The Loanable Funds Model

Interest rate determination

You want to get this right so you can stay here ...

About the exam coming up ...

- Exam is on **Tuesday, February 18** at class time
- I will send out an a single email on Thursday. If you get extra time respond to ***that*** email.
- I will post a review video giving you guidance on the exam, possibly on Thursday, on Friday at the latest.
- There will be an online timed objective exam (T/F, MC, matching) that you will have some time to take.
- The 40-minute in-class online exam is closed book, no notes, no sharing, ***and*** it must be taken in the classroom. It can be typed and the use of laptops is allowed.
- The exam will cover only core material ... and that will be reviewed in the video.

What we will do with this 2-part lecture …

1. Discuss certain types of borrowing and financial assets (means of borrowing)
2. Describe key interest rates
3. Introduce fundamentals of the loanable funds model
4. Draw primary lessons from the use of the loanable funds model
5. Use the loanable funds model for topical applications

The major players in markets for borrowing and lending (for credit and debt)

Borrowing (DF)

Households
Credit cards, installment debt, mortgages, student loans

Businesses
Bank credit, mortgages, corporate notes and bonds

Federal Government
U.S. Treasury and Agency bills, notes and bonds

State and Local Govt.
Municipal bills, notes and bonds

Lending (SF)

Households
Savings, direct investments, retirement investments

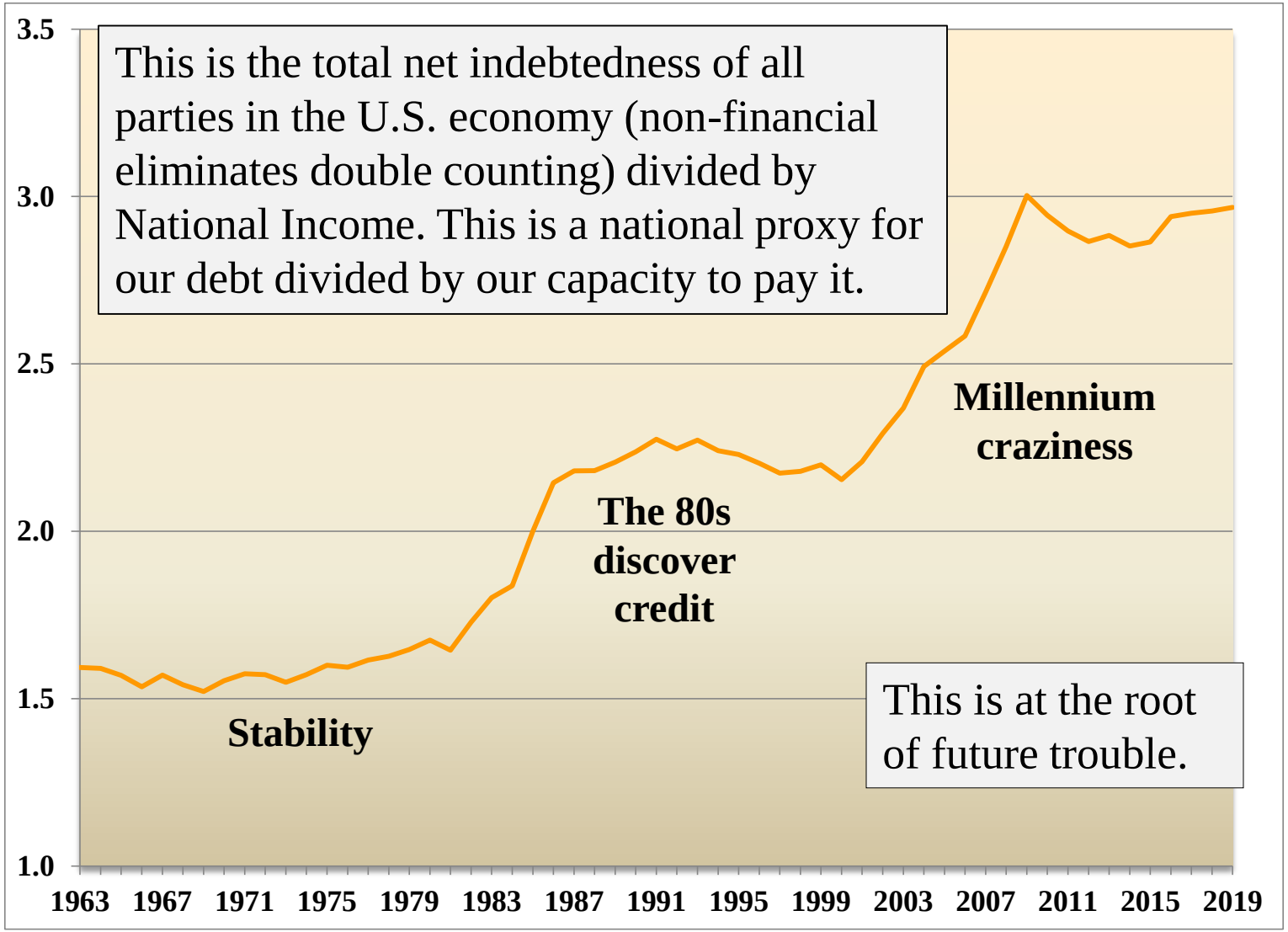
Businesses
Business savings, direct investment

Federal Reserve System
Direct unfunded credit creation

Finance Markets & Banks

Overseas borrowing from & lending to

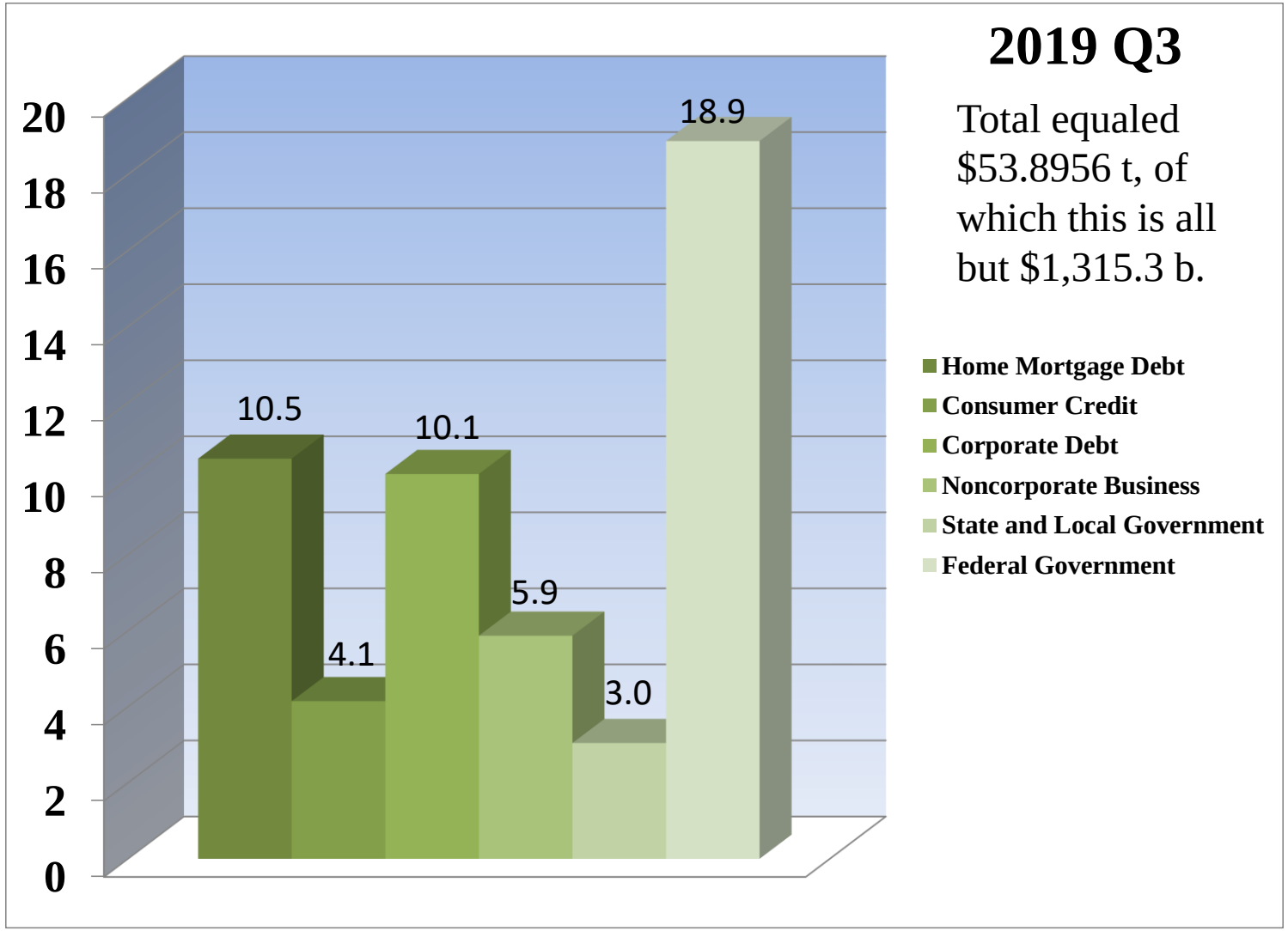
Domestic Non-financial Debt / National Income
1962-2019



Source (debt): *Federal Reserve Flow of Funds Accounts, Z1 statistical release*

$ Trillions

Net Debt Outstanding by Sector



Source: Federal Reserve Flow of Funds Z1 series, Summary Tables, D.3 Credit Market Debt Outstanding by Sector, Domestic Non-financial., 2019 Q3.

Financing the U.S. Government budget deficit

The budget deficit is financed by the sale of interest-bearing U.S. Treasury securities to the public, including corporations, financial institutions, and foreign investors, including foreign central banks of countries with which we have been running a trade deficit, like the Bank of China, OPEC funds, etc., and to the Federal Reserve System (indirectly) The securities differ largely by the maturities. These are the classes of securities sold:

U.S Treasury Securities Offered to the Public

Security	Maturity	Now Offered
Bills:	Less than one year	4,13,26 and 52 weeks
Notes:	More than one to ten years	2,3,5,7,9 and 10*
Bonds:	20 to 30 years	30 years*
Inflation Indexed:	5, 10, and 20 years	All*

*These are sometimes approximate. E.g. a 30 year bond might have a maturity of 29 years and 11 months.

These are sold at competitive interest rates and they vary from maturity to maturity and the vary over time as market interest rates change. Current UST rates will be shown in a later slide.

Note: When a debt security matures, it is "rolled over" by issuing a new one.

Total U.S. Treasury External Marketable Debt

Total Marketable Treasury Debt
(external, $ billions)
Sept 2019

Bills:	2,376.4
Notes:	9,756.0
Bonds:	2,311.5
TIPS and floating rate:	1,878.8
Total Marketable Debt:	16,322.6

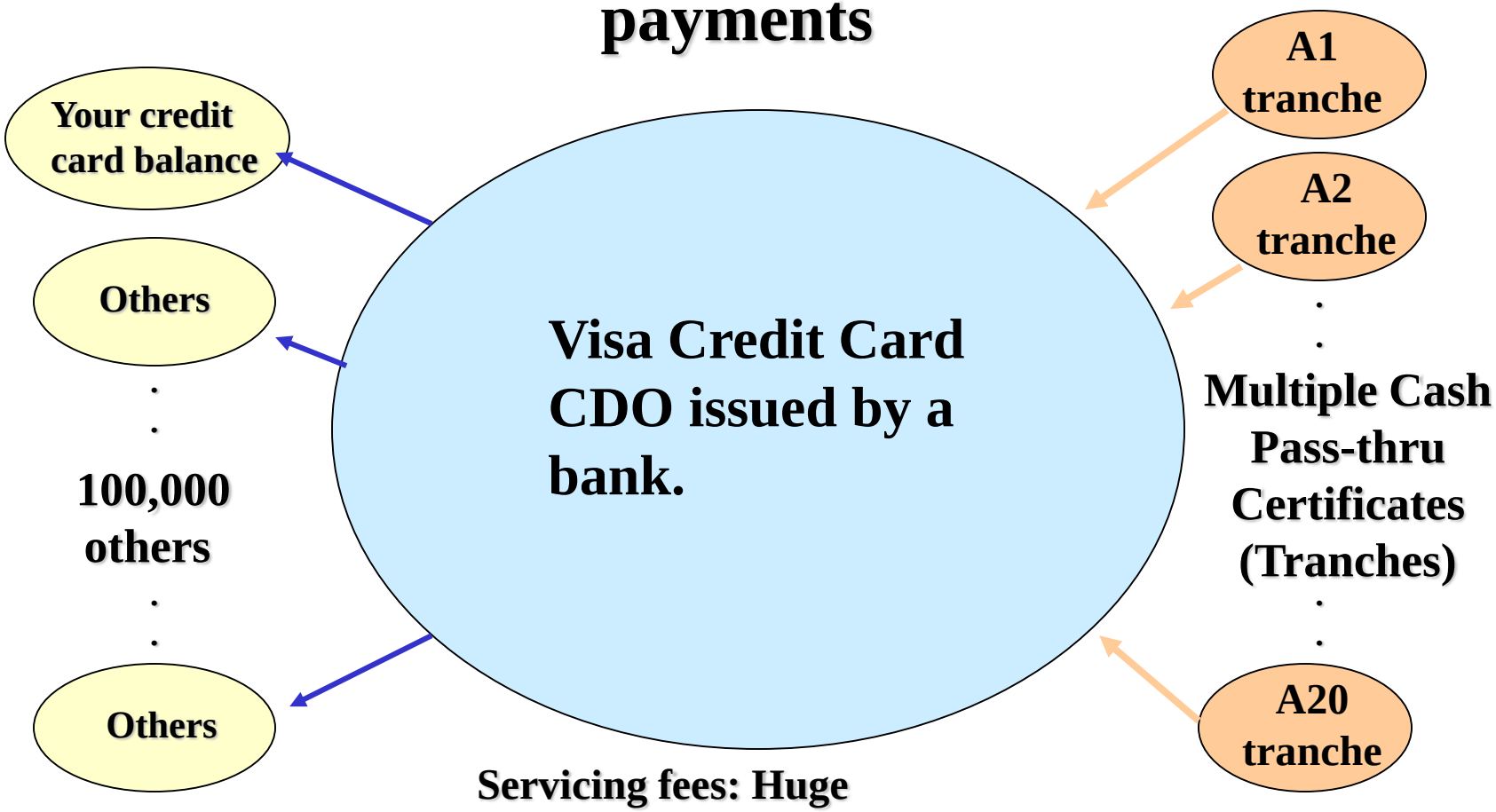
TIPS are Treasury Inflation Protected Securities.
Source: Treasury Bulletin, December 2019, Table FD-2

This is the true level of the indebtedness of the U.S. Government. It is debt owed to outside parties.

The amount shown is more than double what it was in 2006.

By this time next year, the amount will be about $16.3 trillion.

Example: CDOs that pass through interest payments



These CDOs can be repackaged and resold. A freeze-up of this market (especially in mortgages) was a significant part of the problem in 2008 - 2012.

Observations about interest rates (yields)

- There are as many interest rates as there are yield-bearing financial assets in circulation, because each has its own yield ... there is a full continuum of interest rates.
- There are two types of assets that offer interest: (1) yields on deposits in financial institutions, which are "sticky" and slow to change, and (2) the yields on marketable securities like U.S. Treasury notes or corporate bonds, which can change in value minute by minute because these securities are traded in a huge secondary market. Both classes of interest are competitive.
- *Many* of the loans that you obtain for student loans, credit cards, auto finance, mortgages, etc. were originally funded by combining the loans into huge pools of loans called ***Collateralized Debt Obligations*** which in turn are sold as (1) yield-bearing financial assets with either market-determined competitive yields and fixed maturities or (2) ***pass-thru*** securities where the investors earn the interest that you pay. [Example shown in previous slide].

... observations (continued)

- Intermediary financial institutions like banks and commercial mortgage and credit card lenders make their profits from the *spread* between their cost of funds (their deposit interest rates or the yields on the financial assets they issue) and what they charge for their loans.
- Although there are often exceptions, interest rates in general rise in fall together as market conditions change. Therefore, for the purposes of an introductory macroeconomics class, we can refer to the full spectrum of interest rates as "the interest rate" without too much loss. Theories about the full spectrum of interest rates are taught in introductory finance classes (like Econ 104).
- Generally, financial assets with higher risk have higher yields.
- Generally, financial assets with longer maturities have higher risk, hence higher yields when compared to short-term maturities.

Select key interest rates

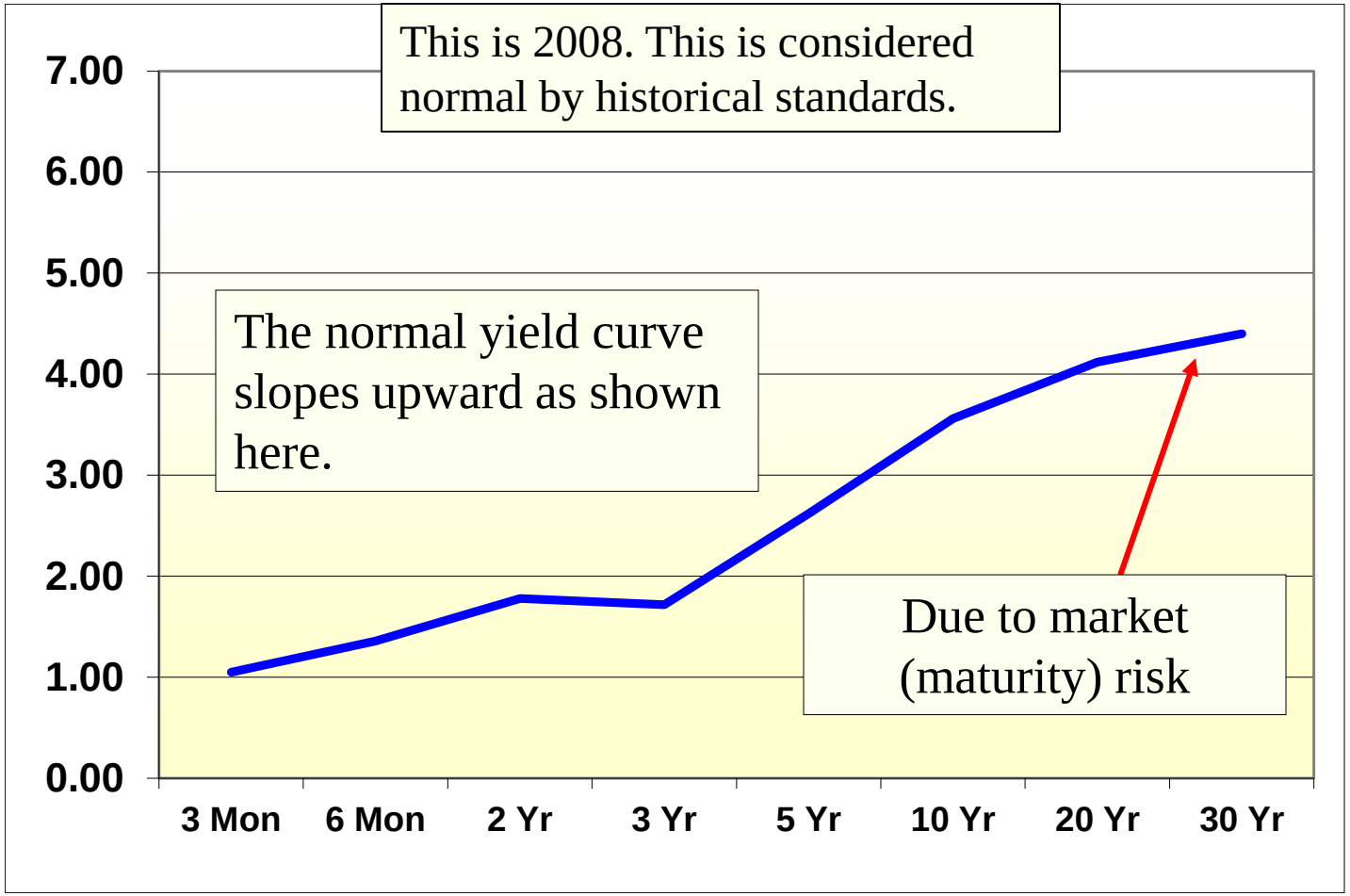
(see handout)

Deposit rates	
Savings	No maturity, low, insured
CD	Short maturity, insured
Lending rates	
Prime	Variable bank corporate base rate
Mortgage	Variable and fixed multiple maturities
Installment	High
Financial asset rates	
U.S. Treasury	Multiple maturities
10-year note	UST bellweather rate
Corporate notes/bonds	Multiple maturities, different levels risk
Municipal notes/bonds	Multiple maturities
Policy rates	
Federal Funds rate	Short-term FRS target interbank lending rate
Discount rate	Direct bank loan rate from FRS

Why interest rates matter (so much)

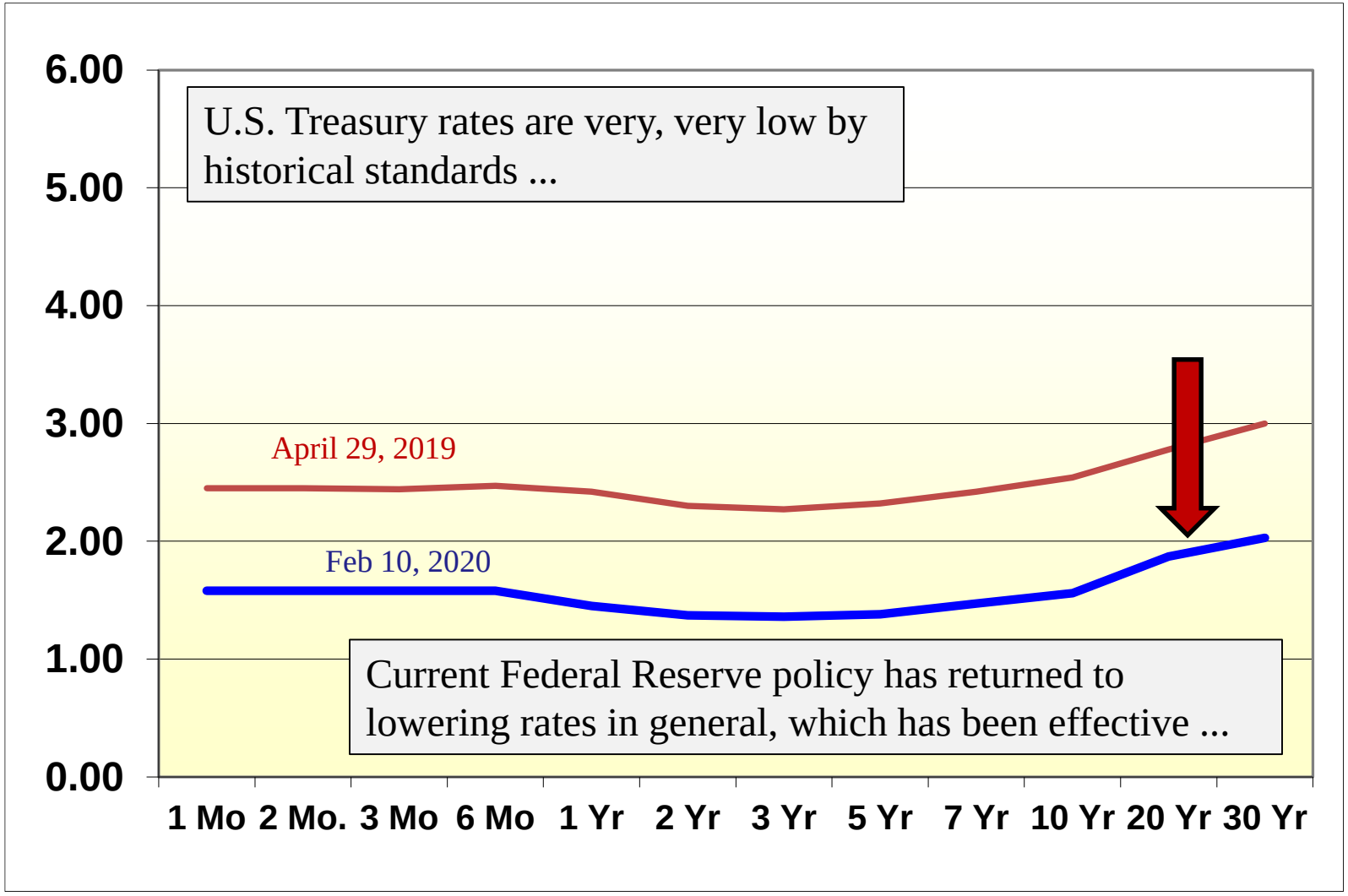
- They are the cost of credit/debt, and this is a credit-based economy if there ever was one.
  - Credit cards, consumer durables, mortgages
  - Debt service can become a problem in a country like this.
- Real estate lives and dies by interest rate levels
- They are an international barometer of national strength and price stability.
- They strongly affect the financial markets
  - When higher, generally harmful
  - Hence the wealth effect
- International capital flows strongly influenced by relative interest rates.

The U.S. Treasury Yield Curve

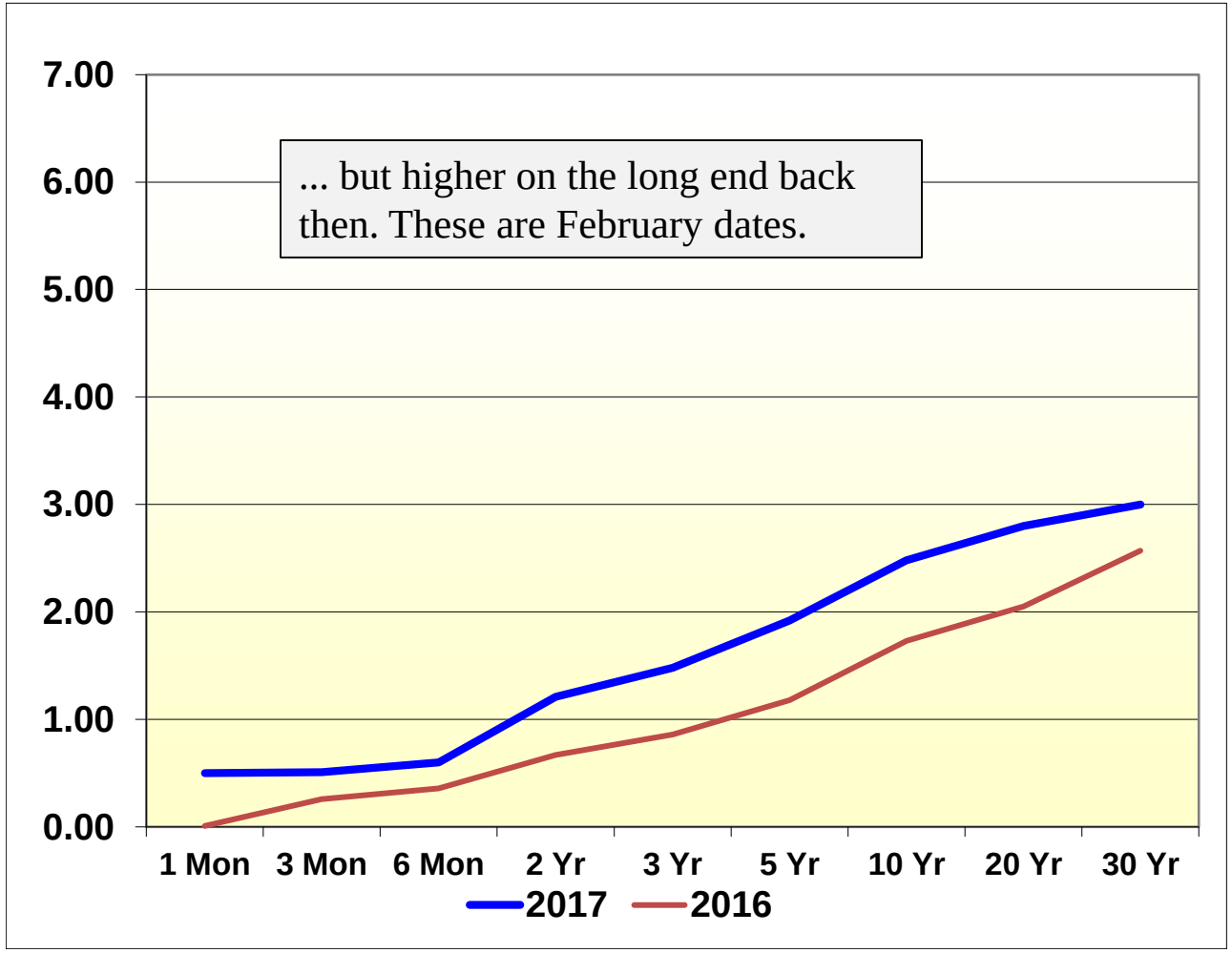


The yield curve, sometimes called the "**term structure of interest rates**" normally slopes upward as maturities lengthen. This reflects the greater market and economic risk of long-term YBFAs. Typical spreads might be 250 to 400 basis points.

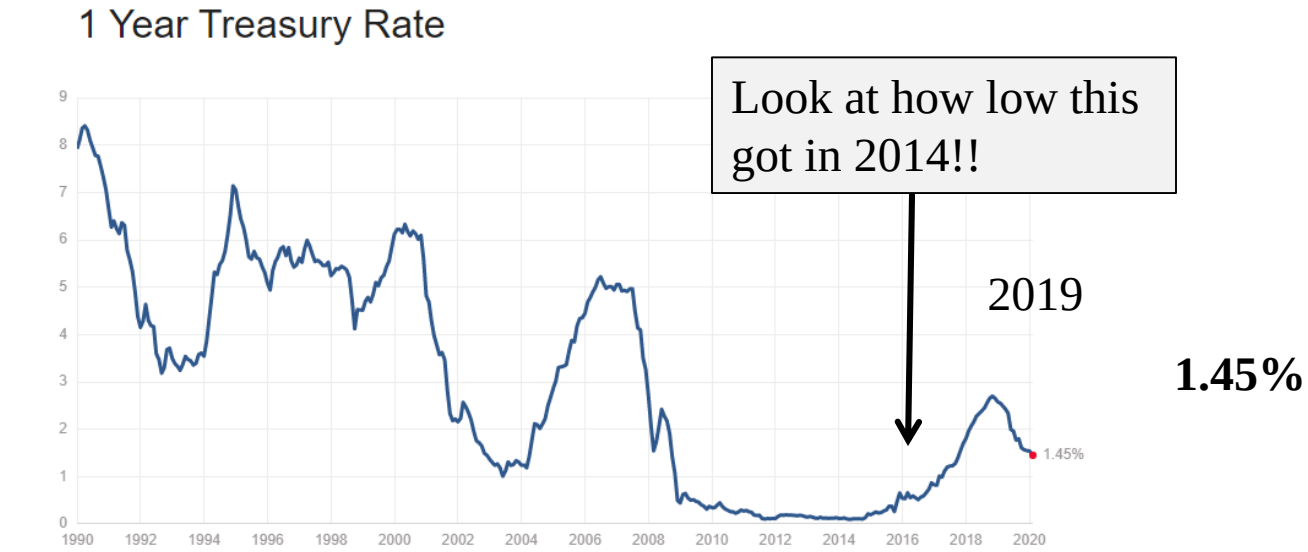
The U.S. Treasury Yield Curve Now



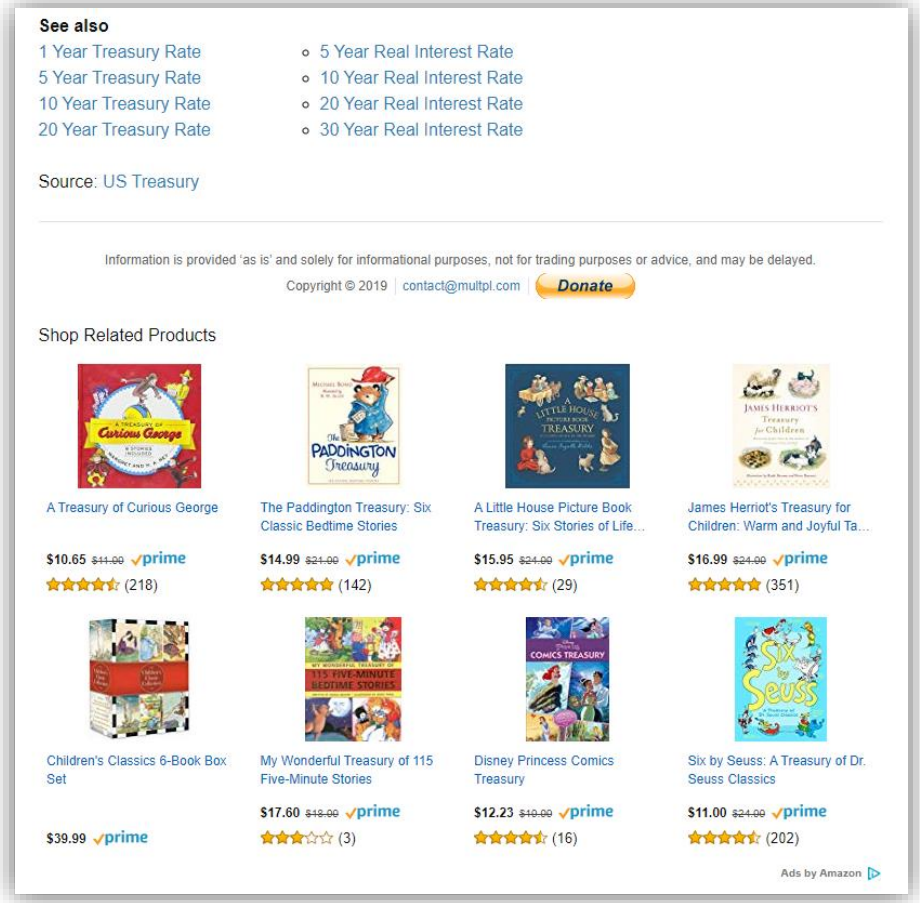
... but they have been lower on the short end!



The rates over time ...



2.03%



... and for you machine-learning experts, this is how stupid Amazon's algorithm is ...

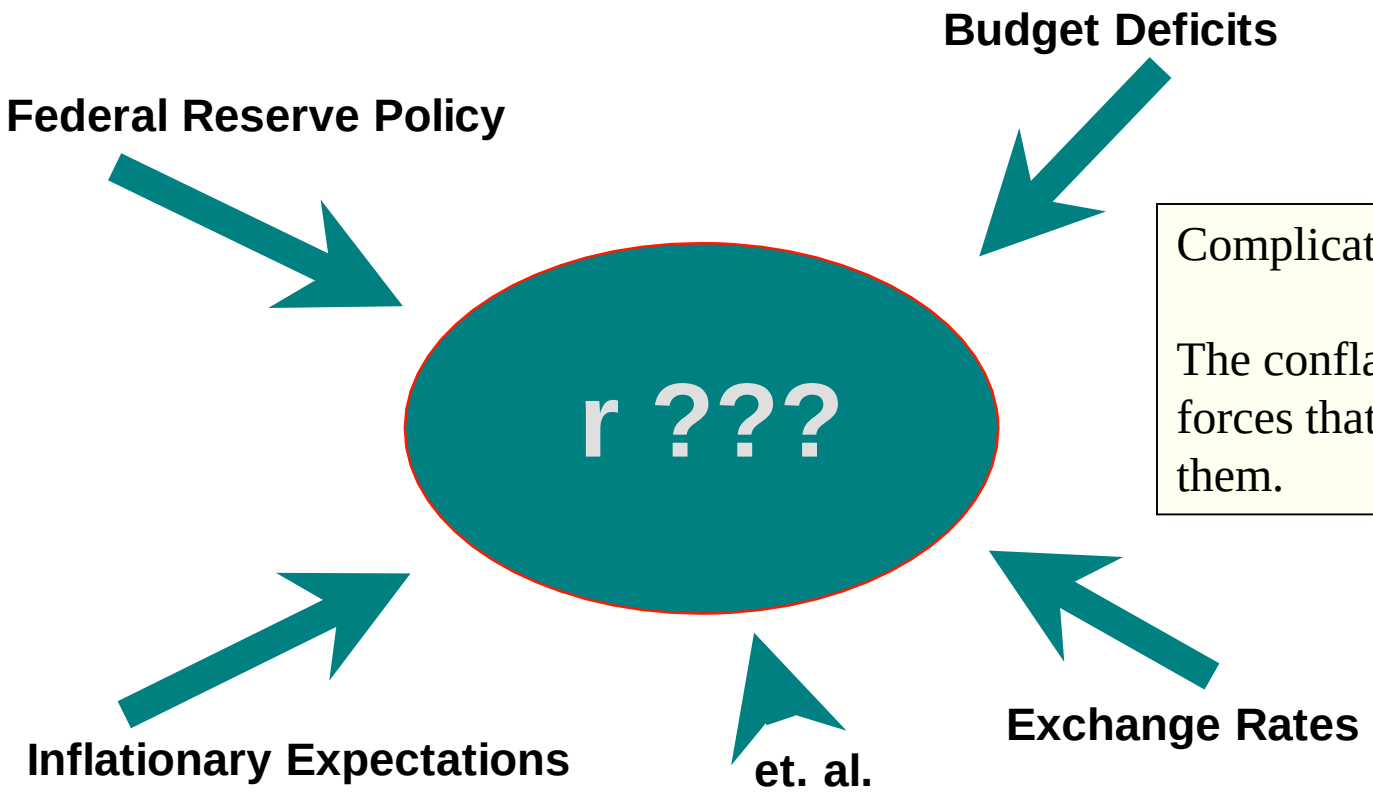
Source: www.multpl.com

The Role Played by the Federal Reserve System (FRS)

- The FRS is our nation's central banking authority (central bank), with a counterpart in every country of the world.
- The FRS is a regulatory agency whose job is to keep our banking system healthy, promote price stability (prevent inflation) and regulate interest rates to the degree possible.
- (For the purposes of this lecture) The FRS has the unrestricted ability to increase the supply of credit to this economy at any time.
  - how this is done is complicated and is covered later in the course in the lectures on open market operation in the section about monetary policy.
  - in the context of this model, we will assume that they can do this.
  - in the model, this will be shown by shifting out the supply-of-funds line

Question ...???

What determines the level of Interest Rates



Complicated answer:

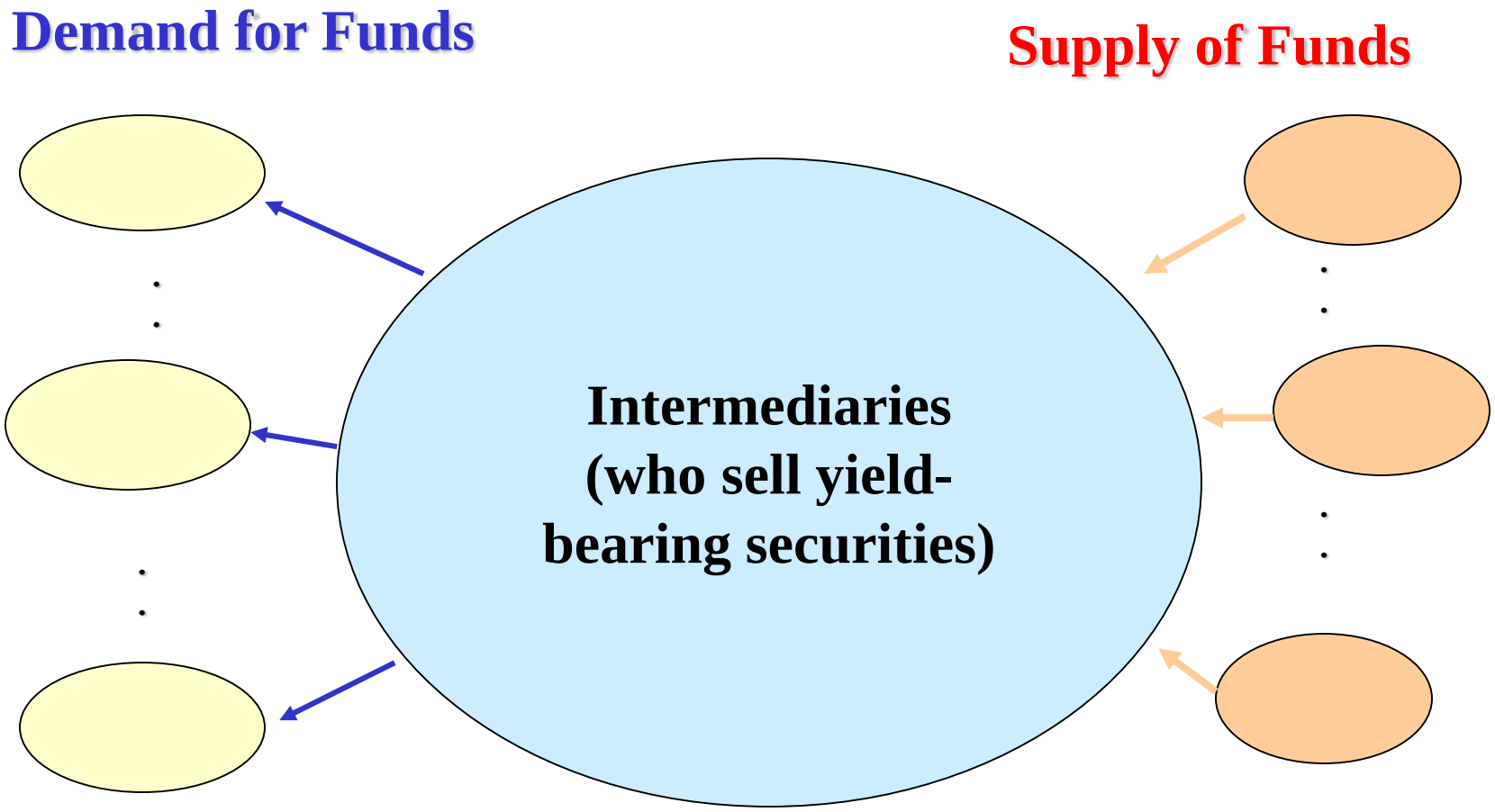
The conflation of all forces that act upon them.

... a little confusing

The demand for funds represents the desire of borrowers to borrow. They include obvious examples like consumer demand for auto loans, mortgages, and credit cards, but also U.S. Treasury borrowing through the **sales** of U.S. Treasury Securities, state and local government borrowing through the sale of municipal securities, corporate borrowing through the sale of corporate bills notes and bonds, and any and all borrowing from banks.

The supply of funds represents the desire of lenders to lend, including banks, credit card companies, and includes **purchases** of U.S. Treasury Securities, municipal securities, corporate bills, notes and bonds, and any other debt assets.

Demand and Supply of Funds in the Context of CDOs.



Borrowers through credit cards, installment loans, auto loans, leases, mortgage loans etc.

Lenders through purchases of yield-bearing securities.

Variables that effect the supply of and demand for funds

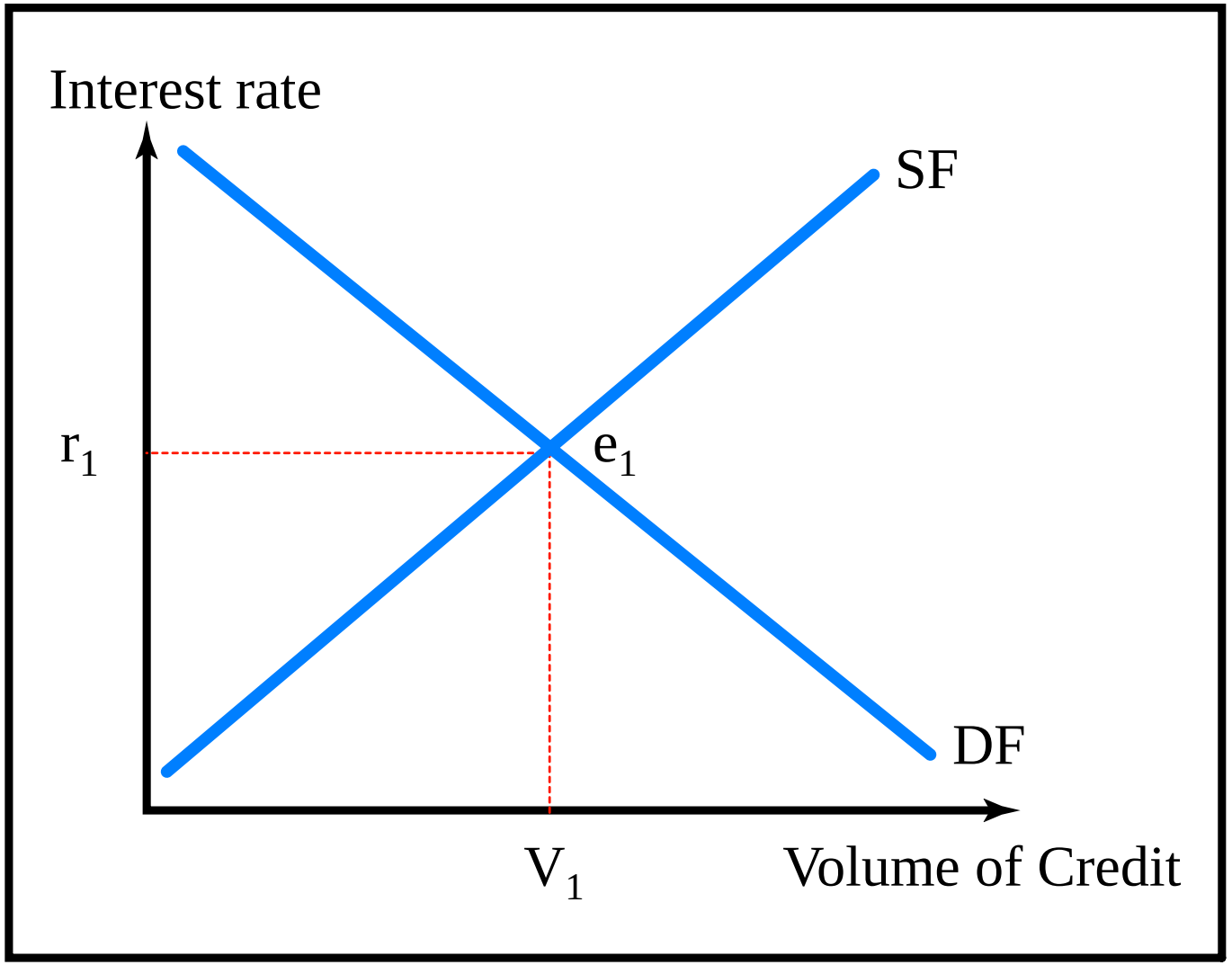
The demand for funds

1. Interest rates (-)
2. Inflationary expectations (+)
3. Budget deficits (+)
4. Corporate borrowing (+)
5. Commercial real estate (+)
6. Foreign demand for U.S. funds (+)

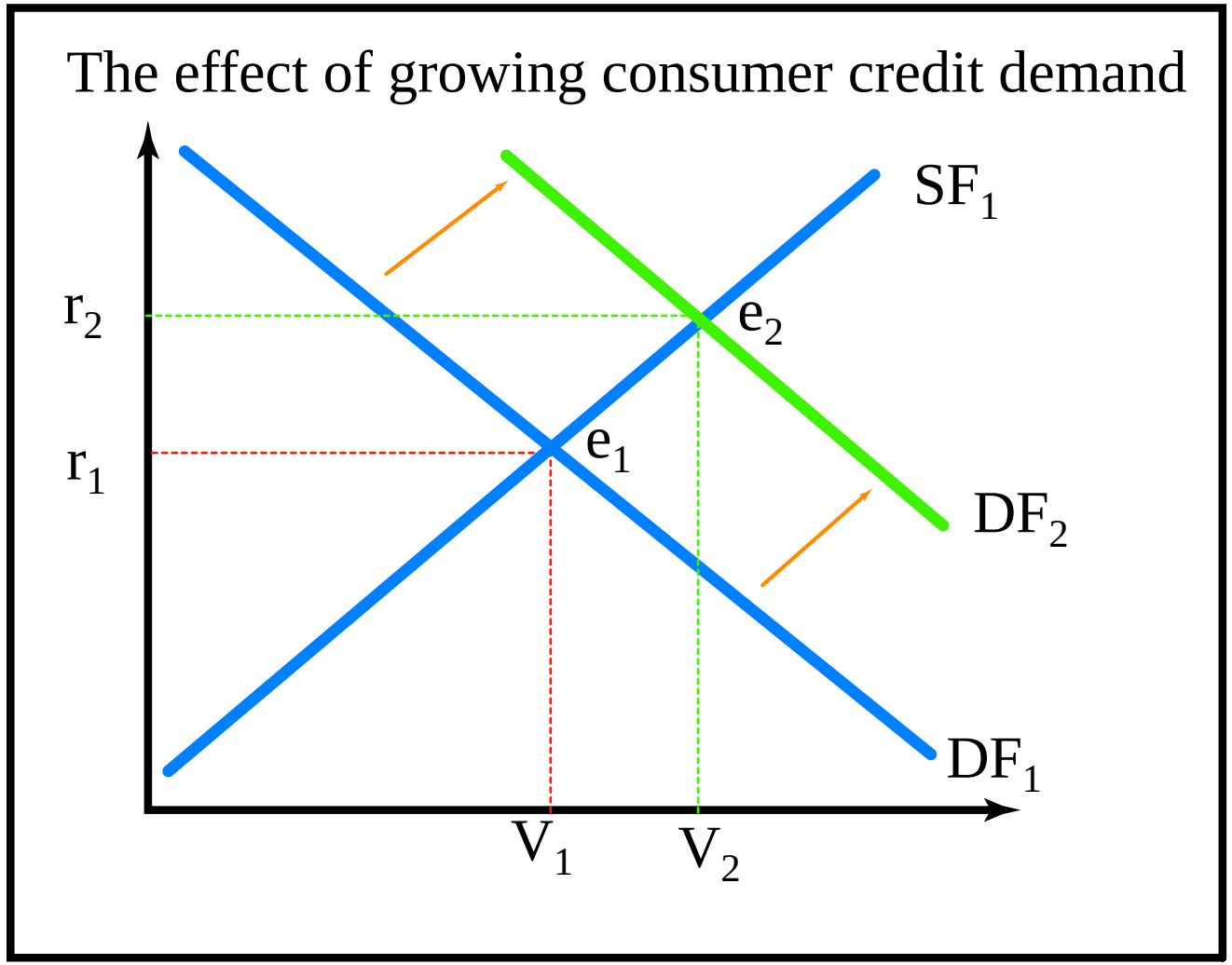
The supply of funds

1. Interest rates (+)
2. Inflationary expectations (-)
3. Institutional savings (+)
4. Discretionary savings (+)
5. Corporate savings (+)
6. FRS Open Market Ops (+/-)
7. Foreign purchases of U.S. financial assets

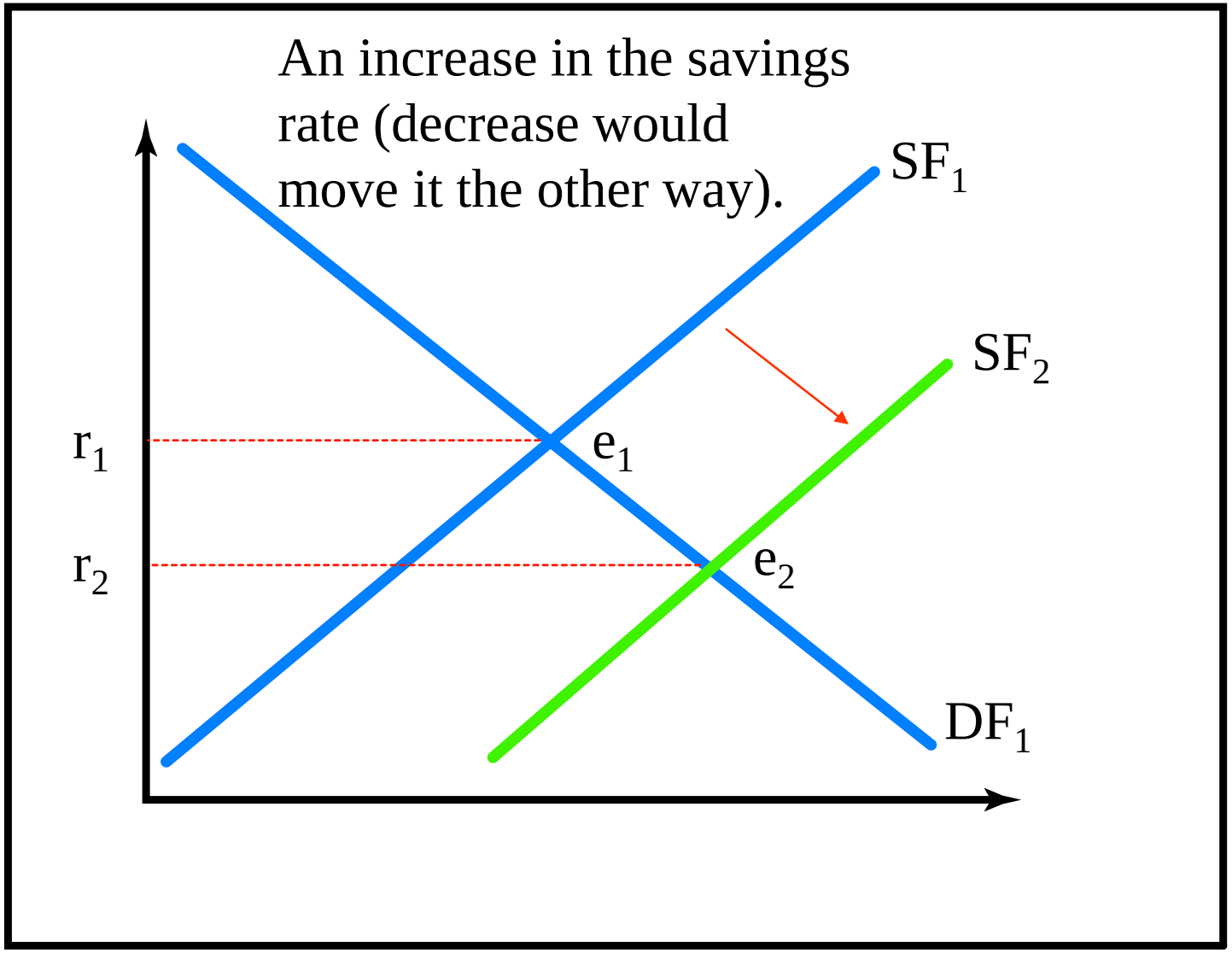
The Loanable Funds Model



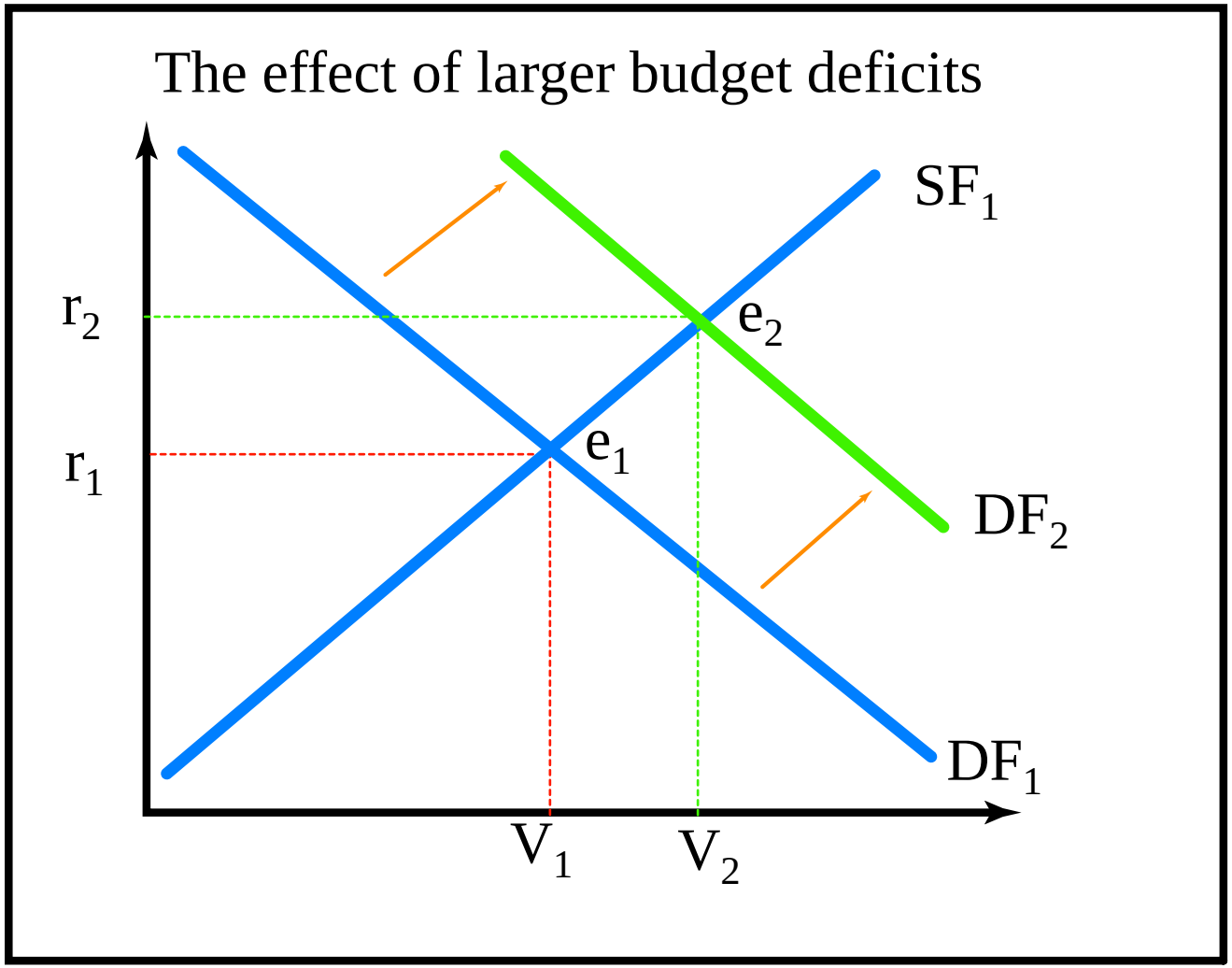
Any general increase in the demand for credit will increase interest rates:



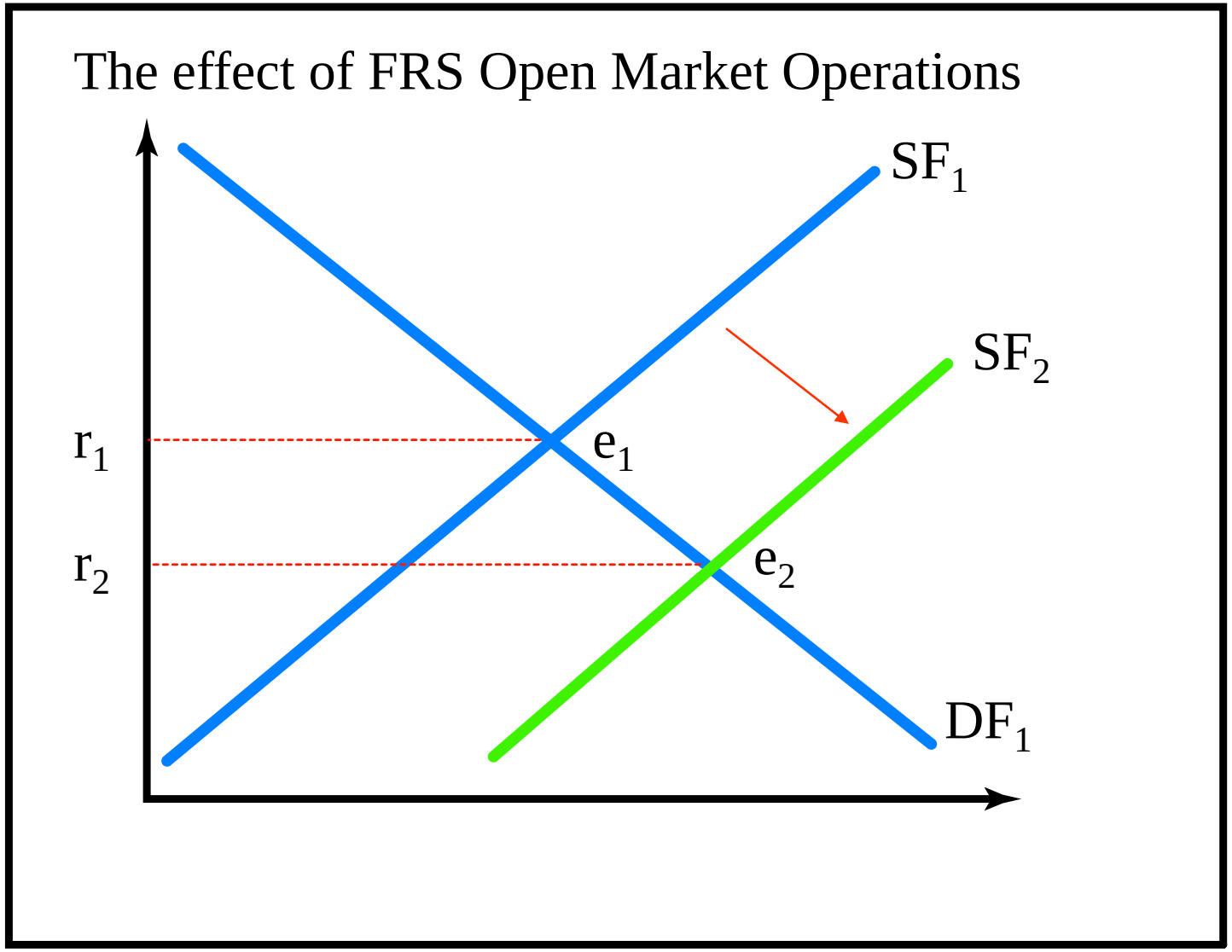
Any increase in savings or other sources of credit will lower interest rates.



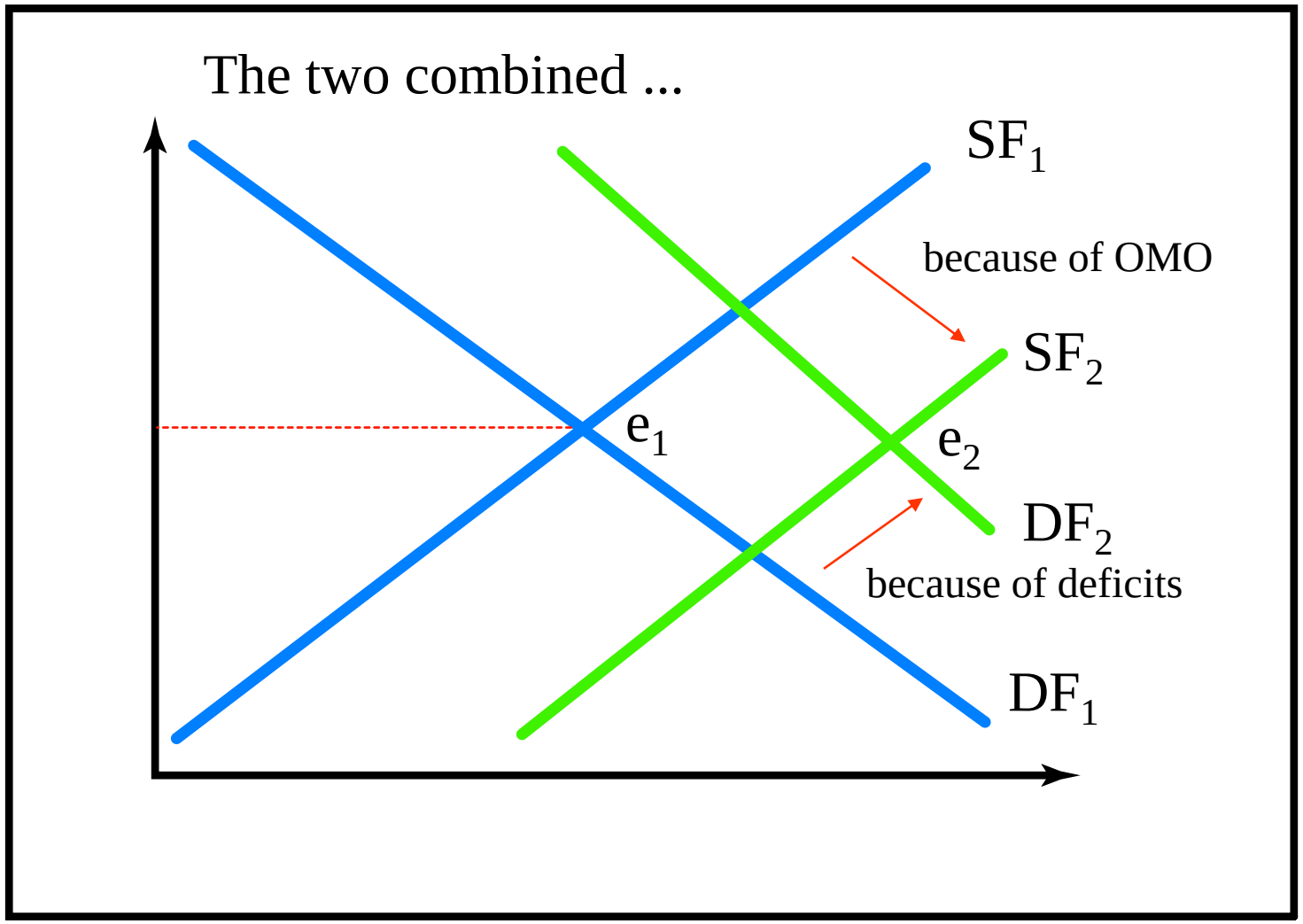
Loanable Funds – Case 1



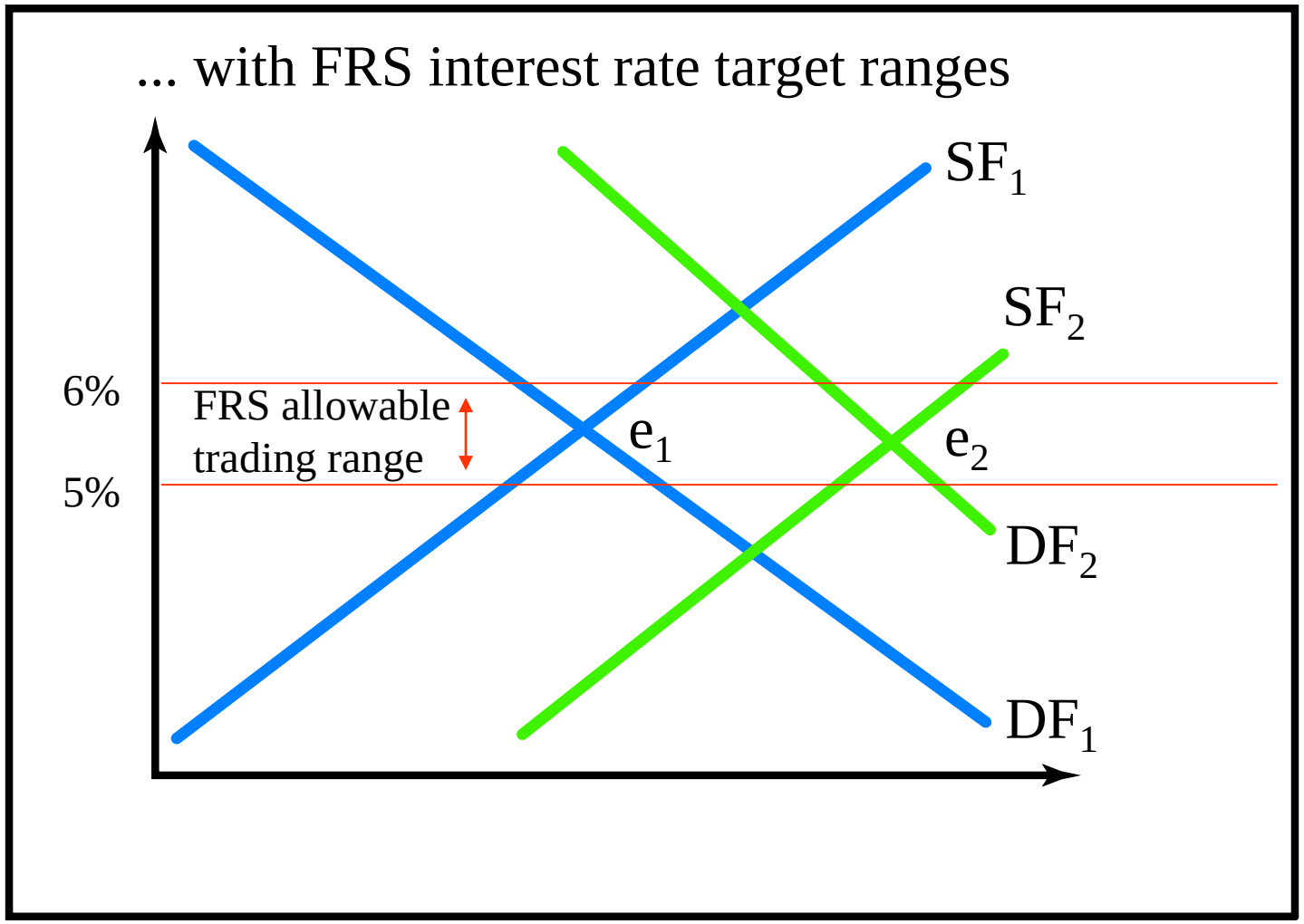
Loanable Funds – Case 2



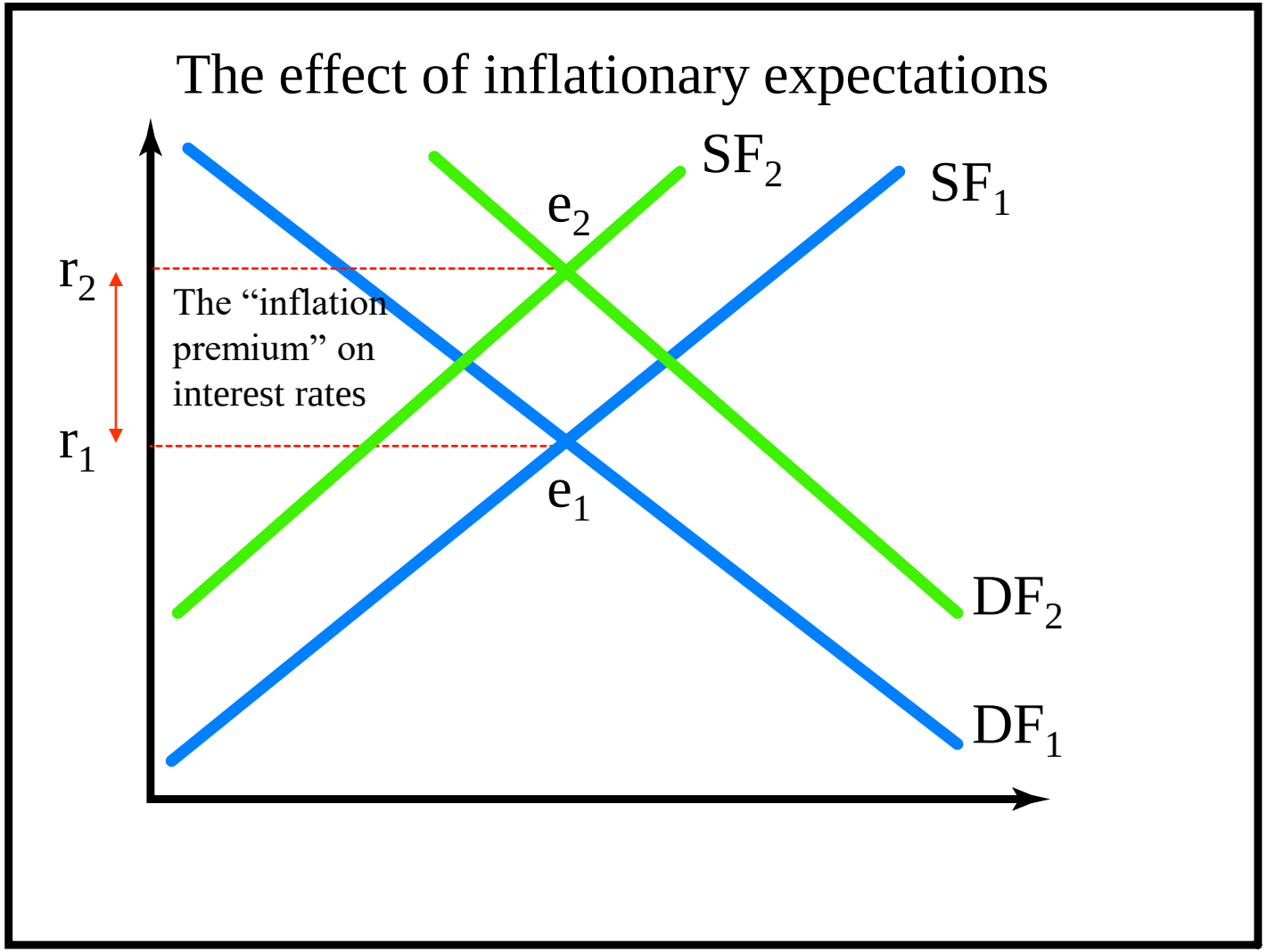
Loanable Funds – Case 3



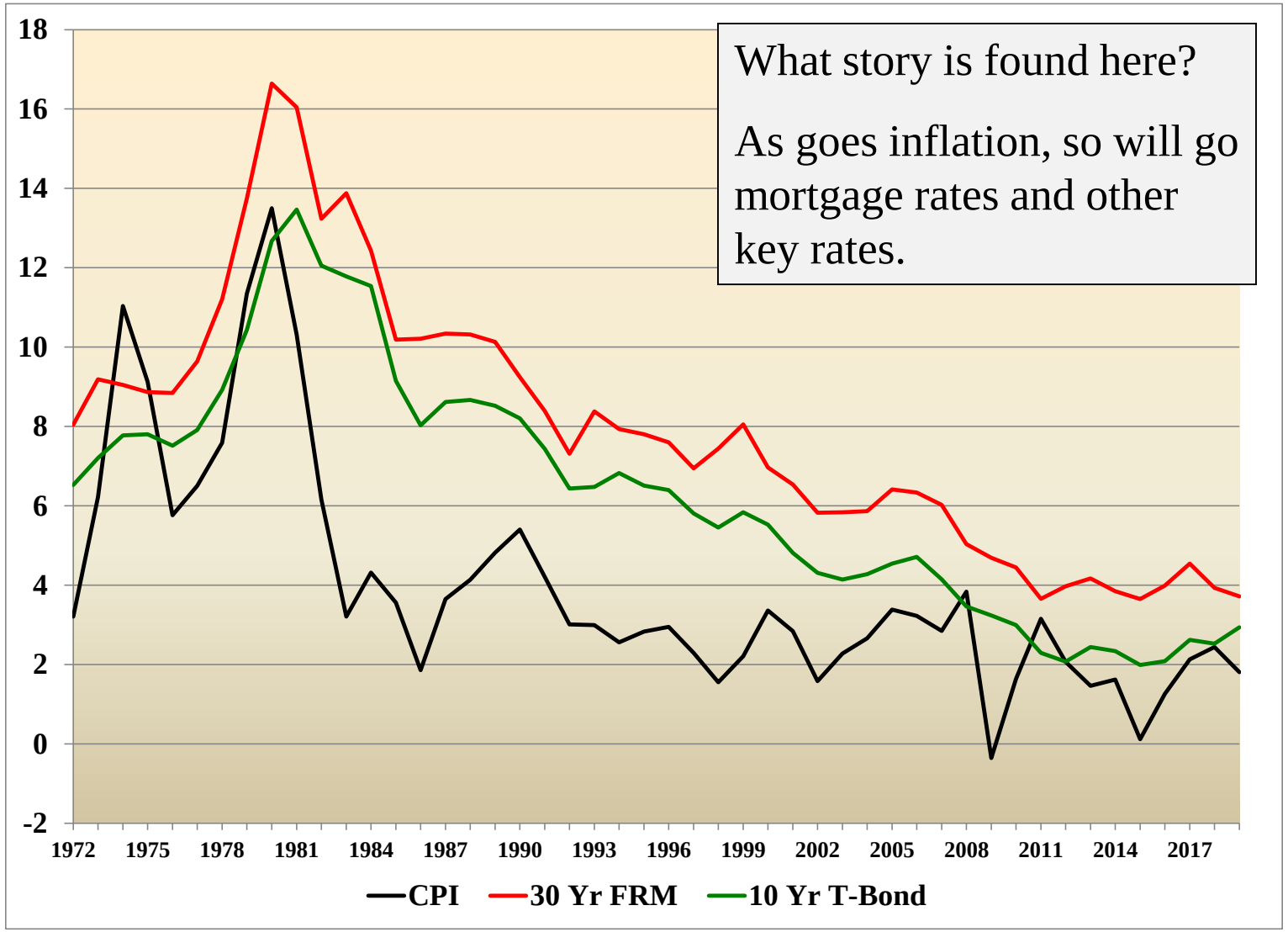
Loanable funds – Case 3 (cont.)



Loanable Funds – Case 4



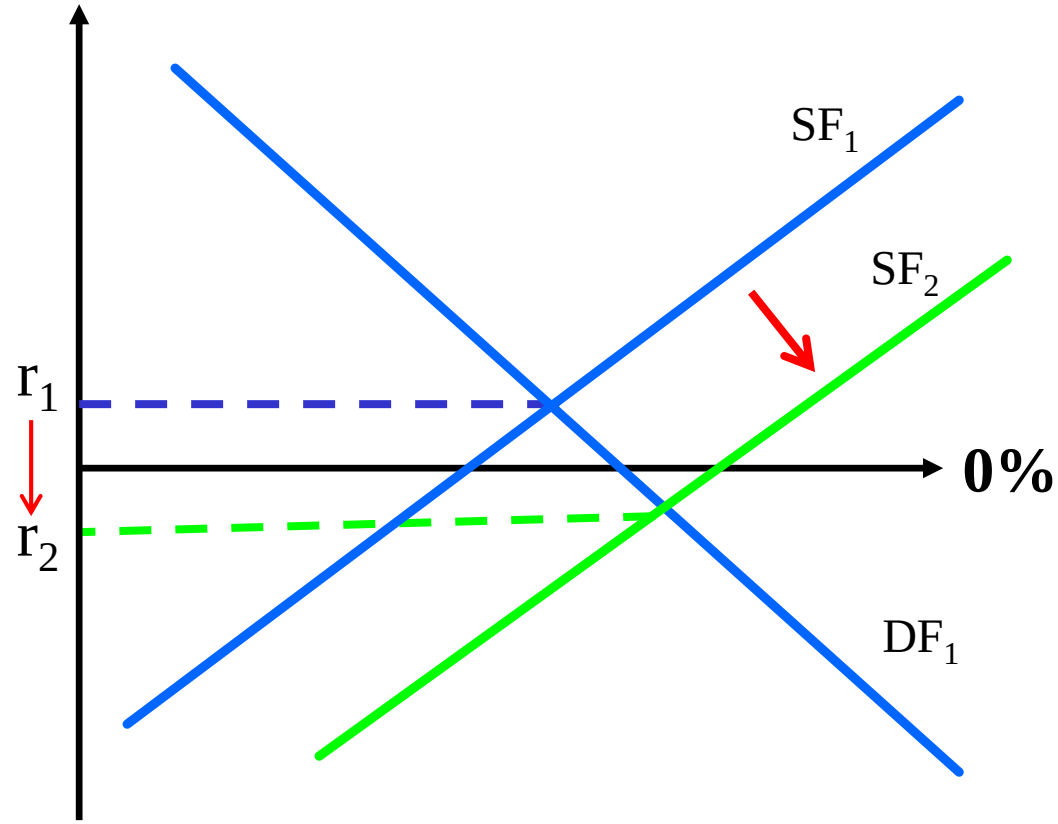
CPI and Mortgage and 10-year Treasury Bond Rates: 1972-2019



Source for interest rates: **Federal Reserve Board data download program, H-15 series**

Negative Nominal Interest Rates

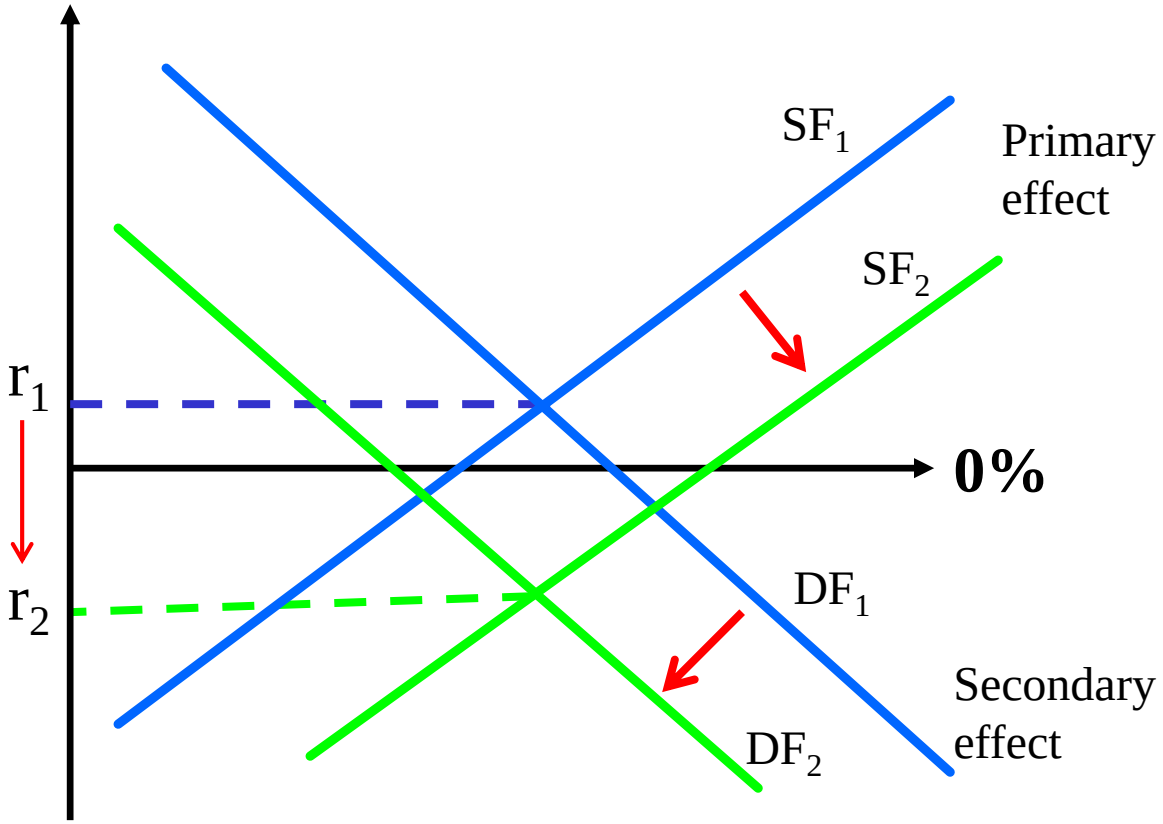
In this scenario, a central bank like the Bank of Japan, the European Central Bank or the Federal Reserve System increases the supply of funds until targeted nominal market rates are negative.



If you made a deposit in a bank account, the balance would gradually go down. If you bought a bond, you would owe periodic interest payments **to** the borrower (perhaps implicitly).

The effect of expectations???

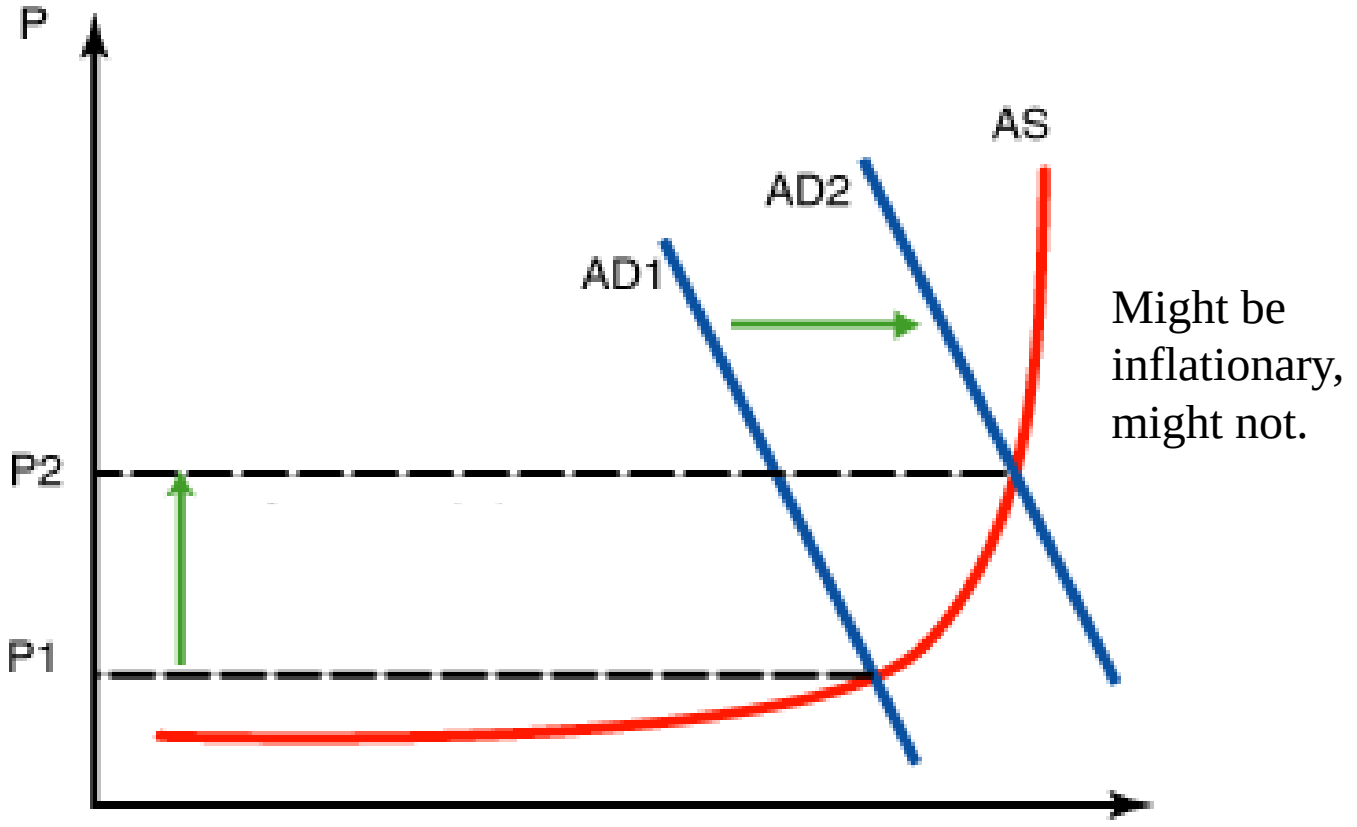
Will the appearance of deflation and/or negative interest rates lead to the formation of negative interest rate expectations, shown as a slippage in the Demand for Funds??



If so, then negative nominal interest rates could become very dangerous, causing huge, undesireable shifts in asset ownership??

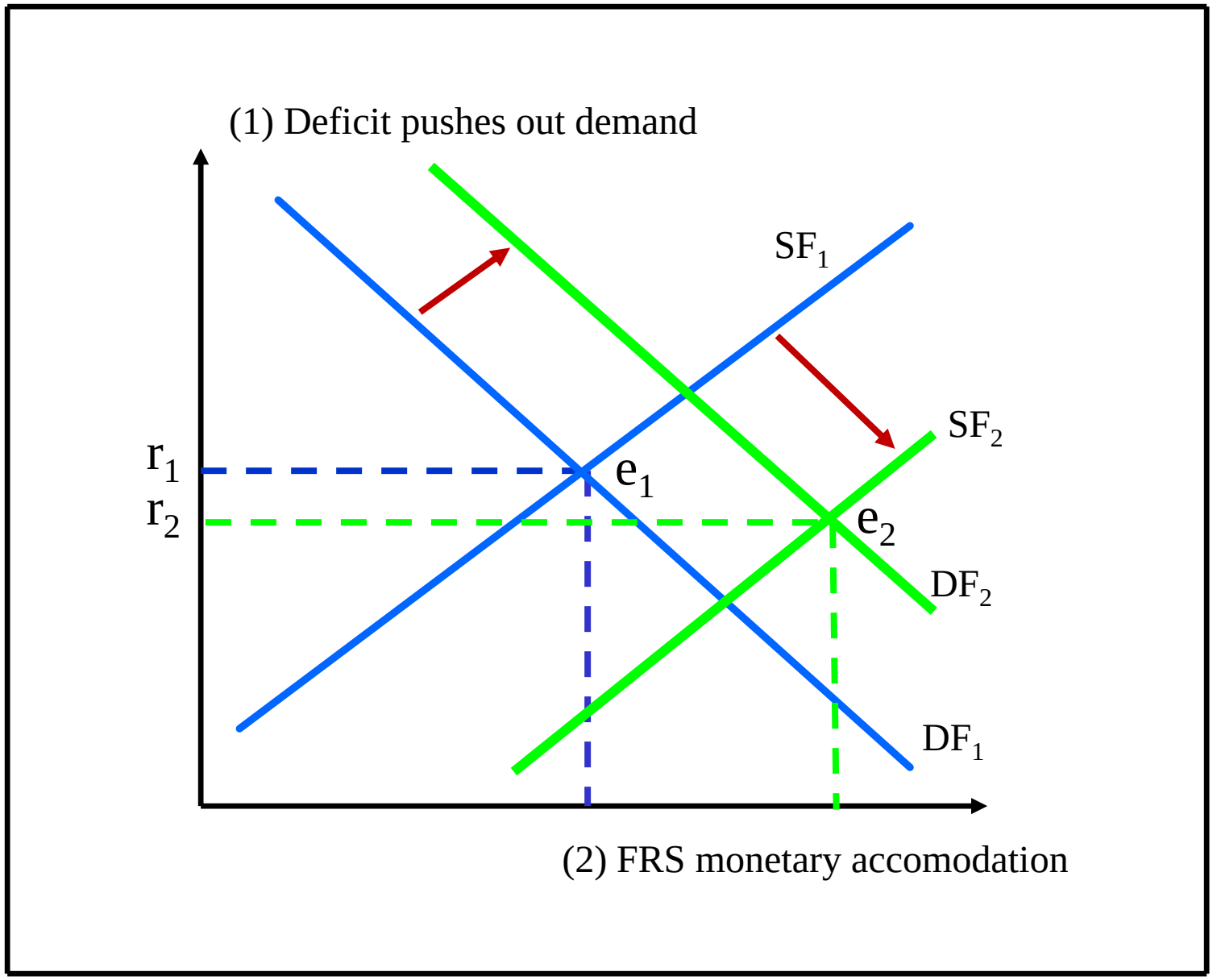
Combining the two models for the first time ...

The 2017/18 Tax Cut / Infrastructure **Stimulus** Package, **AS/AD** modeled



Might be inflationary, might not.

FRS Infrastructure Stimulus Package, **LF** modeled



Key Interest Rate Definitions

Federal Funds Rate - The interest rate (annualized) charged among financial institutions as they borrow and lend excess reserves from and to each other. For example, a large money center bank might borrow reserves from a credit union central for a few days, and will pay this rate. This is the **target interest rate** used by the **Federal Reserve System** in the execution of monetary policy. This rate is flexible and is determined by credit market conditions. If the FRS is "tightening up," for example, and restricting reserves to the system, this rate will rise in response.

Discount Rate - Set by the Federal Reserve Board of Governors, this is the rate charged by the FRS for direct loans of reserves from the FRS. A penalty rate is often added to the Discount Rate by the FRS. The FRS generally does not like banks and other financial institutions to borrow through the discount window. This rate is a "talking head" rate; it remains fixed for long periods of time, then an official announcement is made when it is changed. This rate has been discounted in importance in recent years and is seldom mentioned by the media.

Prime Rate - The benchmark rate used by commercial banks for their corporate borrowers. Commercial loans are usually negotiated at prime plus or minus some percent (such as "prime minus three percent" or "prime plus two percent"). The prime rate itself, in turn, is adjusted up and down as credit market conditions change, although the rate is usually "sticky," remaining at the same level for long periods of time. Because commercial loans are normally negotiated at prime plus or minus some percentage, this makes commercial loans more or less adjustable loans.

Treasury Securities Rates - The range of yields on U.S. Treasury Bills, Notes, and Bonds. The **30-Bond Rate** (the yield on a recently-issued U.S. Treasury 30-year bond), sometimes called the **Long-Bond Rate**, is sometimes regarded as a benchmark rate for long-term interest rates. The **10-year Note Rate** is now regarded as the benchmark intermediate term rate and is the Treasury Securities rate most watched by the finance markets.

Corporate Securities Rates – The full range of interest rates quoted on the entire spectrum of corporate securities, which vary not only by maturity but also by the risk ratings assigned to these issues by the large rating agencies like Standard and Poor and Moody. Companies with very high credit risks can have their notes and bonds essentially rated as "junk bonds," which often have yields considerably higher than Treasury Securities and premium-grade corporate securities.

Municipal Note and Bond Rates – The rates on securities issued by state and local governments. Interest earned on these are always tax free for federal income taxes and typically tax free for state taxes if the owner lives in the state that issued the securities. Yields on these securities are, like corporate securities, highly dependent upon ratings issued by the big ratings agencies. Because of their favored tax status, yields on these securities are typically lower than their corporate equivalents.

Mortgage Rates - Generally, these are interest rates on mortgage loans, which are loans used to finance home purchases. There are many classifications of mortgage loans. The three most common are shown here:

30-year fixed rate - A home loan with a fixed interest rate and equal monthly payments amortized over 30 years (meaning the borrower will make 360 equal monthly payments).

15-year fixed rate - The same as the 30-year fixed rate, but amortized over only 15 years.

ARM (or **VRM**) - Adjustable (or variable) rate mortgage. The loan is amortized over 30 years (or some other period of time), but the interest rate and hence the monthly payment is adjusted to conform to prevailing market rates. The loan typically has a "cap," or upper limit.