

Microfoundations of Macroeconomics
Prof. Wasim Ahmad
Department of Economic Sciences
Indian Institute of Technology, Kanpur

Lecture - 14
Credit Market Imperfection I

Welcome back, we were talking about the Ricardian equivalence under the overlapping generation model. And under overlapping generation, we talked about how benevolence matter a lot and benevolence matters a lot because, when we talk about the inter-generation wealth transfer then that has an impact on the Ricardian equivalence. The smoothing of consumption when you have the tax burden or the debt burden.

Now we are extending it further and we are trying to see what happens when we have uncertainty with regard to any kind of credit market asymmetry. That how when we say that in the banking system when you go to lend money you are being offered a lower rate of interest but when you borrow from the banks then banks charge you or banks offer you loan at a higher rate of interest.

If the banks are offering you a loan at a higher rate of interest means that borrowing and lending scenarios are not the same. Now, with these borrowing and lending scenarios, you have to understand that the role of microfoundations matter a lot and these microfoundations will help you build a basic understanding of how the banking sector operates.

And when we superimpose the condition of the government then how we can understand the behaviour of the government, different agents, and how agents react to the situation that we have because of the credit market asymmetry. In those situations what will be the reactions of the representative agent whether the current consumption of the representative agent will have to compromise then we will be talking about the credit market asymmetry with regard to the limited commitment.

Limited commitment in the sense that when we say that you have the borrowing rate higher charged by the banks, then we have to justify how these things are happening. Now, in the field of the credit market, you have something called limited commitment when the lender is not

satisfied with the information revealed by the borrower then the lender may ask the borrower to deposit some amount of wealth as or something as a collateral.

Now, this collateral will play a very crucial role in the sense that the representative agent's borrowing capacity will depend upon the value of the collateral asset. Suppose you went to the bank and you asked the bank, I want to apply for a loan and I want to purchase a house then what is the value of that house. The bank managers stay there bank when I ask you what is the value of the house.

Then you mention it is about 40 lakhs and I want the financing from you of around 30 lakhs because the rest of the amount I can manage. Now in that situation is the bank is going to give you the amount. In some cases if you do not fulfil certain criteria then the bank may ask you whether you have any kind of savings account or any kind of extra saving long-term saving that you are doing or any kind of wealth that you have.

Since the bank is not having any information about you the document verification may not be just sufficient. It may ask that if you have land if you are holding or owning any valuable asset then you can deposit as an or you can attach that as collateral. And then we will be ready to or we will be happy to give you a loan of 30 lakhs. Why does that happen? Because, in the credit market when you are not repaying then banks will not have any opportunity if they do not have any collateral.

Banks will be happy to extend you the loan only when they find it easier that in case if the consumer is going to default then the bank will still have the hand on the collateral and then they can sell it in the market and whatever the value they will have either the low or high they will always be having no loss scenario. Now, keeping this thing in mind, we can think about how we can go about improving it and understanding the model in a much better way.

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Introduction Credit Market Imperfections Example

Key Learning Objectives

- Understand the basics of credit market imperfections
- Introduce asymmetric information to explain the credit market imperfections
- How limited commitment makes collateral important in the credit markets model
- Introduce different social security schemes to counter the relevance of Ricardian Equivalence

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Now, here we have the basics of credit market imperfections, introduce asymmetric information to explain the credit market imperfections, how limited commitment makes collateral important in the credit markets model, and introduce different social security schemes to counter the relevance of the Ricardian equivalence. These are the concept that we are talking about.

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Reference Book
Key Learning Objectives

2 Credit Market Imperfections
Credit Market Imperfections and Consumption

3 Example

Here we have the credit market imperfections. Let us start how we are dealing with.

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we are not talking about, we are talking about the future period scenario. If he is the lender this is his future consumption.

If he is a borrower then he will be supposed to have at this kind of this scenario $1 + r_2$ now here we have

$$C_{t+1} = Y_{t+1} - T_{t+1} + (1 + r_2)s_t$$

$1 + r_2$ is attached with the borrowing here we are saying that if saving is less than 0, which means that he is borrowing saving is not positive it is just that this particular individual is supposed to pay at this rate r_2 rate this is what we are assuming here.

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The slide is titled "Consumer's Lifetime Budget Constraint: Credit Market Asymmetry". It contains the following content:

- The consumer's current-period budget constraint:
- What happens when we experience credit market asymmetry: $r_2 > r_1$

$$C_t + S_t = y_t - t_t \quad (3)$$

- The consumer's future-period budget constraint:

$$C_t + \frac{C_{t+1}}{1 + r_1} = y_t - t_t + \frac{y_{t+1} - t_{t+1}}{1 + r_1}$$

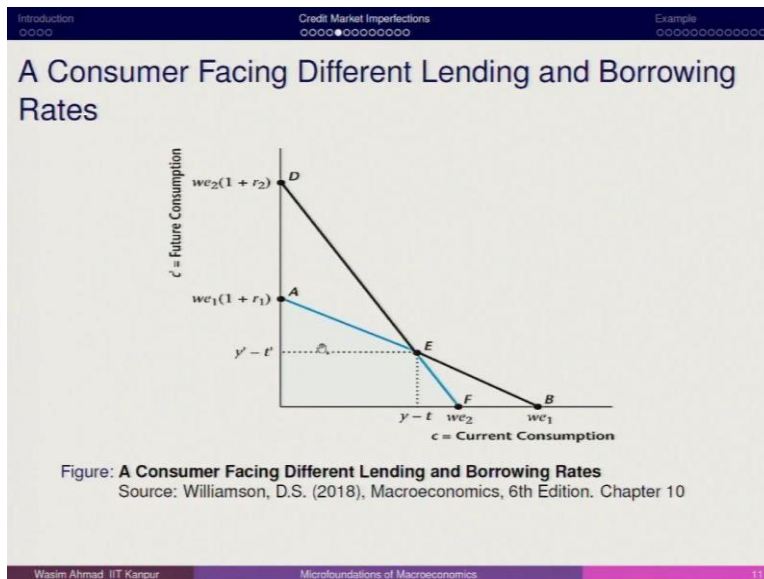
- if $s > 0$ and the consumer is a lender $C_t + \frac{C_{t+1}}{1 + r_2} = y_t - t_t + \frac{y_{t+1} - t_{t+1}}{1 + r_2}$
- if $s < 0$ and the consumer is a borrower (4)

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Now, similarly if you try to derive the budget constraint of the representative agent. If he is lender then this is what is the lifetime budget constraint agent is having.

$$c_t + \frac{c_{t+1}}{1 + r_2} = y_t - t_t + \frac{y_{t+1}}{1 + r_2}$$

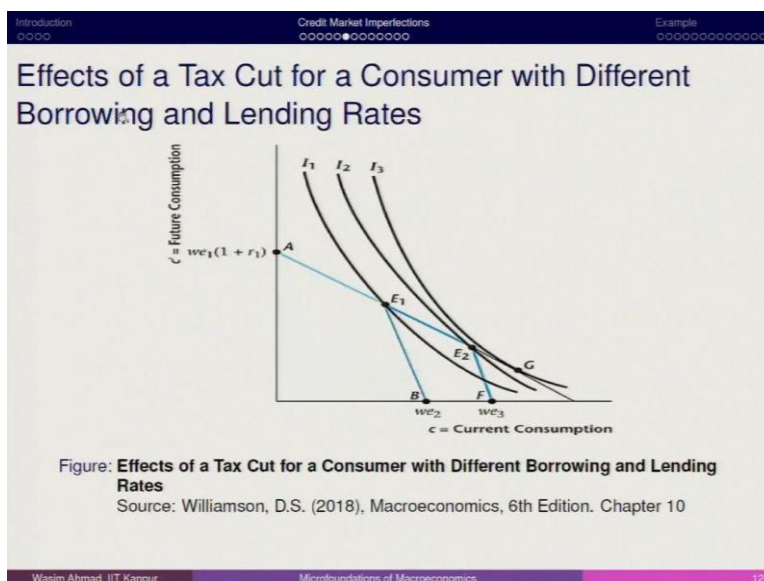
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Considering these 2 scenarios where you have a r_1 and r_2 the budget constraint where the representative agent will be playing is nothing but AEF here, this area will be available for the representative agent to play a role here, it is AEF now we will be working in most of these situations in our setup with this. This is the lending part this is the borrowing part if suppose he goes here.

He will be the lender if he operates in this zone, he will be the borrower because this is his income and this is the future income this is the current income disposable income. If he is operating beyond this, he is the borrower if he is operating in this, he is the lender. If you think about AEF will be the budget constraint of the representative agent.

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Here we are mentioning the effects of a tax cut on a consumer with different borrowing and lending rates. Let us talk about the E_1 B at this level the representative agent is having future consumption of this much amount and current consumption of this.

The individual is happy at I_3 which means that here is the equilibrium consumption. What we find is that at E_1 this representative agent does not have to go for enough kind of borrowing but yes even if he goes for borrowing, he will have a limited opportunity to go because he is happy here. But if I am thinking about the consumption the amount that he can borrow is this much but the government has given him the incentive, some kind of tax relief.

Now he moves here what he does is that E_2 point is that you can see clearly here. If he has been given the tax incentive that the representative agent is having. Now, at E_2 the future consumption is going down current consumption is increasing which means that whatever tax incentive that the government has given to this particular individual it is being used for the current consumption.

If this particular individual simply uses that for current consumption the future consumption declines. Here we do not see that much increase whereas if an individual was given the opportunity to be at equilibrium, then he would have gone for G. But given these 2 scenarios he is better off at E_2 ; E_1 was the borrowing scenario. With the tax cut the current consumption increases.

This is what we try to mention whatever amount that comes as a tax relief the individual man individual's consumer behaviour may not be impacted because this is beyond the consumer may like to be happy here but he is still comfortable in dealing with both situations E_1 and E_2 Endowments at E_1 and E_2 are not going to impact the consumption behaviour except that and E_2 , he has the scenario in which the consumption in the current period is higher and here consumption in the future period is lower.

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Introduction ○○○○ Credit Market Imperfections ○○○○○●○○○○○ Example ○○○○○○○○○○○○

Effects of a Tax Cut with Credit Market Imperfections

- Suppose a consumer initially is credit constrained – that is, he or she saves zero.
- For such a consumer, the entire tax cut will be spent on current consumption.
- This is very different from the case with no credit market imperfections, where the consumer will save the entire tax cut to pay higher future taxes.

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This is what we always mentioned that this is say that in these situations even if you have the borrowing scenario, it may not disturb the consumers equilibrium

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Credit Market Imperfections and the Financial Crisis

- Two key credit market frictions: asymmetric information and limited commitment.
- Asymmetric information: Would-be borrowers know more about their characteristics than do lenders.
- Limited Commitment: Borrowers may choose to default – lender can overcome limited commitment with collateral.

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There are some more angles to look at this. This is the simplest scenario where we are just assuming that here, we have the borrower and lending scenario when we have the credit market asymmetry. But credit market symmetry has a lot to play a role beyond this credit market imperfections and the financial crisis. In case of credit market imperfections when you have asymmetric information. This asymmetric information what would be?

The asymmetric information basically tells that the individual when 2 agents are interacting, one agent has the information advantage over the another which means that if you have 2 agents a and b if both are having some kind of venous interaction then if a is supposed to reveal some

information to b , b may not have the exact information about a which a is already having because a has to reveal the exact information which b should have.

But a is having an opportunity that may not reveal the same amount of information. Here it happens before the deal of the contract you may have gone to the bank. Bank is a lender the consumer is the borrower. If a consumer is going to bank asking for a loan bank will ask the customer to furnish certain details which are mandatory.

There will be some mandatory requirements and this mandatory requirement the representative agent has to reveal to the bank says that ok, this information is enough and we are sanctioning you the loan. Now, suppose this representative agent had some involvement with law and order and some issues with the past records or this particular representative agent has not revealed the information that he has already had one more loan.

And he has not paid back still it open then in that situation this extra loan that the bank has agreed to disburse to this particular person will be an extra burden and this may lead to a default in future. Hiding that kind of information that leads to what we call the asymmetric information. Limited commitment when borrowers may choose to default lenders can overcome limited commitment with collateral.

Limited commitment in the sense that if the bank has no complete trust on the borrowers revealing of information, then banks can put a clause that if you are going to attach some collateral with the loan then only will be accepting your request. Otherwise, we will not because if the consumer is going to default then it will be very difficult for the bank to recover.

Because once you have dispersed once you have settled the contract then the reinforcement becomes really difficult and just to avoid that. Bank upfront ask for attachment of certain collateral which means that the commitment that the borrower is making may not be exact. To fulfil the requirement of commitment they attach with the limited commitments and arrivals.

Suppose that a fraction how it works, recently we had in India a banking sector upheavals and banking sector upheavals led to a lot of trouble in the economy. And this trouble had created a big buzz and this big buzz has a lot of important roles to play.

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The slide is titled "Credit Market Imperfections and the Financial Crisis". It contains a bulleted list of assumptions for a model. The slide has a dark blue header with "Introduction", "Credit Market Imperfections", and "Example" sections. The footer includes "Wasim Ahmad, IIT Kanpur", "Microfoundations of Macroeconomics", and the number "15".

- Suppose that a fraction a of the borrowers in the economy are good borrowers, while a fraction $(1 - a)$.
- Suppose the loan quantity sanctioned to each good or bad borrower is L .
- Banks charge the interest rate r_2 on loans and pay r_1 on deposits.
- It means that banks have to pay $L(1 + r_1)$ amount to depositors and receive $L(1 + r_2)$ from good and bad borrowers.
- Here one thing to not that the banks will not receive any payment from $(1 - a)$ who are bad borrowers.

Now, suppose that a fraction a of the borrowers in the economy are good borrowers while a fraction $1 - a$ is a bad borrower. Think about here we are talking about a as a good borrower $1 - a$ as a bad borrower. Suppose the loan quantity sanctioned to each good or bad borrower is L . Bank charges the interest at r_2 on loans and pay r_1 on deposits. which means that the credit market symmetry exists and here r_2 is the borrowing interest rate and r_1 is the lending interest rate.

Here in terms of inflow and outflow let us understand. Banks when it is receiving the deposit from the customer it has to pay $L(1 + r_1)$. Suppose bank is giving the loan to the customer is paying back the in the form of EMI or whatever interest income divisible. This is I would say asset and liability scenario if you think about this is the asset for the bank this is the liability.

Because this bank has to pay and this bank has to keep. This is the income that it gets, for the banks to remain floating in the business this has to be higher than this otherwise bank will not be able to survive. But, here one thing to note that banks will not receive any payment from $1 - a$ who are bad borrowers. When we say that we have the interest rate spread or default premium.

Default premium is nothing but the extra money that the bank is charging from the borrowers for defaulting risks which means that when I say that the borrowing rate is higher than the lending. Then borrowing rates are higher because the banks feel that if there be any default then these customers may not be responsible but banks will have to be responsible.

And for that reason and since there is a requirement there is a chance that there will be a higher default. Just to avoid bank charges the premium that if the default it is higher bank is going to incur huge losses just to make sure that it does not incur that kind of loss it goes for charging a higher rate of interest.

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Asymmetric Information-Deposit Rate and Loan Rate

- The average profit of the bank will be

$$\pi = aL(1 + r_2) - L(1 + r_1) = L[a(1 + r_2) - (1 + r_1)]$$
- In equilibrium, each bank must earn zero profits
- Zero profits for the bank implies:

$$r_2 = \frac{(1 + r_1)}{a} - 1$$
- Therefore, there is a default premium $r_2 > r_1$ when $a < 1$. The default premium increases as a decreases.

Now, let us define the profit of the bank. Here

$$\pi = aL(1 + r_2) - L(1 + r_1) = L [a(1 + r_2) - (1 + r_1)]$$

In the equilibrium each bank must earn 0 profits. Here we are talking at equilibrium which means that if both are here at equilibrium this profit will be 0 which means that

$$r_2 = \frac{(1 + r_1)}{a} - 1$$

What is a here? Good borrower. Here we have assumed a as good borrowers $1 - a$ as bad borrow. $\frac{(1+r_1)}{a}$ is nothing but if a is increasing which means that overall ratio will be lower which means that the rate of interest on borrowing will also be lower. But the moment you have good number of borrowers decreasing then you have r_2 will be greater than r_1 .

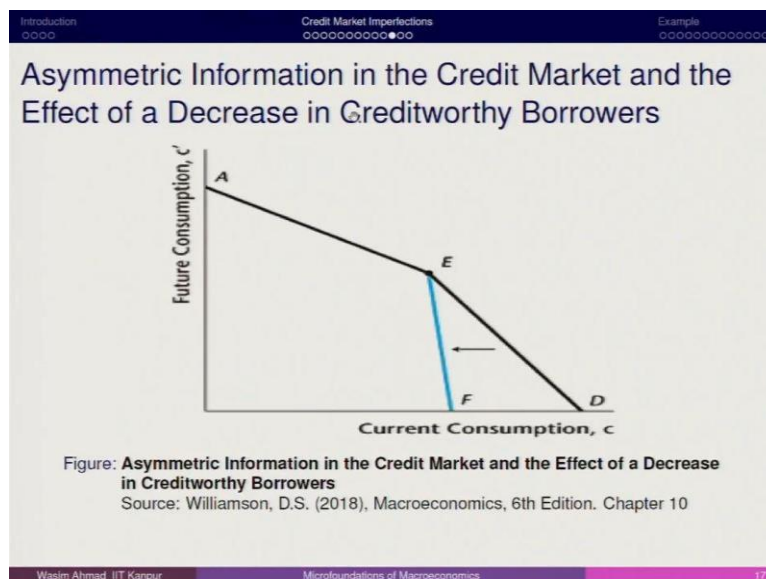
Because if you just solve; then this gets cancelled and then here you have the scenarios. The default risk premium that we mentioned it is mostly because of this good borrower. In the Indian banking scenario if you have gone through the consolidation of bank and certain developments you will find that when the economy faces a situation when you have the large number of default scenarios.

Large number of defaults which means that the individuals are making or the borrowers are not paying on time to the banks. Banks will not even give a lower rate of interest or some concessional loan to even good borrowers. Good borrowers who are not on default and they have made regular payments and they are the credible customers. They also pay higher rate of interest because of this.

Default premium is applicable on even the good borrower but it is happening because of the bad borrower. Since for the bank it is very difficult to differentiate between good borrower and bad borrower. The size of a will matter as long as size of a is higher your borrowing rate is lower and we are moving towards a situation where the efficiency the credit market asymmetry is getting lower.

The rate of borrowing will also be lower and the rate of interest rate of lending will also both will not have much spread. But as on as we see decrease in a the interested spread or the default risk premium will go up. This is what we have.

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This is what is the scenario. Asymmetric information in the credit market and the effect of a decrease in creditworthy borrower. These are the scenarios where we are here it is AED here original is this with the decrease in a we are seeing that it is getting much steeper and this is what we are looking at A. here which means; that this representative consumer will have the compromise on the current consumption.

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Effect of a Decrease in the Fraction of Creditworthy Borrowers

- Default premium increases – even good borrowers face higher loan rates.
- Budget constraint shifts in.
- Consumption falls for all borrowers.
- Matches observations from the current financial crisis – increase in credit market uncertainty, reduction in lending, decrease in consumption expenditures.

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Even good borrower face higher consumption falls for all borrowers matches observation current financial crisis. Here if you think from the macro perspective you will find that the a scenario was quite applicable for the global financial crisis when we had large number of defaults on the mortgage loans. And these mortgage loans had impacted the economy very adversely.

And I would say that if you think about how this topic matters it is because of this.

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Limited Commitment and Credit Markets

- Borrowers need incentives not to default on their debts – these incentives typically provided by collateral requirements.
- Examples: House is collateral for a mortgage loan, car is collateral for a car loan.

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This is what we mention about the limited commitment and credit market. We will be now introducing to a new topic which will be linked to the credit market asymmetry. And limited commitment has lot a role to play and this may also be linked with what we discuss about the

overlapping generation. But overall, what it appears that the in the credit market when you have different borrowing.

And lending rates the different borrowing lending rates are not just because banks are directly involved. It is because of the type of borrowers that we have. If you have a good number of borrowers then this will expand otherwise, if you have a decreasing then this is what we have. decrease in creditworthy borrowers. This is what and then here we are talking about the situation but we will start this in the next class.

But if you want to read more about this scenario, this scenario makes a lot of sense if you want to read more about the scenario. Then I would request that please refer the 2008 09 global financial crisis how it worked and when you had this shoot up of the borrowing rate, when we see that we have lot of uncertainty in the economy. Normally you have the interest rate incentives given.

But we are not taking into account any business cycle phenomena here. Here, we are just directly putting up the framework. do not link with the scenario that when you have the uncertainty at that time governments go for a lot of incentives, interest rate incentives or tax incentives. Those things we are not considering. Here we are simply considering the number of borrowers and lenders. That matters a lot and will be stopping it here, thank you. Thank you much.