

Week 5 Transcript

We.

Yeah.

And.

Just.

Again.

My.

Okay.

Good afternoon everybody.

Um.

Welcome back.

So today we're going to switch to new topic.

And that's about credit markets consumption saving and investment.

Last week we talked about labour markets and the connection

between last week this week and the first series of

lectures we had on growth is obviously that growth depends

on capital, labour and productivity.

Right now, Labour being one of the essential components to

the production, uh, function is something that we explored last

week, uh, regarding unemployment and what determines labour force participation

and employment and, and so forth.

But we haven't really discussed about capital.

And capital is obviously one of the most basic and

important inputs to a country's economy.

Where does it come from?

As we know from the solo model, it comes from

saving, right?

But where does the saving actually, how does it say

they actually become machines and equipment and computers and laptops

and all of that for the economy?

How does that actually work?

So if we look at really kind of the whole

structure of the economy, just to give you some contextual,

um, concept, we have households, we have firms, we have

government, all of which we have discussed before.

We haven't discussed about the financial system, which is what

actually connects all of them together.

Okay.

So financial system is clearly very important as we're going

to figure out in the next couple of lectures that

it's what is going to help match borrowers and savers

and what's going to help capital from being channelled from

saving to actually being firms, equipment and laptop and sorry

tools and machinery, etc..

Right.

So credit market is that is that is that is

the market we're going to consider different from labour market.

Now credit demand and supply curve are the two markets.

We're sorry the two curves are going to focus on

the credit credit market.

And the equilibrium price that we're going to be interested

in is real interest rate like the labour market, labour

supply and labour demand together to determine the equilibrium wage

rate in the capital market and the credit market.

That is the real interest rate.

So these are the two concepts we're going to focus

on today's lecture.

Now, of course, you know, financial system as a whole

is a very, very important big topic, right?

We're not really it's not you can take a whole

course on finance, a whole year on finance.

So we're going to briefly touch upon this.

And of course, we know that financial system is both

really important because that's actually what makes the real economy

function.

Again, going from savings from your work in your home all the way to capital for firms.

But it's also increasingly it's also a sorry, it's also extremely fragile.

Look at the Great Recession in 2009, all these banking crises and financial crises we've seen.

Right.

So we're going to look at two sides of the same coin, which is how important financial system is and how vulnerable it can be.

So let's just take a look at who are the players involved.

Okay.

Now we said there are three agents firms, government and households, but they could be both debtors or creditors.

Right.

Debtors are the borrowers of the economy.

Entrepreneurs, businesses.

Homebuyers, college students, whoever it could be firms and households who borrow funds.

Creditors are the people who lend money.

You are.

You can be a simultaneously a borrower and a lender.

When you put that money in the bank, what do you think is happening?

You're lending to somebody, but you don't know who that is.

Right.

And just, you know, just very briefly, if we think about why it's so important to have this financial system, how do you think Start-Ups started in the first place?

You can go to the bank and you have absolutely no wealth.

And you can create these great companies that comes from the financial system.

If you save from your income.

All right.

We learn from the solo model that suppose households actually save 20% of their income.

You can put in a bank.

You don't have to stuff it under your mattress and earn zero return.

You can put it in a bank, right?

So, um.

And then we'll talk about financial institutions like venture capitalists, private equity people, mutual funds, insurance.

All of these are players in the financial system.

And they do really one important thing, which is to connect these agents together through capital.

Right.

So you are simultaneously can be a borrower and a creditor.

Now the key variable that's involved when you borrow money or lend money is the nominal interest rate.

Well familiar with the concept of interest rate.

But here you're quoted you're quoted the nominal interest rate.

Right.

10% nominal interest rate right now in the UK is

about 5%.

But as we'll see, what really matters here is the real interest rate, just like nominal versus real GDP.

Okay.

So the first is when we look at the credit market, right.

What is credit.

First of all credit is the funds you borrow okay.
That's all called credit.
Um credit demand.
Are the borrowers, right?
The demand for investment, the demand for capital.
That's called credit demand.
So who are the people who demand?
So it could be businesses.
Start-Ups.
As we mentioned, entrepreneurs.
They will take out some loans from banks, or even
from venture capitalists or private equity or investors.
Right.
How much they repay?
Well, if it's from a bank, you're going to pay
repay an interest rate every year.
If you're issuing debt, right, you're paying a fixed interest
rate or an interest rate per year.
If you are giving away your equity, right, somebody is
owning a share of your company.
Okay, so but when we talk about borrowers, you know,
really talking talking about, um, uh, borrowing based on interest
rate.
So that could be from the early, uh, Start-Ups to
the more mature businesses.
All big companies have massive amount of borrowing.
And why is that?
It actually makes a lot of sense.
You know, not only businesses but also countries borrow, right?
If you think about a country level decision, right, say
you are a country.
I don't know Sri Lanka, okay, Sri Lanka had a
very tough time during the pandemic because tourism stopped.
Now because it is able to borrow.
It doesn't have to suffer as much.
Sri Lanka is still suffering.
But that said, it doesn't have to suffer because it
can take out loans internationally and when the economy does
better, it can repay.
Right.
Same thing.
You had a natural disaster when one of these countries,
let's say Haiti today, it's a bad shock for you.
But next year it will be fine.
So you borrow today and I repay tomorrow.
Same thing with businesses now.
Businesses, you know, even Amazon, Google, all of these have,
you know, major profits, but they still have bank borrowings,
right?
They still have debt issuance.
Because again, there are a variety of reasons why you
might want to do that.
You can expand way before you just need to take
out your profits.
You can expand based on borrowing and then even more
money.
Right?
That gets to some of the leverage issues that we
have observed.
So.
So it is not just about starting something big businesses
and mature businesses also take out a lot of the
loans in the credit market.
Um, so one example is when, you know, let's say
you don't even have a lot of these, a lot
of these wholesalers, you know, if you buy a computer

from BestBuy, right, at some point they're going to buy from their suppliers and they can borrow from the bank to buy these, uh, computers because they won't get the the money from you yet before they sold it to you.

Right.

And they can repay the bank once they've gotten that money.

So pay workers or other bills when revenue is temporarily low.

And you can repay in good times.

So that kind of smoothing over time is a very important aspect of what finance can do, right?

Borrowing and lending over time.

Now of course, it's not just businesses that borrow you.

You guys, whenever you pay with a credit card, you are a borrower.

You're paying interest on that, in case you haven't noticed.

Um, but it could not it could be just not just a small credit card bills.

But you can take out mortgages, right?

To buy a house, put a down payment on a house, sorry, put a down payment, take out a mortgage on a house or flat or big consumer durables like cars.

And you can also.

So I remember some stories about young entrepreneurs who, you know, Start-Up just basically borrowed, I don't know, \$30,000 spread across 11 credit cards.

Okay.

That's actually how they started.

All right.

So you can do that.

You can smooth consumption when income is temporarily low, you lose your job.

Let's say you're in a frictional unemployment period.

You pay with your credit card, you're effectively borrowing.

And then when you get a job, you'll repay.

Right.

So that is what finance does.

It's not just connecting savers with borrowers and allowing people to smooth consumption over time, or allow businesses to smooth over shocks over time.

College students borrow a lot for your education.

It's an investment in human capital.

Remember, human capital is what we talked about in the growth theory.

So you borrow to invest in human capital.

So all these concepts should be all connected right.

We're shifting from the long term growth theories to the shorter term macro economy.

But whether it's capital or labour as we discussed last time, they're all connected.

We're just giving you a more specific mechanism as to how they are interrelated and connected.

Okay.

So you're quoted a nominal interest rate.

So if you owe \$20,000 and with a promise to repay back in one year, um, what are your total interest payments?

Well, let's take a look.

If you had, um, you were quoted a nominal interest rate of 1%, which was the case.

Before the pandemic, let's say.

Then you only owe £200.

5%.

You owe £1,000.

And if you had 50% interest, which is not very common, if you unless you're going for a black market, then you pay £10,000.

So obviously the higher nominal interest rate, these are the total interest payments.

The higher it is.

You know, we're somewhere around here three years ago or a few years ago, it was just around here.

So it's enormous amount of difference if you think about the real estate sector.

Right.

Why is it so sensitive, sensitive to interest rate.

Precisely because all these mortgage holders, you know, if they're thinking, if I'm thinking about buying a house, I put a 20, 30% down payment.

The rest is financed.

I'm borrowing.

If I have a high 5% interest rate, then obviously my burden is much higher every year than compared to low interest rate, the nominal interest rate.

We're going to come back over and over again because this is like the key critical, important price in macro economy, right.

Uh, this is why we talk about interest rates so much and why everybody follows the interest rate in the financial sector and the real economy, because they are, you know, investment is very, very sensitive.

Consumer consumption, consumer borrowing, investment, everything is very sensitive to the interest rate.

And we can see that it does make a very, very big difference here.

We're only talking about £20,000.

But think about £2 million.

What the difference between a 5% and a 1% interest rate is.

It really affects your your demand for credit or your demand for borrowing.

Okay.

Um, but is it really.

The nominal interest rate that makes you decide whether how much you want to borrow on the surface of it.

Yes, maybe because that's exactly, exactly how much you have to repay.

But let's look at what the real interest rate is first.

And let me give you an example to tell you that why you care about the real interest rate rather than the nominal interest rate.

Um.

So.

Uh, here there is, you know, you know, a description of the real price of the loan that you're paying back.

Apples and apples.

But let me just give you an example.

Let's say that you borrowed \$100,000 to start a jeans company.

Okay?

And let's say that the nominal interest rate is 10% per year.

Nominal interest rate is 10% per year.

So that means that you owe £10,000 every year.

Okay.

Um, let's say that every pair of jeans that you sell is \$100, so you need to repay with 100

pairs of jeans worth of value.

Right?

100 times 100 is 10,000.

Okay.

So let's suppose that now we have inflation okay.

You're still paid that nominal interest rate of 10%.

But everything price is all double right.

Remember we talked about inflation is you know price level increases.

Let's say that all prices double next year.

You still owe the bank £10,000.

But now jeans that you sell cost not £100 but £200.

So how many jeans do you have to repay?

Only 50.

Right.

So when you had the previous, um, case without the inflation, you had to sell 100 pairs worth of jeans to repay the 10,000.

Now you only have to sell 50.

So clearly, because all prices rose.

But the amount of money you owed is exactly the same because of the nominal interest rate.

If you're a borrower, you're pretty happy with inflation.

You can do the opposite.

Let's say if there's deflation.

Deflation, you're going to have to sell not 50, but 200 pairs of jeans to repay if the prices were cut by a half.

So if you're borrowers, you like inflation.

But if you already know what inflation is going to be.

You're going to make these decisions whether how much you want to borrow based on the real interest rate rather than nominal interest rate.

Okay.

Which is pretty much what this guy was saying.

So what is the real interest rate?

This is called the Fisher equation because the Fisher, as an economist, emphasised repeatedly the importance of the real interest.

He's saying, look, in the end, business and people think about the real interest rate because of the example I gave you.

Now, real interest rate is simply the difference between nominal interest rate and inflation.

You don't actually know the inflation between today and tomorrow.

So sometimes it's nominal minus expected inflation.

Right.

So in the same way when you make these decisions today you're looking at the UK as having high inflation.

You're going to make your borrowing decisions based on your expected real interest rate.

Right.

You're going to take into account expected inflation rather than just look at nominal interest rate.

Okay.

So that's the basis for which we can talk about the first curve on our in our credit markets which is credit demand curve.

Now.

Credit demand curve on the x axis is the quantity of credit demanded or quantity of, let's say, borrowing.

And on the vertical axis is the real interest rate for the reason that we described.

Why is it downward sloping?

Well, the lower the real interest rate, the more you

want to borrow, right?
It's just cheaper to borrow.
Okay.
The higher the real interest rate is more expensive to invest or borrow.
So that's why it's a downward sloping curve.
The other way you want to think about it, you can also think about it is the marginal product capital.
Now last lecture we talked about labour how marginal product of labour is a downward sloping curve.
Because one additional labour reduces the marginal value of that unit of labour.
Same thing with capital right.
Now when we talk about diminishing returns to capital.
So one additional unit of capital, um, decreases the marginal value of that capital for a firm that also makes it very downward slope.
It also makes it downward sloping.
And real interest rate in equilibrium is equal to the marginal product of capital.
But I think the simplest way you might want to think about it is this is the price of borrowing.
The price of borrowing goes down.
Otherwise real interest rate goes down.
You're going to borrow more.
If it goes up, you're going to borrow less.
Okay.
So if the interest rate goes from real interest goes from 5 to 7% on this graph, you're going to your amount of credit taken is going to drop from 100 to 60.
Now.
We care about the slope of this curve.
Because it captures a sensitivity to interest rate.
Now, before looking at the next slide, just think about this.
If interest rate suddenly dropped okay.
How much additional loans are you going to take out?
Well, everyone is going to be different.
Right now.
If I'm a business and I desperately need these funds because I need these funds to bring in the computers from my suppliers so I can sell them, then I have a low elasticity or very low sensitive to interest rates.
So even if interest rate goes up by a lot, you know, I'm not going to change or reduce my borrowing.
But in other cases, I'm less sensitive to these interest rate changes because maybe I don't need the loans as desperately.
So.
Oops.
Where is my.
Two steep curves.
Sorry, I'm going to.
I don't know what happened to my slide, but basically it shows.
I'll upload the updated slides.
Um, two levels of steepness of the curve.
We can see it from this graph.
If you have a very steep slope going this way.
Okay.
Let's say we're drawing this way.
Then you can see if this curve is steeper.
Then by dropping interest rate from 7 to 5%, the

reduction in my credit demand is going to be smaller than this curve, which has a higher a bigger slope or more elastic, right.

If it's steeper, steeper, you have a 2% drop in the interest rate.

I'm not going to borrow a lot more or sorry.

Yeah.

Uh, whereas compared to the, the, the less steep curve or vice versa, if my interest rate rose by 2%, if I have a steep curve, then that means that I'm not going to reduce my borrowing bylaw.

Right?

Because I have low levels of sensitivity to the real interest rate.

Okay.

So this slope captures the sensitivity.

Why is that important?

It's very important eventually because when we talk about monetary policy and how it transmits to the real economy, they're going to care about the sensitivity, right.

Let's say the Bank of England decides to cut interest rate from 5% to 1%, right?

If your have a low sorry a high elasticity, then that's going to have a big impact.

Right.

Everyone is going to borrow a lot more if you have low elasticity.

So not very elastic inelastic curve.

That means that even if you dropped from 5% to 1%, my borrowing is not going to change that much.

So the impact monetary policy is not going to be that big, right?

So we care about the steepness of this credit demand curve or the slope of it, because it captures the sensitivity to interest rate.

Okay.

And the same thing will be true also for savers.

Okay, so I'm just missing one side comparing the slope of the curve.

I don't know what happened, but I will upload a new new slide.

Okay.

Now, just like the labour demand curve and all the curves that we've seen, we want to be very careful about the movement along the curve and the shifts of the curve.

Okay.

So what's going to shift the credit demand curve?

You want to think about this for every given interest rate?

What is going to happen to my.

What's how much borrowing is going to change?

Or what's going to be the demand for my borrowing for every given interest rate?

What does that mean?

You hold interest rate constant.

If you say for every given interest rate I want to borrow less.

It's a shift in the curve to the left for every given interest rate.

I want to borrow more.

Right?

That's a shift to the to the right.

But if you're saying oh, but what happens?

Did my interest rate change?

Well that's a movement along the curve okay.

So that should be pretty clear by now.
Now there are lots and lots of examples where for every given interest rate we want to borrow more or less.
Now perceive business opportunities for firms.
So let's just take the AI example.
Right.
We all know AI is coming everywhere and it's going to be a revolution.
And everybody needs to adopt AI and automation, all that stuff.
And governments are starting to see that.
That means for every given interest rate, even though the cost of borrowing has not changed.
I want to invest more, right?
So I want to borrow more.
So that means it's going to be a shift of the curve to the right side.
Okay.
For every given interest rate, let's say the interest rate 5% didn't change, but for 5% of interest I want to borrow more.
Then it shifts to the right.
Okay.
Now what about remember that credit?
Who are the borrowers here?
It's not just the household and the businesses, but also the government.
They're all borrowers and creditors, as we'll see.
Let's see the households change somehow.
So.
You know, there's more uncertainty.
You, the younger generation, sees less optimistic.
You're less optimistic about the future.
You don't know whether you borrow you you know, you borrow this funds to create a company or whatever it is can have the same opportunities as the previous generation.
You feel that it's less.
The economy is more uncertain.
Than for every given interest rate, even though the interest rate has not changed at 5%.
You want to borrow less, then this curve shifts to the left.
You feel rosy, everything's going to go well.
I want to spend more.
I'm changing my lifestyle.
I want to work less.
I want to spend more.
I want to borrow more, or I want to invest more in education.
Then it's a shift to the right.
And as I mentioned, government is very much part of the story as well.
We're talking I'm going to talk about a lot about fiscal policy.
But let's say, you know, God forbid there's a war.
Then for every interest rate, the government's going to borrow more.
So that's also a shift to the left of the credit demand curve.
Okay.
So these changes are not caused by changes in interest rate.
Then it amounts to a shift of the curve rather than a movement along the curve.
So that's very important to understand.

And we're going to see when we're putting it together with the credit supply curve what that means for the interest rate.

Okay, so let's turn to supply.

Um, on the opposite of demand is a supply.

So we all understand about borrowing.

But where do the funds come from?

You're borrowing from a bank.

But where did the bank get its funds?

That's coming from the savers of the economy.

Okay.

Who are the savers?

Well, people are people who put in deposits into the bank.

Now we're going to talk a lot more about financial institutions as part of this series.

But these financial intermediaries will take in funds from savers and then eventually lend it out to borrowers, and they will do the work.

You just put the money in the bank.

You don't need to say, I want to borrow to so-and-so and so and so on to lend to so and so.

You put it into a bank.

So deposit comes from these savers, right?

And saving is postponing your current consumption.

To finance your future consumption.

Because saving you can come back.

You can get it back with normally a positive nominal interest rate.

There are certain circumstances where we see negative nominal interest rate, which means they discourage you to save, right?

But in normal cases it's a positive interest rate I say for the future.

So banks here play the role of the middleman.

Right.

We have these agents.

We have borrowers and savers in the economy.

How do you match them?

You can say well I'm going to directly.

Support a company, right?

Go on the stock market.

I'm going to buy stocks of these companies.

Fine.

You're lending to them in some sense, but most of the times you don't know how to pick your investments, right?

You don't know who to lend to.

And by the way, it's very risky to lend it to one or a few or three, you know, or few individuals or companies.

So banks do that.

We're going to talk about the role of financial institutions.

But basically they not only match borrowers and savers, but they also help you diversify your risk and search for good investment opportunities.

So what do they say for?

Who are the savers?

Well, obviously consumers are savers.

Actually, businesses are big savers too.

If you look at corporate saving in the world, it's very high corporates every year they have profits, right.

You can either redistribute these profits to your shareholders or you can say I'm going to retain these earnings so I can do lots of other things and retain these earnings to make more investments, buy more equipment or save

for a rainy day just in case something happens.
A lot of firms are doing that huge corporate investment,
corporate saving to overcome shocks or to to to to
to purchase more capital.
Now when people save they often say for retirement.
Right.
I know that this is not really what you guys
are thinking right now, but at some point you will
retire and not get your normal wage.
So what you do is you try to work when
you're young.
Save.
Hopefully save.
And then when you retire, you consume your retirement income,
which comprises your Social Security.
And and you're safe.
Right.
So Social Security is also a form of saving.
When you go to work every month, a part of
your salary goes into these Social Security payments.
It's for your old age retirement.
Um, so that achieved something called consumption smoothing.
You don't want to only have an income and be
able to consume all the things you like to consume
where you're young, you'd like to have a relatively stable,
um, uh, kind of consumption profile, even when you get
old.
So saving is about smoothing your consumption between today and
tomorrow.
You might want to save your for your kids, uh,
as a form of bequests.
Some people want to save to buy big durables like
cars and houses and all of that.
You might want to be starting a business or acting
as insurance, you know, during Covid.
A lot of people thought about this.
Finally, you know, actually a lot of people, especially in
the US, are living from check to check every month.
They cash their check, they spend it, there's no saving
and then goes on.
What happens during Covid?
Well, we saw there was huge rise in unemployment.
People started stop having um, a pay.
So people who had saving were able to do better
or fare better.
So you might want to do that, right.
And if you look at savings, it's really interesting because
across countries.
The savings rate is really, really, really quite different.
Um, I'd say Europe saves around 7 to 10%.
Maybe Germans save more of the household disposable income.
Americans save 2% of household disposable income.
Country like East Asia, East Asian countries.
China today saves about 30% of your disposable income.
Japan Korea, during their height of growth, also was at
a very similar levels.
I think in Europe, Germans have the highest level of
saving rate.
Right.
So what determines savings is also very, very interesting.
But interest rate is one such determinant.
It's not the only factor but as we'll see will
be very important.
Right.
So we talked about borrowers.
Who lends to them are the savers.

And we talked about why saving is so important because that goes into capital stock right.

Savings rate determines your level of income in the long run.

That's what we've learned from the, um, growth theories.

Now under Michaelmas term or, uh, micro, you've learned about household optimisation and one of the most fundamental things you want to decide as a person, as a household, at the individual basis, is how much to consume and how much to save.

So just a reminder, okay, why do we care about the interest rate?

So much for people who forgot about the two period model is let's just take a look at these two choices.

So you have you want to decide between consuming today.

Call it C_1 and consuming tomorrow.

Call it C_2 .

And this is a true peer model.

So consumers live for two periods.

Okay, so just three equations just to help us, you know, make sure that help us guide us through this, this this problem here.

In the first period you earn income y_1 .

Okay.

You divide it between consumption C_1 plus some saving.

Now there's only two periods.

So we're not going to put a time subscript here because saving is going to be the same right.

There's only one decision which is saving.

But in period two your consumption is going to be one plus R times the amount of saving.

Plus your income in year two.

Right.

So these two things are called your budget constraint.

Okay.

There's no optimisation yet.

But let's say you substitute the first period constraint into the second period constraint.

So s you write it as $y_1 - C_1$ okay.

And you plug it in here okay.

So this is $y_1 - C_1$.

You rearrange this equation.

That's one step of algebra and you get the lifetime budget constraint.

Okay.

Without going through the algebra, let me just tell you some of the intuition what this means.

First of all, this tells you why is it called a lifetime budget constraint?

Because on the left hand side you have the present value of consumption.

Okay.

Uh, C_2 divided by one plus R is the present value.

Value today of your future consumption.

Is equal to the present value of your income.

Y_1 is today, Y_2 you're earning tomorrow, so you have to discount it by one plus r , because everything in today's term has an interest rate, where everything in tomorrow's term has an interest rate evolved.

Right.

Because you save \$1 today you're going to get one plus R back.

So discounting it by one plus R brings y_2

to today's units of consumption.

Okay.

So lifetime budget constraint.

Now this tells you it's a very simple equation but

it tells you quite important things.

Well first of all it tells you that your consumption decisions doesn't have to be based on your current income.

Right.

You're maximising consumption based on this one lifetime budget constraint.

What is it based on?

If it's not based on your current income, it's based

on your lifetime income, which is also y two.

And how is it possible that you can base it

on not on today's income, but on today and tomorrow?

Well, because you can borrow and save.

Right.

If C_1 is less than or C_1 is greater than

Y_1 .

So you're consuming more, you're more than you're earning.

What are you doing?

You're borrowing.

If you're consuming less than your income today, what does that mean?

You're saving?

Now, this very simple reasoning tells you the benefit of having something like the financial system, because you can borrow and lend.

So the second important thing of this implication is that you can smooth consumption.

Right.

Let's say that you have a very low Y_1 today.

You got zero today.

And Y_2 is 100.

Does that mean your consumption has to be zero today?

No.

Your consumption could be, let's say 100.

You borrow 100, right?

And then tomorrow you repay 100.

And depending on the interest rate, your C_2 is whatever that's left from your 200 of income.

Okay.

That gets you a much smoother path of consumption.

So financial system already tells you basically if you have a borrowing and saving vehicle, you're able to smooth consumption.

The third important part of this equation is that this depends on the interest rate.

Ah, because it shows up here okay.

We're not going to do any mathematics and optimisation, but probably you guys have already done it in Michaelmas term, but we can already see it from this equation.

How does the interest rate affect your consumption versus saving decision?

Okay, so what is the price?

First of all, what is the price of consuming?

The price of consuming today is one plus R .

Right.

Because if you didn't consume that one unit.

You get one plus R back.

So of course, interest rate going up means the price of consuming today gets higher.

Okay.

So first of all, Y_1 goes up.

You probably want to consume less because the price of consumption goes up.

Okay.

So optimality at this point we're not going to you

know, we're not going to go and kind of show or prove.

But basically optimality takes into account how much you like smooth consumption.

Okay.

And also depends on the interest rate because the interest rate is the price of consuming between today and tomorrow.

And this, you choose this based on the fact that when the marginal rate of substitution across C_1 and C_2 is exactly equal to the relative price, which is one plus R .

Okay.

So let's look at what happens to interest rate to understand why borrowers and savers might be impacted.

So as we mentioned the price of consumption consuming today is higher or is increasing.

So what you can do.

You're going to do what you're going to do is

C_1 is going to go down.

You're going to consume less right.

You're substituting between today and tomorrow.

Why.

Because you get more tomorrow if you saved okay.

Your interest rate just got up.

And what's going to happen to tomorrow's consumption.

Is that it's going to go up right?

Because you save more, you consume less today.

So when interest rate goes up, C_1 goes down and

C_2 goes up.

Correct.

But that's only the substitution effect.

There's an additional effect here that we have to take into account.

And that is the income effect.

Why?

Let's say you're a saver.

If you look at this.

If you look at this, you're a saver.

Interest rate goes up.

So you can your whole income write your entire income.

Which is not just why two, but also one plus

R times.

Uh, s goes up.

Right.

So your income goes up.

What does that mean?

That means that if you're a saver, you can actually increase your consumption in both periods.

You're wealthier.

Your saver.

But it's not the case if you're a borrower.

If you're a borrower, remember when real interest rate goes up, you owe much more, right?

So that means your net income falls.

And the income effect says if you're.

A less wealthy.

Then you're going to consume less in both periods.

Okay.

Any questions here?

So substitution effect is what we usually think about.

Interest rate goes up.

I'm going to save a bit more.

Okay.

So I'm going to substitute consumption today for consumption tomorrow okay.

Income effect says if I'm overall have a higher level

of income and this is the case, if I'm a saver, then I can increase my consumption in both periods, not just in one.

But if I'm a borrower, my total income is less then I can actually that I will actually consume less in both periods.

So what's the net effect?

The net effect is that if you are a saver, if you look at a saver.

What's going to happen is that my consumption in period two is going to rise.

Right.

And if I'm a borrower here, if I'm a borrower, consumption in period one is going to fall.

So this is why we have an upward sloping credit supply curve.

Okay that when interest rate goes up, people will save more.

Another way to think about is the substitution effect tends to dominate income effect.

And when interest rate goes down, you tend to save less.

Okay.

Credit demand borrowers are the exact opposite.

Right.

Credit supply curve.

That's an upward sloping supply curve again because when the interest rate real interest rate goes up I'm going to save more and it will fall.

When when the interest rate falls I'm going to save less.

Now.

Same thing with the credit demand curve.

The reasons why the supply curve might shift, right.

That's not due to interest rate changes.

So let me ask you this.

Okay.

So let's say, um, you know, it's the pandemic.

We don't know when jobs are going to come back.

We don't know when the economy is going to come return to normal.

Everybody feels there's more uncertainty around.

What's going to happen to this credit supply curve or the saving curve?

More uncertainty.

Does anyone want to tell me?

So for every given interest rate.

Do you want to save more or less?

We want to say more, right?

There's more uncertainty.

So that means the credit supply curve will shift to the right.

What's another example?

Um.

Let's say firms, right?

Firms have these profits and they say that, well, you know, looking at the dividend policies, we don't want to really distribute that many not much dividends.

We have, you know, huge plans for the future.

We want to buy robots.

You know, we want to buy new equipment, the latest technologies.

We want to insure ourselves to these uncertainties.

So that in that case, for every given interest rate, they want to save more as well.

And the entire aggregate supply curve also shifts, right.

What about the government?

The government are also savers or borrowers.

Right.

And if the government, um, is a net saver, right, then that can also change the aggregate supply curve as well due to changes in different shocks.

Outside of the.

That's not the real interest rate changes.

So.

The equilibrium of the credit market is going to determine.

The quantity that is lent or borrowed, or the total amount of credit in the economy and the equilibrium interest rate.

Equilibrium real interest rate.

Now, as we're going to see, monetary authorities are going to set the nominal interest rate.

They don't have any control on the real interest rate.

Okay, but ultimately it's this real interest rate that comes from this market, a saving and investment market or the credit market.

And that pins down the real equilibrium interest rate.

So let's just take a look at the things that we said.

So there's greater uncertainty.

Everybody wants to save more.

What's going to happen to the interest rate.

It's going to fall.

Right.

Because quite a supply curve is going to rise.

Now if we think about what's going on with the real world.

We had a very long period of extremely low real interest rates in the last 20 years.

Okay.

That's before the set of inflation pandemic.

Why might that be?

A lot of policymakers, economists try to answer with these.

Really.

Low real interest rates.

It caused the financial bubble because lower interest rate means everybody is investing a lot.

Right.

That's what you that's what you see with this credit demand curve.

If the interest rate falls you invest a lot, right?

But what's but this graph tells you exactly why the real interest rate could potentially have fallen.

One reason is if the supply curve shift is shifted to the right.

So there's more savings, right?

Um, or another example is everybody invested less then the left shift of the demand curve also gives you a lower real interest rate.

Now there were lots of real competing theories that you can use as just using a simple graph.

You can demystify or answer.

So one such example was the arrival of developing countries.

The developing countries, as we know, saved a lot.

So there was a saving glut in the developing country.

And these people, including China, 1 billion people in the market, etc. A lot of high saving people arrived in the market.

What happened?

This graph will tell you that the credit supply curve shifted to the right, right?

If that's the case, that leads to a lower equilibrium

interest rate.

Now that's one theory.

Another theory just said that basically everybody sorry, everyone in the advanced world invested less.

Okay.

And that's maybe because I don't know.

Productivity growth as we've seen is pretty low in the last, last ten years or so.

And if that's the case for every given interest rate, if everybody invested less, that will be a leftward shift to the supply curve.

But guess what?

How do you distinguish between these two theories?

What's the difference between the two sides of the debate?

Well.

The real interest rate in both cases falls right.

But in one case the quantity of credit demanded increases.

In the first story and the second story, the quantity demanded false.

So you can already bust one of the one side of the debate based on a simple equation or simple model, right?

So next time, you know, people are having these debates, why, you know, we're investing so little, but you can look at both the real interest rate and the quantity demanded.

And in fact, investment didn't fall over this period.

Okay, investment did not fall or contract, which means that the second theory must have been wrong.

Right.

Which is a fall in the demand.

If anything, investment for any given interest rate actually increased.

Now of course, now if both curves increase or both curves shift to the right, what happens?

Let's say for every given interest rate, credit card credit supply curve shifts to the right and credit demand shifts to the right.

Then we know for sure that the equilibrium credit demanded is going to be increasing, but it's an ambiguous effect on the real interest rate.

Right.

Because one curve shifts.

Right.

Tending to reduce real interest rate, one curve, that investment curve shifts to the right means that increases interest rate in equilibrium.

Then one is going up, one it's going down.

It's ambiguous.

Okay.

So, you know, this is a very you know, this is a very, uh, simple but really interesting kind of graph to be playing with.

Okay.

Um.

What else?

Well, if you look at the US, there was a huge increase in fiscal deficit.

Okay.

What does that mean?

The government started to borrow more.

What would that amount to if the government start to borrow more for every given interest rate, that is an increase.

Or shift of the right word, shift of the credit demand curve that will tend to drive up interest rates.

Okay, so this is why you see here often fiscal

deficit is going to put upward pressure on the real interest rate.

Right.

You can already see it from this graph.

Okay.

Okay.

So this is something that we want to.

We can play with.

This is a saving curve and investment curve.

We call it credit supply and part of demand.

Okay.

And the real interest rate is determined by this.

If you think about the whole world it's dependent.

It depends on the world saving and world demand.

It's the same idea right.

And the world's real interest rate.

So you know, why is let's say, the real interest rate going up at the present.

Now you can tell some stories.

One story is for instance, if saving have have shrunk over time.

Right.

Or if fiscal deficit has increased over time, which is the case, right.

For the US and for lots of government, they're all borrowing like crazy.

We can explain the recent rise in the real interest rate all through this simple, simple graph.

So very lastly, the credit market as we've seen already does a lot of things.

It also improves efficiency.

Remember that we talked about efficiency production in the growth theory and why that contributes to higher a.

Well guess what.

Credit market also plays that role.

If you have a very efficient financial system, what happens.

All these promising entrepreneurs and highly, you know, competent ideas or great ideas will be funded.

Because there will be a fluent a fluid matching of savers to borrowers.

Right.

And the good entrepreneurs are going to get the capital and the bad entrepreneurs will get less capital.

And remember how credit in a in a inefficient allocation reduces the a well, good functioning financial market and help you improve that a for that that sense for for that reason.

Now for you personally.

Suppose you had \$1,000 set aside for next year.

Without credit market, what are you going to do?

You're going to put it under your mattress.

If there's a 10% inflation.

Your money is going to be worth 10% worth less next year if you put it in the, um.

Uh, banks, you're going to get around 1 to 5%, uh, return based on, you know, a normal kind of loan.

If you are more of a risk taker, you want to.

You want to invest in the stock market.

You could get a higher return, but also potentially more risky.

And so financial system gives you all of these kind of um, of options.

So if there are credit markets, you could lend the money deposit into bank and firms can borrow your money

from the bank and investment and in new plan equipment.
And so next lecture we're going to take specifically looking
a look at the financial institutions that do that right.
The banks hedge funds, private equity funds venture capital.
They all play a very different role.
We're also going to look at why there could be
some major failures and banking crises.
Okay.
Thank you.
Yeah.
After.
I.
Come on.
What?

Yes.
And.
Yeah.
Last.
Year.
I can understand.
Oh.
And.
Okay.
Good morning everyone.
Um, let's get started.
So last lecture, we started with a really important market.
Uh, after we've taken a look at labour market.
And that's the capital markets or credit market.
And we talked about, uh, borrowing and lending.
So today we're going to talk about the actual players
in that market and um, the role that they play
and the risks that they pose.
Okay.
And that's the whole financial system.
We're not going to talk about the entire financial system
because we're going to focus on banks.
But, um, there are a lot of similarities between these
financial institutions, both for the benefit they exert on the
economy and the risks that they, they, they pose.
So just a brief review.
We know that saving and investment last, uh, from last
lecture determines the real interest rate, right?
Real interest rate, not nominal interest rate.
Nominal interest rate.
As we will see, we're going to come back to
this over and over again is determined by monetary authorities
like the central bank.
The real interest rate is really what is the price
that equilibrate saving and investment?
Or in other words, credit supply and credit demand.
Right.
And look at how the curves shift and how we
can assess the various theories about why interest rates has
been low or high recently and so forth.
So today we're going to look at financial institutions and
banks in general.
Uh, just to preface this lecture, uh, what happened during
2003, in the spring of 2003 was, uh, the first
another series of banking crisis after the 2009 crisis.
So over the course of five days in March 2023,
three small to mid-sized US banks failed.
Okay?
And it triggered a sharp decline in global bank stock
prices.

Like everybody's stock prices for these banks fell. And the regulators, US regulators rushed in to kind of save the banks to resolve the banking failures. Now one of the banks, um, is called, uh, Silicon Valley Bank. I don't know how many of you have followed, um, uh, what's FTX is Bank and all that. And, um, First Republic and Signature Bank. Uh, what was interesting is that these banks, which were primarily on the West Coast, in California in particular, uh, focussed a lot of investments on technology. Right. And as we'll discuss, you know, what happens when interest rates rise and their portfolio gets squeezed. Lots of these tech companies wanted to withdraw their money from these banks, and ultimately it led to a bank failure. We're going to see how that actually works in practice or sorry, how how that is explained by theory. Um, uh, and try to understand what has happened in reality. Now this comes 15 years after the collapse of Lehman Brothers, another Titan investment bank, and Bear Stearns, in 2009, which triggered the financial crisis of, or now called the Great Recession of oh seven to oh nine. Now, the the the cause of the crisis is somewhat different, caused by the the collapse of mortgage backed securities, which we'll discuss briefly, but but the idea is pretty much the same, uh, led to bank runs, bank failures, and then uh, comes in steps in the US financial regulators. Uh, there was a, there was a scare also in the European banking markets also after SVB, uh, in Switzerland. And all of this can lead to worldwide panic. So, um, so last, last class, we really talked about specifically why these institutions like banks are important. Right. Just as a reminder, again, when we look at the solo growth model, a key component is capital. But whatever you say doesn't automatically go to investors, sorry. Go to companies that that accumulate capital. It has to be intermediated by institutions like financial institutions like banks. And we'll see what role exactly they play. Now, of course, you can do direct investments like, you know, um, invest in stock markets, but these are public companies. What about Start-Ups? What about private companies? What about having a diversified portfolio of of companies that you want to invest in. So you need some intermediary and financial system. Is that intermediary, um, a platform that links, first of all, not only the households and the companies and the government and massive savings and investment, but really play a critical role for real economy, economic growth. Why? Because they are the ones that actually turn out capital for use, right? So they are obviously extremely important. But today we're going to look at. Why they're also potentially very vulnerable and risky. As we said. These are intermediaries that connect savers and borrowers. But these financial institutions are are many in degree in type.

Right.

Um, we talked about banks, but financial institutions such as asset management companies, hedge funds, private equity and so forth are played somewhat of a different role.

Insurance companies.

So asset management companies want to think about it.

As, you know, they take a company or individuals money and they try to grow the portfolio, okay.

And they usually buy stocks and bonds and have a diversified portfolio, um, and try to grow that portfolio for you because they have these, uh, financial expertise.

Now, if you were to pick out stocks and bonds yourself, obviously you might not have that expertise.

You're going to have access to all these financial instruments.

Uh, similarly, something like wealth management company or bank would take very, very rich individuals, high net worth individuals and try to reach some financial goal.

They have offer some additional financial services.

Right.

As you enter the workforce and accumulate wealth, you're going to see that these are really important types of services for you to preserve wealth, to grow wealth, to diversify or to achieve the kind of goals you want to achieve.

Uh, something like hedge fund.

More risky.

Um, it tends to gather pools of money from very wealthy institutions like endowments, university endowments, pension funds or individuals.

Um, uh, and they make some kind of off a non-conventional, uh, type of investments sometimes could be very conventional, just like buying oil prices.

Okay.

But highly risky in that sense that they're pursuing, um, returns rather than just kind of a what, what a lot of these mutual funds which actually gather the majority of assets, which pulls people's money together to make, you know, stock portfolio decisions, but in a relatively less risky way, in some sense, hedge funds are much more risky.

Now, private equity funds, uh, tend to hold securities that are generally not publicly traded.

So that's why it's called private equity funds.

Now, you can imagine that, I don't know, you saw a good, great company, um, that is doing logistics and it's not publicly traded yet.

Or in other words, it's not listed yet.

Okay.

So it only takes private money.

Uh, your private equity fund, you can go and buy a share of, uh, the company and equity share of the company.

And once the company gets listed or exit or being bought by another company, then of course, you make a return.

But these are private companies tend to.

This is why it's called private equity.

Um, even more risky is something like a venture capital fund.

Uh, venture capital fund tends to make to invest in Start-Ups or those companies with no track record.

Right.

So if you think about, uh, the, the venture capital companies that invested in a company like Google, okay, Google had no track record or was a Start-Up in 1999.

And, um, they made a 8000 time return between 1999 and 2020 when they bought 20% of Google for, I think, \$20 billion in 1999.

Sorry, not 20 billion, 25 million.
And that was worth 200 million, uh, by 2020.
So obviously very risky, but potentially with high returns.
But actually most of these venture capital investments fail.
Lots of Start-Ups fail.
Most Start-Ups fail.
We only see the winners.
Right?
It's a positive selection.
Um, but maybe one of those wins, like Google, like
Facebook would be able to compensate or more than compensate
for all the losses made.
So venture capital earlier.
Um, uh, so these are obviously not definitions that you
would need to know, right?
This is not a financial course, but it helps to
understand a little bit of the financial players in the
system.
Now obviously there are things like rating agencies, Moody's, insurance
companies like AXA, AIA, Prudential, the ones that you're familiar
with.
And they have a different set of goals.
Right.
Potentially their financial objectives are different because they need to
take less risky.
You know, you give them money, you buy a medical
insurance and other kinds of insurance.
And, uh, they can pull together all these funds, but
they would they can't take very, very risky bets, uh,
in general or less risky bets than some of these.
But they're very, very big players and they were big
players.
Also in 2002, 2007, 2009, um, uh, crisis as well,
um, rating agencies like Moody's, they rate uh companies, they
rate companies, um, uh, credit credit's status and that they're
very important because once they give, you know, a Lehman
Brothers a very bad credit rating, then that's going to
trigger a lot of the loss in investor confidence.
So they obviously have a very.
Role to play a shadow banking system.
Well, it's, you know, comprises a lot of the investment
banks.
What's the formal what's the definition of a formal bank?
Formal bank basically has this, um, rule where they can
take deposits.
Right.
Remember we talked about you take in the deposits and
then they make loans.
Now investment banks are institutions part of the shadow banking.
So they often play a very similar role to investment
banks.
But they don't take in deposits.
And deposits, as we'll see, are insured by some authority
up to a certain amount.
So that makes it safer.
But if they're not taking deposits then that means these
loans that they sorry that the kind of funds that
they raised are not insured, but they similarly make a
riskier loans.
And sometimes that can create a problem, as we'll see.
So that's why banks are not typical commercial banks.
When we talk about banks, it's those that can take
in deposits.
Right.
And from from people like you.
Um, but shadow banking system, uh, played a very important

role leading up to the US 2007 2009 crisis for these, these investment banks.
 We'll talk a little bit more about them when we get to these various issues.
 So let's look at a bank balance sheet okay.
 Just to understand how the bank operates and the role.
 Let's look at a balance sheet of a bank.
 Now why is it called a balance sheet.
 Because the things on IT assets and liabilities have to ultimately balance out okay.
 It records the assets and liabilities of a company like a bank.
 It's different from a profit and loss statement okay.
 Remember we talked about flows and stock right.
 Asset and liabilities are stock variables profit and flows.
 Profit and profit and losses are flow variables.
 The things that happen over a period of time, assets and liabilities are things the bank owns and the bank owes.
 Right.
 It's a stock, okay.
 At the end of a period, how much do you owe.
 So you want to think about an asset as something that the bank owns.
 Now when the bank makes these investments.
 These are assets, right?
 It it makes an investment in a company.
 These are assets makes an investment in real estate.
 It's an asset.
 Right.
 So whatever the bank owns is an asset.
 So let's look at Citibank's balance sheet.
 Uh, one of the US's large banks.
 Uh, obviously it's not just an investment bank, is it?
 Can take in deposits.
 Um, so let's just look at the asset side.
 Okay.
 Um, so on the asset side, it's the it's the left hand side here.
 Total assets.
 And on the right hand side it's total liabilities.
 Now what are the assets.
 So what does it own.
 The first category is something called reserves okay.
 Reserves is basically things like cash that the bank holds either in its big vaults or with the central bank right.
 In the US it's the Federal Reserve.
 Okay.
 So so it's held at the Federal Reserve's vault because it can access a very quickly to pay off other banks.
 Now, remember, these financial institutions borrow and lend to each other sometimes on a daily basis.
 Okay.
 Sometimes a bank would take out a loan of one day a bridge loan and repay it the next day and take it out again the next day.
 Right.
 So these financial institutions lend a lot to each other, and you can have access, quick access to these very liquid assets, reserves, um, for these uh, for these uses often held with um, with the central bank cash equivalents similarly.
 Right.

Riskless liquid assets that can be accessed immediately.

Okay.

Just like cash okay.

But these it could also be assets that are very, very liquid.

You can take it out any time.

We'll think about your demand deposit that you hold for the bank.

Right.

You put it in the checking checking you're actually depositing there.

But you can take it out any time you can go to the ATM and take out the money.

Right.

So cash equivalents riskless and liquid.

So that's obvious in assets.

Right.

Asset includes everything that you own.

Um and then the long term investments are these lending or loans that you make to people like other people like households.

Um, like uh, more like, uh, other companies.

Right.

For instance, if you're, uh, you know, take, take any company, uh, Amazon, Google, all of them go to these banks and say, I want to take out a loan of so and so and so and so and the bank evaluates.

Is this a good proposition?

Um, sorry.

Uh, with, uh, you know, a fixed, uh, of an interest rate of a certain amount.

And then if it's approved, then you make the loan that's an asset of the of the bank.

But it's these long term are different.

Why is it different from the short term liquid.

Why is it called an illiquid asset.

And that's going to be very crucial because often the banks fail not because of insolvency but because of illiquidity.

Okay.

We're going to talk about that because when you make out the loans, let's say it's a five year loan or a three year loan, it's a long term loan.

You can't call it back instantaneously.

Right?

So it's a long term investment.

But these long term investments are really crucial.

Why?

Because here we can see the banks enable the economy to undertake significant longer term investments, which is really needed for, as we see in the growth model, capital accumulation.

Right.

You give this these funds to these companies, they can expand.

They can then have the assurance that they have these funds to do these long term strategic decisions.

Right.

So that's very important.

And often you can make more money or have a higher return on these long term, uh, on, on these long term investments, if you hold that cash the return is zero, right.

Whatever you hold is going to be that.

And then you have inflation and then it grows.

But these long term investments you can charge a higher interest rate, uh, for these um, for these uh, for

these loans and often, of course, how do you assess whether these loans are risky or not?

Well, obviously, you look at the project is a good the company, but often, um, it's backed by some collateral. Right.

Collateral is just basically you want to understand it as, you know, the asset that you give to the bank in case you don't repay the loan. Think about mortgages, right?

You put a down payment, you get out a mortgage from a bank.

Uh, what's the collateral?

The collateral is the property, right?

If you don't repay what you owe the bank in the end, well, they're going to take away the house, right?

That's obviously what happened to a lot of households, unfortunately, in the US, after they couldn't repay, uh, these, these mortgages.

So the collateral.

So.

So the bank will assess your collateral.

It's high value.

It's good collateral.

Then this loan is potentially not as risky.

Right.

So they make.

All these kinds of decisions.

Okay.

So that's a simplified, um, balance sheet asset side of the balance sheet.

Obviously there's lots and lots of different other categories, but just short term and long term or liquid uh, assets.

Okay.

So this add ups to adds up to um.

Uh, \$1.9 trillion.

Okay.

So then let's look at the liability side.

Liabilities are what banks owe to others.

Okay.

So if you deposit.

Some cash or make some deposit.

Checking into your checking account at the in the bank, you're effectively lending it to the bank, right?

You think you're depositing it to the bank, but you're lending it to the bank.

The bank is going to use these funds potentially for other purposes.

So demand deposits are the kind of checking account or think we think about where you can access it immediately.

Okay.

Um, you want to withdraw, you can withdraw.

Now that amounts to, uh, well, that's that's the majority of the funds for the bank, right?

The bank, the funds comprise of you know, the liability is basically the funds of the bank.

What they owe it's majority driven by demand deposits for Citibank, because, again, it's it can take in deposits.

Um, then it has something like short term borrowing, the kind of I mentioned where it would borrow from another financial institution for less than a year.

That would be considered short term.

Sometimes it's as short as a day as I mentioned.

And you pay interest on it.

Okay.

Just for doing it based on one day, lots of

these bank take out short term loans all the time
to to to bridge a funding gap, uh, if that
occurs.
And then you can take out things like long term
debt by US treasuries that are longer term.
Right.
These are and these are, you know, borrowings.
Um.
Uh, or you can issue a long term debt.
Uh, you can issue.
Sorry, not not us Treasury.
You can issue long term debt where others you owe
others, uh, or others are lending to you.
In other words, for the longer term.
Okay.
Okay, so that adds up to 1.75 trillion.
Okay.
So there's a gap here.
What's the rest?
The rest belongs to shareholders.
A bank can have shareholders.
You can go.
Go search on your, um.
You've purchased stocks on any kind of platform.
You can buy stocks for Citibank.
Buy stocks for Barclays.
Buy stocks for you know UBS and all these banks.
Right.
Why?
Because the shareholders um.
Also, the shareholders give you money, right?
You're a bank, right?
The shareholders.
If you're buying stock, then you're you're giving money to
the bank effectively.
And the shareholders equity is just the difference between the
assets and the liabilities.
Okay.
By the way, why are the assets higher than the
liabilities.
Or it could be higher than the liabilities if you
say, okay, I took demand deposits of 1 trillion, I
made the loans.
Why would it be necessarily be higher.
Well the reason is that the value.
The acid side.
It's a value.
It's a market value of these loans and investments that
you made.
For instance, um, the bank made an investment on a
real estate.
Okay.
They bought lots of real estate.
That real estate grew by 30%.
And the real estate is worth more, 30% more than
when it was bought.
Right.
The kind of stocks that the bank invested in or
the bonds can have returns.
Right.
And even if you make interest on some of these
loans that you make to, to, um, these long term
investments, these interests get carried back into the bank, potentially
as cash or short term investments.
So remember that asset side.
It's a value.

Same thing with liabilities but it's a value.
So these assets can grow.
Think about your assets.
It can obviously grow right.
If you're doing good investment decisions can grow from year to year.
Now if you're a stock shareholder.
And these banks made very sound investments and had a very high returns, then I tend to benefit as an equity holder, right?
Because again, I'm owning what the difference between assets and liabilities.
On the other hand, who are taking the most amount of risk?
The bondholders, the ones that lend the bank long term money, or the stockholders or the equity holders.
As you see, it's going to be the equity holders because, you know, everything gets wiped out and we get everyone gets repaid.
But the stock, the shareholder gets nothing.
Okay.
Well we'll come back to that as an example.
But then these two things necessarily have to be the same because the shareholders equity is by definition the difference between the assets and the liabilities.
Right.
So of course when you add them up this is balance.
So it's called a balance sheet.
Okay.
So this is what we discussed.
Now the role of the bank.
There's been, you know, huge studies on banks right there, economic significance, this financial significance, what role exactly they play.
So this is a summary of exactly what banks do and what role they play.
So most importantly there are three functions and they're interrelated.
Okay.
The first is they're going to identify profitable lending opportunities.
First of all, it's the same question we started out with.
If you had that money, can you make sound investment decisions yourself?
If everybody could cost us sleep then you don't need a bank, right?
But the truth is, you can't.
First of all, there is the time cost to do these research, right.
You need to look into this.
So that's a big transaction cost.
Second you don't really know the companies.
Okay.
Somebody else like a bank has that financial expertise.
Know these companies much better.
Third you don't know what's around right.
They have a big, big, big pool.
Why?
Because everybody goes to a bank to get loans, right?
So they have a much bigger pool of potential borrowers that you don't have.
So clearly, um, they can help banks can help you identify profitable lending opportunities because they have that kind of access and expertise.
The second also extremely important is what's called maturity transformation.
Maturity.
What is the definition of maturity?

Let's see.
It's the time until a debt must be repaid, right?
So it's the time.
So you have a long maturity debt.
It means it won't be paid for.
It won't need to be repaid for a very long time.
Short maturity means it has to be repaid and a very short period of time.
Demand deposit.
Zero year maturity.
Others like mortgages.
Okay.
If you go and buy a house, how many years do you want to take out the loan for?
You can take it out for maybe ten years.
15 years even.
Okay, so why are we.
Why do we call them maturity?
Transformation.
Well, let's go back to this.
A balance sheet.
Look at the majority, okay, of the liabilities or what the banks owe are what are they short term or are they long term?
The majority of the liabilities are short term.
Right.
In other words, when people lend to banks, it's primarily short term.
You're in a demand deposit.
You can take it out any time.
Right.
So that's 1 trillion out of 1.7 trillion.
And actually short term borrowing is also short term.
So if you add the two together 1.4 trillion 1.5 trillion, um, that's the majority of liabilities is short term, which means that most, most funds that are lent to the bank are very short term.
It can easily be pulled back or called back.
Right now, if you look at the asset side, is a majority long term investments or short term investments?
It's a majority.
Long term investments.
Something like a little less than 50% is in long term investment.
Whereas what banks oh is majority short term.
So this creates what's called a maturity mismatch.
And the maturity mismatch is at the core of why these banks are so fragile.
Why is that?
Let's say that everybody wants to withdraw.
Okay.
SVB Bank, what happened to SVB Bank?
Silicon Valley bank.
Well, these tech companies were having a really hard time raising funds, okay?
Because after the tech bubble, I mean, it didn't didn't really collapse.
But when interest rate rose in the US then it was harder to.
Then the stock prices kind of fell and they needed to withdraw their cash deposited in the bank.
Okay.
If they withdraw, what happens?
Well, you have to give them back immediately, right.
Because it's short term.

But if you don't have enough because you only have cash and reserves of this much, what you need to do is that you need to call back to, excuse me, long term investments.

Now, can you call back long term investments?

Well, very often you can't.

And other times you have to fire sell or you have to sell these long term investments at a discount, right?

Ten year, 30 year treasuries.

I have to sell them now.

You have to sell them at a discount.

So that's kind of what crippled SVB Bank when all these companies wanted to take out cash, there wasn't enough.

So they had to buy or sell a lot of their long term assets.

And then guess what happened?

The assets were worth less than the liabilities and the bank became insolvent.

If the assets were less than worth less than the liabilities, then the stockholders equity is also zero, right?

You wipe out the entire equity stake.

So SVB banks prices share price fell by 75% within a very, very short period of time.

Right.

So that's the maturity mismatch.

If maturity were exactly match between assets and liabilities and were good right.

The liquidity aspect is is is sufficient to meet the demands and withdrawals of your lenders, of the banks, lenders.

But when there's a maturity mismatch that is at the heart of the banking fragility.

Okay.

So.

It has this great important role of maturity transformation because as we mentioned, it also helps you who has cash make higher rate of return right above zero, sometimes 5% if you put it in a bank for a year.

Why?

Because they're making long term roll, a long term loans that have a higher rate of return.

So that helps you.

It helps the economy because it helps these companies grow with longer term investment.

But it has this risk right which is maturity mismatch.

And that subjects these banks to a bank run which we're going to talk about.

And the third is the banks are supposed to be managing risk.

Okay.

Um they say well guarantee you your money back if you put it into some, you know, CD, um, or some kind of investment, we're going to give you 5 to 6% back or 8% back, whatever it is, uh, that are perceived to be riskless, why are they confident in doing so?

Because they have a diversified portfolio, right?

In principle, they should have a diversified portfolio not only in investing in mortgages in different kinds of companies, different sectors, uh, rather than pull them together.

But in practice, they're not that sometimes they're not that diversified.

For example, the SVB Bank, we talked about First Republic Bank, they were all concentrate.

A lot of their investments were concentrated in tech.

That's not diversified portfolio.

In other circumstances, you could have a diversified portfolio but still run into the same problem.

Why?

Because all asset prices fall at the same time with an economic, uh, downturn.

Right now.

In 2007 2008, stock prices fell by more than 50% across the board.

So even if you were diversified, you had a violent contraction of your assets.

Why?

Because sometimes there's economic panics or, sorry, financial panics or recessions.

Everyone wants to sell.

There's more uncertainty.

So even when you have a diversified portfolio, it doesn't mean that you won't.

You won't.

You're not.

You're, well, managing your risk.

But of course, the banks manage risk much better than you and I can do.

Right?

Because they have they have more diversification.

Same thing with the 2007 2009 crisis.

Um, a lot of these banks held mortgage backed securities and toxic assets, the kind of securities that were linked to subprime mortgages.

Okay.

And if everybody if all this fell, this entire sector fell, lots of banks were holding it, then that could mean a significant drop in the in the value of the assets.

Okay.

So.

So as we mentioned it has a large number of borrowers.

So we can identify the best loan applications.

And it can um transform these short term liabilities into long term investments, which is important for the economy but also poses some risk.

Okay.

So this we also talked about um, and we also talked about the fact that diversification is sometimes insufficient.

Just as in 2007 to 2000, 2009, 12% of all mortgages entered some form of delinquency.

And again, as I mentioned, stock prices fell by more than 50% in that period.

Now, um.

This is the question, right?

What happens if banks go insolvent?

Depositors remain safe.

For a simple reason.

There's something called, um, FDIC.

Uh, and that's the American.

But we have all these, uh, basically the same authorities in every country, which is that the government insures the bank up to a certain amount or ensures your deposit to a certain amount.

So in the US is \$250,000, right?

If you deposited your, um, if you deposited anything up to \$250,000 in a bank, you're insured, which means that whatever happens to the bank collapses and fails and gets bought, you will get your money back up to \$250,000 and that FDIC.

This authority was established in 1933.

If we look back in history, we'll see a little bit earlier.

There were just massive numbers of bank failures all the time.

Um, but after the introduction of these, um, federally insured accounts, then bank failures started to, to, to to decline.

The number declined, but there were still bank failures.

So why why does why do these banks ultimately transfer risk to stockholders and the government?

So first of all, um, as we mentioned, if the bank fails, then the US government will take will step in or the similarly the British government and they will insure up to a certain amount.

But you can also see now with an illustration, as we mentioned, the stockholders equity are the most risky part of this.

Um, through this example, you transfer the risk to the shareholders.

How?

Okay.

So let's say as a simple, um, balance sheet of a bank, this is before the investment loss.

Okay.

This is before.

And let's look at after.

So let's say that we had a short term funds or cash of around \$1 billion.

Okay.

Um, then um, uh, the long term investments is around \$10 billion in total assets is 11.

Okay.

Now, where did this come from?

What were the funds?

Uh, how were the funds raised from the banks?

Well, depositors contribute \$9 billion.

Okay.

Um, and so, um, uh.

Sorry, this is probably missing some others.

Um, but the stockholder equity, uh, is, uh, the difference.

What?

What?

Let's see what is going on here.

I think there is a typo here.

Um, the total assets is 11, so liabilities?

Total liabilities should be nine.

Let's correct this for for now.

And, uh, if the difference would be two, \$2 billion.

Okay.

That's the stockholders equity.

So stockholders equity \$2 billion plus nine is going to be \$11 \$11 billion.

Okay.

Now let's imagine that we have, um, a \$1 billion loss in our long term investment.

Okay.

So this one is the correct, correct version.

So this \$10 billion of investment became \$9 billion investment.

Let's say that basically you lost 10% of the value

okay.

Maybe stock prices went down, real estate went down.

And so total assets became ten because you had one less.

And then what happens to the, uh, stockholders, stockholders equity?

Well, it was reduced from 2 billion previously to 1 billion.

Now, what happened to everybody's demand?
 Deposits?
 Well, it had no impact.
 You still got it back, right at 9 billion.
 But all of this risk was transferred to the stockholders
 equity, which was reduced by, uh, by 50%.
 Okay.
 Now, um, what if the bank's long term investments lost
 30% of the value?
 Let's just look at this.
 If it lost 30% of value.
 Um, then this would be, uh, seven.
 Okay.
 And if you add it together, that would be eight.
 Total assets would be eight and total liabilities would be
 nine.
 First of all, the bank becomes insolvent.
 All of this 8 billion goes to demand deposits.
 And the government can step in to make up for
 the rest.
 But the stockholders equity value is exactly zero, right.
 Because the shareholders are the residual claimants on the banks.
 Okay.
 So all of their equity gets wiped out.
 Um, demand deposits is also, uh, not covered because it's
 nine rather than um, and there's only, uh what do
 we say seven.
 Did we say 7 or 8?
 Um, so but it first of all goes into the,
 the, the demand deposits in short term, um, lenders while
 the stockholders get completely wiped out.
 Okay?
 So it gets transferred, this risk gets transferred to the
 equity holders.
 Okay, so that is an insolvency.
 Uh, problem?
 Uh eight.
 Yes, nine.
 Exactly zero.
 And total liabilities is 11 minus two is equal to
 nine.
 Okay.
 So that's exactly what happens with 30%.
 Now when the stockholders equity goes to zero, the bank
 becomes insolvent because the assets is less than the liabilities.
 And here the FDIC, Federal Deposit Insurance Corporation comes in
 US taxpayers.
 This is why people are so against bailing out banks,
 because ultimately there are taxpayers who will pay the difference.
 Okay, I don't know how much I think the US
 government put in more than \$100 billion to save these
 banks in 2007, and obviously that created, um, a reverberation
 through the taxpayers because they think they are bearing that
 cost.
 But if we also think about the fact, is it
 really legitimate, you know, their concerns, I think in certain
 to a certain degree it is.
 But what if you actually let all the banks fail?
 That's much more calamitous, right?
 None of these companies can have.
 Let's take it to the logical extreme.
 None of these companies can borrow money that can operate,
 um, operate their their the businesses.
 None of them can pay out the workers.
 Then obviously the economy tanked and everybody is worse off.
 Right?

So by stepping in to saving these large, systemically important banks, as we will see, you're going to stem the panic from spreading across the board to other financial institutions when everybody is going to have a bank run, as we will see, it's going to create much havoc.

So there's a sense in which, yes, these banks, because they were transferring, um, the risk to stockholders and to the US government for the reasons we mentioned.

They can actually be they can take on more risks, right.

Because if they take on more risks, they're going to potentially make more money.

But if they make these risky bets, ultimately it's going to be bailed out.

If they think it's going to be bailed out, then they're more likely to take on more risk.

And that creates a phenomenon called moral hazard. Right.

Um, the fact that, um, kind of, um, they make money, then they, they gain if they lose money, stock pay, stockholders and taxpayers pay, that kind of distorted, um, a behaviour.

Okay.

So first of all, what will the FDIC do?

Shut down the bank when assets are less than liabilities?

The bank is insolvent, right.

That's what happened to SVB.

Um, as we'll see, some of these got bought right in um, uh, in uh, 2023, First Republic Bank was bought by JPMorgan Chase.

That's after JPMorgan Chase bought Bear Stearns, uh, in 2009, uh, for really a fraction of, uh, the value, the stock value before, uh, the, the crisis and now JPMorgan Chase has lots more branches from this purchase of First Republic and got all the assets that the bank held.

But it stemmed a crisis because when it takes over, then everybody won't have this bank run.

Right.

That we'll see because, um, they know that their deposits and their loans will be repaid.

So the FDIC will either shut it down and make payments to depositors up to \$250,000.

Sometimes it will come from taxpayer money.

Um, and second, it could also transfer the bank to new ownership.

Now, um, there was a very kind of, uh, dramatic, uh, kind of drama unfolded during the time when the US government was calling the British government to work with all these banks to deal with Bear Stearns and Lehman Brothers.

Right.

Say, who's going to take on this ownership?

And finally, we had JPMorgan, uh, Chase, uh, buy Bear Stearns.

Uh, I think, uh, Barclays was also called and but they didn't really have enough strength and power to do so.

But that is also a second option, um, to prevent.

And this can avoid the situation of the government stepping in and taxpayers obviously, uh, being involved again.

So sometimes the bank JPMorgan case is referred to the bank that never lets a crisis go to waste.

Every single time it was able to buy it at

a very cheap price, expand its assets, expand its presence all over the US and, and, uh, and also make a lot of gains on the assets.

The assets were still, uh, worth a lot of money for both of these banks.

Now let's talk about what actually is a bank front.

Now, we already hinted at, uh, this uh, situation when we say, okay, let's look at this balance sheet.

If everybody wants to withdraw \$9 billion, how much do I have as a bank to service them?

I only have one, right?

In normal cases, not everybody wants to withdraw.

At the same time, there's only a small.

And on any given day, there's a small portion of people who actually want to withdraw from a bank.

And that's often balanced by the fact that there going to be new deposits, fresh new deposits coming in.

Because every time you earn a salary, you want to save some of it.

You put it in the bank.

Right?

So often balanced.

But what if everybody wants to withdraw at the same time?

Then obviously there's not enough cash, right?

Reserves and cash equivalent.

And then you're in a liquidity crisis.

You don't have enough liquidity and the bank fails.

The bank collapses when everybody wants to take it out.

And that's called a bank run.

Um.

So and that's come from that's coming from the fact that there's a maturity transformation.

Right.

That creates a match and mismatch of liquidity.

Because again, your assets are less liquid, your liabilities are more liquid.

And the bank is effectively locking up the money and sometimes unable to pay the depositor at short notice if everyone wants to do together.

And this panic can lead to other depositors wanting to withdraw the liquid assets before because, you know, you think, okay, if you worry that the bank is going to be illiquid, then what are you going to do?

Are you going to go to the bank and try to withdraw?

And that creates that kind of panic.

Now, um, if anybody has watched, um, uh, what is it called, Mary Poppins?

Um, that is one of the, the, the you know, the little boy was trying to go to the bank and there was a senior banker, and he wanted to take that that coin.

And, um, the little boy wanted to hold on to that coin and created this massive panic in the entire bank because they thought the bank was going to collapse.

And everybody rushed to the counter to try to take out money.

And you created a bank run.

And so in some sense, even if you're solvent, right, even if you're doing just fine, that kind of credibility issue comes into play.

Then you're you're done for, right?

If the bank panic comes about even when you're solvent because of illiquidity, then you're done for.

So a lot of banks fail for that reason.

Um, and sometimes the bank is forced to sell its illiquid assets a fire sale.

And that's what we talked about, the SBB bank having to sell a sell or First Republic, some of the longer, um, longer term assets on a fire sale. So at a discount. And that's effectively what led to a massive loss on the banking assets side. Okay. So in the last five minutes, a bit of history. So. Since 1900. Okay. So here we have basically a data from 18, 20, 92 to 2018 before the pandemic. And this is a graph that shows the annual rate of bank failures. So the number of banks failing in any given year divided by the number of banks basically in operation. Okay. Um. Since 1900 in the US, 20,000 banks have failed 20,000. Now FDIC was established in 1933, as we mentioned, and that created deposit insurance. So basically up to a certain amount of your checking is insured. And it also played the important role of regulation, banking regulation. So we recently had, after 2007 2009, significant degree of regulation to make the banks safer, better capitalised and make sure that they take on less risky, uh, investments. Now, in 1929, 28, um, 20% of the banks failed before the Great Depression. So up to the Great Depression, 20% of banks at some given point was failed. Um, and during the Great Depression, almost 40% of the banks failed. So again, what causes banks to fail? Well, when we talked about bank runs, but mostly it's because some fundamentals have, have gone wrong. Right. So remember we talked about the fact that, you know, Texas Tech stocks went down. Um, uh, mortgage backed securities. Uh, because, you know, a lot of people bought subprime, which there are a lot of people took out subprime lending. They couldn't afford the houses. They bought the houses. A lot of these assets were packaged and sold off to different financial institutions. The financial institutions held them. And they said, oh, suddenly the the housing prices fell dramatically, uh, in the US peak to trough, 30% drop in real estate prices, properties. Right. And what happened? Well, these assets that you held contracted. Right. It was worth a lot less. And that led to insolvency. Now, um, in the earlier years, um, in 1928, uh, during the Great Depression or before the Great Depression, it was caused by a lot is caused by land values and real estate values, mortgages, etc.. When the land fell, uh, their mortgages fell and the banks ran into trouble. Um, in the 1980s, there was a savings and loan

crisis.

This is this blip here.

Um, because these regional banks in the US made a lot of risky investments in local farms and businesses, okay.

And there were huge asset price fluctuations in oil prices and agriculture, cultural goods.

When these tanked, then these assets became worthless.

So a lot of it has to do with asset

price bubbles, right?

It runs up and it collapses.

And then all these assets that are held by banks effectively contracted in value.

And, um, in 2007, 2009, here's here are the the blips only 460 bank failures during the crisis.

But guess what?

It's very different because not every banks are the same.

When you have a major, systemically important bank like Lehman Brothers, uh, then that only counts as one point.

But they obviously spread to the real economy and other financial institutions and more important ways.

Um, so, uh, and that was caused by, uh, by

by a collapse of the real estate now 2020, we don't have the data for here, but there were actually very few banking crisis.

Only two banks failed during the pandemic.

And why?

The reason was that it wasn't really a financial crisis, right?

It was a real economy crisis where lots of people lost jobs because they couldn't go to work in service industries and so forth, and that didn't really have a major impact on property prices per se.

Right?

Asset prices were actually okay.

Texas Tech prices were higher than ever.

A lot of these stock prices were driven up, but

it didn't really have a financial crisis because a lot of these cyclical things like real estate, like, um, like

these, uh, commodity prices didn't go through these huge fluctuations.

So in fact, it did not have, um, a banking crisis.

Okay.

So here are some a summary of some of the reasons that cause a bank collapses.

But let me just mention one last thing, one last important thing before we break, uh, in the last minute.

And that's the concept of too big to fail.

Now, there are banks such as Lehman Brothers, such as these major investment banks.

All of these major investment banks are considered to be systemically important financial institutions, cities.

And they're considered too big to fail.

Now, why is that?

Well, first of all, a big bank has a lot more liabilities than a small bank, right?

Which means they owe a lot more money to a lot more parties.

By definition, they're big now.

If they fail, then those people who lent money to these, these big banks are also going to have a major problem, potentially even failing.

Right.

And that means that it's going to create this ripple effect where lots of other counterparties are going to fail, and then you're going to have this huge financial crisis that will spread across like a wildfire.

That's not necessarily the case for small regional banks, which can be contained.

And so.

For these too big to fail banks.

It creates another problem which is called what we mentioned moral hazard.

Right?

Because you know that you're too big to fail, that you're going to be bailed out in the end.

Well, why not make really risky bets, right?

You're going to be safe anyway.

So that's the moral hazard aspects of it.

But after the 2007 2009 crisis, which led to huge amount of enforcement on regulation tightening up right capital requirements, liquidity requirements, less, less, um, less ability to make flexible decisions.

They now have to have these three things.

Which is, um, a living whale, how it's going to sell off its assets in the case of a bank collapse.

Um, the kind of choices on risky and less risky and therefore lower returns.

Right.

The flip side of this is that the more regulated you are, the less returns these banks are going to make.

The less risky returns.

But the longer term loans are also going to be, uh, curtailed.

So these banks also become much less competitive.

And that's exactly what happened to European banks.

Okay.

Thank you.

And see you on Thursday.

Not.

I'm.

Yeah.

Yeah, yeah.

No I think.

I.

We.

He.