

Microfoundations of Macroeconomics
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Module No # 08
Lecture No # 39
Open Economy Macroeconomics

Welcome back so now we are going to start a new session and in this particular session we will be focusing on the micro foundations of international trade. So all of you those who are familiar with economic concepts, you must be; knowing that one dimension that we always talk about we economist always fascinated to talk about is the international trade.

And what do we do in this particular area? So we try to understand the behavior of or I would say movement of goods and services. So how the countries are reacting with their exports and imports? So if you have more of import then it becomes a burden for the country that you will have to pay more of your wealth to compensate or to meet the import demand.

If you are more of exports then it becomes really interesting for the country because then the country will be earning more of foreign assets. So in most of the international trade analysis we often find that the understanding of international trade becomes really important. And if you read the basic text book Dominick Salvatore or even the Higgins you find that there they talk about more of gains from trade and they mention also about that how the smaller economies.

So the basic theories that we have in international trade which is about the absolute advantage and the relative advantage theory. So there we talk about in absolute and relative sense whether the country is specializes in a particular product has the relative or absolute advantage then what will be the facilitation of the trade? So, whether these countries should be trading or not.

Without trade scenarios which we normally name the authority scenarios are those scenarios in which the country does not have any exposure to the international trade which means no goods and services flow from one country to another. And if the country is operating in that setup then we just consider the domestic economy functions.

So international trade has lot meanings and especially at the time when you have communication speed of communication is really high across borders. And we find that it is not just the manufacturing it is also the services sector which is playing a role. You have lot of foreign trade agreements then we started with 1944 when we had set up the general agreement on tariffs and trade tat.

Then we move to World Trade Organization. Then we have different regional trading blocs then you have monetary union. So all these; have lot of implications on the international movement of goods and services. The factor movements play very important role. In this particular session we will be focusing on certain dynamics which are related with the micro foundation.

So we will have the mix of so we have already done the 2 period model so we will be trying in the 2 period context very basic framework and that too in a very small opening on the model why small is open economy model because it helps to draw the; map or the contours at the broader level. So maybe if I am talking about the small economy so, maybe the Luxembourg may be Maldives.

So if you want to understand if you are able to understand the dynamics of trade in these smaller economies then maybe at the larger level you can have some overview and may be your theories may give you the different insights. So, most of; the micro foundation theories they target at the smaller problems. The smaller agents and then they try to generalize at the macro level.

So, in the very first class that we had discussed about the micro foundations and this is also the topic of this course. That we; are trying to understand each and every macro phenomenon from the micro perspective. So we are introducing governments, were are introducing consumers, we are introducing firms and then we are seeing with respect to productivity with respect to government expenditure, with respect to consumption.

So these dimensions are really important will be also trying to see what we have already had done. So this particular session is going to be more familiar. If you have already gone through the rest of the slides and lecture that I have shared. For example I will be using 2 period consumption lifetime buyer constraints. So that we have already covered

we will be using the Ricardian equivalence concept which means that the taxes smoothing framework.

Under that if the government is going to introduce tax then how individuals are going react? So we will be introducing that also so that we call it as Ricardian equivalence framework. Then we also, trying to see that if you have different interest rates scenario. So if interest is going to go up and your borrower or lender; how you will be reacting to that?

So whether your, whether with respect to the open economy whether it will be the same or it will be different right. So when I talk in the context of consumer then we talk about the borrowing and lending of individual consumer. But when we talk about at the international trade level then we say that it is about the country. So if the individual in the 2 period model; I was making decisions about saving here saving implies that it is saved at the country level.

So country is saving borrowing and lending that I talked about borrowing and lending in case of individual consumer it will be with borrowing lending happening with one institution another. Here this particular country will participating international credit market where it can go for lending or it can borrow from that market. So that kind of understanding is I would say crucial before we start formally the model.

So I hope it is clear that international trade when we mention about international trade has facilitated the dimensions of many economies. Majority of the economies which are dependent upon exports are doing well. So for example South Korea export driven economy Japan is also more or less export driven economy. If we are talking about China is export driven economy it is led by manufacturing sector.

So most of the countries, they focus on the international trade because with international trade you have 2 things that you have a movement of goods and services. Second thing is the movement of culture movement of know how about new technology new processes. So this knowledge transfer which is happening through import and export of goods and services.

It is of immense importance because then you have different universities very different colleges using those tools and techniques and then it further improves the efficiency of

their production and then it also broadens the understanding about a particular process. Then maybe after some time the country will be going for import substitution policy.

In the modern era we are in 2022. So in modern era if you try and understand; the role of international trade then it becomes important in the context that how the countries are interacting? When we talk about international trade the international trade has direct link with the globalization. So if more and more borders are open more and more countries are opening their borders.

And if they are allowing goods and services even factor movements; which means that labor is free to move from one place to another. If it is happening in that way then we say that it is some kind of open economy framework. Then you have the dimensions of goods and services export import people will be interacting at different level movement of capital from one ends to another.

So with the availability of high speed internet it has facilitated a lot. So nowadays you must be saying that the emerging economies are becoming the global hub of services sector. India is one of the leading countries in that regard so international trade though in the beginning it was part of the macroeconomics but over a period of time with the evolution of the international trade as in diversified sector.

In most of the economics we have a different complexities; in the international trade. So nowadays international trade has become a different subject and it has become a separate discipline from macro economics. And it has more to deal with the dimensions which are more related with the cross border transactions and cross border movement of goods and services.

So if you ask anyone who is doing master or bachelor degree in economics. If you ask them that which all courses you have done then they will be mentioning macro and international trade separately. Because in the beginning at the very basic level the international trade becomes part of open economy macroeconomics. But if you want to specialize yourself; at the goods level at the different activities level then international trade becomes a separate discipline.

So this introduction I am giving most of I am sure most of you are aware about this. But those who are from non economics background I think it is crucial that you should

have such type of background in your mind and then we will be thinking about. I mean in macroeconomics normally when we talk about open economy macroeconomics in nowadays we deal more with the exchange rate.

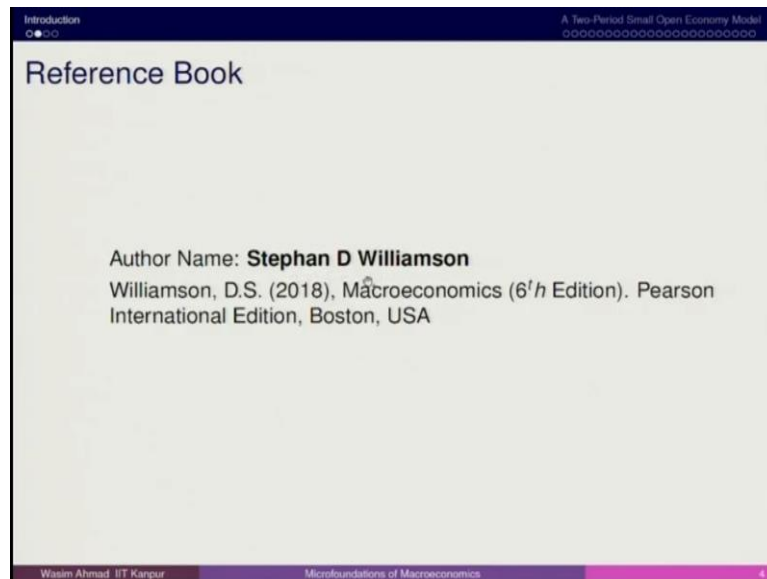
That how is exchange rate? How the US dollar is being exchanged with rupee? And if we are going to talk about exchange then if what will be the impact of exchange rate on macroeconomics? So when you have the exchange rate appreciation then what will happen? Which means that if, the dollar is getting weaker your rupee is getting stronger.

So earlier the dollar was being purchased at 47, 46 rupees now; you are buying at 48 rupees then; that is called the appreciation. What is the impact of that? How it transmits to different goods? What is the pass through to the inflation? What is the pass through to the real economic activity? All these things are these days part of macroeconomics in I would say in detail context.

But if you try and understand from the perspective of what; we call it international trade as a subject. Then international trade as a subject you will have the dimensions of tariffs quotas your monetary unions. Then you have a lot of free trade agreement different theories regarding the gains of trade there are different theorems talking about at product level with different classification level.

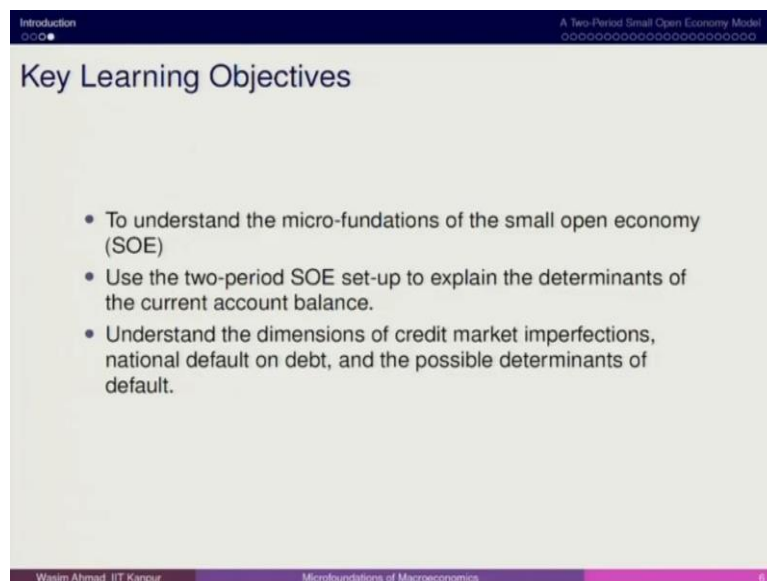
So international trade; becomes really interesting if you want to analyze at the balance of payment level different compositions movement of goods and services whether you have a one advantage over another. So these dimensions are really important so in today's session will be talking about those; kind of dimensions.

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So for this particular lecture the reference remains same so I referred this Stephen D Williamson books. So it is about the macroeconomics and it is the sixth edition is widely popular and this particular book I have already referred for many sections. So I think you are already familiar with this.

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So the objective of this particular session is that we will be trying to set a micro foundation model microeconomics based model for the small open economy. And then from there we will drive the international trade idea. So basically we will be talking about balance of trade. So balance of trade means that we talking more about the current account I would say surplus deficits in visual contacts.

Will be; touching upon a very important topic which is about the current economy balance that I mentioned. Will be talking about the very important topic that needs attention is about how the credit market imperfection leads to default or indebtedness in countries. So once I talk about indebtedness then it talks about the; what is the likelihood of default of a country on the date?

You will be surprised that in most of the cases what we find that it is not just the size of the debt it is also the debt servicing which means that the rate of interest offered on the bond that also becomes a major challenge. So during 2007 at global financial crisis Greece defaulted on the on its sovereign debt and later it became full-fledged sovereign debt crisis.

One of the reasons why that Greece defaulted on its; debt because of the rate being offered. So rate was much higher than most of the countries but later part when it became part of the European monetary union then even after that it continued. And once you have suppose you have a Germany offering the bond rate of around 4% on its sovereign debt bond you have Greece which is offering you 14% and 15%.

Of course the burden of servicing debt will be a big challenge; for Greece. Because the bond being offered 14% means that you have to generate that much amount of money. For that reason you should have the tax collection rate higher you should have less leakage you should have more of the investment and consumption activities taking place so that you have more multiplier effect in the economy right.

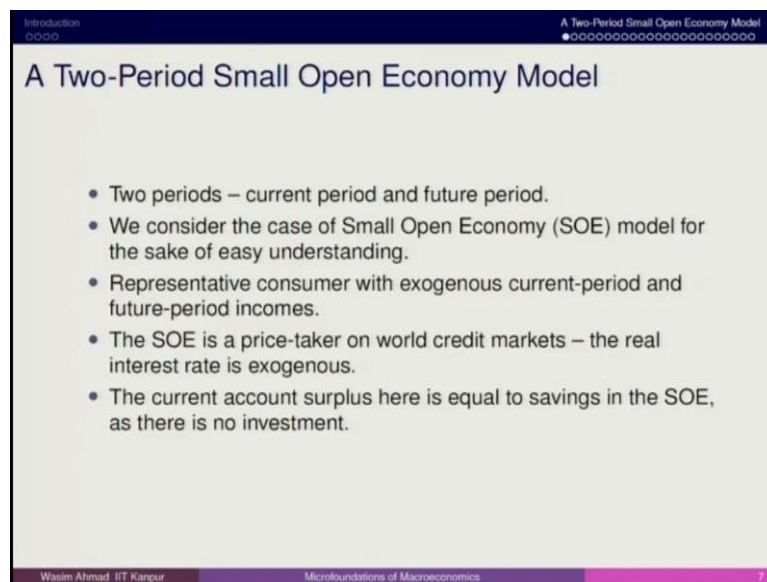
If those things are not functioning then it becomes really a big challenge. In case of Japan is also a country which has the one of the highest or the debt to GDP ratio 200 more than 200%. But Japan does not become the case of Greece because it has the less likelihood that; it will be defaulting on its loan because of the macroeconomics scenarios and also the tax efficiency.

So if the government is going to charge a tax it collects efficiently and then whatever rate of interest being offered on the bond it is also much lower. So from the bond market perspective; it becomes really important that how the countries behave in the international bond market? And if the countries are going on repetitive borrowing and they are not servicing their debt and if they default.

Then it will be very high likelihood that these countries may not be getting the debt from some other countries so that aspect becomes a big challenge that how are we going to deal with? Here we also try to understand that here we focus on what are they so as you mentioned about the debt default?

Towards the end will be also putting up some scenarios that what happens if we have the production investment if I superimpose the condition of interest rate on different activities? And how does it look like? So all those dimensions are important it is worth investigating and that is what we thought that we should be mentioning.

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The slide is titled "A Two-Period Small Open Economy Model". It contains a bulleted list of five points:

- Two periods – current period and future period.
- We consider the case of Small Open Economy (SOE) model for the sake of easy understanding.
- Representative consumer with exogenous current-period and future-period incomes.
- The SOE is a price-taker on world credit markets – the real interest rate is exogenous.
- The current account surplus here is equal to savings in the SOE, as there is no investment.

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So let us start so we assume that we have a small open economy model. So let us take the example of Luxembourg or any small economy island economy country or any smaller countries that you have in mind. So in this particular country you have 1 representative consumer who lives for only 2 periods he is having only 2 periods which means that current period and the future period.

In current period he has some income and he also receives some income in the future period. In both periods whatever income he is receiving it is ingenious which means it is not coming it is just you can think about is coming from somewhere. So we are just assuming that this particular the income system is independent of whatever happening in the economy.

So here we are not bothered about how much it is going to form and how much form is coming here. We are just assuming that this particular individual is having some amount of income right representative consumer on your current period and future period incomes. The small economy model is a price taker in the world credit market it means that it can go for borrower and it can borrow and lend in international markets.

So here we assume that the interest rate is not decided within the economy interest it is decided in the international market. So international market most of the countries which are participating in their world credit market they decide about so mutual agreement on a particular rate it becomes the rate for everyone. So for example the Euro zone country so small economy in the Euro zone countries whatever is decided by the European Central Bank it becomes for everyone.

So here we think about that way. Current account surplus is equal to the savings in the open economy and there is no investment. So whatever surplus that you have it goes in the form of saving which means that it will earn some amount of rate of interest in future. So if you have current account surplus in period 1 whatever the amount 1000 rupees 2000 rupees or 5000 rupees if you are carrying forward to the future period. It will earn $1 + r$.

So it will be C A in the current period but in the future period. It will be C A into $1 + r$ so some kind of rate of interest is going to be attached so this is how we deal with.

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The slide is titled "Lifetime Budget Constraint" and contains the following text and equation:

- The representative consumer's lifetime budget constraint:

$$C + \frac{C'}{1+r} = Y - T + \frac{Y' - T'}{1+r}$$

The slide also includes a navigation bar at the top with "Introduction" and "A Two-Period Small Open Economy Model" and a footer with "Wasim Ahmad, IIT Kanpur" and "Microfoundations of Macroeconomics".

Now we have the representative consumer and this representative consumer I think we have already done this part so let us not spend time here. So here it is simple that this is the lifetime budget constraint of the representative consumer who is living for 2 periods. Period 1 period 2, period 1 is denoted by C and period 2 is denoted by C transpose or C dash right.

Here you have the present value of the future consumption so this is the expenditure this is the consumption and this is the income they representative consumer is also supposed to pay tax so and this tax for the sake of simplicity. We are assuming that this tax is of the; lump sum type it is not a proportional type.

It is not being introduced on the interest rate it is not $1 - \tau$. It is just the T. So here you have $Y - T + Y' - T'$ so this is what we have the consumer lifetime budget constraint. Similarly if the individual is paying the tax T this is going to the government.

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Introduction A Two-Period Small Open Economy Model

Government

- The government's intertemporal budget constraint:

$$G + \frac{G'}{1+r} = T + \frac{T'}{1+r}$$
- The quantity of government saving is given by $S^g = T - G$ in this economy, where there is no investment, the current account surplus in the current period is

$$CA = S - I = (S^p + S^g) - 0 = Y - C - G$$

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Here we have the government center lifetime budget constraint. So in this case here you have the government in the current period so this is the expenditure and this is the income. So tax revenue so lifetime tax revenue is equal to lifetime government expenditure so this is what. So the amount that the government is receiving from the representative agent is it is using that for expenditure.

So if you have a G increasing it means that T is also going to increase for this particular representative consumer. So it becomes really important to understand so I hope these 2 dimensions are quite clear to all of you that we have already covered this part. So

there should not be any doubt on this particular aspect. Now finally once I have drive the government budget constraint and I know that the government saving is nothing but how much it is collecting the tax?

And how much it is using that tax as an expenditure right? If government is not saving at all right so it means that even if you have Ricardian equivalence it will not fail and there will be smoothening of tax transfer right. So in this economy $S_g = T - G$ where there is no investment. The current account surplus in the current period is this so when we introduced the international trade dimensions. So far we have discussed only the consumer we have discussed the government.

We have we are discussing now the open economy context in open economy you know that in the balance of payment you have 2 types of indicator. One is the current account another is the capital account in current account we talk about the difference between export and import. So that is why in national income accounting we often use $Y = C + I + G + NX$ means net exports

So that becomes part of the current account and capital account which talks about the movement of financial capital so that may have some restrictions in India we have not allowed. In case of foreign countries you have the capital account convertibility but in case of India we have not done that. Current account so here we have the current account is equal to saving minus investment right.

So this is what we have which is equal to saving is nothing but private saving plus government saving and since investment we are assuming so once we have the current account surplus. It includes the saving component it does not include the investment.

So here we have $S_p + S_g - I$ is 0 what do we write as an equation is that here it becomes $Y - C - G$. So at international level if; you want to see that how is your current account surplus look like so here it is almost like $Y - C - G$. So this is how it looks like now we also drive so far what we have done is that this is applicable for individual agent right and this is applicable for the government.

We introduced the consumer we introduced Government right. So this is the consumer this is the government this is the buyer constraint we introduced the current account surplus so this is what we have?

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The slide is titled "National present-value budget constraint". It contains the following text and equation:

- From consumer's lifetime budget constraint and the present value budget constraint for the government, we get the following equation:

$$C + G + \frac{C' + G'}{1 + r} = Y + \frac{Y'}{1 + r}$$

- National present value of consumption plus government spending must equal the present value of national income.

At the bottom of the slide, it says "Wasim Ahmad, IIT Kanpur" and "Microfoundations of Macroeconomics".

Here we are introducing the national present value by our constraint. So what is that national present value buyer constraint? Here it includes by combining both if I am going to write here C so here it becomes $C + C'$ upon $1 + r = Y - T + Y' - T'$ upon $1 + r$. Now here what we what I mentioned that since $G = T$.

So I am replacing that T by C so it becomes $C + C'$ upon $1 + r = Y - G + Y - Y' - T$ transpose upon $1 + r$. So here instead of T I will be using G. It becomes G' so $Y - G + Y'$ minus G transpose upon $1 + r$. Since it is becoming part of the expenditure so if we bring G this side so this becomes $C + G + C' + G'$

So this will come this side upon $1 + r = Y + Y'$ upon $1 + r$ so this will be the budget constraint that we derive. So this is what we derive here what I mentioned here was the same that I replaced T by G. So if I am replacing T by G because $G = T$ is whatever government expenditure that government is making it comes from tax revenue taxes 100 government expenditure is also going to be 100 so if it does what it implies.

So here we have $C + C'$; upon $1 + r = Y - T + Y' - T'$ upon $1 + r$. Now the government inter temporal budget constraint is this which is nothing but $G + G'$ upon $1 + r = T + T'$ transpose $1 + r$ also. So finally what we are getting is the national present value by our constraint which looks like it is the $C + G + C' + G'$ upon $1 + r = Y + Y'$ upon $1 + r$.

What is the meaning? The meaning is that the national present value of the consumption which is here plus government spending must equal to the present value of national income then only you have the current account surplus scenario arising. So for the balance of trade you should have this is the component of expenditure that we are accounting.

So consumption of the representative households plus you can see private consumption plus government consumption that is what we always mention about. The expenditure is equal to the national income that the government that the country is having and this national income include everything net factor income from abroad. So this is not just the GDP it is also about the GNP scenario that we mentioned.

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Introduction
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A Two-Period Small Open Economy Model
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Nation's budget constraint

- The nation's budget constraints for the current and future periods, respectively, as:

$$C + G + CA = Y$$

$$C' + G' = (1 + r)CA + Y'$$
- In this set-up, we can think of representative consumer's making choices over consumption bundles

$$(C + G, C' + G')$$

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So the here we mentioned about the Nation's budget constraint for the current and future periods. So if you want to just write about how does it look like so as I had mentioned that C A include savings. It does not include investment. So here we have $C + G + CA = Y$ and here we have $C' + G' = 1 + r CA + Y'$ transpose why here in the future period.

So this is the current period and this is the future period. In the future period here you have a $C' + G'$ equal to $1 + r CA + Y'$ $Y CA$ you have $1 + r$ because this is nothing but the saving and saving will attract the rate of interest. So here when I mention about $1 + r$ so this is the future value of the CA that the government is having.

So ultimately it becomes in future period this becomes your expenditure and this becomes your income. So if the countries are having more of savings more of current account surplus it means that it is added to their income and that is what in the beginning I mentioned about the international trade becomes important. Because countries get extra money and that money is added to their national income and then they can invest in certain activities.

So your; $C + G$ will depend upon how much you have the current account surplus the output which is why so domestic output plus the external income that you have that consist that can be used to finance your $C' + G'$. We are going to deal in the further sections we are going to deal about the consumers making choices over consumption bundles.

So unlike current and future consumption here we will be talking about the $C + G$ and $C' + G'$. So I will be taking forward from here and I will be stopping now and we have already I think this part of the session has helped you understand. And it has given you the basic premise of what we are going to deal and I hope that this particular session has been useful to all of you thank you so much for your attention.