

Economic Fluctuations Continued

We are going to combine the idea explored last week, that aggregate demand causes Real GDP and Potential GDP to differ with some newer ideas about how expectations and inflation adjust over time.

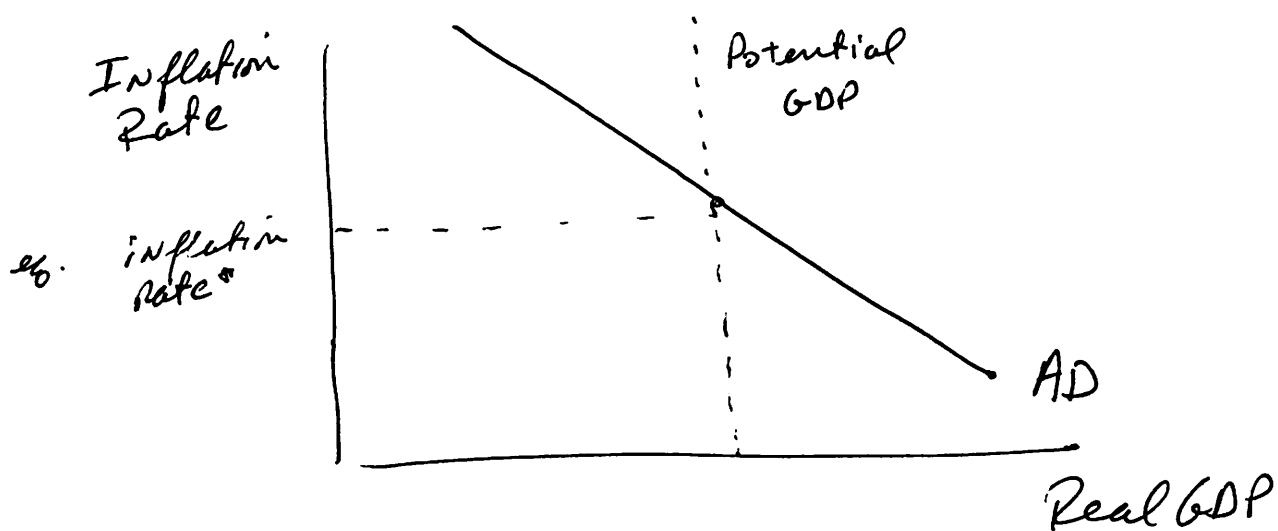
Basically, we are going to develop a Supply & Demand type model for the whole economy.

We'll use this model to explore how government policy-makers try to smooth out the Business cycle.

Aggregate Demand.

Relationship Between Inflation and Real GDP.

As a rule, Real GDP tends to fall as inflation increases.



Why is the relationship negative?

3 Steps to show this

- we review our explanation of why GDP increases when real interest rates fall.
- we explain (why and how) real interest rates are related to inflation.
- we show how combining these leads to AD.

Interest Rates & Real GDP (stage 1)

$$\text{Real interest rate} = \text{nominal interest rate} - \text{expected inflation}$$

Also recall that real interest rate affects

Investment
 Net exports } 3 elements of
 Consumption } GDP.

1 Investment - As real rates increase borrowing to purchase investment goods becomes more expensive. Firms will tend to Borrow & Invest less.

As mortgage rates rise, potential home buyers are priced out of the market. New home purchases fall.

Simply put, lower real interest rates reduce the costs of borrowing to purchase investment goods.

Net Exports

$$\text{Exchange Rate} = \frac{\text{Amount of Foreign Currency}}{\$1}$$

It is how much of a foreign currency you can purchase with \$1. Conversely, it is how much of a foreign currency it takes to purchase \$1.

$$\begin{aligned} \text{Net Exports} &= \text{Exports of US Goods to Foreigners} \\ &\quad - \text{Imports of Foreign Goods by U.S.} \end{aligned}$$

When Exports become more expensive,
we export less. $NX \downarrow$

When Imports become more expensive,
we import less $NX \uparrow$

So, here is how these are related to Real Interest Rates.

Suppose the real interest rate falls ↓.

$r \downarrow$

U.S. savers now want to save less in the U.S. and more abroad.
Foreign savers, like wise.

This requires cashing out of dollars and into the foreign currency. The value of the \$ will fall.

$$E = \frac{\text{Foreign Currency}}{\$} \downarrow$$

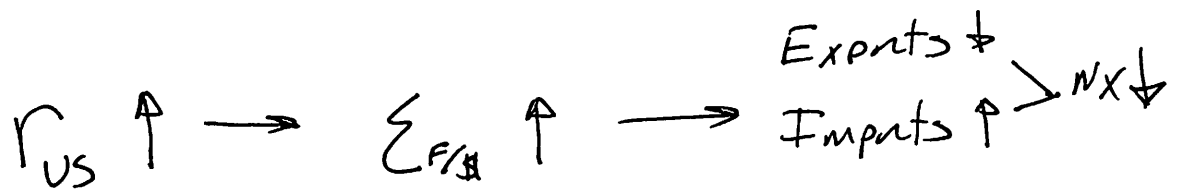
As this happens, anything priced in \$ becomes cheaper (our exports).
For US, it now takes more \$ to purchase foreign goods (Imports ↓)

$$r \downarrow \Rightarrow E \downarrow \Rightarrow \begin{array}{l} \text{Exports } \uparrow \\ \text{Imports } \downarrow \end{array} \Rightarrow NX \uparrow$$

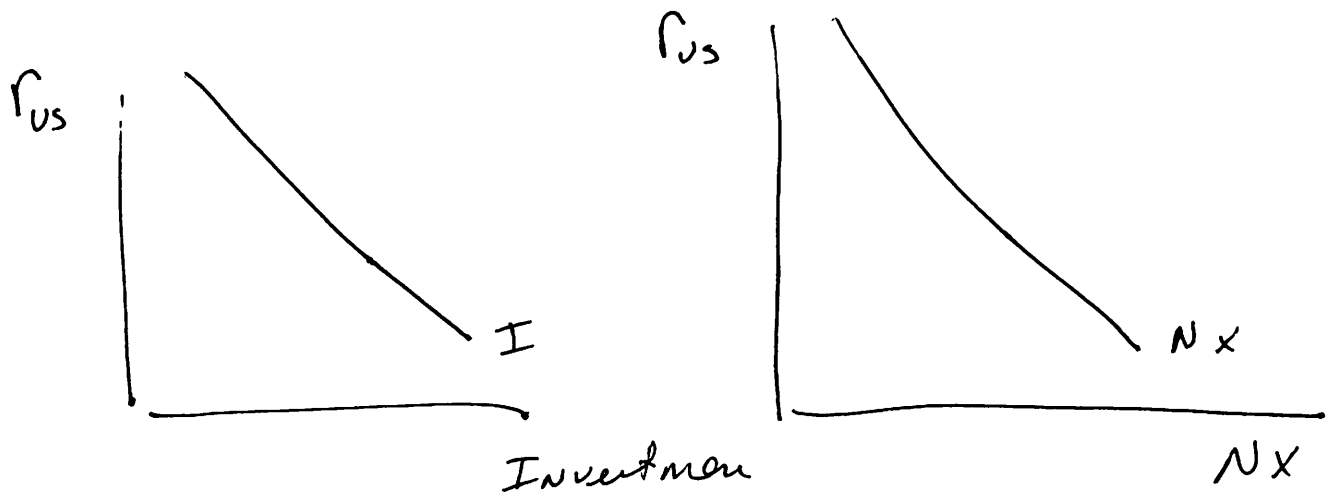
When $r_{us} \uparrow$, our Banks attract more savings from ABroad.

Competition for more dollars drives their price up. It ~~at~~ takes more

Foreign currency to Buy A \$.



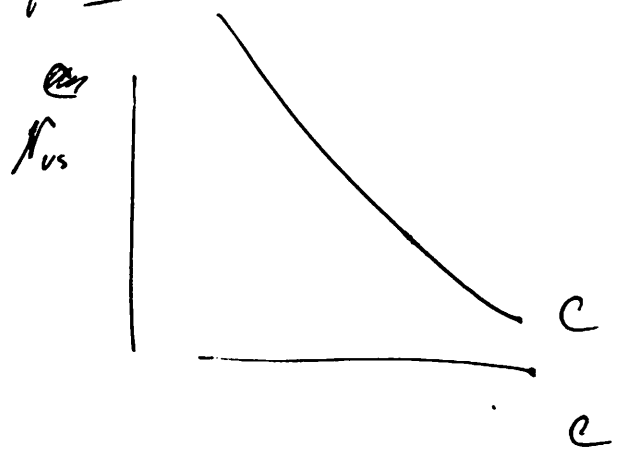
OUR goods are more expensive relative to Foreign goods. Exports fall, Imports rise and $NX \downarrow$



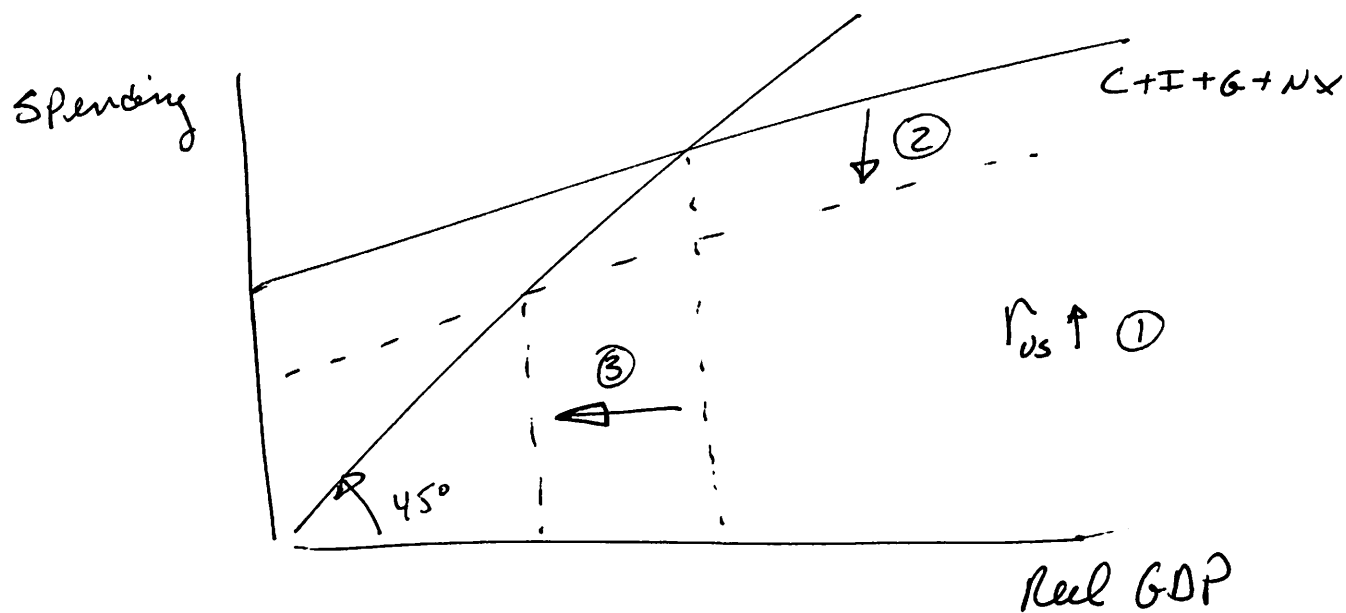
Consumption

Real interest rate also affects consumption. Higher int rates discourage consumption of anything a consumer would borrow to own.

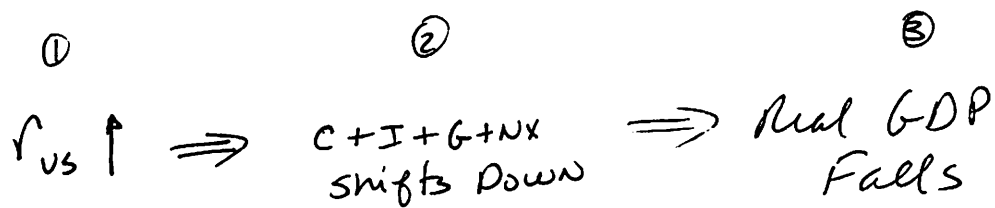
Also, since fewer new homes are being built, less new stuff is needed to fill them.



Real Int. Rate & Spending Balance.



As real rates rise, The spending line shifts down as C, I, NX Fall



Interest Rates & Inflation (stage 2)

Why does an increase in inflation increase the real interest rate?

$$\text{Real interest rate} = \text{Nominal rate} - \text{expect. Inflation.}$$

The FED attempts to influence the real interest rate by undertaking policies that affect the Nominal interest rate and to ~~manage~~ MANAGE inflationary expectations in the economy.

- Nominal Interest Rate is affected by increasing or decreasing Bank Reserves.
- Inflation expectations are affected by ~~the~~ predictable FED Actions: If people believe the FED is serious about reducing inflation then expected inflation falls.

To do this, The Fed adopts a policy rule (and follows it, we hope). The rule is based on actual inflation and the nominal interest rate.

The nominal interest rate that the FED targets is the Federal Funds Rate (Fed Funds). This is the interest rate charged by banks when making overnight loans to other banks.

~~By~~ In order for banks to meet required reserves, they sometimes have to borrow. When they borrow from another bank, they pay an interest rate (Fed Funds).

The Fed Funds Market (supply of and demand for) measures, indirectly, the amount of excess reserves (and their distribution) in the Banking System.

When the rate is high, ~~there~~

the market is tight, ~~banks are~~ excess reserves are relatively scarce. ~~lending out maximums to all available~~

~~reserves~~. The FED can inject more reserves into the system by buying bonds from the public. Fed Funds rate will fall.

FED increases reserves — Fed Funds Rate
open market purchase of bonds ↓

FED reduces reserves — Fed Funds Rate
open market sale of bonds ↑

Suppose The FED wants a ~~2%~~ inflation rate.
And figures a 2%
Real interest rate. will get us there.

If inflation is 2% They'll adjust
Reserve so that nominal interest is
4%

Nominal rate - Inflation = Real.

$$4\% - 2\% = 2\%$$

If Inflation increases to 3% Then
The FED will try to increase real
Rates so that spending will fall
and take inflation down with it.

$$5.5\% - 3\% = 2.5\%$$

So, The increase in Nominal rate is
more than the increase in inflation.
This is required to raise the real rate.

If Fed sees inflation at 4%
it knows that to bring that
down it needs a larger increase
in real interest, say to 3% -
Thus, it sets nominal to 7%.

$$\text{Nominal Rate} - \text{Inflation} = \text{Real}$$

$$7\% - 4\% = 3\%$$

So, The Fed looks at inflation (or
expectations thereof) and if it is
above the desired inflation rate,
it targets a higher real interest
rate and achieves that by
setting a higher nominal rate.

Inflation \rightarrow

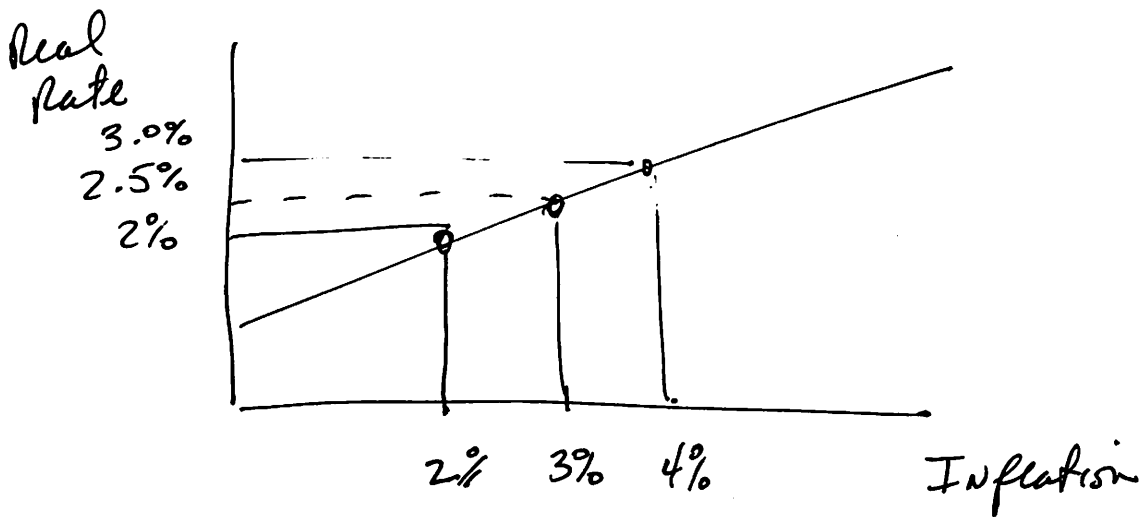
Inflation > Desired Inflation



Raise Real Int rate

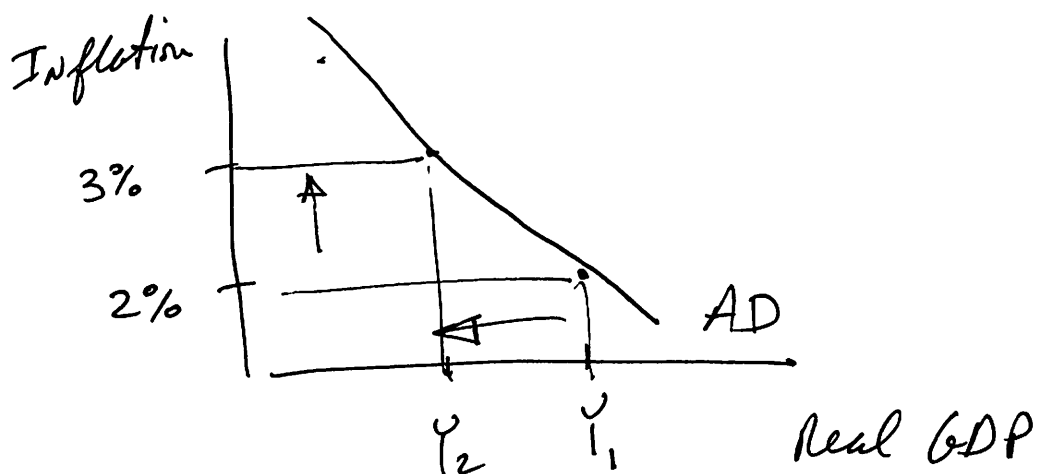


This requires an increase in nominal rate that exceeds the imbalance in inflation with its desired level.



③ As real interest rates rise,
 $I \downarrow$, $NX \downarrow$, and $C \downarrow$
This reduces expenditures.

④ This causes Real GDP to Fall.



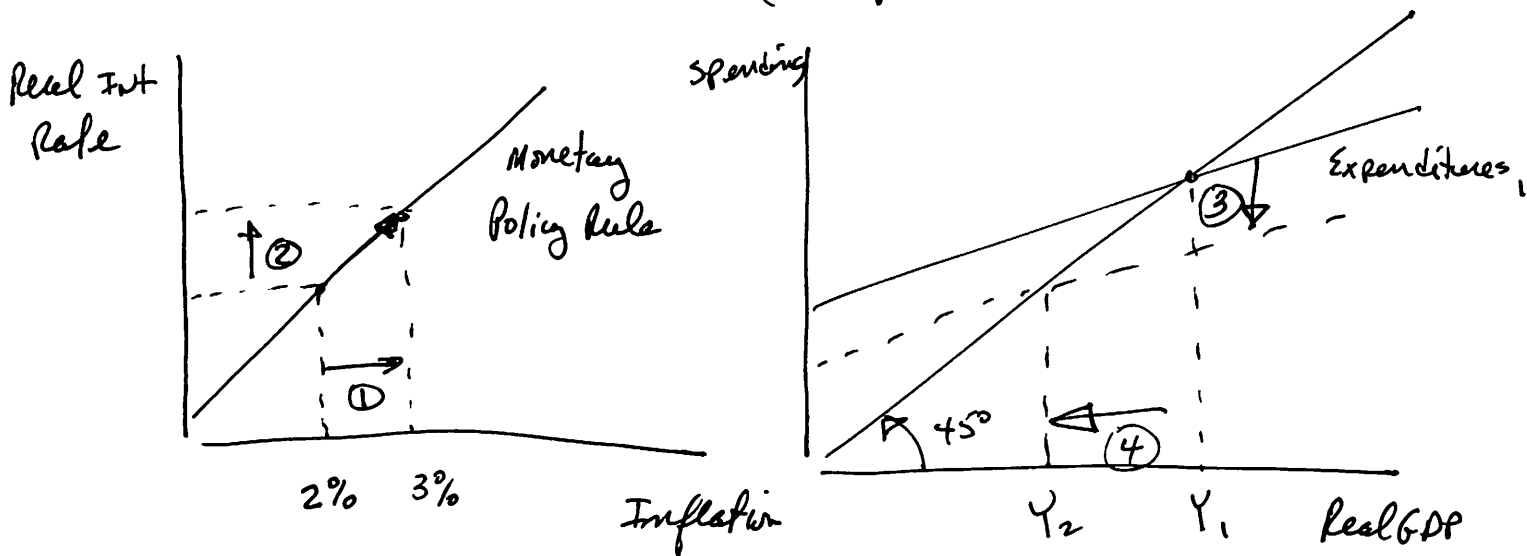
In the Inflation / GDP space
this is a negatively sloped
AD.

Monetary Policy Rule

- Raise the real interest rate when inflation increases.
- Lower real interest rate when inflation falls

It describes the behavior of the central bank.

Here's the model: (Step 3)



- ① Inflation increases from 2% to 3%
- ② Fed responds by increasing nominal interest enough to increase real $\underset{\text{int}}{\text{Rate}}$ to 3%

Shifts in AD

Δ in G

Increase in G shifts AD right

Decrease in G " AD left.

Δ in inflation Target.

Higher Target level for inflation
reduces the real interest rate.

This increases \rightarrow AD as
Expenditure rise.

~~Real = Nominal = inflation~~

Δ Taxes Lower Taxes, Increase AD \uparrow

Δ Foreign Demand Higher Exports, \uparrow AD

~~A~~

Inflation adjustment

firms and workers are constantly setting prices and wages.

We are going to assume that in the short-run, inflation rate stays constant.

When Real GDP $>$ Potential (Boom)
Then people will adjust expectations of inflation ~~downward~~ upward

When Real GDP $<$ Potential (Recession)
People will adjust inflationary expectations ~~upward~~ downward

Prices tend to adjust rather slowly.

- transactions costs assoc. with changing price
- wage and MSRP tend to be adjusted in long-intervals

Basically, This is what we
observe. Inflation tends to rise
as $GDP > \text{potential}$ (Boom)

Boom - rising inflation

Recession - falling ~~inflation~~ inflation