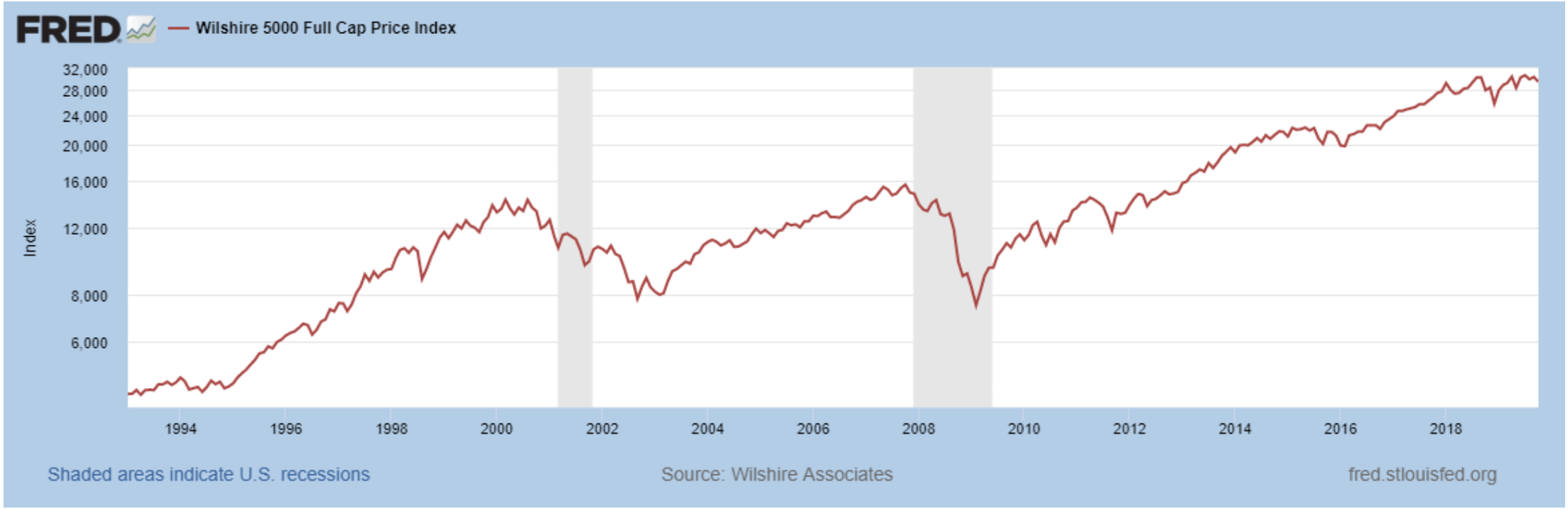
- **RISK FREE:** U.S. government 10-year
- **RISKY: Baa bonds,** 10-year note from IBM
- **Very risky: Junk bonds** 10-year note from Tesla

The *risky/risk free spread:* the interest rate on risky bonds minus the interest rate on risk free bonds.

Note: risky/risk free spreads leap in recessions, recede as the economy improves.



Wilshire	Stock	Index				
	1993	2000	2002	2007	2009	2019
index level	4300	14,300	7,800	15,700	7,474	30,351
Period to Period, %Δ		233%	-45%	101%	-52%	306%
Annualized %Δ		19%	-26%	15%	-31%	15%



Nobel Prize in Economics, 2013: Eugene Fama vs. Robert Shiller

- Eugene Fama, University of Chicago:
  - Markets are efficient, most of the time.
  - The centerpiece of 'freshwater economics'

- Robert Shiller, Yale University:
  - Markets can be irrational, over long periods
  - Acceptable commentary at 'saltwater schools'

Efficient market hypothesis (EMH)

- An efficient financial market is one in which security prices always fully reflect the available information.
  - As news emerges, investors buy or sell assets, as the news flow changes opinion about the future.
  - This happens nearly instantly, making it very hard to profit from trading on emerging news.

Efficient Market Hypothesis: Three Assertions

- 1. Investors are assumed to be rational.
- 2. If irrational, their actions are random and cancel.
- 3. If irrational in similar ways, rational SPECULATORS reverse their effects on asset prices.

From the vantage point of a household investor

- You purchase a t-note from the treasury
- You give the treasury $100
- You receive $2 in interest for 10 years.
- After 10 years, you are paid back your $100

You have the right to sell your t-note.
What forces will influence the price you can get for you t-note?

- Your t-note has a coupon of 2%

  That means it pays $2 in interest, on a $100 loan
- Suppose war breaks out in the Middle East and oil goes to $115 per barrel. Suppose further this leads many people to expect much higher inflation.
- Ernie, when he began to include inflation in his thinking about lending money, demanded a higher nominal interest rate, when his expectation for inflation rose.
- Suppose people now believe inflation will rise and the government now has to pay 3% to borrow money for 2 years.
- Why would someone buy your bond, with $2 in interest, when a $3 in interest bond is now being offered by the government?

A KEY FINANCE REALITY:
WHEN BOND PRICES GO DOWN, YIELDS GO UP!

- YOU OWN A $2 PER YEAR BOND, AT A PRICE OF $100

- SUPPOSE YOU SELL IT FOR $20.

- SOMEONE COLLECTING $2 PER YEAR, ON A $20 INVESTMENT IS BEING PAID MUCH MORE THAN 2%

  (If we ignore the principle repayment, $2 per year on a $20 loan is 10%)

- Notice what happened: the price on the bond you are selling went down. That instantly translates to the yield on the bond you are selling going up.

More Generally: What drives bond prices up and down and bond yields down and up?

- In 1962, 10-year t-note yields were 4%
- In 1980, 10-year t-note yields were 13%
- In 1993, 10-year t-note yields were 5.5%
- In 1999, 10-year t-note yields were 6.5%

Bond yields: driven by inflation and real growth expectations

- The Fisher Equation
- $i = r + \pi$
- Interest rate= real rate + inflation rate

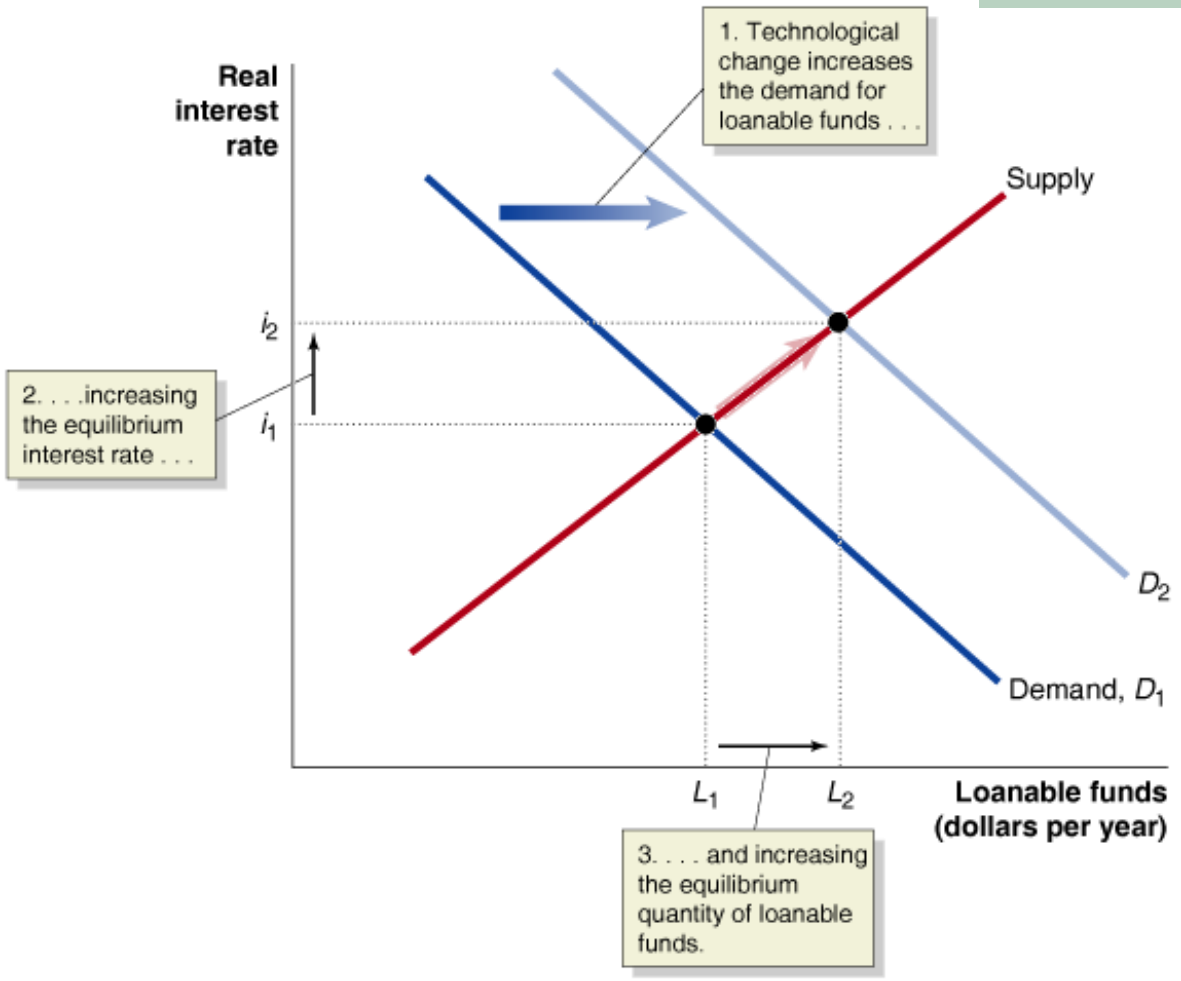
Repeat Slide: Real activity jumps, real interest rates rise.

Suppose that technological change occurs, so that investments become more profitable for firms.

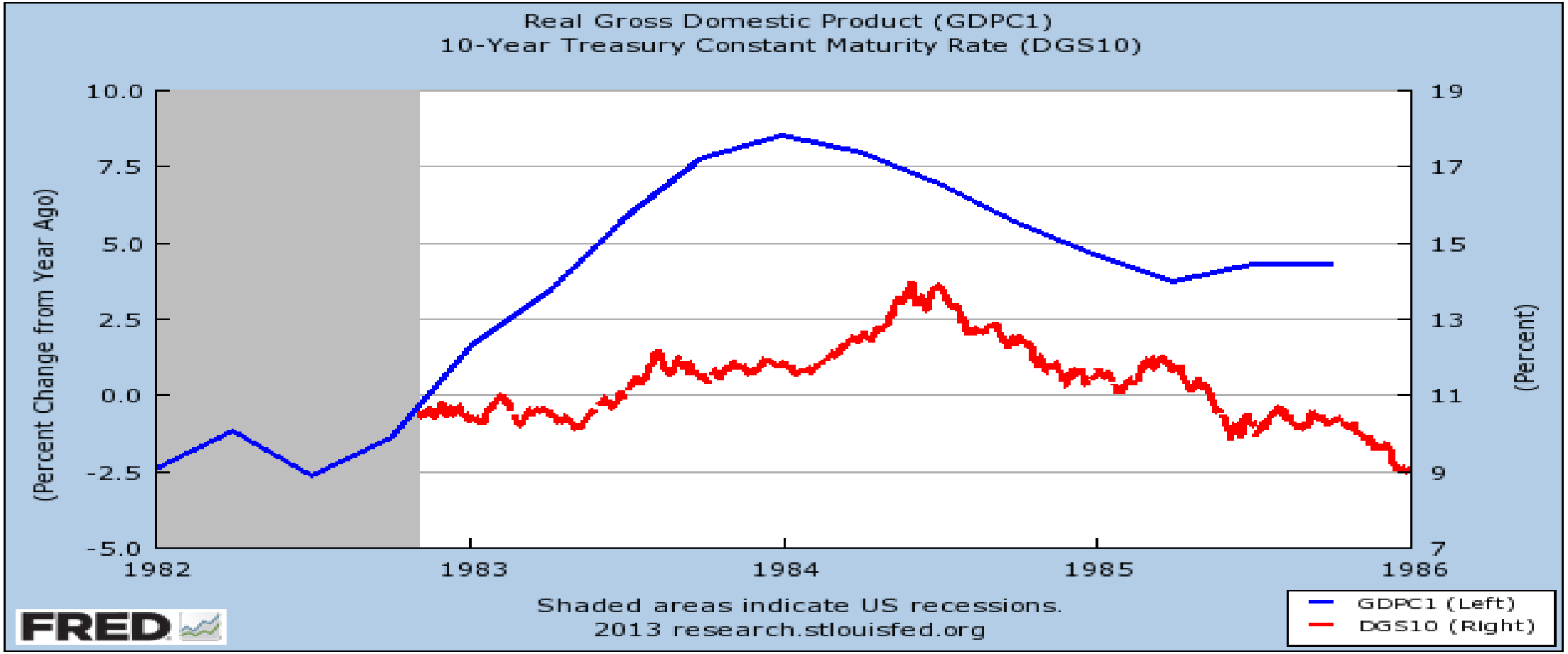
This will increase the demand for loanable funds.

The real interest rate will rise, as will the quantity of funds loaned.

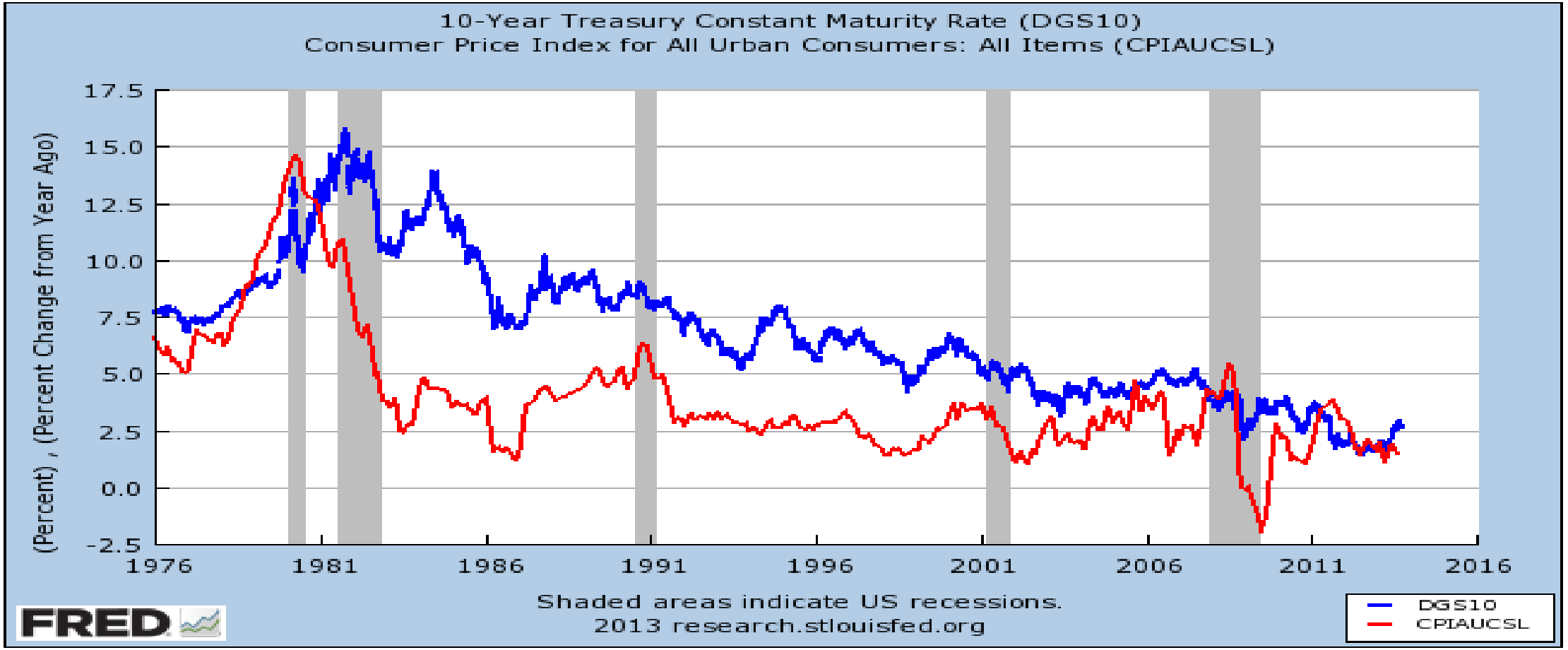
Figure 10.4



In 1983-1984, real growth soared.
In reaction, t-note yields leapt.



The Great Disinflation, 1980-2000:
As inflation expectations fell, long rates fell.



REPEAT SLIDE: What forces drive stock, bond and all other asset prices?
CHANGING EXPECTATIONS! ABOUT REAL GROWTH RATES AND INFLATION RATES
CONFIDNECE IN A GROWING ECONOMY: U.S. share prices: 800 to 1450,
PANIC ABOUT COLLAPSING ECONOMY: 1450 to 666, 2007 through early 2009. ,

Interest rate differences: Investors' Collective opinion about the FUTURE

Spreads between short-term bonds and long term bonds:

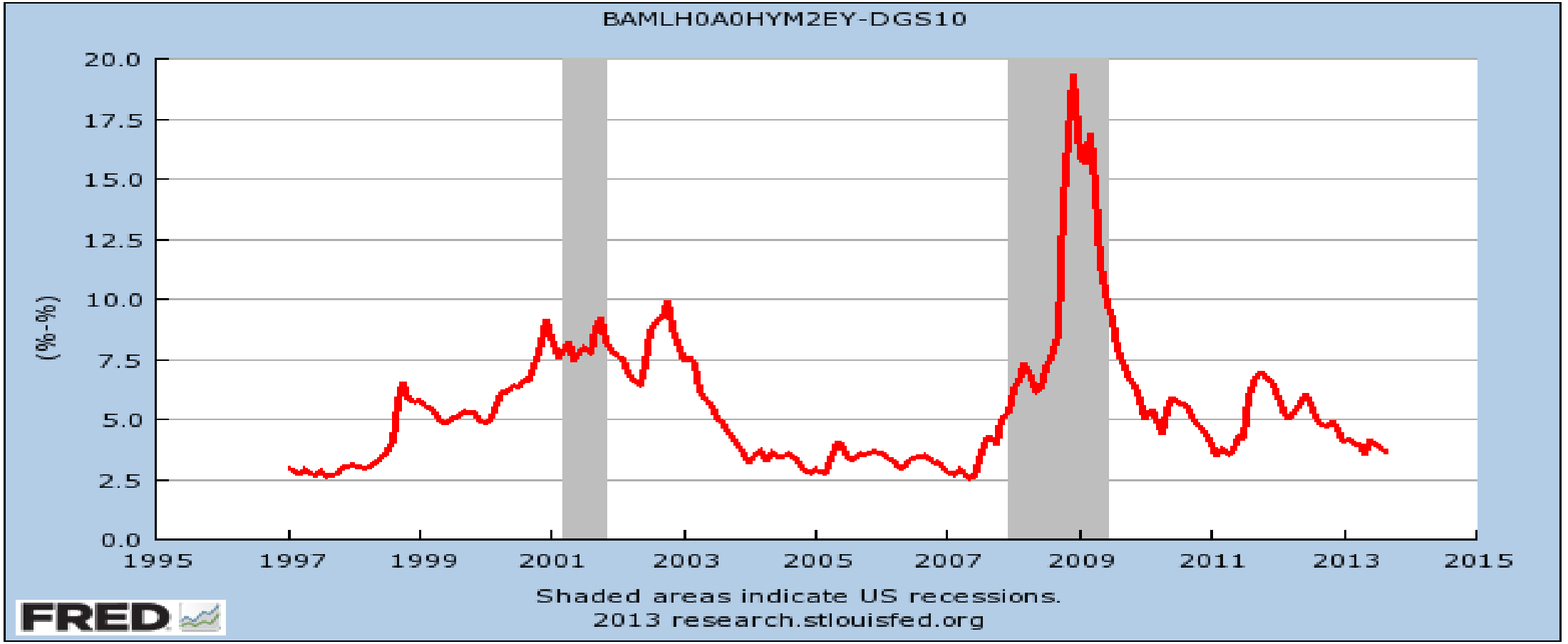
they tell us whether investors think rates are going up or down

Spreads between government bonds and company bonds:

they tell us how much risk of bankruptcy

investors see in the world

Calm periods: 2.5 percentage points more than the Treasury
Panic periods: 5PP to 20PP more than Treasury
(JUNK BOND YIELDS MINUS TREASURY BOND YIELDS)



Circling Back to our Model: Saving = Investment

Hubbard text, rejects the idea that the surge in saving in 2009 played 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**.'

The Simple Loanable Funds Model: Savings Up, the Real Interest Rate down

Blue: Firms borrow (D curve)

Red: Households lend (S curve)

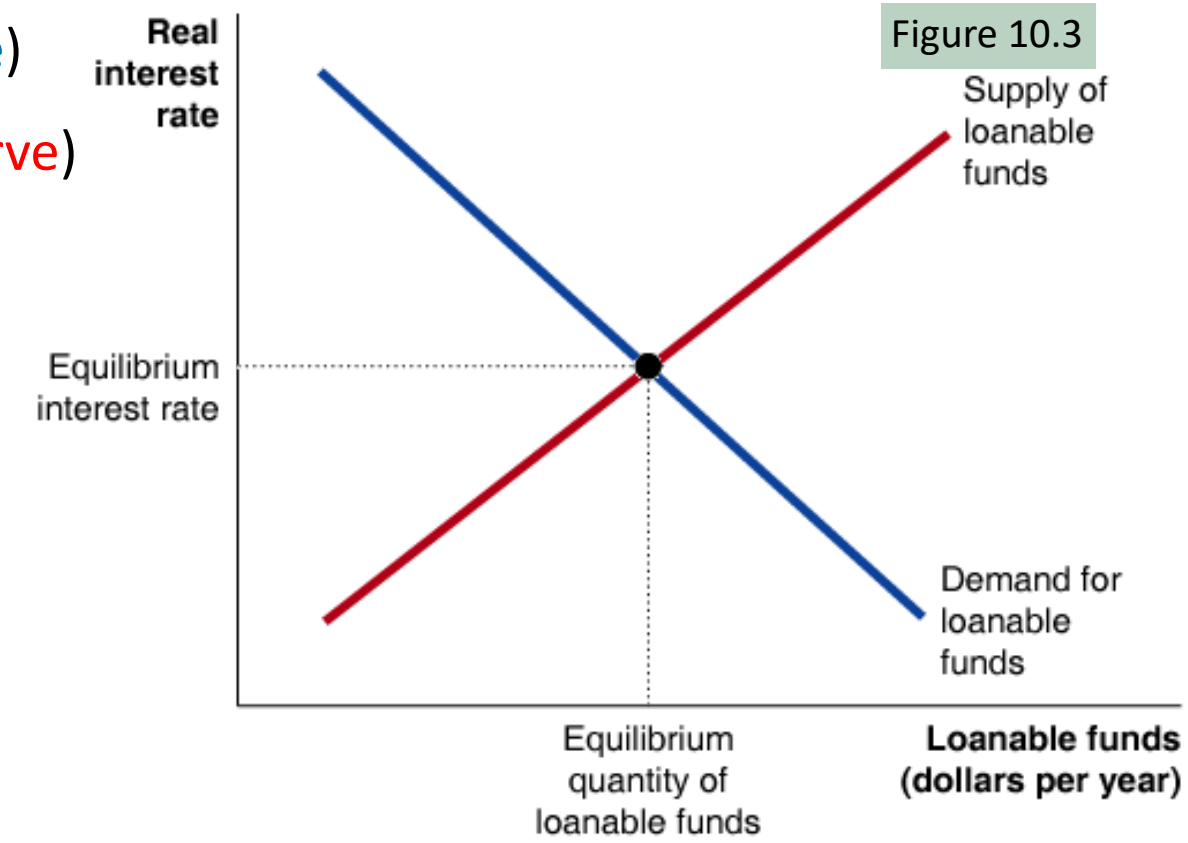
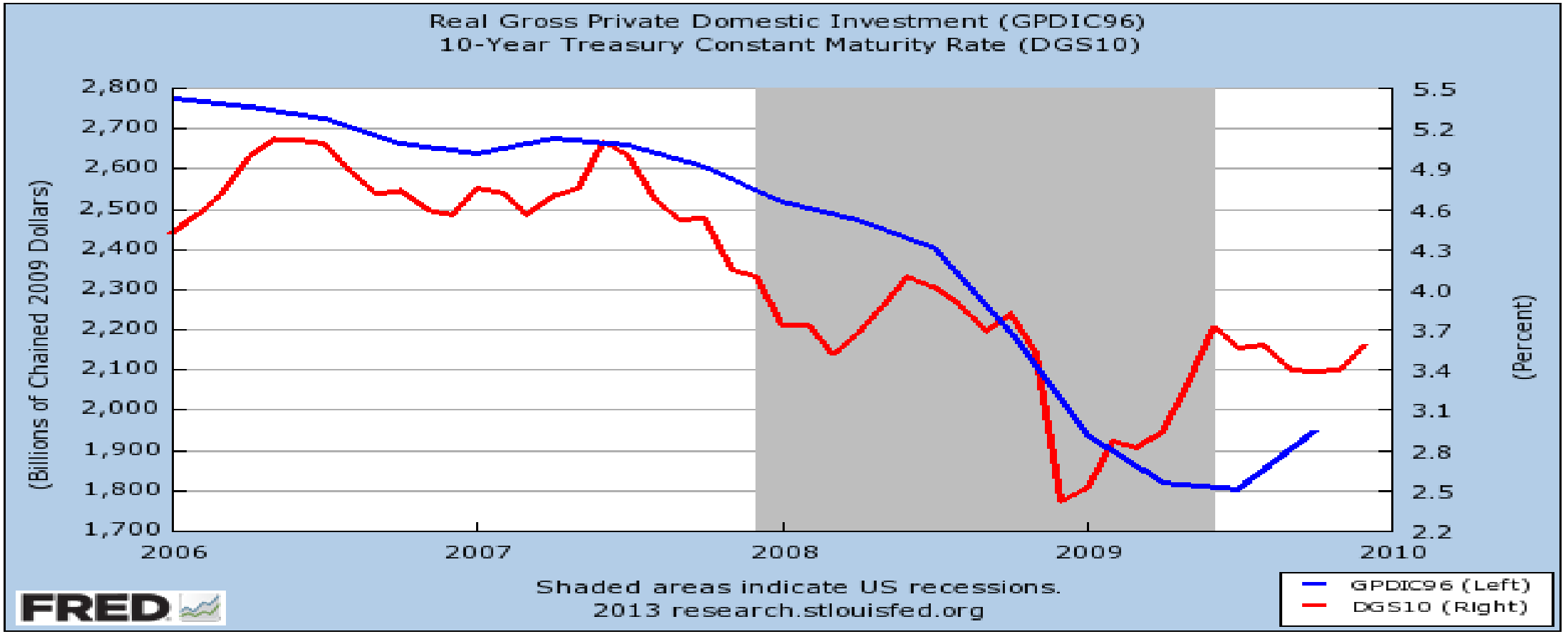


Figure 10.3

T-note rates did plunge in 2009. But investment plunged as well!



A more THOROUGH look at the world of finance
rejects the SIMPLE loanable funds model.

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

- GOVERNMENT BORROWING RATES PLUNGED AS SAVERS BOUGHT SAFE BONDS

COMPANY BORROWING RATES SOARED!

We Need to understand Household investment choices!

- investors violently change their demand for risky assets vs. risk free assets
- That means risky interest rates LEAP
- That means investment plunges

We can expand on our loanable funds model, to include the issue of risk

- Definitions:

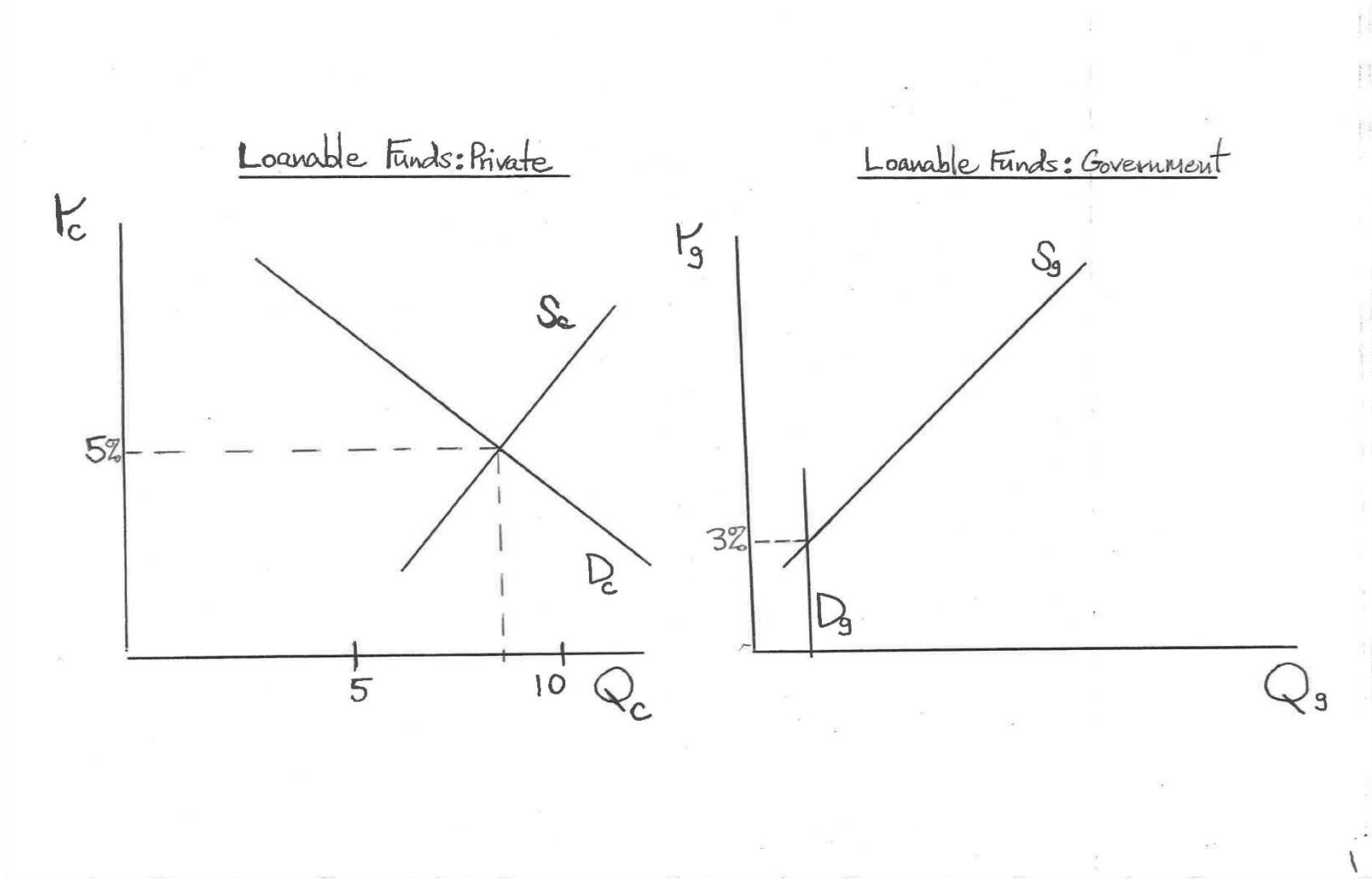
  r_c = real, long-term, corporate borrowing rate
  (inflation-adjusted interest rate risky borrowers pay for 10-year money)

  r_g = real, long-term, government borrowing rate
  (inflation-adjusted interest rate the government pays for 10-year money)

  S_c = households' supply of funds to corporations

  S_g = households' supply of funds to the government

The Loanable Funds Model: Expanding on the Basic Diagram



Why is D_c downward sloping? Remember the Cell Tower Co. Why is D_g a vertical line?

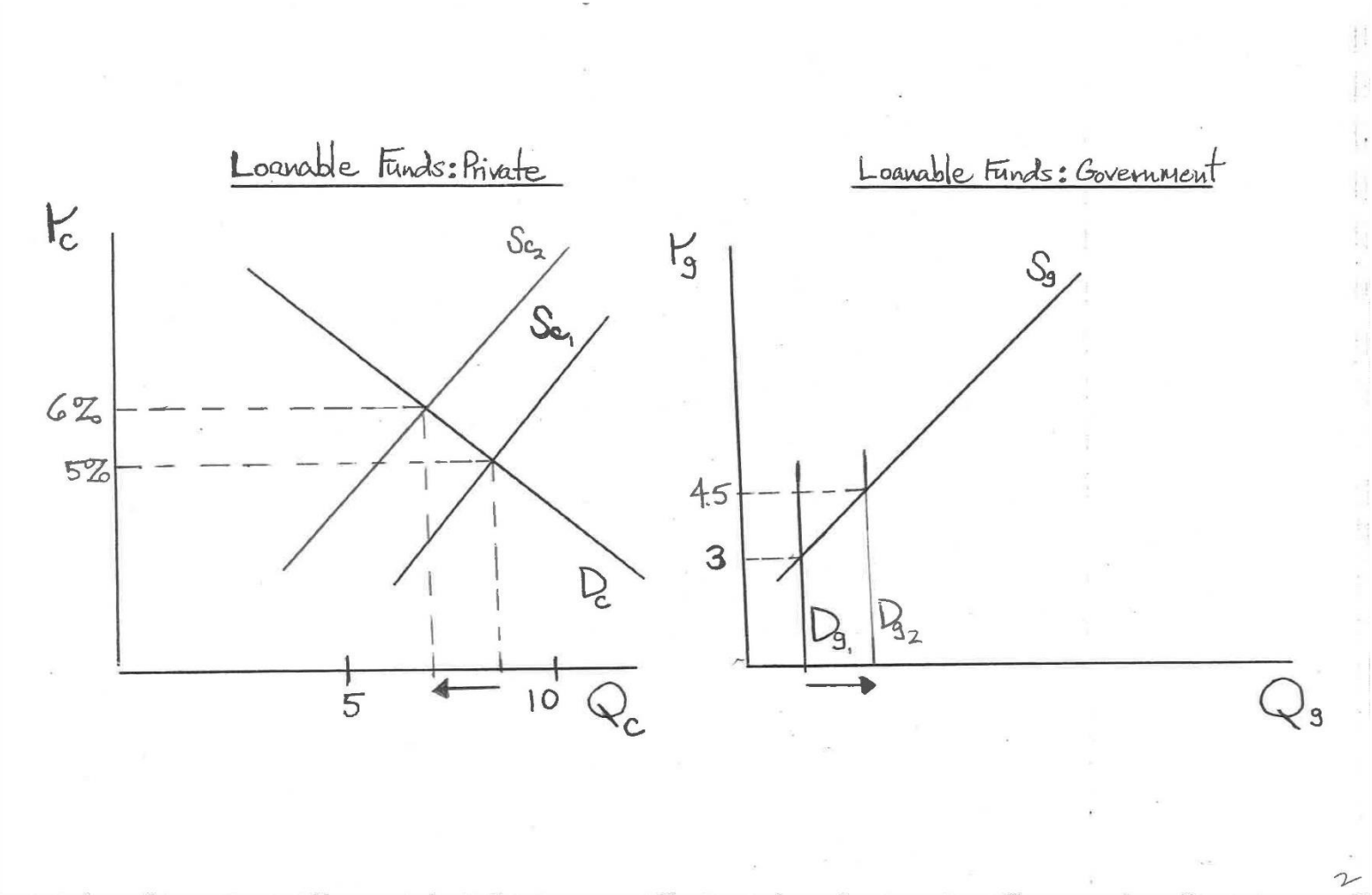
- D_g, the government demand for loanable funds, ignores the level of interest rates.

  If rates jump they borrow to pay for social security, defense, etc.

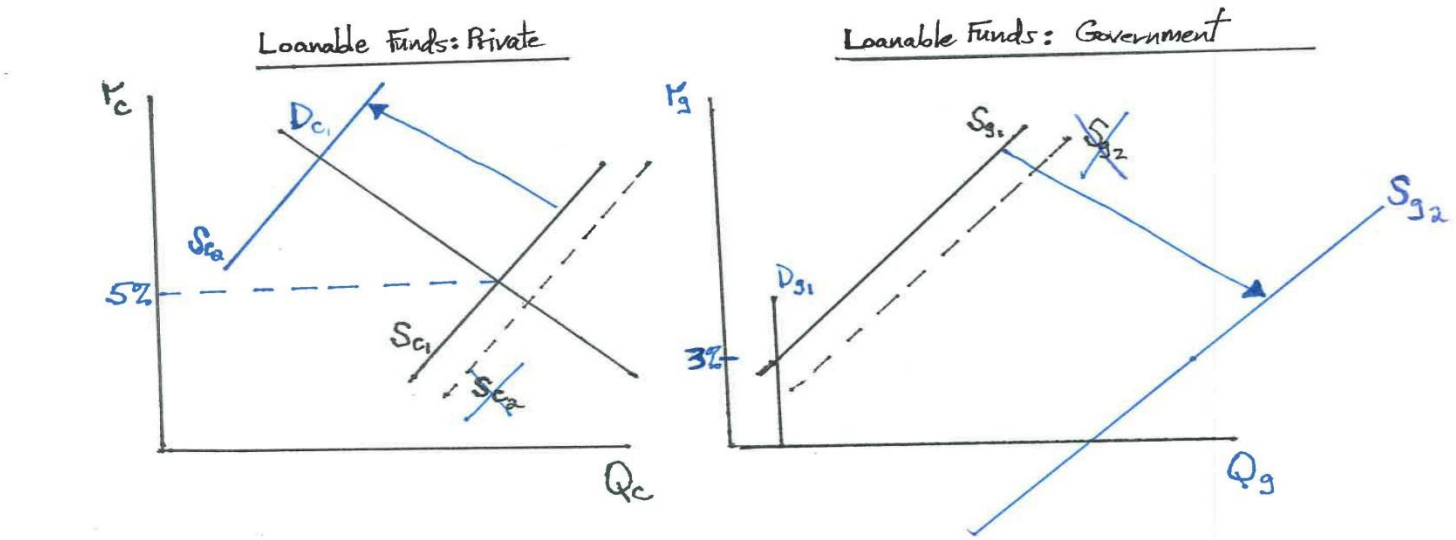
  the government borrows to pay its bills, Irrespective of the interest rate.

	at 3%	at 4%	at 5%
social security	$500b	$500b	$500b
medicare	$400b	$400b	$400b
defense	$200b	$200b	$200b
interest	$100b	$100b	$100b
total	$1,200b	$1,200b	$1,200b

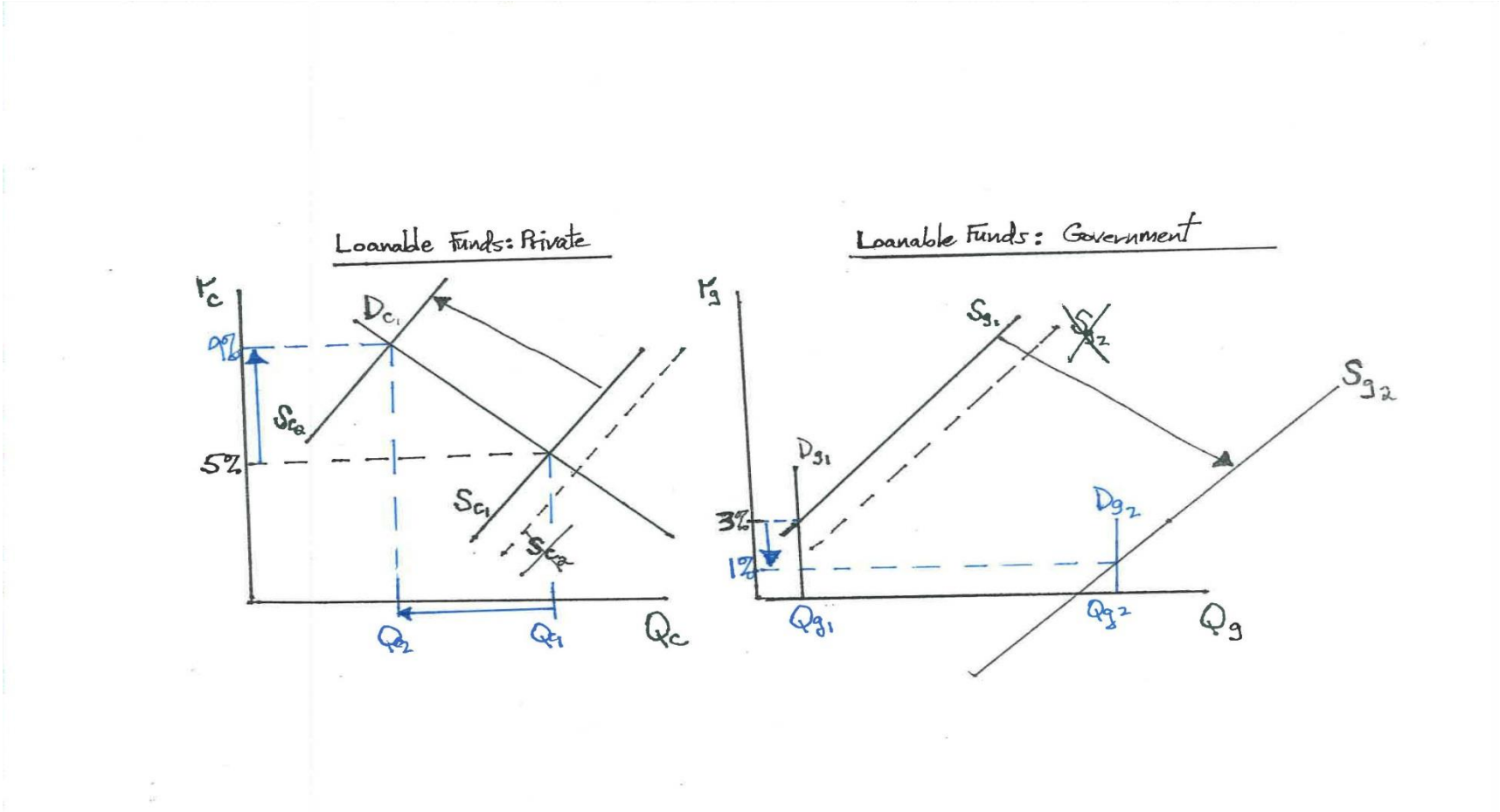
The Loanable Funds Model: Expanding on Crowding Out



What happens when we are in an economic crisis?
Households saving leaps. But the increased savings supply goes to SAFE government debt:
Amid panic, households radically reduce their willingness to fund corporations, S_c plunges.



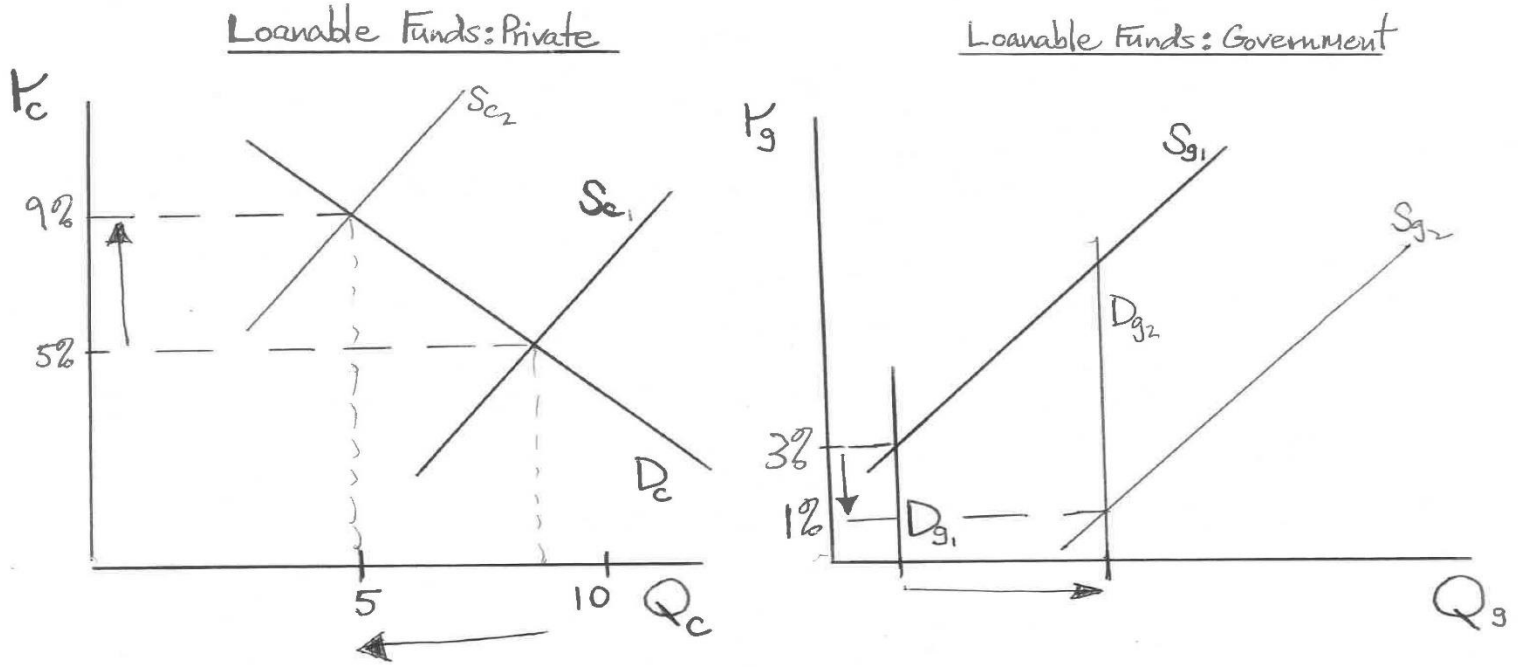
The Corporate borrowing rate, r_c soars, and lending to corporations, $Q_{c,}$ plunges.
Government borrowing, Q_g soars, as tax collections plunge and transfers leap.
Nonetheless, the government borrowing rate, r_g , plunges.



Equilibrium in 2009:

r_c much higher // Q_c much lower

r_g much lower // Q_g much higher



Now we have a model that squares with the 2008-2009 Great Recession